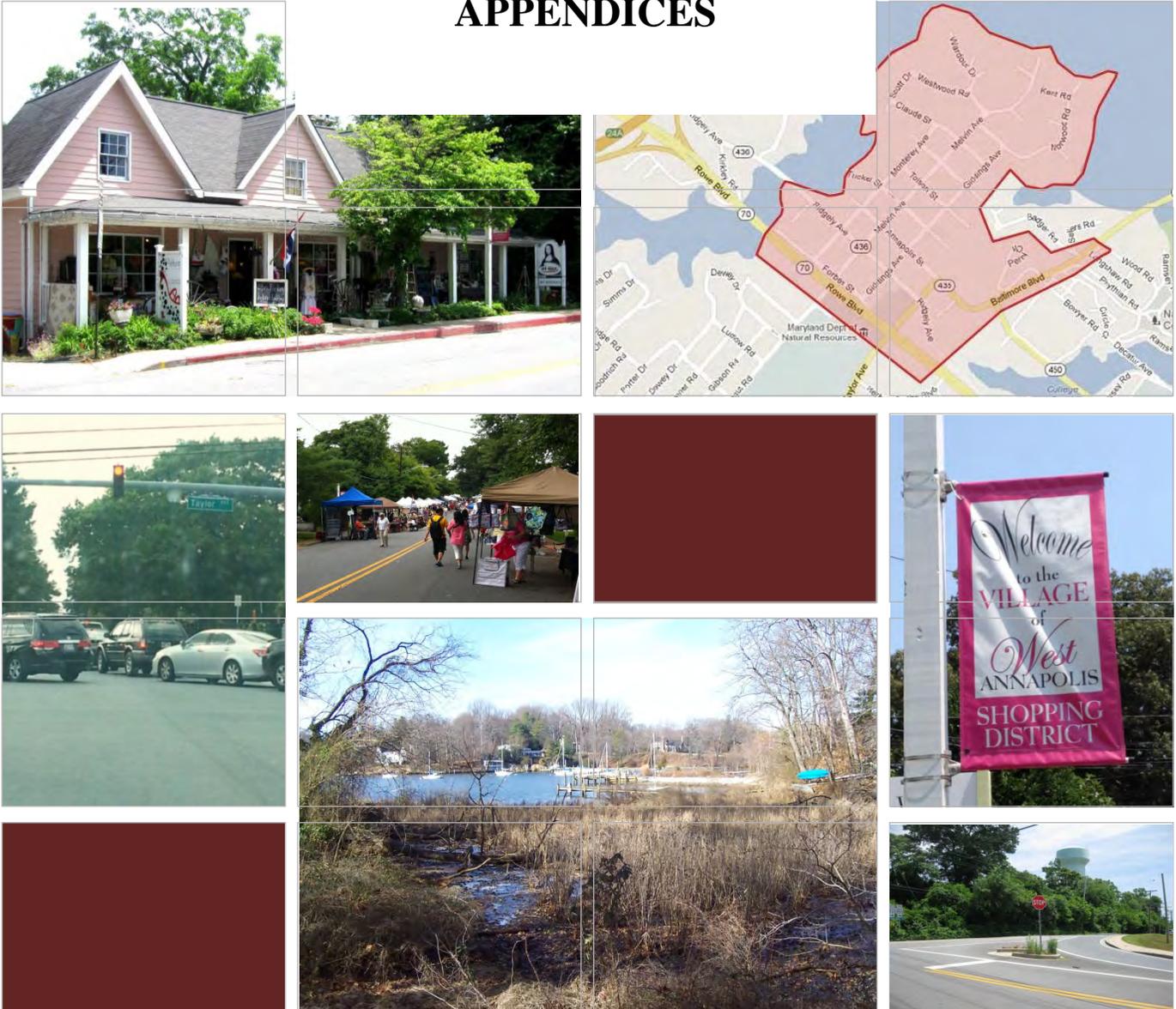


# APPENDICES



## West Annapolis Sector Study

Prepared for the  
City of Annapolis



by  
Environmental Resources Management



## **Appendices**

Appendix A: Lane Diagrams

Appendix B: Intersection Traffic Counts

Appendix C: Origin-Destination Reports

Appendix D: Event Calendar

Appendix E: Traffic/Transportation Stakeholder Interviews

Appendix F: Competitive Retail Center Inventory

Appendix G: Annapolis Street Streetscape Study

Appendix H: Annapolis Bicycle Master Plan, Selected Pages

**Appendix A:**  
**Lane Diagrams**

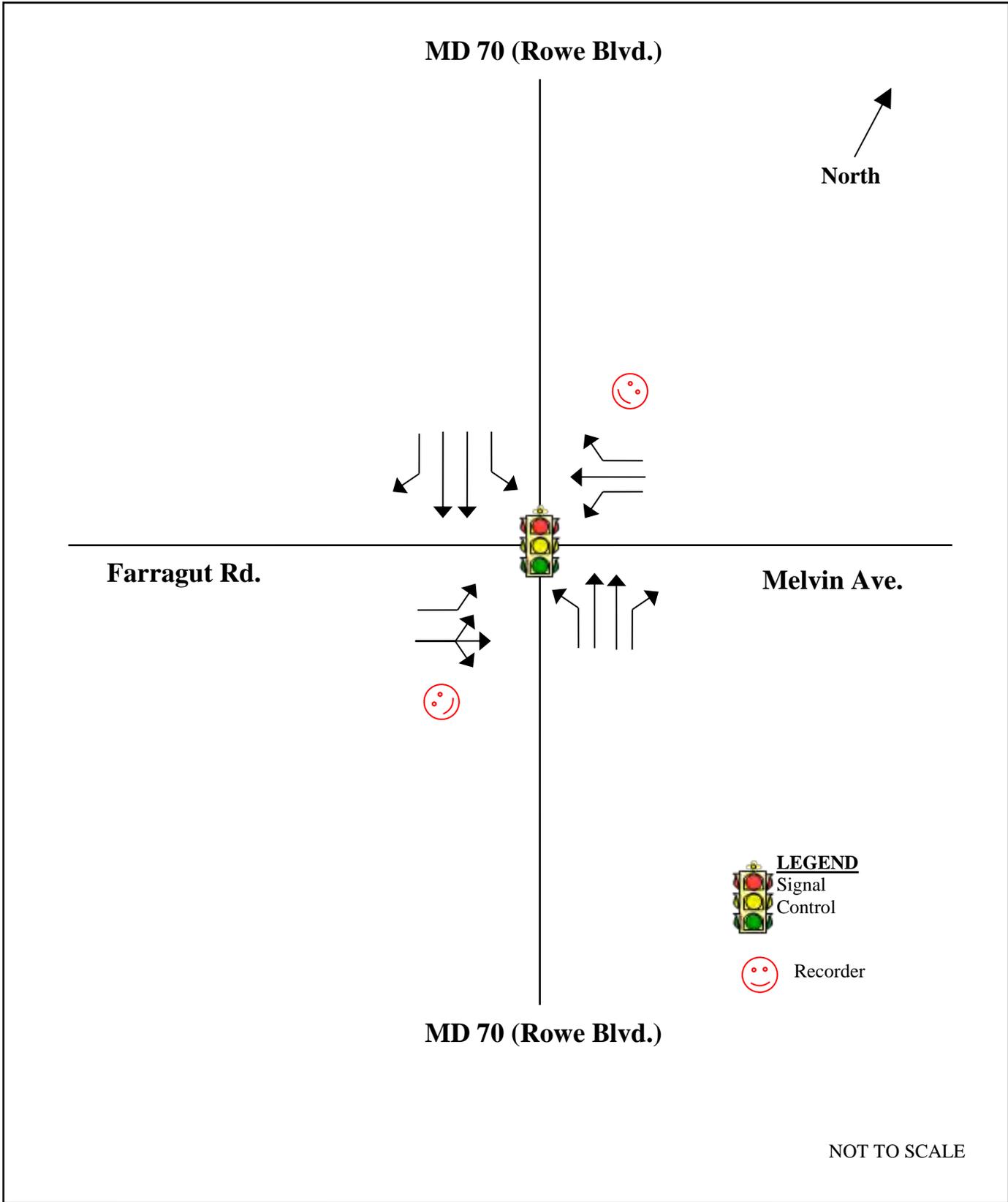


Figure 1. Lane Configuration:  
 MD 70 (Rowe Boulevard) at Melvin Ave. /  
 Farragut Rd.  
 Anne Arundel County, MD

**SABRA, WANG & ASSOCIATES, INC.**  
**7055 SAMUEL MORSE DRIVE, SUITE 100**  
**COLUMBIA, MD 21046**

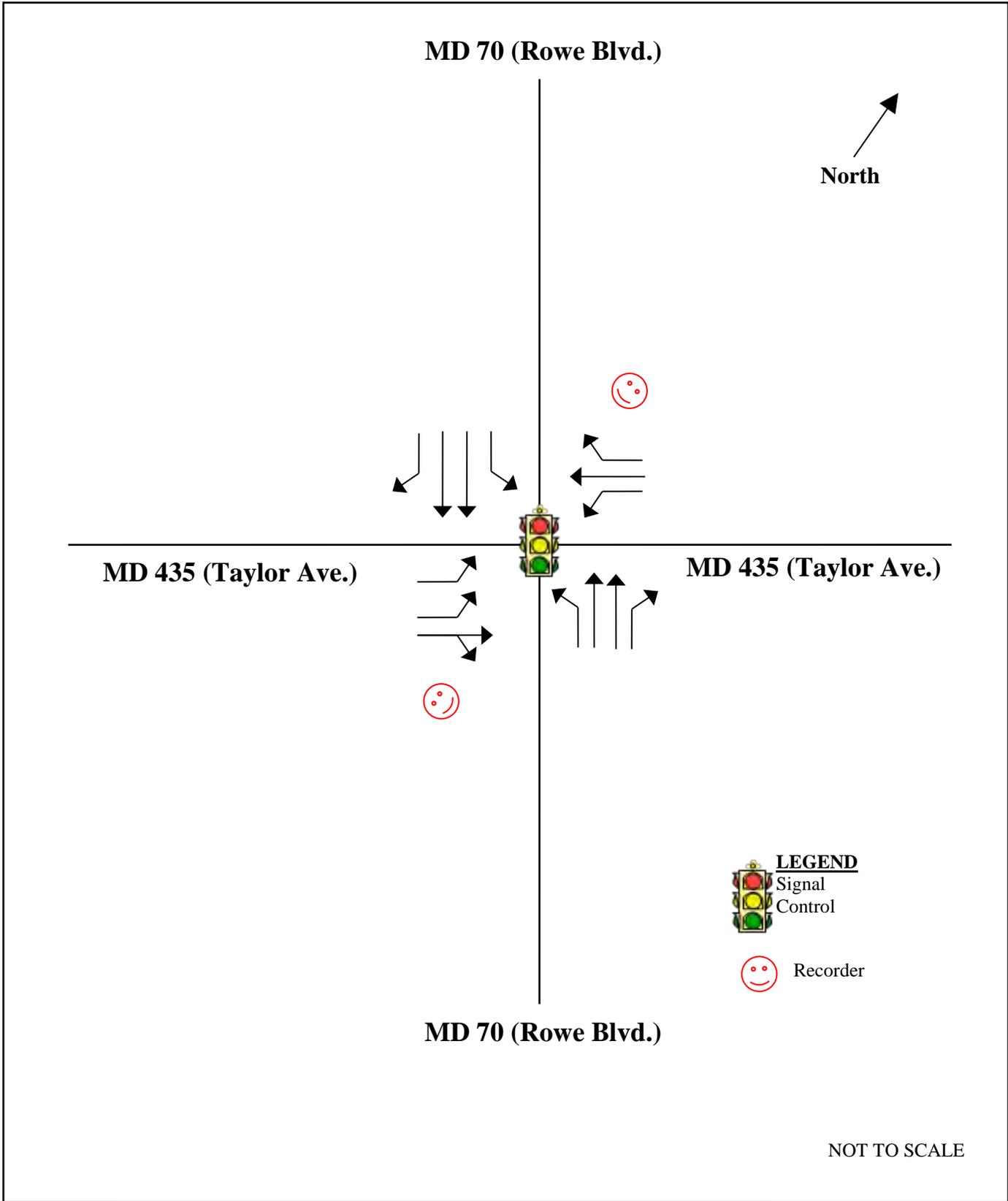


Figure 1. Lane Configuration:  
 Rowe Boulevard (MD 70) at MD 435  
 (Taylor Ave.)  
 Anne Arundel County, MD

**SABRA, WANG & ASSOCIATES, INC.**  
**7055 SAMUEL MORSE DRIVE, SUITE 100**  
**COLUMBIA, MD 21046**



Figure 1. Lane Configuration:  
 Forbes St. at Melvin Ave.  
 Anne Arundel County, MD

**SABRA, WANG & ASSOCIATES, INC.**  
 7055 SAMUEL MORSE DRIVE, SUITE 100  
 COLUMBIA, MD 21046

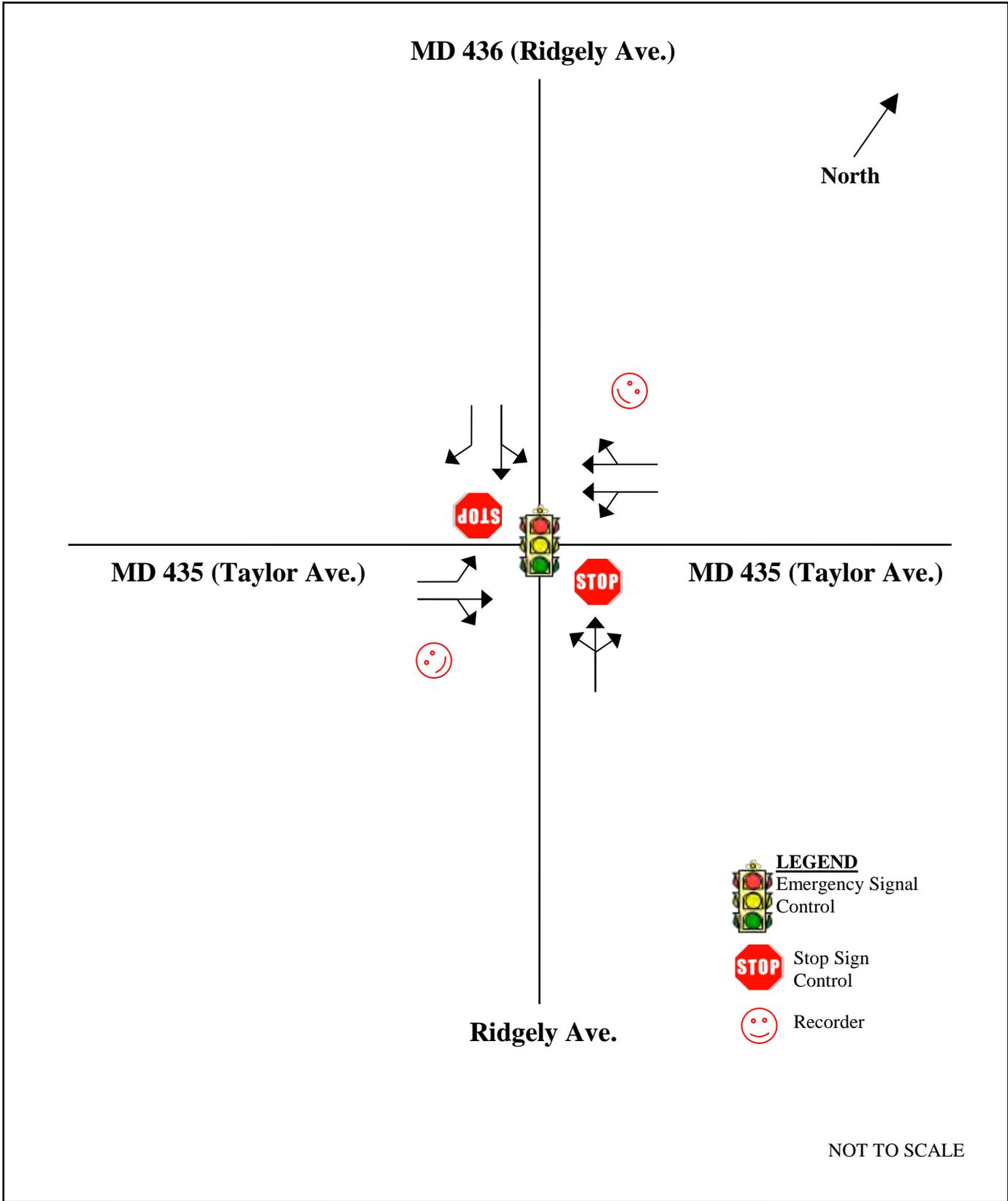


Figure 1. Lane Configuration:  
 MD 435 (Taylor Ave.) at MD 436 (Ridgely Ave.)  
 Anne Arundel County, MD

**SABRA, WANG & ASSOCIATES, INC.**  
 7055 SAMUEL MORSE DRIVE, SUITE 100  
 COLUMBIA, MD 21046

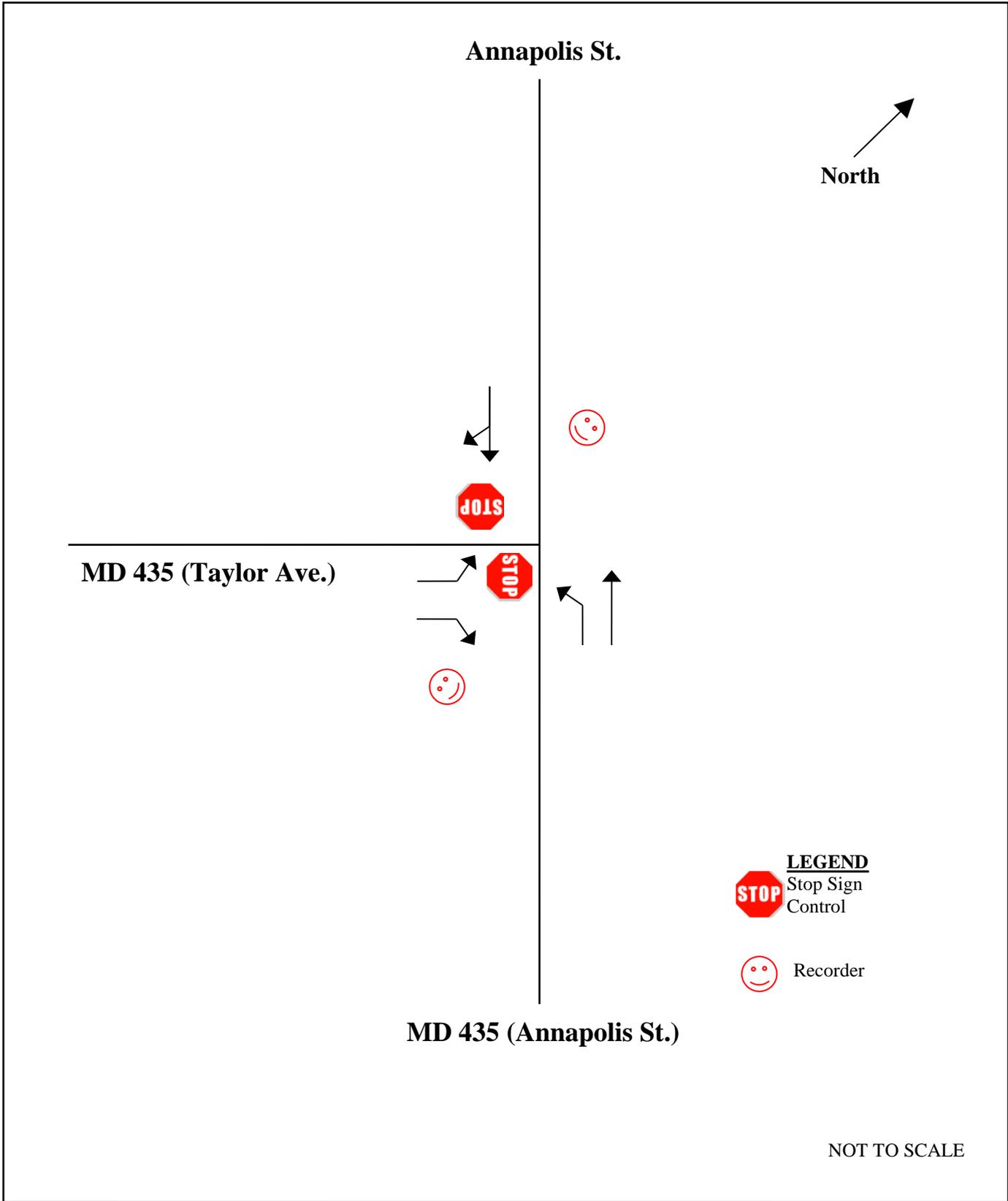
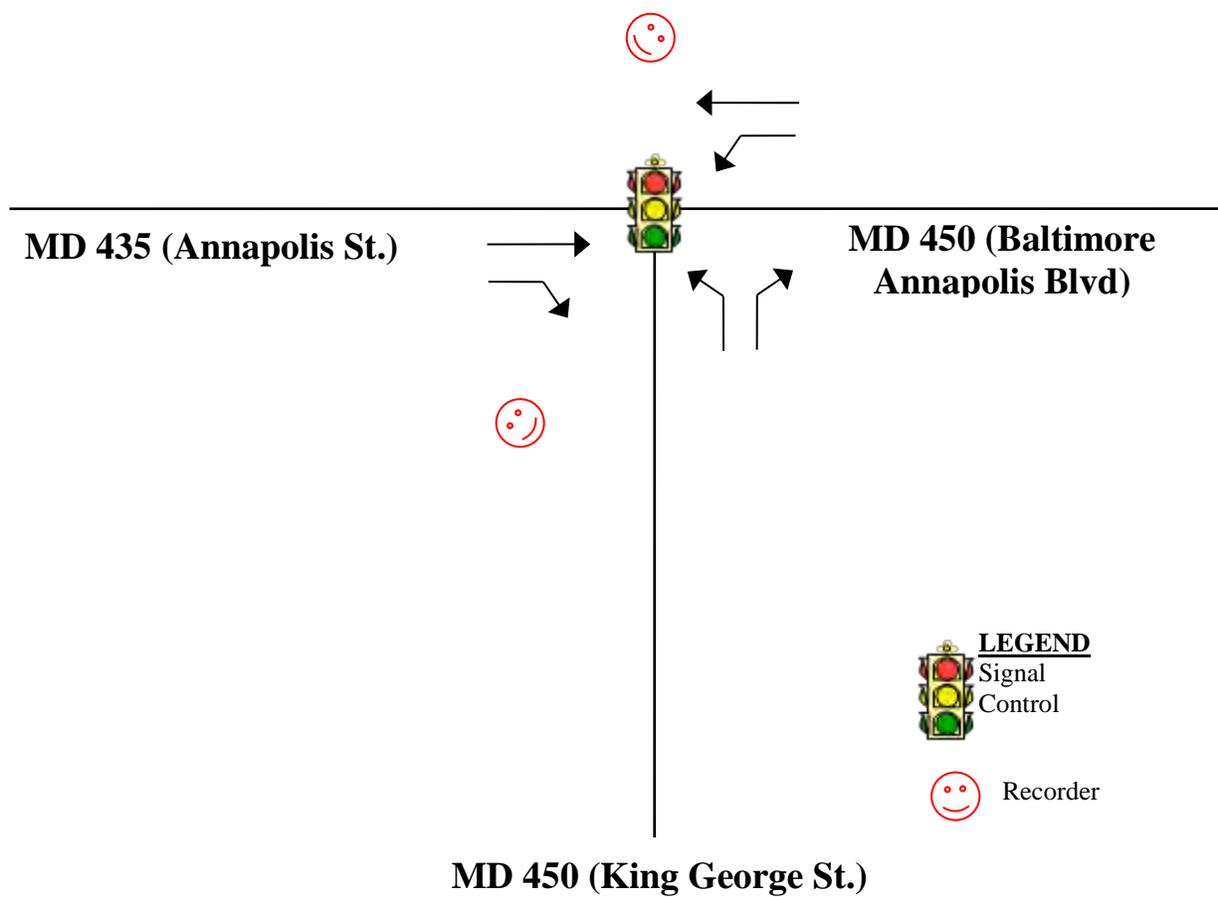


Figure 1. Lane Configuration:  
 MD 435 (Taylor Ave.) at Annapolis St.  
 Anne Arundel County, MD

**SABRA, WANG & ASSOCIATES, INC.**  
**7055 SAMUEL MORSE DRIVE, SUITE 100**  
**COLUMBIA, MD 21046**



NOT TO SCALE

Figure 1. Lane Configuration:  
MD 435 (Annapolis St.)/MD 450  
(Baltimore Annapolis Blvd.) at MD 450  
(King George St.)  
Anne Arundel County, MD

**SABRA, WANG & ASSOCIATES, INC.**  
**7055 SAMUEL MORSE DRIVE, SUITE 100**  
**COLUMBIA, MD 21046**

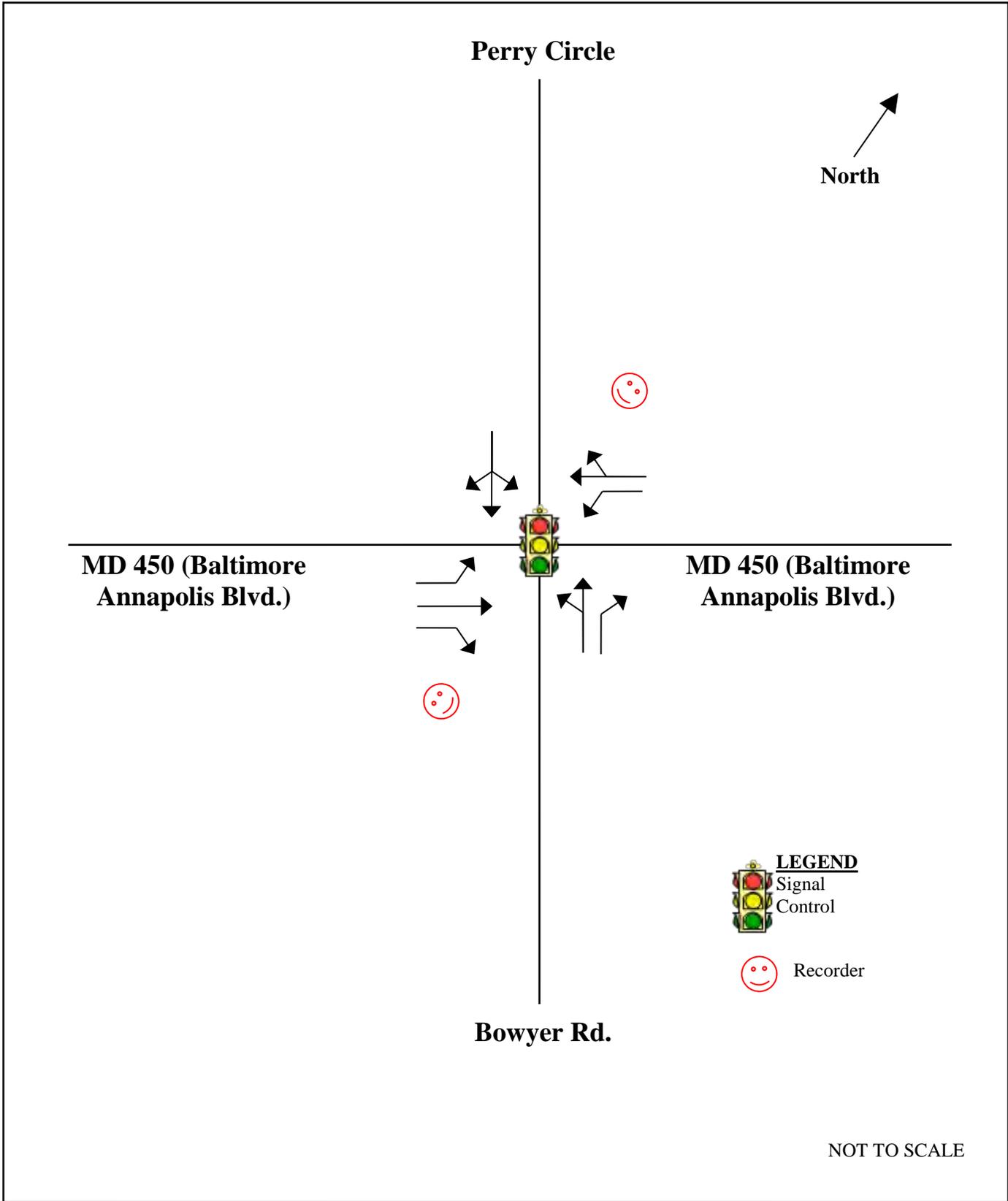


Figure 1. Lane Configuration:  
 MD 450 (Baltimore Annapolis Blvd.) at  
 Bowyer Rd / Perry Circle  
 Anne Arundel County, MD

**SABRA, WANG & ASSOCIATES, INC.**  
**7055 SAMUEL MORSE DRIVE, SUITE 100**  
**COLUMBIA, MD 21046**

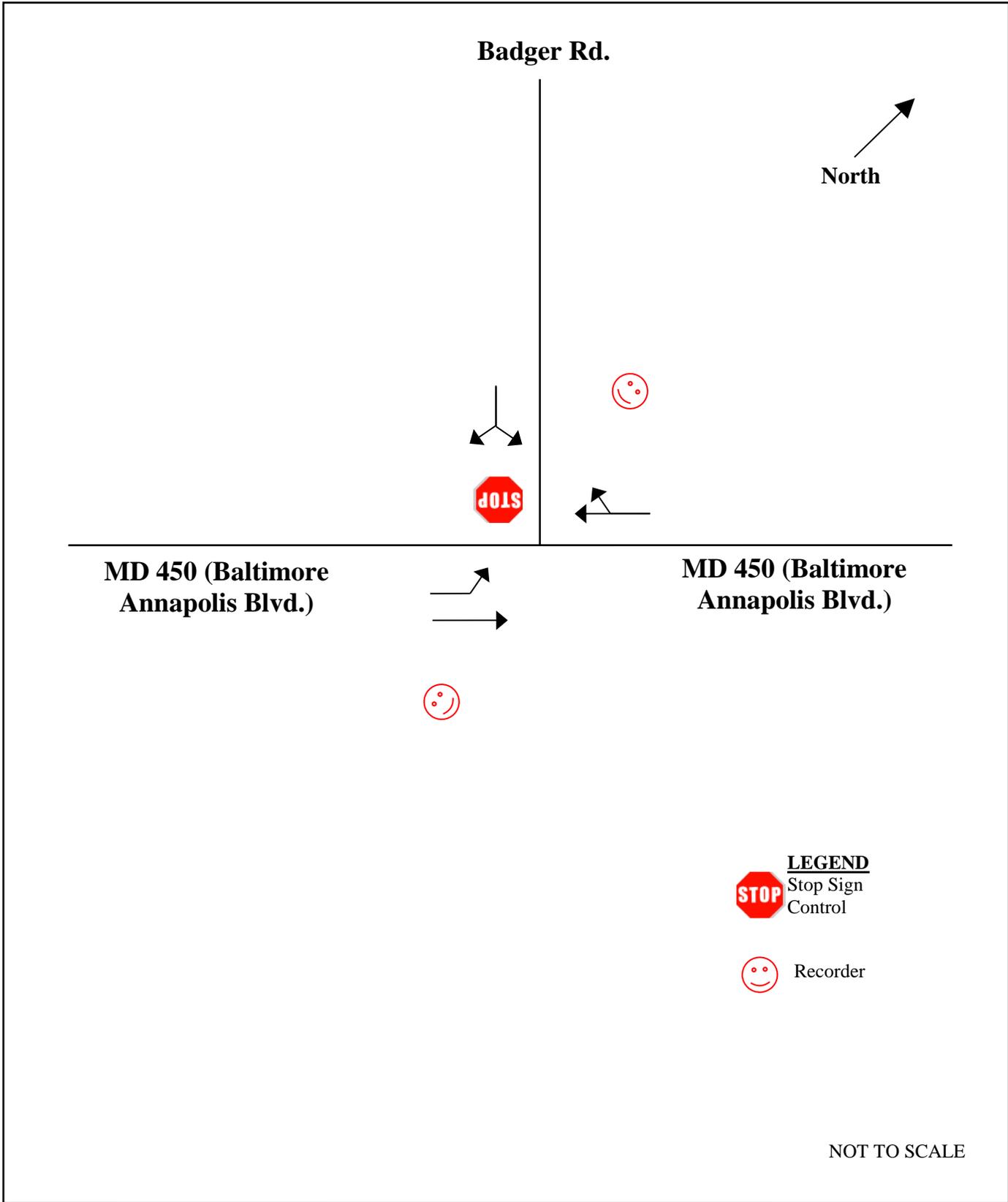


Figure 1. Lane Configuration:  
 MD 450 (Baltimore Annapolis Blvd.) at  
 Badger Rd.  
 Anne Arundel County, MD

**SABRA, WANG & ASSOCIATES, INC.**  
**7055 SAMUEL MORSE DRIVE, SUITE 100**  
**COLUMBIA, MD 21046**

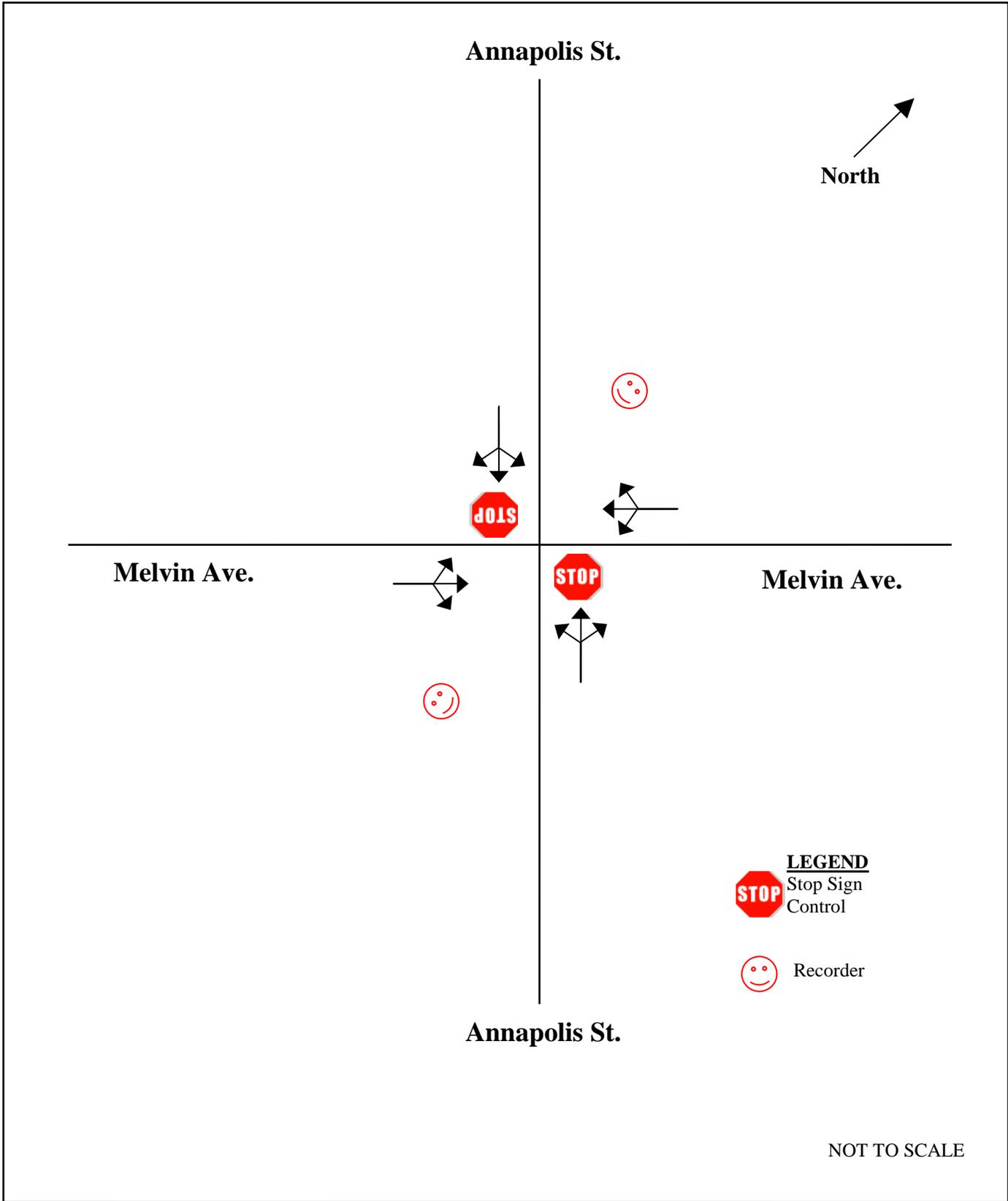


Figure 1. Lane Configuration:  
 Melvin Ave. at Annapolis St.  
 Anne Arundel County, MD

**SABRA, WANG & ASSOCIATES, INC.**  
**7055 SAMUEL MORSE DRIVE, SUITE 100**  
**COLUMBIA, MD 21046**

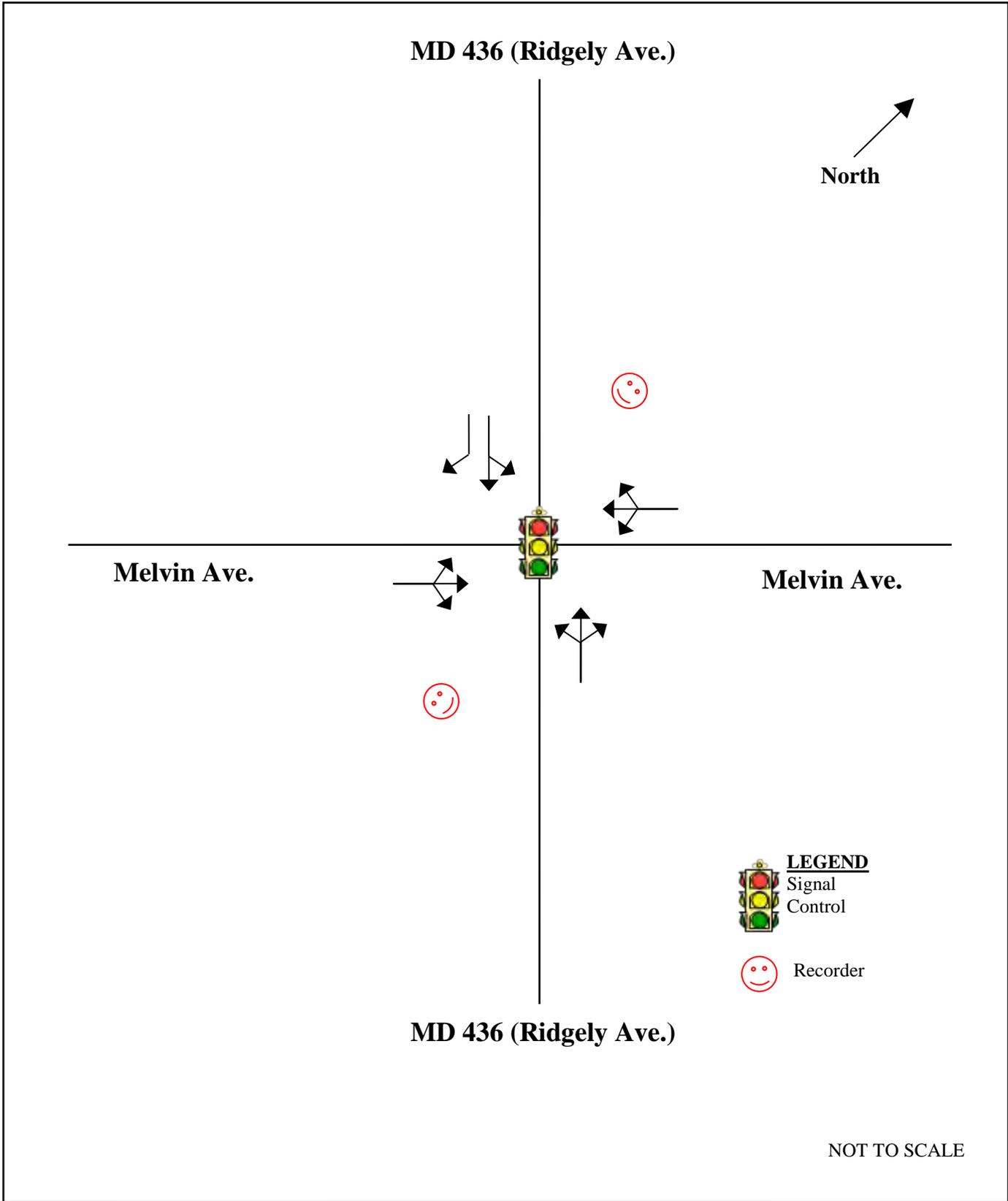


Figure 1. Lane Configuration:  
 Melvin Ave. at MD 436 (Ridgely Ave.)  
 Anne Arundel County, MD

**SABRA, WANG & ASSOCIATES, INC.**  
**7055 SAMUEL MORSE DRIVE, SUITE 100**  
**COLUMBIA, MD 21046**



**Appendix B**

**Intersection Traffic Counts**

# Non-Event (Normal) Volumes

# Sabra, Wang & Assoc, Inc

7055 Samuel Morse Dr, Suite 100  
Columbia, MD 21046

443-741-3500

Weather: SUNNY  
Counted By: NATALIE  
Town: ANNAPOLIS  
County: ANNE ARUNDEL

File Name : Melvin Ave at Forbes St  
Site Code : 00000000  
Start Date : 6/11/2013  
Page No : 1

## Groups Printed- VEHS PEDS

Start Time	MELVIN AVE From North					FORBES ST From East					MELVIN AVE From South					FORBES ST From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:30 PM	0	86	0	0	86	3	1	5	0	9	21	57	2	1	81	9	1	0	0	10	186
03:45 PM	1	87	0	0	88	7	2	5	0	14	15	71	10	0	96	8	0	0	0	8	206
Total	1	173	0	0	174	10	3	10	0	23	36	128	12	1	177	17	1	0	0	18	392
04:00 PM	1	105	0	0	106	4	1	5	0	10	17	42	2	1	62	9	1	1	1	12	190
04:15 PM	5	112	0	0	117	7	1	4	0	12	13	65	2	0	80	14	0	0	0	14	223
04:30 PM	1	108	0	0	109	4	2	5	1	12	19	63	2	0	84	6	0	1	0	7	212
04:45 PM	0	96	0	0	96	2	3	9	0	14	14	76	0	0	90	6	1	0	0	7	207
Total	7	421	0	0	428	17	7	23	1	48	63	246	6	1	316	35	2	2	1	40	832
05:00 PM	1	132	0	1	134	5	0	6	0	11	16	96	2	1	115	15	0	0	1	16	276
05:15 PM	0	74	1	0	75	2	1	1	0	4	12	76	6	1	95	7	0	0	1	8	182
05:30 PM	1	91	1	0	93	0	0	0	3	3	10	88	3	2	103	3	0	0	2	5	204
05:45 PM	2	78	1	2	83	3	0	2	2	7	16	72	1	2	91	5	1	0	1	7	188
Total	4	375	3	3	385	10	1	9	5	25	54	332	12	6	404	30	1	0	5	36	850
Grand Total	12	969	3	3	987	37	11	42	6	96	153	706	30	8	897	82	4	2	6	94	2074
Apprch %	1.2	98.2	0.3	0.3		38.5	11.5	43.8	6.2		17.1	78.7	3.3	0.9		87.2	4.3	2.1	6.4		
Total %	0.6	46.7	0.1	0.1	47.6	1.8	0.5	2	0.3	4.6	7.4	34	1.4	0.4	43.2	4	0.2	0.1	0.3	4.5	

# Sabra, Wang & Assoc, Inc

7055 Samuel Morse Dr, Suite 100  
Columbia, MD 21046

443-741-3500

File Name : Annapolis St at Taylor Ave

Site Code : 00000000

Start Date : 6/18/2013

Page No : 1

Weather: SUNNY  
Counted By: PAUL BUSHEE  
Town: ANNAPOLIS  
County: ANNE ARUNDEL

## Groups Printed- VEHS PEDS

Start Time	NO ENTRANCE From North					ANNAPOLIS ST From East					TAYLOR AVE From South					ANNAPOLIS RD From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:30 PM	0	0	0	0	0	0	39	129	0	168	131	0	3	0	134	1	41	0	0	42	344
03:45 PM	0	0	0	0	0	0	32	108	0	140	119	0	2	0	121	4	52	0	0	56	317
Total	0	0	0	0	0	0	71	237	0	308	250	0	5	0	255	5	93	0	0	98	661
04:00 PM	0	0	0	0	0	0	46	135	0	181	108	0	3	0	111	7	62	0	0	69	361
04:15 PM	0	0	0	0	0	0	45	101	0	146	128	0	2	0	130	1	54	0	0	55	331
04:30 PM	0	0	0	0	0	0	29	88	0	117	142	0	0	0	142	8	61	0	0	69	328
04:45 PM	0	0	0	0	0	0	36	89	0	125	125	0	5	0	130	5	55	0	0	60	315
Total	0	0	0	0	0	0	156	413	0	569	503	0	10	0	513	21	232	0	0	253	1335
05:00 PM	0	0	0	0	0	0	33	74	0	107	150	0	4	1	155	2	58	0	0	60	322
05:15 PM	0	0	0	0	0	0	21	71	0	92	131	0	1	0	132	4	65	0	0	69	293
05:30 PM	0	0	0	0	0	0	17	65	0	82	124	0	3	0	127	2	72	0	0	74	283
Grand Total	0	0	0	0	0	0	298	860	0	1158	1158	0	23	1	1182	34	520	0	0	554	2894
Apprch %	0	0	0	0	0	0	25.7	74.3	0		98	0	1.9	0.1		6.1	93.9	0	0		
Total %	0	0	0	0	0	0	10.3	29.7	0	40	40	0	0.8	0	40.8	1.2	18	0	0	19.1	

# Sabra, Wang & Assoc, Inc

7055 Samuel Morse Dr, Suite 100  
Columbia, MD 21046

Weather: SUNNY  
Counted By: LATEZ PEARSON  
Town: ANNAPOLIS  
County: ANNE ARUNDEL

443-741-3500  
File Name : King George Dr at Baltimore Blvd  
Site Code : 00000000  
Start Date : 6/19/2013  
Page No : 1

Groups Printed- VEHS PEDS

Start Time	KING GEORGE DR From North					BALTIMORE DR From East					KING GEORGE DR From South					BALTIMORE DR From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:30 PM	0	0	0	0	0	0	104	63	0	167	55	0	26	1	82	18	136	0	0	154	403
03:45 PM	0	0	0	0	0	0	115	69	0	184	78	0	37	0	115	19	132	0	0	151	450
Total	0	0	0	0	0	0	219	132	0	351	133	0	63	1	197	37	268	0	0	305	853
04:00 PM	0	0	0	0	0	0	113	79	0	192	86	0	64	0	150	17	114	0	0	131	473
04:15 PM	0	0	0	0	0	0	121	80	0	201	100	0	32	2	134	13	129	0	0	142	477
04:30 PM	0	0	0	0	0	0	151	66	1	218	89	0	10	0	99	7	131	0	0	138	455
04:45 PM	0	0	0	0	0	0	146	79	0	225	99	0	57	0	156	19	130	0	0	149	530
Total	0	0	0	0	0	0	531	304	1	836	374	0	163	2	539	56	504	0	0	560	1935
05:00 PM	0	0	0	0	0	0	110	85	0	195	90	0	34	1	125	8	151	0	0	159	479
05:15 PM	0	0	0	0	0	0	110	73	2	185	96	0	25	0	121	15	156	0	0	171	477
05:30 PM	0	0	0	0	0	0	111	80	1	192	100	0	15	1	116	18	177	0	1	196	504
05:45 PM	0	0	0	0	0	0	119	66	1	186	110	0	31	3	144	3	177	0	0	180	510
Total	0	0	0	0	0	0	450	304	4	758	396	0	105	5	506	44	661	0	1	706	1970
Grand Total	0	0	0	0	0	0	1200	740	5	1945	903	0	331	8	1242	137	1433	0	1	1571	4758
Apprch %	0	0	0	0		0	61.7	38	0.3		72.7	0	26.7	0.6		8.7	91.2	0	0.1		
Total %	0	0	0	0	0	0	25.2	15.6	0.1	40.9	19	0	7	0.2	26.1	2.9	30.1	0	0	33	

# Sabra, Wang & Assoc, Inc

7055 Samuel Morse Dr, Suite 100  
Columbia, MD 21046

443-741-3500

Weather: SUNNY  
Counted By: GARY BOYD  
Town: ANNAPOLIS  
County: ANNE ARUNDEL

File Name : MD 450 at Bowyer  
Site Code : 00000000  
Start Date : 6/19/2013  
Page No : 1

## Groups Printed- VEHS PEDS

Start Time	BOWYER RD From North					MD 450 From East					BOWYER RD From South					MD 450 From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:30 PM	4	0	1	0	5	3	113	17	2	135	59	3	50	2	114	8	180	3	0	191	445
03:45 PM	4	2	3	0	9	1	136	17	1	155	67	6	44	0	117	9	197	4	0	210	491
Total	8	2	4	0	14	4	249	34	3	290	126	9	94	2	231	17	377	7	0	401	936
04:00 PM	3	1	3	0	7	0	134	12	0	146	117	0	55	3	175	9	189	2	0	200	528
04:15 PM	4	1	2	0	7	2	146	7	5	160	55	0	51	1	107	8	210	11	0	229	503
04:30 PM	4	4	0	0	8	4	161	11	5	181	59	1	52	0	112	8	208	4	0	220	521
04:45 PM	1	2	4	4	11	2	175	7	9	193	70	1	49	3	123	9	220	0	0	229	556
Total	12	8	9	4	33	8	616	37	19	680	301	2	207	7	517	34	827	17	0	878	2108
05:00 PM	4	3	1	2	10	3	148	11	1	163	55	2	43	1	101	7	231	3	0	241	515
05:15 PM	2	5	1	0	8	2	150	7	4	163	45	2	31	1	79	8	237	7	0	252	502
05:30 PM	3	2	0	3	8	2	164	5	5	176	29	1	24	1	55	9	264	4	0	277	516
05:45 PM	2	2	1	0	5	2	151	5	5	163	31	1	32	1	65	10	275	2	0	287	520
Total	11	12	3	5	31	9	613	28	15	665	160	6	130	4	300	34	1007	16	0	1057	2053
Grand Total	31	22	16	9	78	21	1478	99	37	1635	587	17	431	13	1048	85	2211	40	0	2336	5097
Apprch %	39.7	28.2	20.5	11.5		1.3	90.4	6.1	2.3		56	1.6	41.1	1.2		3.6	94.6	1.7	0		
Total %	0.6	0.4	0.3	0.2	1.5	0.4	29	1.9	0.7	32.1	11.5	0.3	8.5	0.3	20.6	1.7	43.4	0.8	0	45.8	

# Sabra, Wang & Assoc, Inc

7055 Samuel Morse Dr, Suite 100  
Columbia, MD 21046

443-741-3500

File Name : Melvin Ave at Annapolis St

Site Code : 00000000

Start Date : 6/11/2013

Page No : 1

Weather: SUNNY  
Counted By: ASHRAF  
Town: ANNAPOLIS  
County: ANNE ARUNDEL

## Groups Printed- VEHS PEDS

Start Time	MELVIN AVE From North					ANNAPOLIS ST From East					MELVIN AVE From South					ANNAPOLIS ST From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:30 PM	0	19	3	0	22	3	3	32	0	38	21	13	1	0	35	3	3	0	0	6	101
03:45 PM	0	14	4	0	18	1	3	31	0	35	20	14	1	2	37	1	2	1	0	4	94
Total	0	33	7	0	40	4	6	63	0	73	41	27	2	2	72	4	5	1	0	10	195
04:00 PM	2	15	5	2	24	7	7	54	0	68	17	10	1	0	28	0	1	0	2	3	123
04:15 PM	1	9	6	0	16	1	4	34	1	40	23	16	1	0	40	4	2	1	0	7	103
04:30 PM	0	16	4	1	21	5	4	21	0	30	32	11	0	0	43	2	6	1	0	9	103
04:45 PM	1	17	1	0	19	0	0	28	0	28	33	15	2	1	51	2	3	0	0	5	103
Total	4	57	16	3	80	13	15	137	1	166	105	52	4	1	162	8	12	2	2	24	432
05:00 PM	1	14	1	2	18	1	8	46	0	55	47	17	0	2	66	1	3	0	1	5	144
05:15 PM	0	10	1	1	12	0	9	34	0	43	39	14	7	4	64	1	5	0	0	6	125
05:30 PM	1	22	4	0	27	2	4	35	0	41	40	20	7	0	67	0	5	0	1	6	141
05:45 PM	1	16	4	1	22	1	7	10	1	19	20	17	2	0	39	1	6	0	1	8	88
Total	3	62	10	4	79	4	28	125	1	158	146	68	16	6	236	3	19	0	3	25	498
Grand Total	7	152	33	7	199	21	49	325	2	397	292	147	22	9	470	15	36	3	5	59	1125
Apprch %	3.5	76.4	16.6	3.5		5.3	12.3	81.9	0.5		62.1	31.3	4.7	1.9		25.4	61	5.1	8.5		
Total %	0.6	13.5	2.9	0.6	17.7	1.9	4.4	28.9	0.2	35.3	26	13.1	2	0.8	41.8	1.3	3.2	0.3	0.4	5.2	

# Sabra, Wang & Assoc, Inc

7055 Samuel Morse Dr, Suite 100  
Columbia, MD 21046

443-741-3500

Weather: SUNNY  
Counted By: LATEZ PEARSON  
Town: ANNAPOLIS  
County: ANNE ARUNDEL

File Name : Ridgely at Melvin  
Site Code : 00000000  
Start Date : 6/18/2013  
Page No : 1

## Groups Printed- VEHS PEDS

Start Time	MELVIN AVE From North					RIDGELY AVE From East					MELVIN AVE From South					RIDGELY AVE From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:30 PM	24	32	14	2	72	10	14	7	0	31	11	29	4	0	44	2	26	20	0	48	195
03:45 PM	27	43	15	0	85	19	28	6	0	53	7	32	1	0	40	4	32	20	0	56	234
Total	51	75	29	2	157	29	42	13	0	84	18	61	5	0	84	6	58	40	0	104	429
04:00 PM	26	37	8	0	71	12	17	9	0	38	21	22	3	0	46	4	37	21	2	64	219
04:15 PM	25	37	17	0	79	22	15	13	0	50	27	33	1	0	61	1	28	15	0	44	234
04:30 PM	13	28	13	1	55	12	31	13	0	56	16	22	1	0	39	5	24	13	0	42	192
04:45 PM	18	36	16	0	70	20	22	14	0	56	17	25	4	0	46	1	46	24	0	71	243
Total	82	138	54	1	275	66	85	49	0	200	81	102	9	0	192	11	135	73	2	221	888
05:00 PM	24	37	19	0	80	16	22	17	0	55	19	33	0	0	52	7	33	38	0	78	265
05:15 PM	24	39	12	0	75	13	25	9	0	47	15	27	0	0	42	1	41	31	1	74	238
05:30 PM	21	42	12	0	75	9	30	15	0	54	12	24	1	0	37	3	29	25	0	57	223
05:45 PM	20	45	14	0	79	11	23	10	0	44	13	12	0	0	25	4	35	15	0	54	202
Total	89	163	57	0	309	49	100	51	0	200	59	96	1	0	156	15	138	109	1	263	928
Grand Total	222	376	140	3	741	144	227	113	0	484	158	259	15	0	432	32	331	222	3	588	2245
Apprch %	30	50.7	18.9	0.4		29.8	46.9	23.3	0		36.6	60	3.5	0		5.4	56.3	37.8	0.5		
Total %	9.9	16.7	6.2	0.1	33	6.4	10.1	5	0	21.6	7	11.5	0.7	0	19.2	1.4	14.7	9.9	0.1	26.2	

# Event Volumes

# Sabra, Wang & Assoc, Inc

7055 Samuel Morse Dr, Suite 100  
Columbia, MD 21046

443-741-3500

Weather: SUNNY  
Counted By: PAUL & TEZ  
Town: ANNAPOLIS  
County ANNE ARUNDEL

File Name : Rowe Blvd at Melvin Ave  
Site Code : 00000000  
Start Date : 8/2/2013  
Page No : 1

## Groups Printed- Unshifted

Start Time	MELVIN AVE From North					ROWE BLVD (MD 70) From East					MELVIN AVE From South					ROWE BLVD (MD 70) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:30 PM	48	12	10	1	71	13	338	3	0	354	4	22	40	0	66	26	220	54	0	300	791
03:45 PM	55	17	11	0	83	16	299	9	0	324	6	33	45	0	84	32	246	57	0	335	826
Total	103	29	21	1	154	29	637	12	0	678	10	55	85	0	150	58	466	111	0	635	1617
04:00 PM	62	17	15	5	99	30	333	6	0	369	9	34	65	6	114	53	276	65	6	400	982
04:15 PM	57	19	8	8	92	11	320	4	0	335	5	27	33	1	66	56	299	69	1	425	918
04:30 PM	38	18	5	0	61	13	286	6	0	305	8	31	41	0	80	66	252	71	0	389	835
04:45 PM	55	23	17	0	95	10	210	5	0	225	8	21	57	0	86	87	275	64	1	427	833
Total	212	77	45	13	347	64	1149	21	0	1234	30	113	196	7	346	262	1102	269	8	1641	3568
05:00 PM	53	16	18	13	100	12	274	11	0	297	7	40	64	0	111	85	290	66	11	452	960
05:15 PM	53	16	13	2	84	12	329	9	8	358	6	40	67	4	117	89	281	66	5	441	1000
05:30 PM	52	16	7	4	79	7	315	5	1	328	6	32	52	0	90	48	246	32	1	327	824
05:45 PM	38	16	7	2	63	7	210	8	0	225	6	14	19	2	41	38	233	42	4	317	646
Total	196	64	45	21	326	38	1128	33	9	1208	25	126	202	6	359	260	1050	206	21	1537	3430
06:00 PM	33	9	5	1	48	4	179	2	0	185	2	19	23	0	44	29	247	19	2	297	574
06:15 PM	32	7	1	0	40	4	181	6	0	191	3	12	21	0	36	24	222	24	0	270	537
06:30 PM	38	5	6	4	53	3	192	4	0	199	5	11	19	0	35	22	215	29	1	267	554
06:45 PM	20	13	6	2	41	3	179	3	1	186	6	14	15	1	36	27	205	27	2	261	524
Total	123	34	18	7	182	14	731	15	1	761	16	56	78	1	151	102	889	99	5	1095	2189
07:00 PM	22	10	5	0	37	2	166	4	0	172	6	15	29	0	50	19	189	28	4	240	499
07:15 PM	21	7	8	0	36	3	165	3	0	171	3	12	26	0	41	16	184	28	1	229	477
Grand Total	677	221	142	42	1082	150	3976	88	10	4224	90	377	616	14	1097	717	3880	741	39	5377	11780
Apprch %	62.6	20.4	13.1	3.9		3.6	94.1	2.1	0.2		8.2	34.4	56.2	1.3		13.3	72.2	13.8	0.7		
Total %	5.7	1.9	1.2	0.4	9.2	1.3	33.8	0.7	0.1	35.9	0.8	3.2	5.2	0.1	9.3	6.1	32.9	6.3	0.3	45.6	

# Sabra, Wang & Assoc, Inc

7055 Samuel Morse Dr, Suite 100  
Columbia, MD 21046

443-741-3500

Weather: SUNNY  
Counted By: HORACE & MARCIE  
Town: ANNAPOLIS  
County ANNE ARUNDEL

File Name : Rowe Blvd at Taylor Ave  
Site Code : 00000000  
Start Date : 8/2/2013  
Page No : 1

## Groups Printed- Unshifted

Start Time	TAYLOR AVE From North					ROWE BLVD (MD 70) From East					TAYLOR AVE From South					ROWE BLVD (MD 70) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:30 PM	61	57	25	4	147	45	198	6	3	252	4	63	95	0	162	38	147	49	2	236	797
03:45 PM	81	54	18	0	153	42	184	8	0	234	2	61	60	5	128	64	123	74	0	261	776
Total	142	111	43	4	300	87	382	14	3	486	6	124	155	5	290	102	270	123	2	497	1573
04:00 PM	63	54	18	1	136	49	214	8	2	273	7	54	92	1	154	61	161	78	4	304	867
04:15 PM	68	63	25	3	159	57	209	9	5	280	2	44	54	2	102	83	161	68	8	320	861
04:30 PM	37	36	24	0	97	62	182	9	1	254	3	57	88	0	148	45	162	57	2	266	765
04:45 PM	38	71	34	6	149	53	130	6	7	196	4	28	54	0	86	71	179	47	4	301	732
Total	206	224	101	10	541	221	735	32	15	1003	16	183	288	3	490	260	663	250	18	1191	3225
05:00 PM	41	57	34	0	132	75	193	11	0	279	2	34	64	1	101	75	178	72	2	327	839
05:15 PM	57	60	28	1	146	72	235	9	1	317	6	42	55	1	104	74	171	55	2	302	869
05:30 PM	77	43	14	1	135	33	180	2	0	215	1	57	66	0	124	76	152	28	2	258	732
05:45 PM	47	49	12	3	111	34	118	5	1	158	6	57	57	0	120	61	158	27	2	248	637
Total	222	209	88	5	524	214	726	27	2	969	15	190	242	2	449	286	659	182	8	1135	3077
06:00 PM	36	43	17	0	96	12	112	3	1	128	3	66	37	0	106	54	180	22	2	258	588
06:15 PM	44	42	10	1	97	18	119	4	0	141	6	36	29	1	72	38	168	23	4	233	543
06:30 PM	42	33	12	2	89	14	112	3	3	132	5	63	44	0	112	28	174	22	0	224	557
06:45 PM	31	30	15	1	77	23	105	1	0	129	4	39	44	0	87	36	168	17	1	222	515
Total	153	148	54	4	359	67	448	11	4	530	18	204	154	1	377	156	690	84	7	937	2203
07:00 PM	23	38	7	0	68	12	112	1	1	126	8	58	28	2	96	29	150	19	0	198	488
07:15 PM	22	34	13	0	69	14	115	1	0	130	3	43	32	0	78	30	148	19	1	198	475
Grand Total	768	764	306	23	1861	615	2518	86	25	3244	66	802	899	13	1780	863	2580	677	36	4156	11041
Apprch %	41.3	41.1	16.4	1.2		19	77.6	2.7	0.8		3.7	45.1	50.5	0.7		20.8	62.1	16.3	0.9		
Total %	7	6.9	2.8	0.2	16.9	5.6	22.8	0.8	0.2	29.4	0.6	7.3	8.1	0.1	16.1	7.8	23.4	6.1	0.3	37.6	

# Sabra, Wang & Assoc, Inc

7055 Samuel Morse Dr, Suite 100  
Columbia, MD 21046

443-741-3500

Weather: SUNNY  
Counted By: MEGAN  
Town: ANNAPOLIS  
County ANNE ARUNDEL

File Name : MD 450 at MD 435  
Site Code : 00000000  
Start Date : 8/2/2013  
Page No : 1

## Groups Printed- Unshifted

Start Time	NO ENTRANCE From North					MD 450 (Baltimore Blvd) From East					MD 435 (King George St) From South					MD 450 (Baltimore Blvd) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:30 PM	0	0	0	0	0	0	108	51	0	159	89	0	42	0	131	2	171	0	0	173	463
03:45 PM	0	0	0	0	0	0	101	69	0	170	91	0	37	0	128	1	172	0	0	173	471
Total	0	0	0	0	0	0	209	120	0	329	180	0	79	0	259	3	343	0	0	346	934
04:00 PM	0	0	0	0	0	0	141	58	2	201	71	0	60	0	131	1	188	0	0	189	521
04:15 PM	0	0	0	0	0	0	131	51	0	182	74	0	46	2	122	8	187	0	0	195	499
04:30 PM	0	0	0	0	0	0	112	55	0	167	97	0	28	0	125	1	199	0	0	200	492
04:45 PM	0	0	0	0	0	0	110	58	0	168	95	0	32	0	127	0	186	0	0	186	481
Total	0	0	0	0	0	0	494	222	2	718	337	0	166	2	505	10	760	0	0	770	1993
05:00 PM	0	0	0	0	0	0	105	41	0	146	91	0	27	0	118	0	201	0	0	201	465
05:15 PM	0	0	0	0	0	0	111	38	0	149	89	0	32	0	121	1	202	0	0	203	473
05:30 PM	0	0	0	0	0	0	102	47	0	149	80	0	30	0	110	5	199	0	0	204	463
05:45 PM	0	0	0	0	0	0	85	60	0	145	77	0	22	0	99	2	124	0	0	126	370
Total	0	0	0	0	0	0	403	186	0	589	337	0	111	0	448	8	726	0	0	734	1771
06:00 PM	0	0	0	0	0	0	96	42	0	138	41	0	18	1	60	12	132	0	0	144	342
06:15 PM	0	0	0	0	0	0	78	47	0	125	48	0	10	0	58	10	89	0	0	99	282
06:30 PM	0	0	0	0	0	0	65	39	0	104	59	0	10	0	69	12	91	0	0	103	276
06:45 PM	0	0	0	0	0	0	71	35	0	106	42	0	10	0	52	7	75	0	0	82	240
Total	0	0	0	0	0	0	310	163	0	473	190	0	48	1	239	41	387	0	0	428	1140
07:00 PM	0	0	0	0	0	0	68	28	0	96	38	0	8	0	46	5	74	0	0	79	221
07:15 PM	0	0	0	0	0	0	55	33	0	88	31	0	5	1	37	6	66	0	0	72	197
Grand Total	0	0	0	0	0	0	1539	752	2	2293	1113	0	417	4	1534	73	2356	0	0	2429	6256
Apprch %	0	0	0	0		0	67.1	32.8	0.1		72.6	0	27.2	0.3		3	97	0	0		
Total %	0	0	0	0	0	0	24.6	12	0	36.7	17.8	0	6.7	0.1	24.5	1.2	37.7	0	0	38.8	

# Sabra, Wang & Assoc, Inc

7055 Samuel Morse Dr, Suite 100  
Columbia, MD 21046

443-741-3500

Weather: SUNNY  
Counted By: GARY  
Town: ANNAPOLIS  
County ANNE ARUNDEL

File Name : MD 450 at Bowyer Rd  
Site Code : 00000000  
Start Date : 8/2/2013  
Page No : 1

## Groups Printed- Unshifted

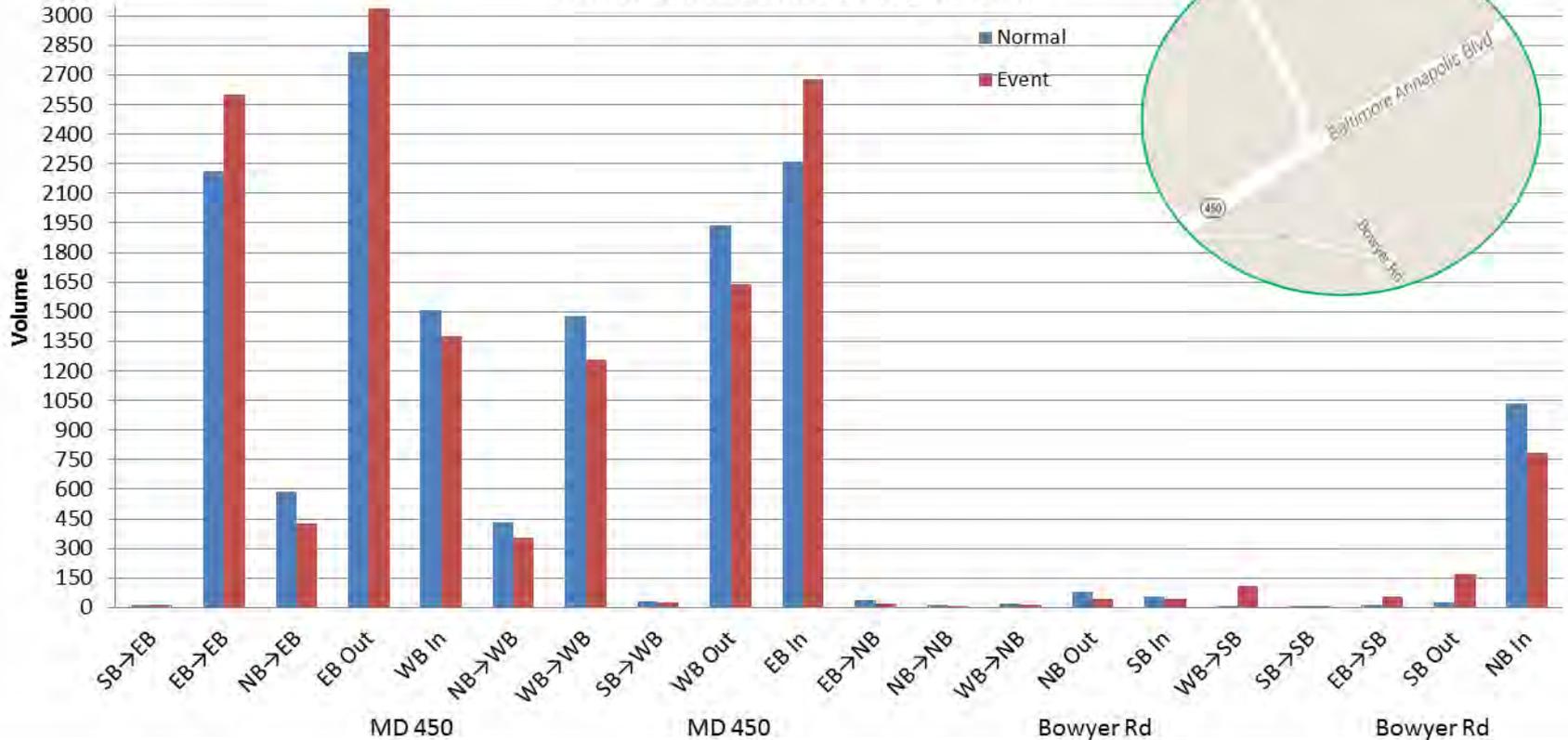
Start Time	BOWYER RD From North					MD 450 (Baltimore Blvd) From East					BOWYER RD From South					MD 450 (Baltimore Blvd) From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:30 PM	3	0	3	0	6	2	117	26	0	145	60	2	42	0	104	5	252	1	0	258	513
03:45 PM	2	1	1	3	7	1	126	13	0	140	58	1	37	0	96	4	261	3	0	268	511
Total	5	1	4	3	13	3	243	39	0	285	118	3	79	0	200	9	513	4	0	526	1024
04:00 PM	0	2	1	0	3	2	139	14	0	155	77	1	60	0	138	4	254	1	0	259	555
04:15 PM	2	0	2	6	10	0	130	6	1	137	36	1	46	0	83	4	258	2	0	264	494
04:30 PM	1	0	0	2	3	1	139	9	1	150	34	0	28	0	62	5	288	1	0	294	509
04:45 PM	4	0	0	3	7	3	132	7	0	142	58	1	32	0	91	10	271	0	0	281	521
Total	7	2	3	11	23	6	540	36	2	584	205	3	166	0	374	23	1071	4	0	1098	2079
05:00 PM	2	1	2	0	5	1	121	11	0	133	39	0	27	0	66	8	281	2	0	291	495
05:15 PM	5	0	1	5	11	3	117	5	6	131	29	0	32	1	62	7	278	2	0	287	491
05:30 PM	3	0	2	0	5	2	115	9	4	130	19	1	30	0	50	7	264	2	0	273	458
05:45 PM	2	0	2	0	4	0	120	7	1	128	14	0	22	2	38	4	191	6	0	201	371
Total	12	1	7	5	25	6	473	32	11	522	101	1	111	3	216	26	1014	12	0	1052	1815
06:00 PM	5	0	0	0	5	0	111	4	1	116	17	1	18	5	41	7	168	2	0	177	339
06:15 PM	1	0	1	0	2	0	115	2	1	118	8	0	10	4	22	4	128	1	0	133	275
06:30 PM	4	1	1	1	7	4	89	11	3	107	9	1	10	1	21	5	139	5	0	149	284
06:45 PM	4	0	0	2	6	2	91	8	8	109	12	0	10	2	24	5	114	4	0	123	262
Total	14	1	2	3	20	6	406	25	13	450	46	2	48	12	108	21	549	12	0	582	1160
07:00 PM	2	0	3	2	7	5	88	4	1	98	7	0	8	2	17	1	107	5	0	113	235
07:15 PM	2	0	2	0	4	1	85	4	0	90	2	0	5	0	7	6	98	0	0	104	205
Grand Total	42	5	21	24	92	27	1835	140	27	2029	479	9	417	17	922	86	3352	37	0	3475	6518
Apprch %	45.7	5.4	22.8	26.1		1.3	90.4	6.9	1.3		52	1	45.2	1.8		2.5	96.5	1.1	0		
Total %	0.6	0.1	0.3	0.4	1.4	0.4	28.2	2.1	0.4	31.1	7.3	0.1	6.4	0.3	14.1	1.3	51.4	0.6	0	53.3	

# Movement Comparison

# Intersection Volumes (PM Peak Period)



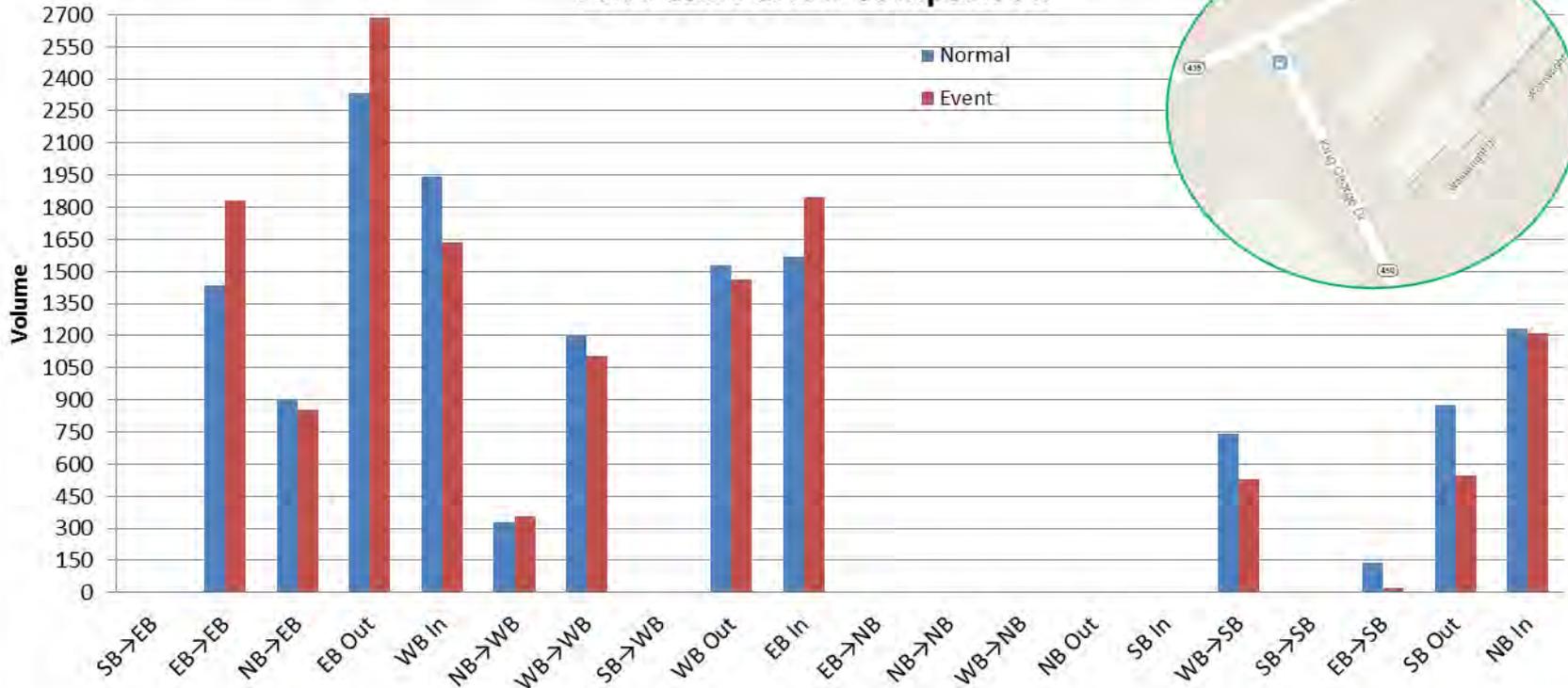
**MD 450 at Bowyer Rd  
PM Peak Period Comparison**



# Intersection Volumes (PM Peak Period)



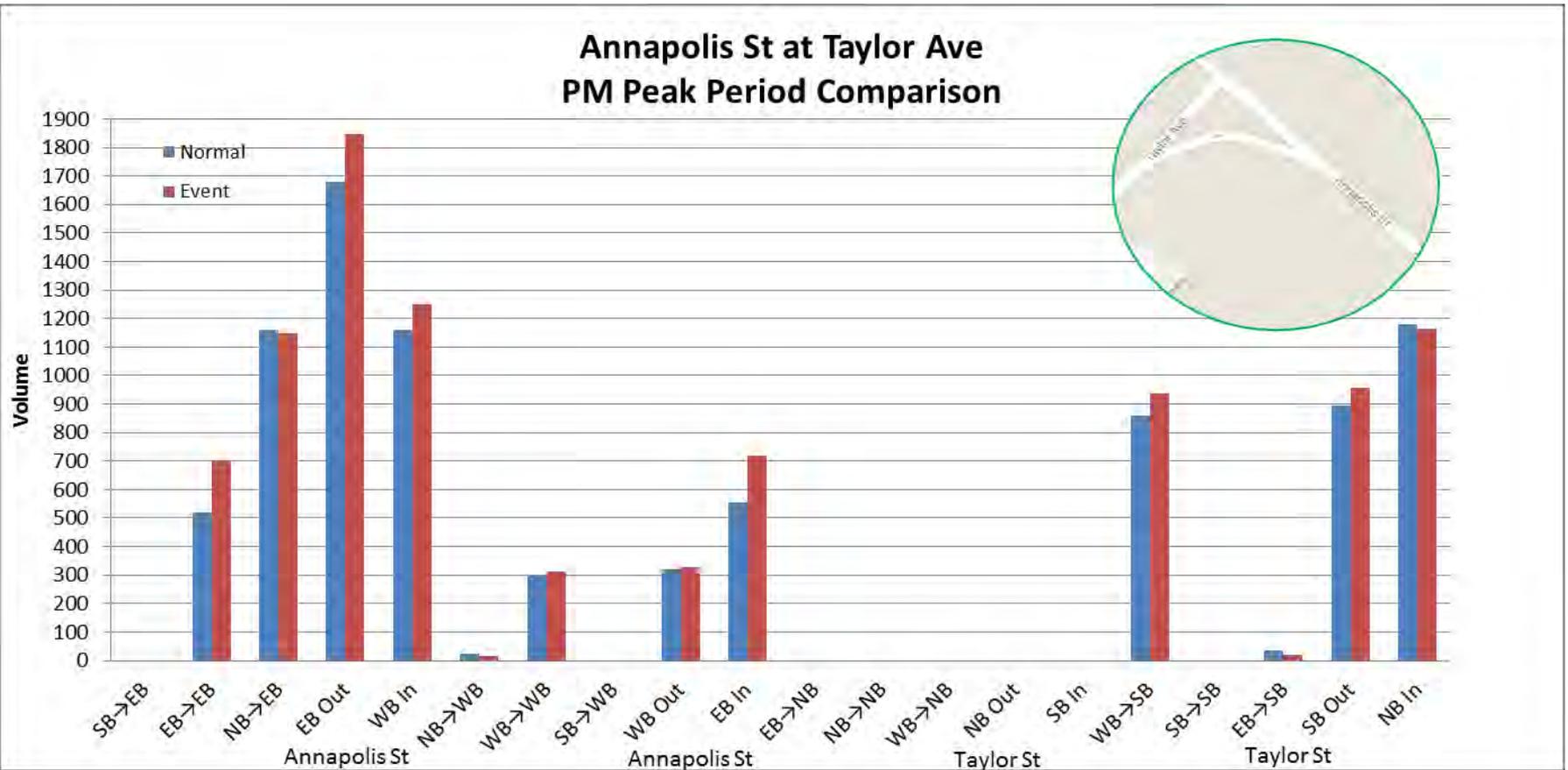
**MD 450 at MD 435  
PM Peak Period Comparison**



# Intersection Volumes (PM Peak Period)

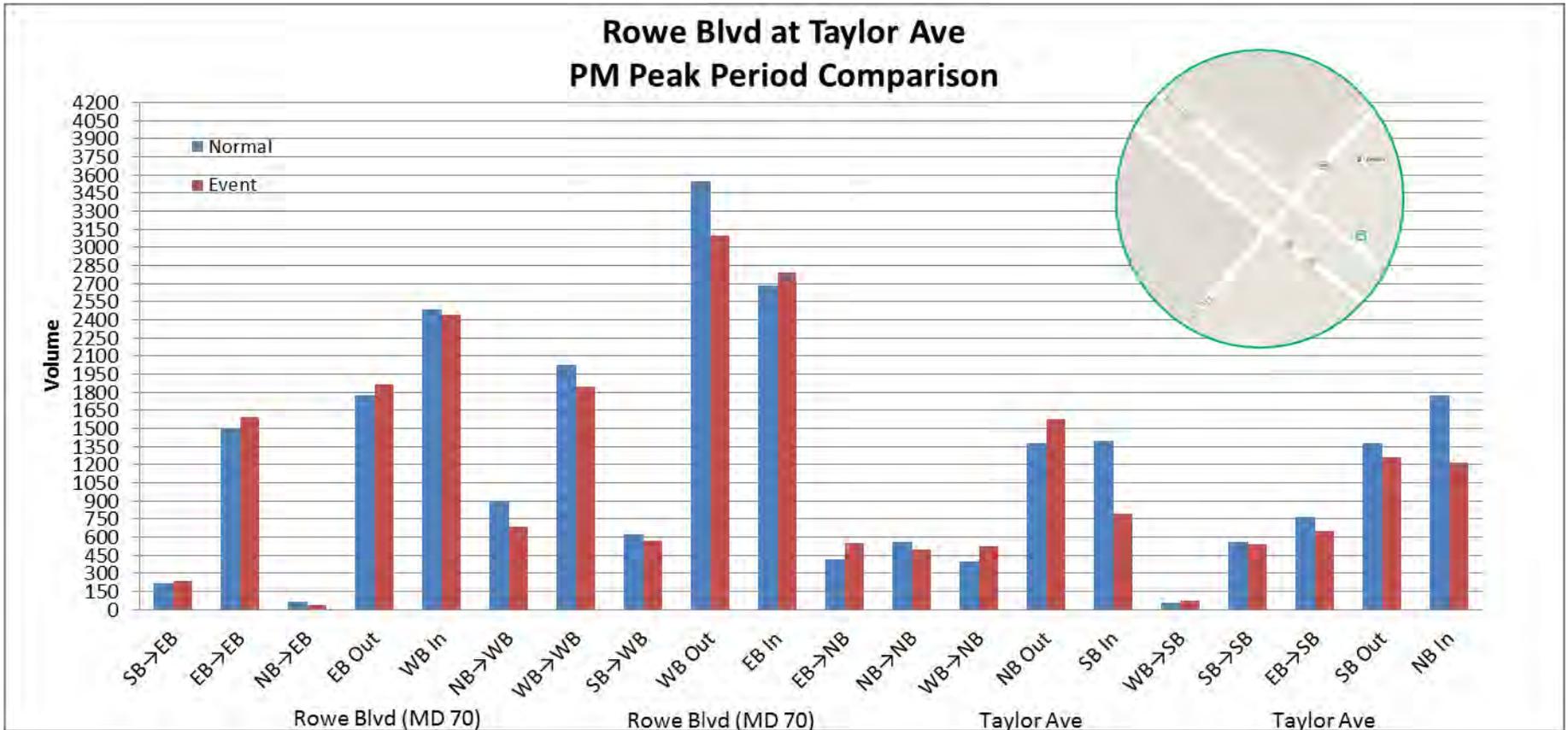


## Annapolis St at Taylor Ave PM Peak Period Comparison





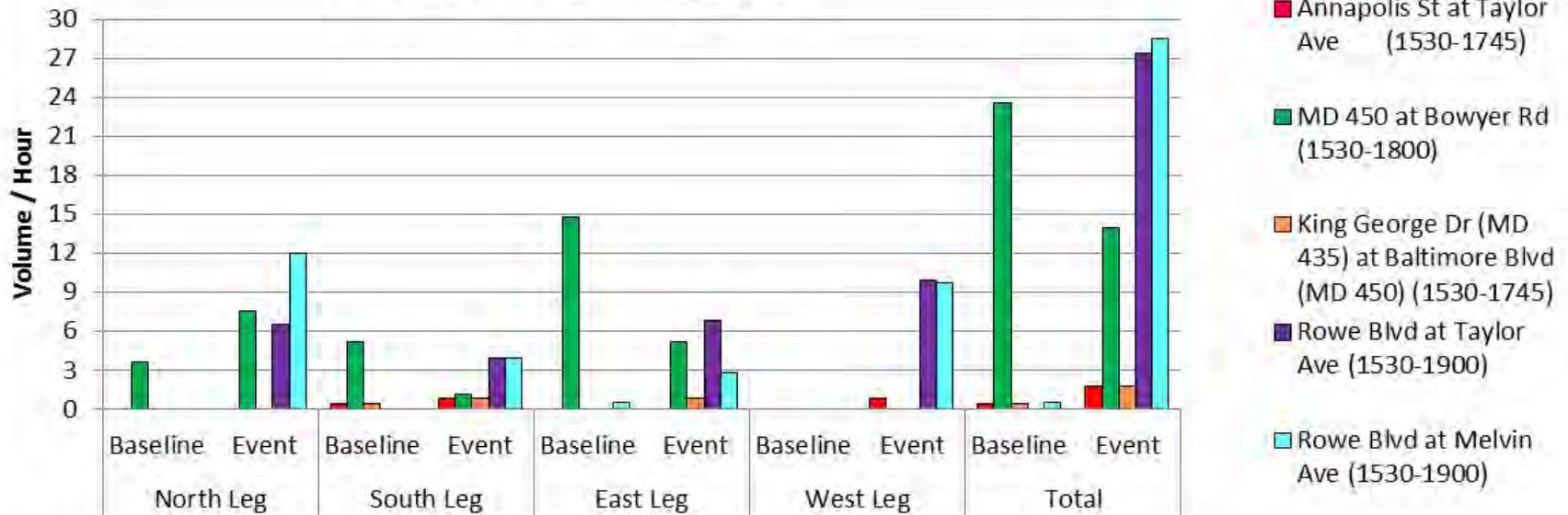
# Intersection Volumes (PM Peak Period)



# Pedestrian Movements



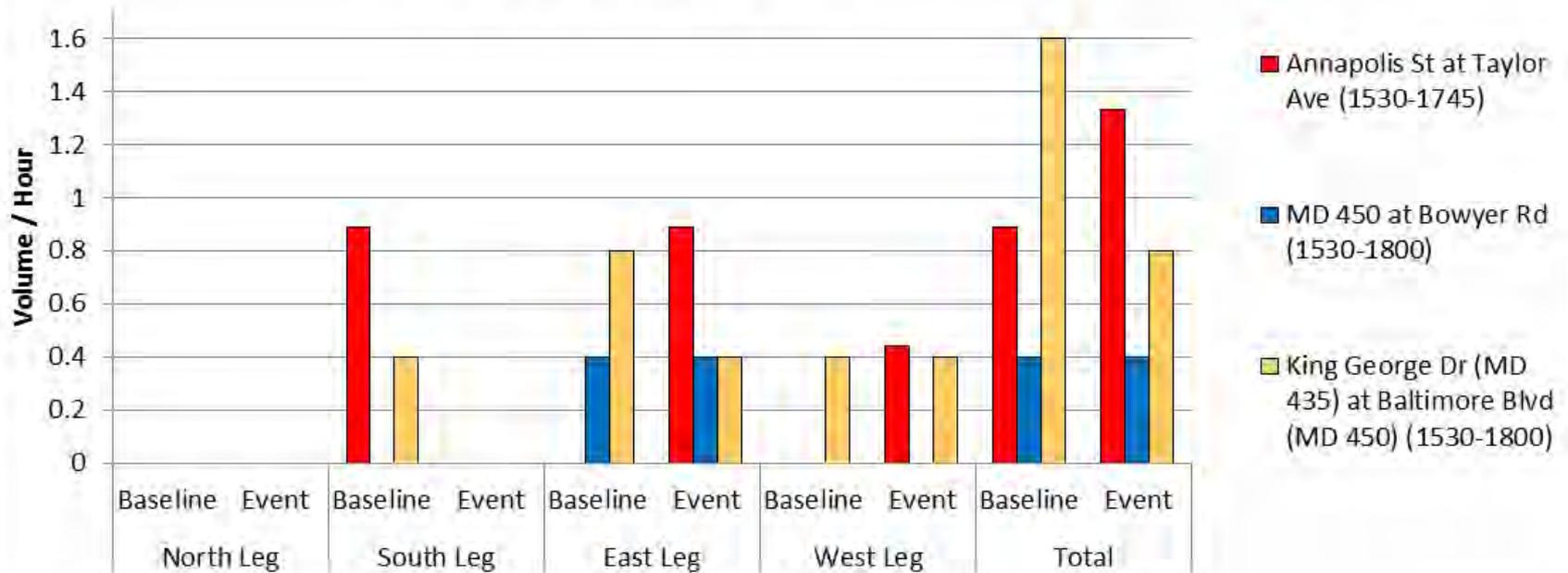
**Pedestrians per Hour  
PM Peak Period Comparison**



# Bicycle Movements



**Bicycles per Hour  
PM Peak Period Comparison**





**Appendix C**

**Origin-Destination Reports**

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# Traffax Inc - Annapolis Project

## Processing and Filter Explanation

8/13/2013

Dennis So Ting Fong

### Introduction

The Annapolis project consisted of a 7 day study around the intersection of Rowe Blvd and Taylor Ave. The data collection information and sensor install locations are given below.

Project	Annapolis
Data Collection Period Start	08/01/2013 00:00:00
Data Collection Period End	08/08/2013 00:00:00
Data Collection Length	7 full days (168 hours)
Data Collection Problems	None

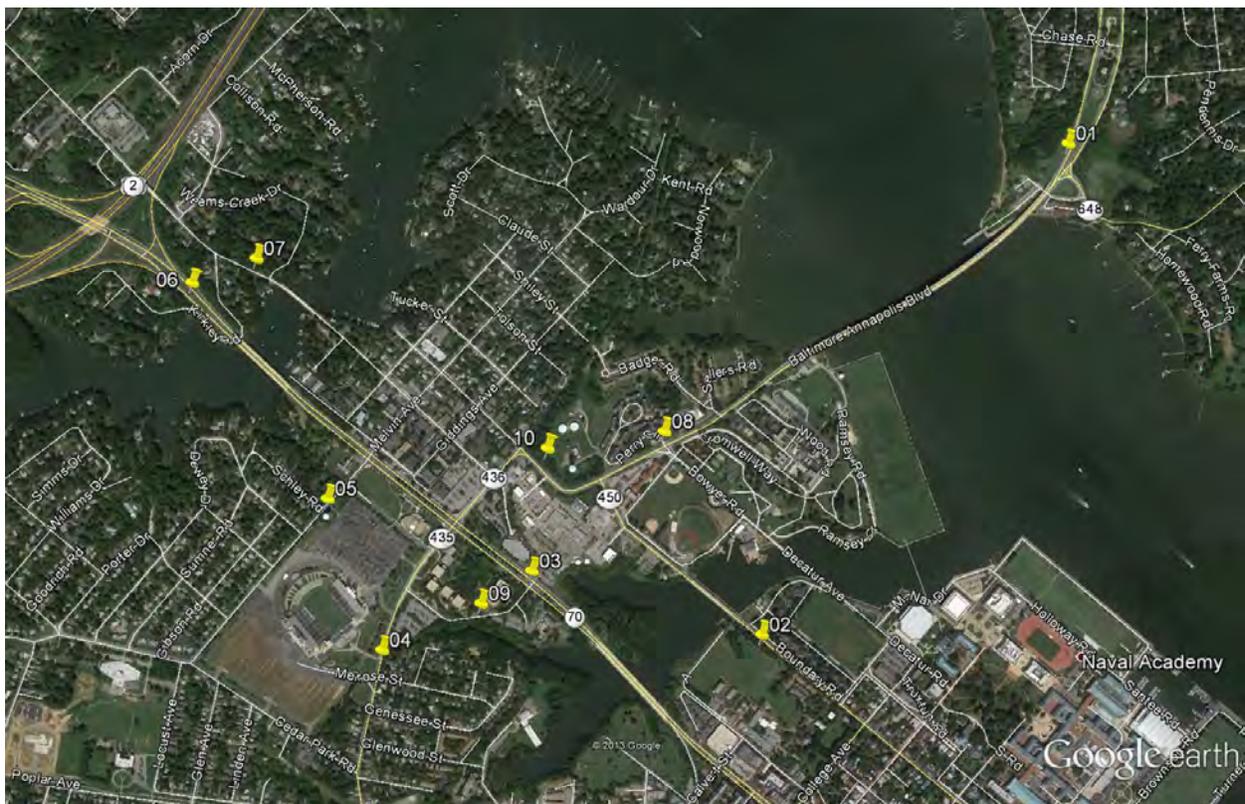


Figure 1 - Study Area and Sensor Locations

### Folder Structure

- **Annapolis Short Report.docx** - This document details the processing used to get the final OD tables.
- **Annapolis.kmz** - This google earth file shows the locations of the sensors. Figure 1 shows a picture taken using this file.

- **filtered OD\_REPORT 2013-07-31 000000 168HRS.xls** - This Excel file contains the OD data for the study. Note that a few checks were run to ensure that the data was reasonable.
- **Bluetooth Data** - This folder contains the raw data from the sensors and a preliminary check on the quality of the data. The excel file used to develop the filters is also contained here.
- **Annapolis BluSTATs Project** - This folder contains the BluSTATs project associated with the data. It has been processed and filtered to output the OD table. Note that most additional information can be obtained by loading this file and running some analyses.

## Filters

There were two filters used for this project. These filters are used (1) at the customer's request and (2) due to the install restrictions placed on [sensor 08]. Below the filters are described a bit more.

The first filter involves [sensor 09]. If a vehicle took the path past [sensor 09], then that traversal was discarded. This was to make sure that the traffic that was measured went through the intersection of Rowe Blvd and Taylor Ave.

The second filter involves [sensor 08]. If a vehicle travels between any sensor other than [sensor 08] to [sensor 01] and was seen at [sensor 08], then that specific detection at [sensor 08] is discarded. Also if a vehicle travels between [sensor 01] to any sensor other than [sensor 08] and was seen at [sensor 08], then that specific detection at [sensor 08] is discarded. This covers both direction to/from [sensor 01]. After eliminating the detections that passed by [sensor 08], all that is left are the detections that ended at [sensor 08].

PM Peak Period  
(3 PM to 7 PM)

From	To				
		<b>All week</b>			
6	1	Rowe east of 50 to B&A @ Severn	352	6402	5.5% all week (352 out of 6402)
4	1	Taylor west of Rowe to B&A @ Severn	392	1743	22% all week (392 out of 1743)
7	2	Ridgley north of Weems Creek to King George south of B&A	48	359	13% (48 out of 359)
2	7	King George south of B&A to Ridgley north of Weems	30	1970	1.5% (30 out of 1970)
		<b>Friday</b>			
6	1	Rowe east of 50 to B&A @ Severn	117	1084	10.8%
4	1	Taylor west of Rowe to B&A @ Severn	83	281	29.5%
7	2	Ridgley north of Weems Creek to King George south of B&A	28	181	15.5%
2	7	King George south of B&A to Ridgley north of Weems	5	323	1.5%

Weekly (168 hour) OD Counts

BEGIN STATION	END STATION									FROM Total
	1	2	3	4	5	6	7	8	10	
1		1037	184	451	75	335	56	449	1192	2587
2	1099		117	69	34	371	30	250	553	1970
3	250	158		298	140	3257	47	69	348	4219
4	392	56	179		125	815	44	132	538	1743
5	79	25	184	123		714	37	40	130	1202
6	352	264	3605	1146	687		57	291	756	6402
7	72	48	41	49	30	80		39	158	359
8	432	170	41	132	31	285	43		576	1134
10	1155	357	238	596	121	859	131	629		4086
TO Total	2676	1758	4351	2268	1122	5857	314	1270	4251	23867

Stations	1	2	3	4	5	6	7	8	10	Grand Total
TO Total	2676	1758	4351	2268	1122	5857	314	1270	4251	23867
FROM Total	2587	1970	4219	1743	1202	6402	359	1134	4086	23867
From/To	0.966741	1.120592	0.969662	0.768519	1.071301	1.093051	1.143312	0.892913	0.961186	1
To /From	1.034403	0.892386	1.031287	1.301205	0.933444	0.91487	0.874652	1.119929	1.040382	1

**NOTES:**

Unit 10 was placed as an additional unit inside the study area as a backup.  
It is not used in the calculations because it is not needed. The information is kept for reference.

Monday, Tuesday, Wednesday, Thursday OD Counts

END STATION

BEGIN STATION	1	2	3	4	5	6	7	8	10	FROM Total
1		568	99	254	32	175	29	287	672	1444
2	605		68	38	17	181	14	151	278	1074
3	127	82		163	77	1821	38	32	192	2340
4	212	31	106		68	494	33	76	300	1020
5	39	11	109	64		384	22	23	67	652
6	163	150	1996	698	360		34	179	432	3580
7	39	31	26	32	13	51		20	90	212
8	280	95	27	93	15	169	28		344	707
10	626	215	145	364	61	480	76	389		2356
TO Total	1465	968	2431	1342	582	3275	198	768	2375	13404

Stations	1	2	3	4	5	6	7	8	10	Grand Total
TO Total	1465	968	2431	1342	582	3275	198	768	2375	13404
FROM Total	1444	1074	2340	1020	652	3580	212	707	2356	13404
From/To	0.985666	1.109504	0.962567	0.76006	1.120275	1.09313	1.070707	0.920573	0.992	1
To /From	1.014543	0.901304	1.038889	1.315686	0.892638	0.914804	0.933962	1.08628	1.008065	1

Friday OD Counts

BEGIN STATION	END STATION									FROM Total
	1	2	3	4	5	6	7	8	10	
1		178	31	84	16	59	9	55	208	432
2	195		18	10	3	54	5	38	88	323
3	60	29		55	19	482	6	17	67	668
4	83	8	29		17	113	4	27	102	281
5	20	5	23	19		112	9	8	31	196
6	117	37	582	184	104		4	56	174	1084
7	20	8	6	9	8	17		8	37	76
8	76	28	2	15	5	46	9		83	181
10	281	44	36	105	22	130	22	118		758
TO Total	571	293	691	376	172	883	46	209	790	4031

Stations	1	2	3	4	5	6	7	8	10	Grand Total
TO Total	571	293	691	376	172	883	46	209	790	4031
FROM Total	432	323	668	281	196	1084	76	181	758	4031
From/To	0.756567	1.102389	0.966715	0.74734	1.139535	1.227633	1.652174	0.866029	0.959494	1
To /From	1.321759	0.907121	1.034431	1.338078	0.877551	0.814576	0.605263	1.154696	1.042216	1

Saturday/Sunday OD Counts

		END STATION									
BEGIN STATION	1	2	3	4	5	6	7	8	10	FROM Total	
1		291	54	113	27	101	18	107	312	711	
2	299		31	21	14	136	11	61	187	573	
3	63	47		80	44	954	3	20	89	1211	
4	97	17	44		40	208	7	29	136	442	
5	20	9	52	40		218	6	9	32	354	
6	72	77	1027	264	223		19	56	150	1738	
7	13	9	9	8	9	12		11	31	71	
8	76	47	12	24	11	70	6		149	246	
10	248	98	57	127	38	249	33	122		972	
TO Total	640	497	1229	550	368	1699	70	293	1086	6432	

Stations	1	2	3	4	5	6	7	8	10	Grand Total
TO Total	640	497	1229	550	368	1699	70	293	1086	6432
FROM Total	711	573	1211	442	354	1738	71	246	972	6432
From/To	1.110938	1.152918	0.985354	0.803636	0.961957	1.022955	1.014286	0.83959	0.895028	1
To /From	0.900141	0.867365	1.014864	1.244344	1.039548	0.97756	0.985915	1.191057	1.117284	1



**Appendix D**  
**Event Calendar**

West Annapolis Traffic Study  
Initial List of Special Events

Date	WeekDay	Event	Event Type
1-Jan	Tuesday	New Years Day	Holiday
21-Jan	Monday	MLK Jr Day	Holiday
18-Feb	Monday	Presidents Day	Holiday
17-Mar	Sunday	St Patrick's Day	Holiday
21-Mar	Thursday	Maryland Day Festival	Downtown Annapolis
22-Mar	Friday	Maryland Day Festival	Downtown Annapolis
23-Mar	Saturday	Maryland Day Festival	Downtown Annapolis
30-Mar	Saturday	Annapolis Youth 5-K Run	Navy Stadium
2-May	Thursday	OC Springfest	Downtown Annapolis
3-May	Friday	OC Springfest	Downtown Annapolis
4-May	Saturday	OC Springfest	Downtown Annapolis
5-May	Sunday	<b>Cinco De Mayo</b> OC Springfest	<b>West Annapolis</b> Ocean City
17-May	Friday	Naval Academy Commissioning Week	Downtown Annapolis
18-May	Saturday	Naval Academy Commissioning Week	Downtown Annapolis
19-May	Sunday	Naval Academy Commissioning Week	Downtown Annapolis
20-May	Monday	Naval Academy Commissioning Week	Downtown Annapolis
21-May	Tuesday	Naval Academy Commissioning Week	Downtown Annapolis
22-May	Wednesday	Naval Academy Commissioning Week	Downtown Annapolis
23-May	Thursday	Naval Academy Commissioning Week	Downtown Annapolis
24-May	Friday	Naval Academy Commissioning Week	Downtown Annapolis
25-May	Saturday	Ocean City Arts & Crafts Festival	Ocean City
26-May	Sunday	Ocean City Arts & Crafts Festival	Ocean City
27-May	Monday	Memoral Day	Holiday
30-May	Thursday	Annapolis Greek Festival	Downtown Annapolis
31-May	Friday	Annapolis Greek Festival	Downtown Annapolis
1-Jun	Saturday	Annapolis Greek Festival/ Zooma Women's Run	Downtown Annapolis
2-Jun	Sunday	Annapolis Greek Festival	Downtown Annapolis
8-Jun	Saturday	Annapolis Arts/Crafts Fest @ Navy Stadium Oc Car & Truck Show	Navy Stadium Ocean City
9-Jun	Sunday	Annapolis Arts/Crafts Fest @ Navy Stadium Maryland Ave Irish Festival Oc Car & Truck Show	Navy Stadium Downtown Annapolis Ocean City
16-Jun	Sunday	Md State Firefighters Convention	Ocean City
23-Jun	Sunday	Paris Flea Market West Annapolis	West Annapolis
26-Jun	Wednesday	Naval Academy Induction Day	Downtown Annapolis
27-Jun	Thursday	Naval Academy Induction Day	Downtown Annapolis
4-Jul	Thursday	Independence Day Fourth Of July Celebration OC Fourth Of July Celebration	Holiday Downtown Annapolis Ocean City
5-Jul	Friday	Fourth Of July Celebration	Downtown Annapolis
6-Jul	Saturday	Fourth Of July Celebration	Downtown Annapolis
7-Jul	Sunday	Fourth Of July Celebration	Downtown Annapolis
12-Jul	Friday	OC Greek Festival	Ocean City
13-Jul	Saturday	Women's Distance Festival	West Annapolis

West Annapolis Traffic Study  
Initial List of Special Events

2-Aug	Friday	Rotary Club Crab Feast @ Navy Stadium	Navy Stadium
14-Sep	Saturday	Navy Football Game	Navy Stadium
25-Aug	Sunday	Annapolis 10-Mile Run	Downtown Annapolis
19-Sep	Thursday	OC Sunfest	Ocean City
20-Sep	Friday	Naval Academy Parents Weekend OC Sunfest	Downtown Annapolis Ocean City
21-Sep	Saturday	Naval Academy Parents Weekend Beer/Music Fest @ Navy Stadium OC Sunfest	Downtown Annapolis Navy Stadium Ocean City
22-Sep	Sunday	<b>Oktoberfest West Annapolis</b> Naval Academy Parents Weekend OC Sunfest	<b>West Annapolis</b> Downtown Annapolis Ocean City
23-Sep	Monday	Naval Academy Parents Weekend	Downtown Annapolis
27-Sep	Friday	OC Wine Festival	Ocean City
28-Sep	Saturday	OC Wine Festival	Ocean City
29-Sep	Sunday	Maryland Ave Fall Festival OC Wine Festival	Downtown Annapolis Ocean City
3-Oct	Thursday	Annapolis Boat Show	Downtown Annapolis
4-Oct	Friday	Annapolis Boat Show	Downtown Annapolis
5-Oct	Saturday	Navy Football Game Annapolis Boat Show	Navy Stadium Downtown Annapolis
6-Oct	Sunday	Annapolis Boat Show	Downtown Annapolis
10-Oct	Thursday	Annapolis Boat Show OC Hot Rod Show	Downtown Annapolis Ocean City
11-Oct	Friday	Annapolis Boat Show OC Hot Rod Show	Downtown Annapolis Ocean City
12-Oct	Saturday	Annapolis Boat Show OC Hot Rod Show	Downtown Annapolis Ocean City
13-Oct	Sunday	Annapolis Boat Show OC Hot Rod Show	Downtown Annapolis Ocean City
14-Oct	Monday	Columbus Day Annapolis Boat Show	Holiday Downtown Annapolis
26-Oct	Saturday	Navy Football Game	Navy Stadium
31-Oct	Thursday	Halloween	Holiday
3-Nov	Tuesday	Ripley Run	Navy Stadium
5-Nov	Tuesday	Election Day	Holiday
9-Nov	Saturday	Navy Football Game	Navy Stadium
11-Nov	Monday	Veterans Day	Holiday
16-Nov	Saturday	Navy Football Game	Navy Stadium
23-Nov	Saturday	Annapolis Running Classic	Navy Stadium
28-Nov	Thursday	Thanksgiving	Holiday
14-Dec	Saturday	Holiday Celebration West Annapolis	West Annapolis
24-Dec	Tuesday	Christmas Eve	Holiday
25-Dec	Wednesday	Christmas Day	Holiday
31-Dec	Tuesday	New Years Eve New Years Eve Celebration	Holiday Downtown Annapolis



**Appendix E**

**Traffic/Transportation Stakeholder Interviews**

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West Annapolis Operations Feedback Matrix								
Name	Position & Agency	1. What are the traffic operations issues/concerns that take place during a "normal" weekday in and around West Annapolis?	a. When/where is there congestion?	b. What operational problems occur regularly and how are they dealt with?	2. What type of events and time periods do you consider as 'non-normal' traffic periods where congestion occurs?	a. Neighborhood events/situations within/near West Annapolis (e.g. Navy stadium events, Craft shows, etc.)?	b. Local/City events/situations within Annapolis (e.g. legislative sessions, the boat show, etc.)	c. External/Statewide events/situations outside of Annapolis (e.g. Ocean City events, US 50 incidents, etc.)
Don MacLean	Maryland Transportation Authority, Traffic Manager	Summer, Friday & Saturday (Primarily Eastbound). Congestion backs from bridge to I-97 in EB direction. Heavy Traffic volumes that exceed Eastbound Two Bridge Lane capacity. A third lane traveling eastbound is provided on the westbound bridge using Contra-flow (Two Way operation). However, this operation is extremely dependent on weather conditions.			Thursday 1:00pm – 7:00pm, Friday 10:00am – 10:00pm, Saturday all day a.. Some impact with Navel Academy Graduation. Some impact with Blue Angel. b. Eastern Shore/Kent Island events c. Eastern Shore events as far out as Ocean City.			
Scott W. Sumner	Transportation Engineer Manager Anne Arundel County Team Maryland State Highway Administration District 5 Traffic	Commute every day along Rowe Blvd. AM not as bad as PM. Inbound occasionally the ramp will backup to the mainline, others not an issue. At Taylor & Melvin it starts improving. Left turn onto Taylor an issue. Special events and incidents along 50 have an impact. PM is "pretty wild" backs up all of the way to Calvert/College Creek and is never good. It is a parking lot every day to different levels. West Annapolis Business Owners complain. Block patronage especially at Taylor Avenue and Grauls No easy solution exists. Feels that green band is best. Don't take route 50 west. May event turn right at Taylor then left on Ridgely to Weems Creek Bridge to avoid 50 and signals on ramps etc.			Wind restrictions an severity of incident impact where people divert, 178, 450, etc. People want to continue moving. Friday is worst. Or when there is an incident Saturday or Sunday do not have normal peak. Graduation Week a nightmare. Boat show does impact the area.			
Joe Zurzolo CIV NAVFAC Washington	Chief Civil Engineer and Chief of Design PWD Annapolis/ USNA	Study done in 2007 - horizon year was 2013. Traffic counts, intersection analysis No morning rush hour in AM from Navy. Minimal delays in the AM. Afternoons - Sustained exiting out of Gate 8 at Bowyer. 3:45 to 5:30. 1/2 N. and 1/2 S. Surprising even split, almost none across to Perry circle. On top of traffic up from King George. 2 major infows of traffic hitting the 2 lights on n450. 2007- 14,00 per day on 450, 9900 on King George, and 6855 on Bowyer. 2013 projects 14,974 on 450, 10,396 on King George, and 7,191 on Bowyer. Previous study had a lot of traffic circle focus. Merges caused problems and elevation. looked at 1 and 2 lane roundabouts. Pretty steady distribution 2.5 /avg in peak hour in PM 1.5 over average in AM. Have a lot of joggers/bikes on 450. create problems with narrow sidewalk next to road. Only 3 ft. Has spillover. Especial in afternoon when mids have exercise periods. Will get local diversion across Naval Academy Bridge to avoid Rowe signals between Taylor and Rt 50. Locals will take Ridgely and Weems Bridge.			Accidents on 50 that impact the Severn River Brid. People try to loop around. Different impact depending on Severn River or Bay Bridge incident. Football games and parades not as serious a problem. Induction Day (June 27th), Parents week, and Commissioning week. Around 10 Academy events per year. Huge traffic problems due to security at Gate 8. Shuttle buses slow things down. Huge issue is POWER OUTAGES. Distrupt signals, and hapen all the time. Also mentioned BICYCLE Events - knows of atleast 1.			
Jason Dicembre	CHART (referred to by Warren Henry)	Along their maintained area, there are delays along US 50 in the area of MD 450, MD 2, Rowe Blvd and the Severn River area. MD 450 itself can also see significant delays due to volume.		Operational problems that occur which they respond to are mainly traffic incidents (crashes, disabled vehicles, etc.) They have Emergency Response Technicians that respond to the scene of these incidents and assist in removing obstructions or incidents so that traffic continues moving.	There isn't a singular answer to all of these points. For them, all of these events can cause significant impacts on traffic and thus extra congestion. In particular, exit 23 along east bound 50 and east bound and west bound 50 ramp to exit 24. The extent of the impact varies with the specific event and the number of people in attendance. Legislative sessions tend to not cause more significant delays than normal to their knowledge. The main time of year of additional impact for them is between Memorial Day and Labor Day every year with an increase presence of "Beach Traffic" and the beginning of vacation season.			
Claudia O'Keeffe	Civil Engineer Anne Arundel County DPW (referred to by Nestor Flores)	Congestion happens regularly but on weekends beach traffic makes it much worse. Most congestion occurs on Taylor Ave and Rowe Blvd. Rowe Blvd. at Melvin Ave. is an awkward intersection and people tend to "wind" through West Annapolis.		Rowe, Ridgely, US 50 are all state roads and outside of Anne Arundel County DPW jurisdiction.		Navy Stadium events to some extent	Craft shows, boat shows	Beach traffic much worse than other neighborhood and local events in her opinion

West Annapolis Operations Feedback			
Name	3. From your perspective what are the most critical transportation issues and concerns in/near West Annapolis and its transportation operations?	4. What traffic management/ operational strategies are currently deployed in the Annapolis area (e.g. ITS, signal timing, traveler information, event parking)	5. What type of traffic management/ operational strategies would you like to see employed?
Don MacLean		Performance Monitoring CCTV Roadway sensors Reversible Lanes Electronic Toll Collection Traveler Information Pre-Trip (Web, Radio) Real time (Highway Advisory Radio Incident Response	
Scott W. Sumner	Congestion is due to just too much traffic. Sheer traffic is the problem. Can't do much. Same issues always come up. Incidents and special events.	For boat show and other special events organizers hire VMS signs for parking. Responsibility of the promoter. Navy or promoter will work with the city for remote parking Need to check if VMS to remote parking at Navy is provided. Not sure. Signal / Timing tweaked as much as possible. Scott's job is to measure/manage recurring conditions. Would like more real time traveller information. No active control out of his office.	Tried to implement local traffic only on service lanes. Difficult to enforce. Police don't like it. Would like to see a list of variables and conditions tied to triggers and operational solutions.
Joe Zurzolo CIV NAVFAC Washington	His perception has been Annapolis & Taylor the real problem. Also narrow lanes and ped/bike from Taylor to Navy Academy Bridge. Lights need to be coordinated along whole section	Navy coordinates with Police. Takes over intersections to direct traffic. Doesn't know if they change signal timing. Parking at Football stadium for every major event. Not sure if there are VMS signs, but Navy security works directly with police. Shuttle buses and especially school buses create problems turning in/out of gate 8. Also security checks at gate 8 during event. Doesn't think the Navy overrides the signal at Gate 8 anymore.	Fix bottlenecks and ped/bike from Annapolis and Taylor to Navy Academy bridge. Make 2 lanes north and 1 south. Coordinate signal on other side of bridge. May cause diversions but will help keep out of residential areas. Has seen backups all the way to ROWE. Restripe the bridge to get 3 lanes, May lower speeds. Use intelligent controls to monitor in real time. Not sure it would help to coordinate with ROWE Blvd. Taylor configure to go north. Knows that non-Taylor traffic coming out on Annapolis can get caught and not be able to get out due to backups. In long term try to regrade to minimize turning into grade. People slow down when making turn and traffic doesn't flow. Also rework Gate 6 traffic and internal circulation so they don't have to go out on King George and then come back in again. Look at access control between Gate 8 and bridge (Perry circle, etc.). Look at putting queue clearing back in. Issue that large vehicles such as School Buses can't make turn in/out of Gate 8 and Taylor/Annapolis when there are vehicles in other lanes.
Jason Dicembre	Rowe Boulevard below US 50, as you approach the Naval Academy, the traffic signal intersections may need to be adjusted or a different traffic control mechanism (i.e. traffic circle or other type) may need to be considered. In addition, since two lanes have been added to Rowe Boulevard East Bound there have been several issues. One being when traffic is backed up on US 50 motorists will use the two exit lanes to advance ahead of the queue and cut back into US 50 traffic. A jersey wall at this location may assist with this, however, that may also increase the impact to US 50. Also another issue is that motorists will take the exit ramp and rather than going east, they will make a left and make what is in a sense a u-turn to head back to US 50 to attempt to get ahead of the queue.	They would not necessarily be the best source for details on this information, however, they do have travel time displayed on the Dynamic Message Signs (DMS) in the area. Again, their District 5 Traffic Office may be the best place to go for assistance.	He believes they answered this within some responses to other questions, in particular please see question 3.
Claudia O'Keeffe	<ul style="list-style-type: none"> <li>She considers West Annapolis a destination place more so than just a pass by and visit place. She said it is somewhat of a hassle to go to anytime and is easy to avoid the retail area. She mentioned you have to stop several times traveling down Annapolis St. and said it can also be hard to find parking.</li> <li>She thinks the Taylor Ave at Annapolis St intersection is confusing because the left-turns have the right-of-way.</li> <li>In general Rowe Blvd., Melvin Ave., Annapolis St, at Taylor Ave are the problematic roads.</li> </ul>	Mentioned they do not have jurisdiction of this area.	<ul style="list-style-type: none"> <li>She would like to see mini roundabouts on some of the less major streets instead of all-way stops. She said it would improve capacity and could be retrofitted into the existing intersection footprints.</li> <li>Said the ramp from Rowe Blvd. to US 50 is basically four lanes from Rowe Blvd merging into one lane prior to US 50 which could be improved and cause less congestion back into the study area.</li> <li>She also mentioned a lot of drivers take the EB US 50 Rowe Blvd. exit then get directly back onto US 50 because the merge lane takes you all the way to the Severn River Bridge. She said this is very common and just causes extra congestion on US 50 from the additional merging traffic.</li> <li>She mentioned you could just in general "tidy up" some of the intersections which would push more traffic through them but said she didn't know if you would want to do that because it could just draw more traffic from US 50 through the area.</li> </ul>

West Annapolis Operations Feedback			
Name	6. Can they describe a notable incident/event that has occurred recently (within the last year) and how it was resolved?	a. How did agencies respond operationally? What traffic management/operational strategies were used?	b. How did agencies collaborate?
Don MacLean	<p>Bridge closures, Severe storm, limited Two-Way operation due to weather.</p> <p>a. Severe backups on eastbound US 50/301. Managed incidents.</p> <p>b. Coordination of traffic plans between the Transportation Authority, SHA, CHART, MSP and Queen Anne's County</p>		
Scott W. Sumner	<p>Light drizzle and minor weather events can cause havoc. Police enforcement actions can really screw things up. Would like to see training and coordination with traffic enforcement to not block lanes etc. during peak periods or congested time periods. due to events/incidents.</p>		
Joe Zurzolo CIV NAVFAC Washington			
Jason Dicembre	<p>While it is not in the area particularly reference, last week with approaching hazardous weather conditions a tractor trailer carrying demolished cars overturned along US 50 near Bay Dale Drive. This also impacted the Maryland Transportation Authority as the road was closed for approximately 4 hours causing delays across the Bay Bridge.</p>	<p>Both the Maryland State Police and their Emergency Response Technicians responded to the scene to attempt to immediately clear the incident. Once it was known this would be a long term closure their SHA Maintenance Shop responded to the area to assist with extra Arrow Boards and other equipment.</p> <p>They do their best to get as many lanes open as possible. They activated Dynamic Message Signs and Highway Advisory Radios to alert motorists along the Maryland 511. All incidents entered into their system are also exported immediately to their CHART Website.</p>	<p>They coordinate daily with the Maryland State Police to respond to the scene of incidents. They also have Emergency Response Technicians that respond to the scene and assist. This provides face to face collaboration at the scene of the incident. They have multi CCTV in the area which are shared with local police, State Police, and Department of Public Works.</p>
Claudia O'Keeffe	<p>Didn't mention a specific event.</p>		

**Appendix F**

**Competitive Retail Center Inventory**

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## Appendix: Competitive Retail Center Inventory

### A.1 Overview

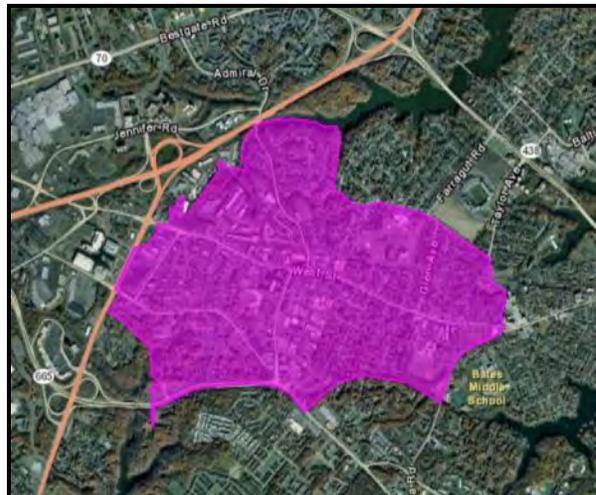
Due to the unique geographic location and characteristics of the West Annapolis and the greater City of Annapolis, retail demand for the identified commercial districts is primarily driven from households located within city limits, local office and State government employees, tourists and students, and facility and staff from the U.S. Naval Academy and St. John's College. With the lack of major big-box retailers, retail within the City of Annapolis primarily consists of small-scale retail establishments.

### A.2 Competitive Retail Clusters and Centers

Vantage Point identified and profiled competitive retail clusters within the city and retail centers located outside the city limits of Annapolis, which consist of primarily large big-box retail centers and serve as main competition to retail establishments located in the City of Annapolis. These analyses are summarized below. Retail Centers are summarized in Table A.1.

#### Outer West Street

- Automotive related establishments including Sheehy Nissan of Annapolis, Advanced Auto Parks, Annapolis Car Center, Jiffy Lube, Precision Tune Auto Care, Klaking Motors, Thrifty Auto Repair, Satellite, Fitzgerald Auto Mall, NextCar of Annapolis, Valvoline Instant Oil Change, Midas Annapolis, Pep Boys Auto, Severn Auto Body, Honda of Annapolis, Adams Jeep of Annapolis, Criswell Audi, Criswell Acura, Rich Morton Lincoln Mercury, Annapolis Hyundai, and AAMCO Transmission & Auto Service.
- Food / eating establishments including Papa John's Pizza, Dunkin Donuts, KFC, Court of Shanghai, Wendy's, McDonald's, Burger King, Chris' Charcoal Pit House, Philly Flash, Starbucks, The Whiskey Restaurant, Carlson's Donuts & Thai Kitchen, Paul's Homewood Café, and the Wild Orchard.













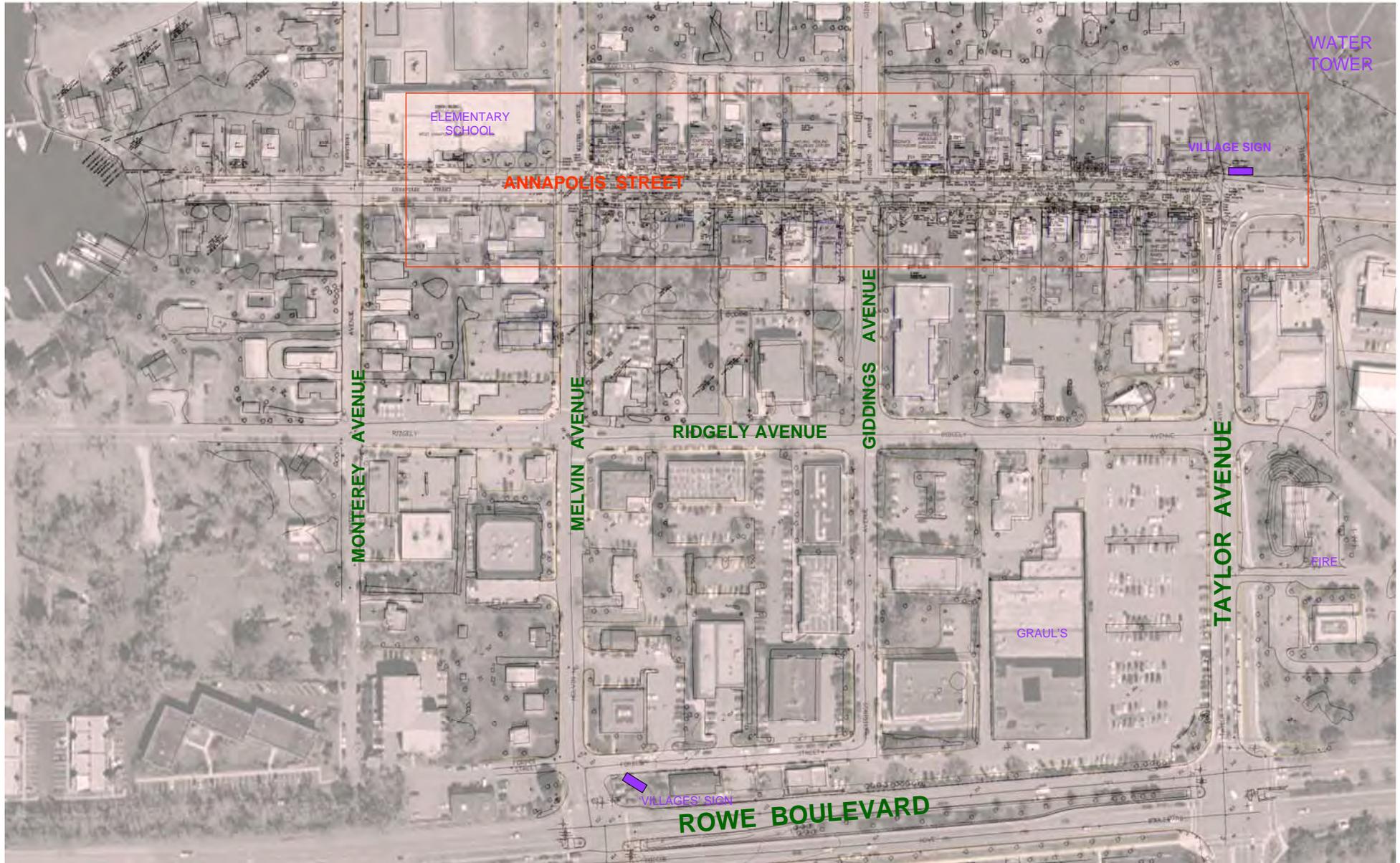


**Appendix G**

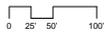
**Annapolis Street  
Streetscape Study**

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# ANNAPOLIS STREET STREETScape



ANNAPOLIS STREET CONTEXT



## PROJECT LOCATION

DATE: 2 September, 2008

DMSL TERRA LANDSCAPE ARCHITECTURE CONSULTING

# ANNAPOLIS STREET STREETScape



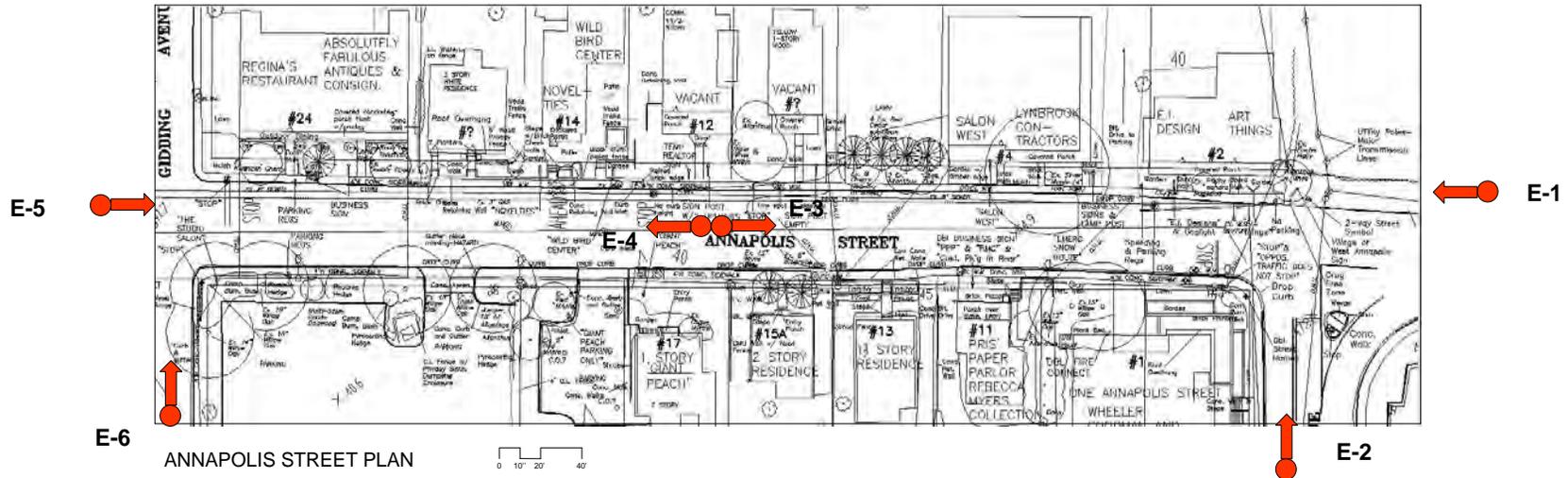
STREET VIEW E-5



STREET VIEW E-3



ENTRY VIEW E-1



STREET ENTRY VIEW E-6



STREET ENTRY VIEW E-4



ENTRY VIEW E-2

EXISTING CONDITIONS-1

DATE:



# ANNAPOLIS STREET STREETScape



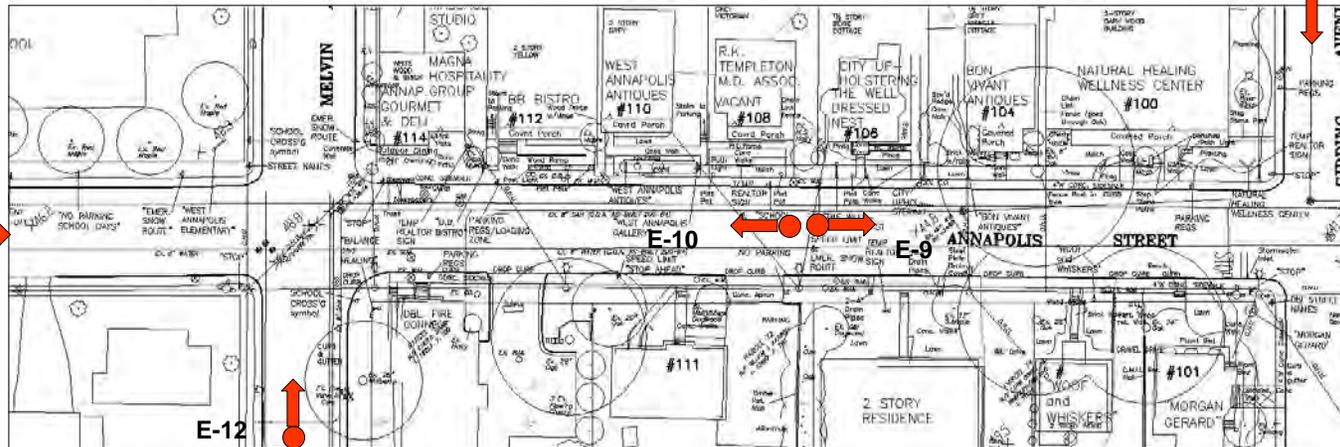
STREET VIEW E-11



STREET VIEW E-9



STREET VIEW E-7



ANNAPOLIS STREET PLAN



ENTRY VIEW E-12



STREET VIEW E-10



STREET VIEW E-8



EXISTING CONDITIONS-2

DATE:



# ANNAPOLIS STREET STREETSCAPE



GOOD SIGN & MISSED ENTRY OPPORTUNITY

A-9



ATTRACTIVE ENTRY

A-7



WIDE STREET HIGH SPEED

A-5



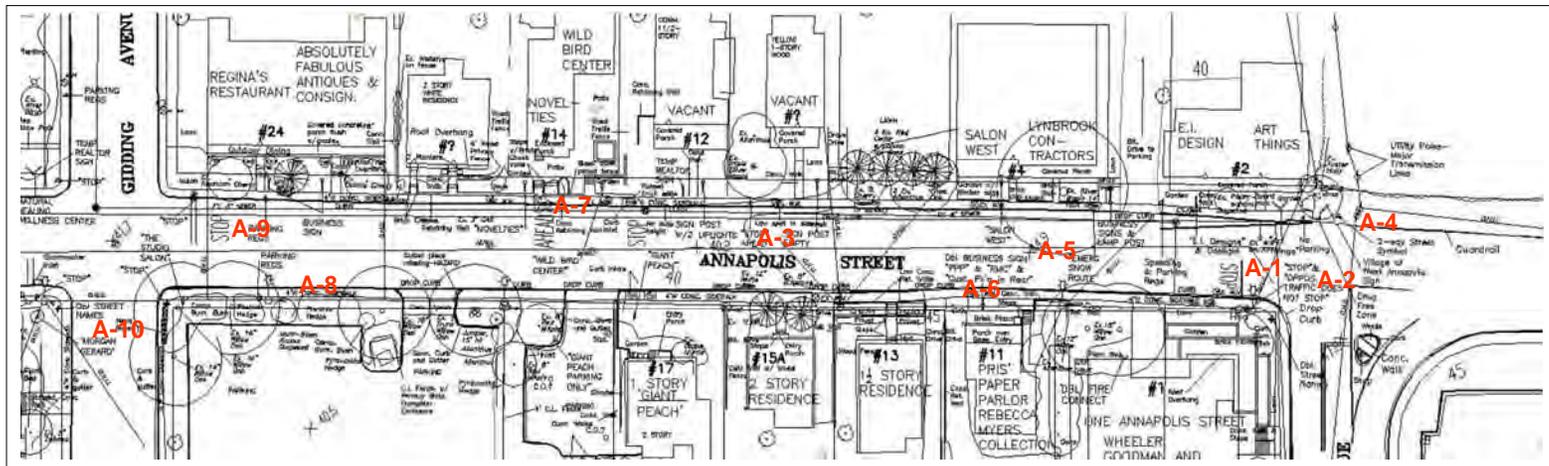
POOR SIGN PLACEMENT

A-3



ADA / PEDSTRIAN SAFETY NO CROSSWALK

A-1



ANNAPOLIS STREET PLAN



SIDEWALK BARRIERS AESTHETICS

A-10



UNCOMFORTABLE SPACE

A-8



STREET INTEREST & SEATING

A-6



VILLAGE SIGN

A-4



WIDE INTERSECTION VILLAGE ENTRY

A-2



# ANNAPOLIS STREET STREETScape



TRAFFIC

A-19



VILLAGE IMAGE



ACTIVE SPACE

A-15

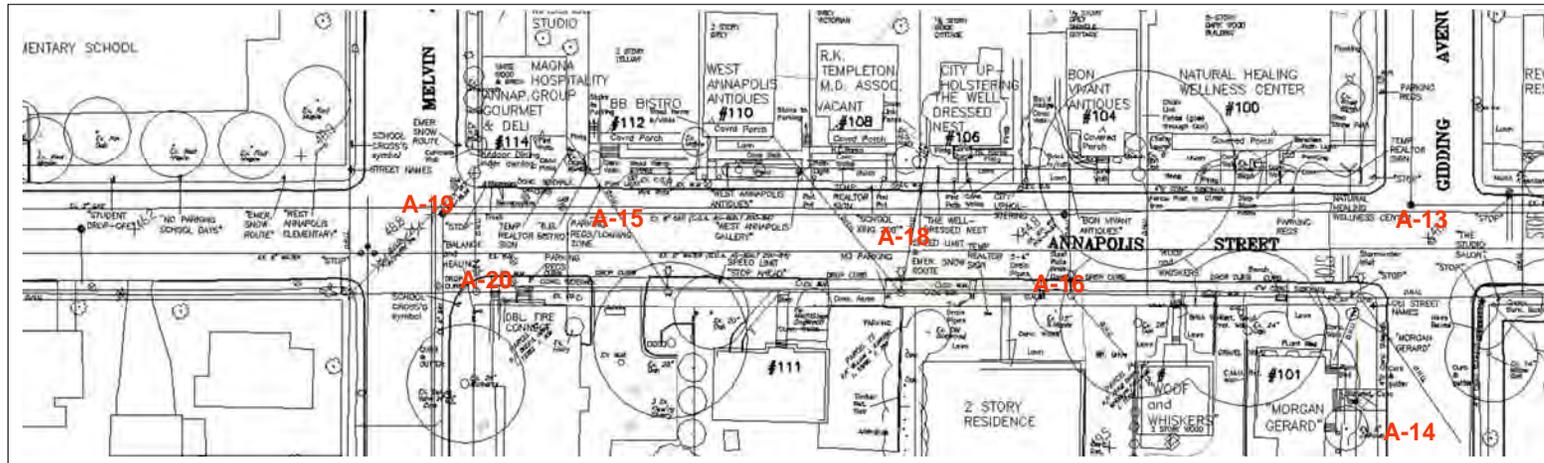


POOR SIDEWALK CONDITIONS



REALTOR SIGN

A-13



ANNAPOLIS STREET PLAN



SIDEWALKS  
FAILURE AT MELVIN / NARROW

A-20



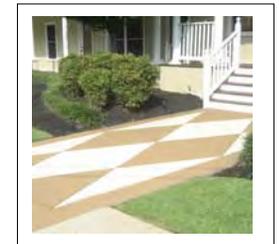
VILLAGE ARCHITECTURE

A-18



TREES  
UTILITIES  
LIGHTS

A-16

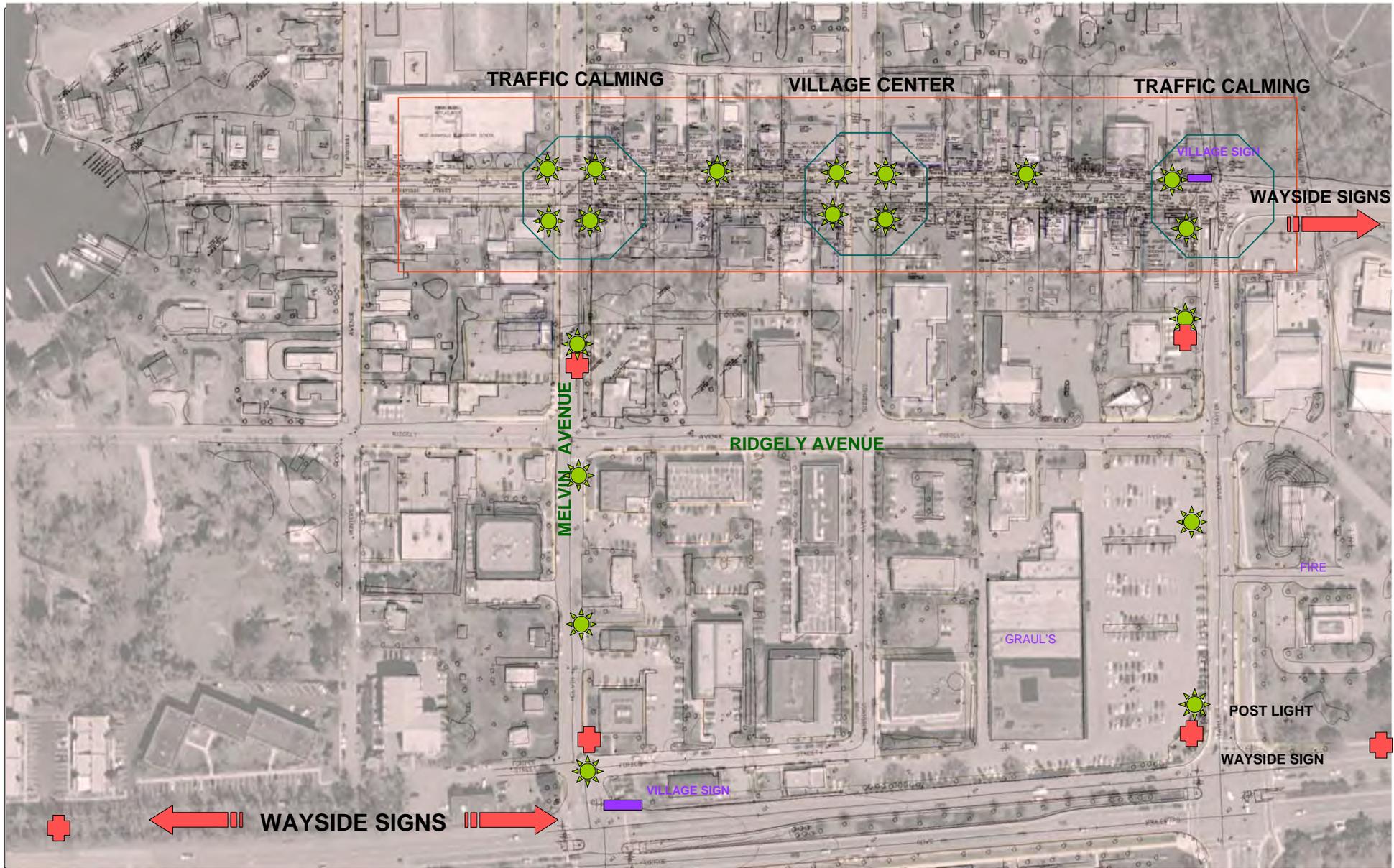


ATTRACTIVE SIDEWALK

A-14



# ANNAPOLIS STREET STREETSCAPE



ANNAPOLIS STREET CONTEXT



VILLAGE CONTEXT

DATE: 4 November, 2008

# ANNAPOLIS STREET STREETScape

## COMMUNITY COMMENTS

The following **Preliminary Streetscape Design** objectives are based on the consultants' first impression's analysis and community input at the initial public meeting as follows:

- Provide solutions that identify and enhance the connections to key areas of the West Annapolis neighborhood, both residential and commercial.
- Create a '*Times Square*' type of space which provides a focal point as a special pedestrian place in addition to enhancing spatial imagery.
- Develop a '*landmark*' signage system to assist in directional issues, enhance image and identify the village arrival. This is not intended to address existing tenant signage.
- Develop a unique street image different from downtown through the utilization of a consistent product design and scale for lighting, benches, kiosks, planters and landscaping.
- Provide traffic control measures at the intersections utilizing street geometry which protects the pedestrian, slows traffic and reduces incentives for cut-through traffic.
- Address confusing parking policy and layout.
- Provide sidewalks that are safe, desirable to use, and aesthetically pleasing.
- Address general pedestrian safety and ADA compliance along the street.
- Develop guidelines for suggested improvements or maintenance of private property that is critical to the village image.

# ANNAPOLIS STREET STREETScape



WAYSIDE SIGN



ENTRY SIGN



LIVELY SIDEWALKS



LOCAL EXAMPLE



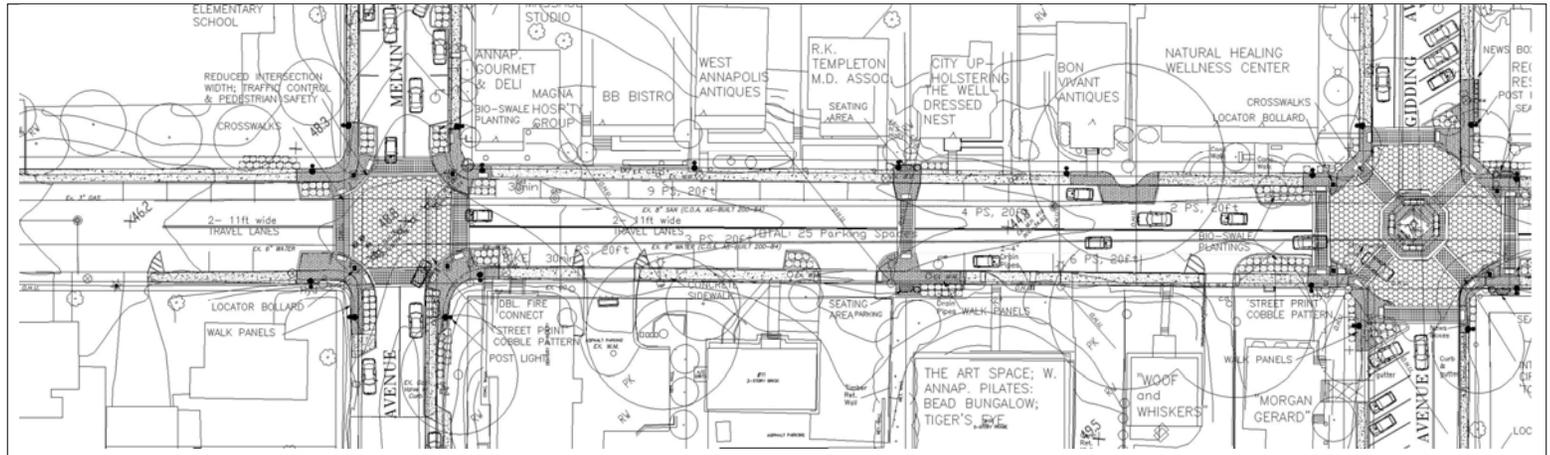
CONCRETE WEST ANNAPOLIS



WOOD

"LOCATOR" BOLLARDS

APPROACH SIGNS



ANNAPOLIS STREET PLAN



LIGHT STYLES



STREET FURNITURE

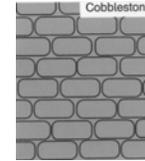
# ANNAPOLIS STREET STREETScape



**CONCRETE with PAVERS  
SIDEWALK PAVEMENT**



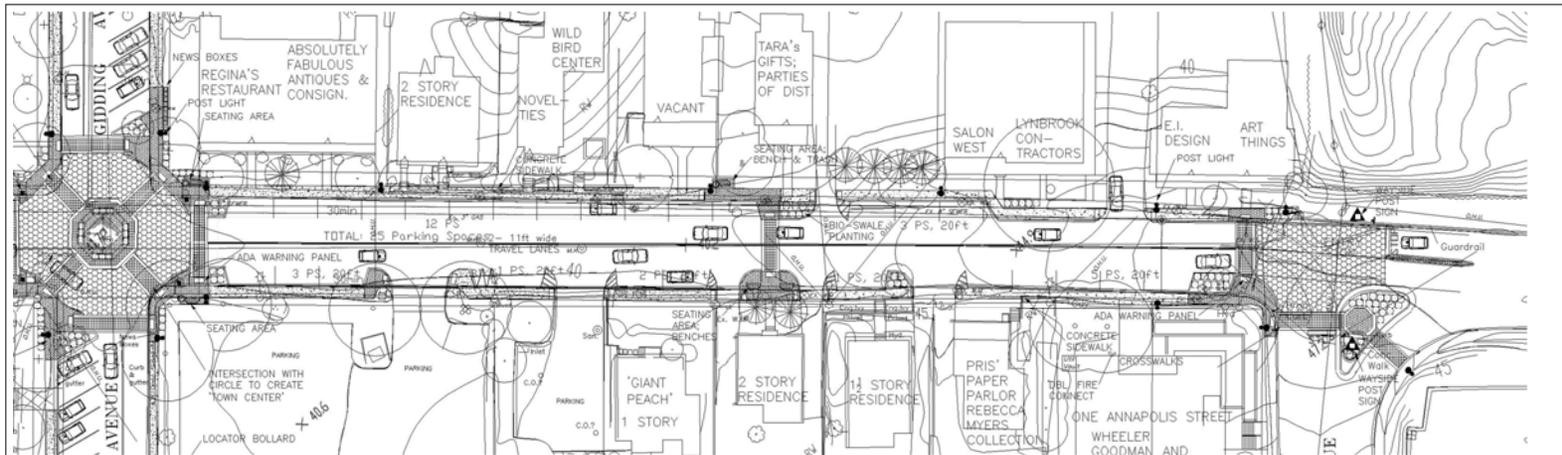
**CIRCLE  
PAVEMENT AND EDGING**



**'STREETPRINT'  
INTERSECTION PAVEMENT**



**CIRCLE  
PAVEMENT AND EDGING**



**ANNAPOLIS STREET PLAN**



**VILLAGE CENTER**



**GRAY PAVER w/ CONCRETE EDGE  
CROSSWALK**

**PROPOSED - 1**

DATE: 4 November, 2008

# ANNAPOLIS STREET STREETScape



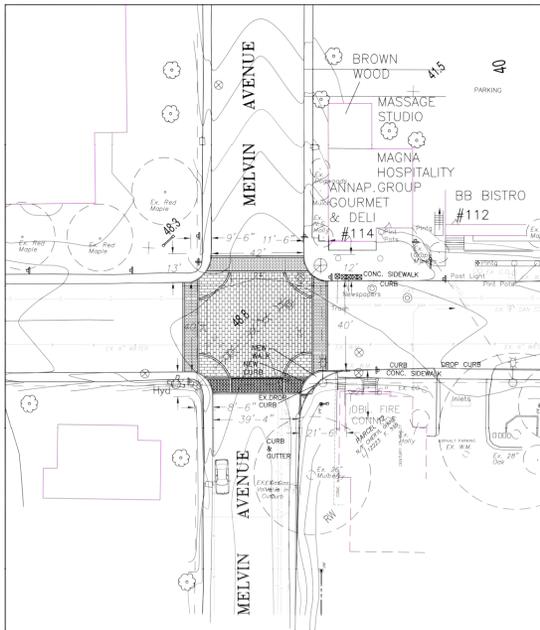
SCALE: 1" = 20'

## ANNAPOLIS STREET - PRELIMINARY CONCEPT SKETCH

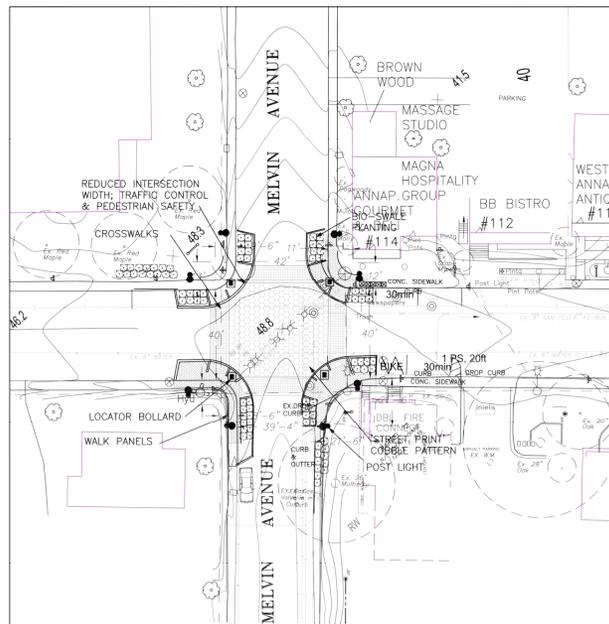


DATE: 4 November, 2008

DMSLA  
TERRA LANDSCAPE ARCHITECTURE CONSULTING



SKETCH USING 3/4 EXISTING CURBLINE



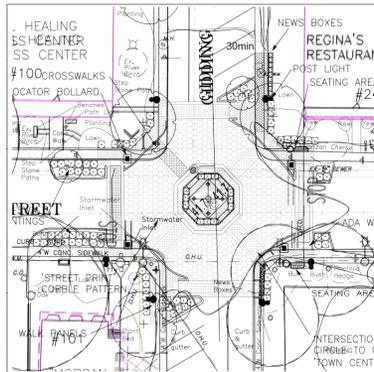
SKETCH USING ALL NEW CURBLINE

## MELVIN - ANNAPOLIS STREET INTERSECTION SCHEMATIC

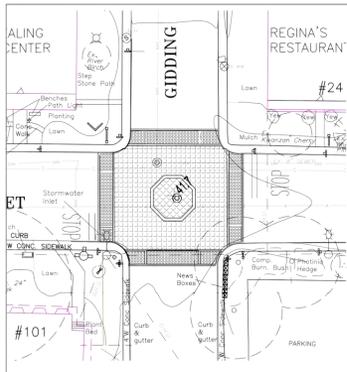


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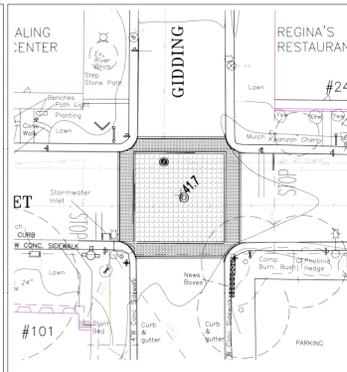
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TERRARCHITECTURE  
CONSULTING



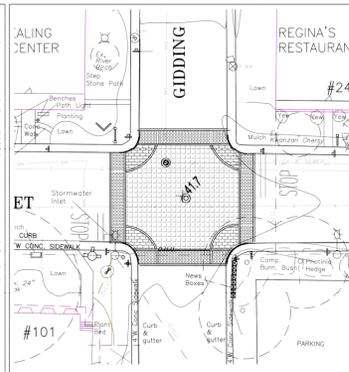
**ORIGINAL CONCEPT**  
Enlarged intersection, Central Feature



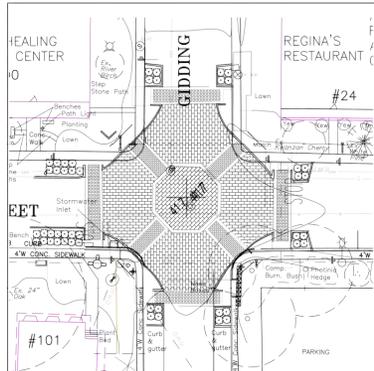
**EXISTING CURB**  
Central Feature



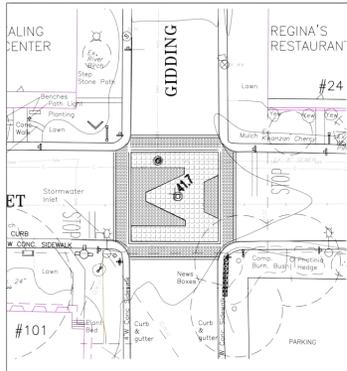
**EXISTING CURB**  
Simple Center



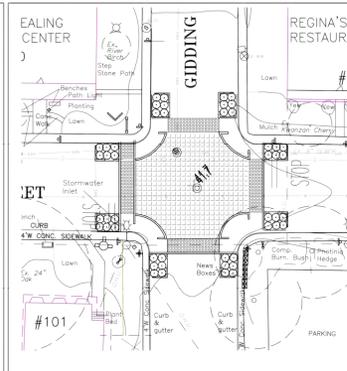
**EXISTING CURB**  
Parking Lane Pattern



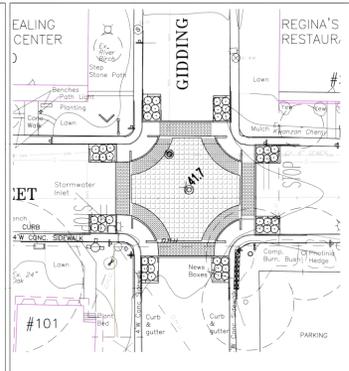
**ENLARGED INTERSECTION**  
Parallel parking, Central Feature



**EXISTING CURB**  
Logo Pattern



**NEW CURB**  
Simple Center



**NEW CURB**  
Parking Lane Pattern

**GIDDINGS - ANNAPOLIS STREET INTERSECTION SCHEMATICS**



SCALE: 1" = 20'

DATE: 23 MARCH, 2009

**DMSL** LANDSCAPE ARCHITECTURE CONSULTING  
**TERRA**



**Appendix H**

**Annapolis Bicycle Master Plan**

**Selected Pages**

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# ANNAPOLIS BICYCLE MASTER PLAN 2011



# CONTENTS

1.	INTRODUCTION.....	4
	Master Plan Vision and Goals. ....	4
	Policy, Program, & Infrastructure Recommendations. ....	5
	Implementation Strategy. ....	7
	Master Plan Process. ....	9
2.	INSTITUTIONALIZING BICYCLING .....	12
	The Case for Bicycling. ....	12
	Other Plans and Studies.....	17
	Policy Recommendations.....	19
3.	PROGRAMS FOR SAFETY, EDUCATION, AND ENCOURAGEMENT .....	21
	Existing City Administered Programs and Activities.....	21
	Recommendations for City-Administered Programs and Activities . ....	23
	Existing Community & Partnership Activities.....	28
	Recommendations for Partnership Programs and Resources.....	30
4.	BICYCLE NETWORK .....	33
	Existing Bicycle Network and Facilities.....	33
	Recommended Bicycle Network.....	35
	Facility Descriptions & Design Guidance. ....	41
	Connecting the Network. ....	47
	Network Support Facilities.....	52
5.	IMPLEMENTATION STRATEGY .....	58
	Implementation Phasing. ....	58
	Opportunities To Implement Facilities.....	66
	Maintenance . ....	69
	APPENDIX .....	80

## 4. BICYCLE NETWORK

This chapter details existing bicycle routes, envisions a recommended network of bicycle routes, and provides detailed guidance on the facilities required to complete the envisioned network and achieve the goals of this Plan.

### Bicycle Network - Master Plan Goals

3. *a convenient and attractive network of on-street and off-street bicycle routes for all abilities, ages and skill levels*
4. *connections to other modes of transportation*

### EXISTING BICYCLE NETWORK AND FACILITIES

The existing network of on-street bicycle facilities in Annapolis is very limited and disconnected, consisting primarily of isolated segments of bike lanes. There are approximately 3.3 miles of bike lanes and bike-friendly shoulders along streets within City limits, including Hilltop Lane, Edgewood Road, Moreland Parkway, Melvin Avenue, the one-way segment of Bay Ridge Drive, and Childs Point Road. Several areas of pavement markings have become visibly worn, including shared lane markings along a portion of Admiral Drive and bike lanes on Tyler Avenue. Shared lane markings were installed on a portion of Bay Ridge Avenue during the completion of this plan, however careful consideration needs to be given to their placement in relation to curb choke points, on-street parking, and vehicle turn lanes. Finally, 'Bicycle Route' signage can be seen along various state-maintained roadways through town. However, the signs are not tied to specific destinations and are apparently not part of a comprehensive route system.



Poplar Trail crossing at Glen Avenue

The existing network of off-street bicycle facilities is similarly discontinuous, but provides the initial links in what will be an exemplary regional trail

network, connecting neighborhoods and forming the core of Annapolis's future Bicycle Network. The existing trail segments include the Poplar Trail following the alignment of the abandoned W,B, & A railroad, portions of the Spa Creek Trail on each side of Spa Road, a loop trail around the Navy-Marine Corps Memorial Stadium, and a closed network of trails through Quiet Waters Park. In 2000, the White House Millennium Council under President Bill Clinton invited every state to nominate trails for designation as a Millennium Legacy Trail. The City established the Colonial Annapolis Maritime Trail route on pathways and sidewalks through town as part of the Maryland Millennium Legacy Trail, including scattered signage located along the trail route.

Several routes of national significance pass through the core of Annapolis including the East Coast Greenway (Florida to Maine) and American Discovery Trail (Delaware to California). The envisioned East Coast Greenway route in and out of town includes the existing B & A Trail, which begins on the east/north side of the Severn River and continues to BWI Airport, and the planned W, B & A "South Shore" Trail, which will follow the south/west side of the Severn River connecting Annapolis to the Odenton area.

Bicyclists can be readily observed in Annapolis riding for both recreation and necessity. Recreational bicyclists were generally observed to ride confidently with vehicle traffic and are often bound for longer loop rides that branch out into Anne Arundel County. Leaving or entering the City of

Annapolis by bicycle requires crossing the ring of automobile-oriented arterial roadways that surround the historic core of Annapolis, including: Roscoe Rowe Boulevard (MD Highway 70), US Highway 50/301, Solomons Island Road (MD Highway 2), and Aris T Allen Boulevard/Forest Drive (MD Highway 665). Bicyclists of necessity can be seen in all parts of Annapolis, weaving routes through neighborhoods and often on sidewalks to access commercial and employment destinations.



Existing barriers to neighborhood connections include this gate on Victor Parkway

Numerous bicycle routes, spot locations, and issues of concern were identified through the interactive online map, Public Workshops, and Open House. The issues of concern included: bicycling conditions along the major thoroughfares, connections to destinations in Anne Arundel County, access to the Naval Academy campus which has been closed to bicyclists since shortly after September 11th, 2001 due to security concerns, and the availability of bike parking.

Several overlapping desired paths of travel were identified in multiple contexts with common sections of difficult connections, including:

- City Dock and Eastport to Parole Town Center - following the West Street & Forest Drive corridors
- Eastport to West Street Arts District via City Dock, including the surface of the Spa Creek Bridge on Compromise Street
- West Annapolis connections, notably King George Street, Taylor Avenue, and the connection between those two streets and the Naval Academy Bridge.

#### RECOMMENDED BICYCLE NETWORK

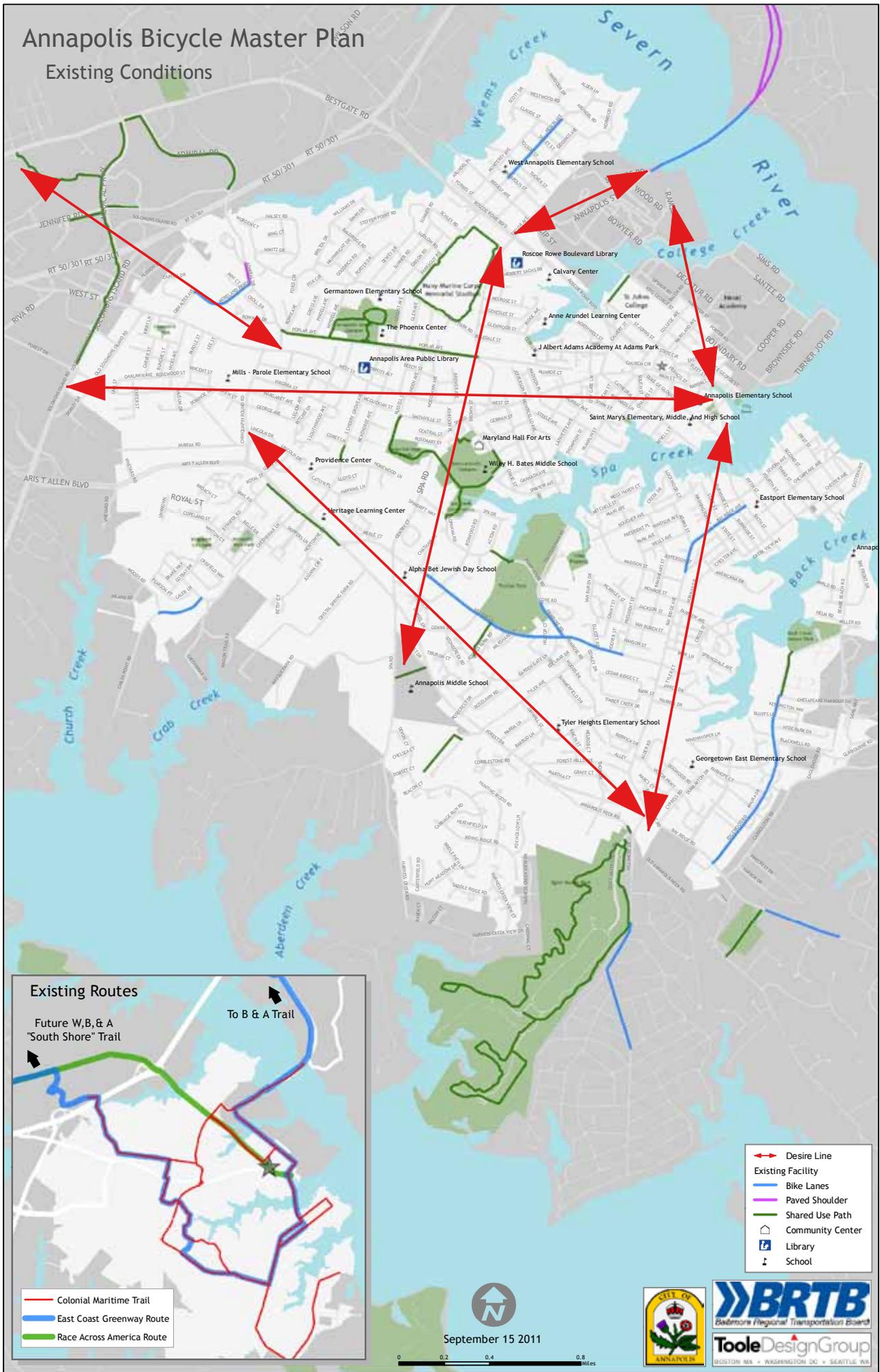
The recommended Bicycle Network was informed by the Plan's goal of establishing a convenient and attractive network of on-street and off-street bicycle routes for all abilities, ages and skill levels. Based on this guiding principle, as well as stakeholder input, the recommendation is to develop a set of core routes that parallel but avoid major vehicle thoroughfares where possible. The routes connect Annapolis' neighborhoods and destinations, enhanced by strategic connector paths, targeted intersection and crossing improvements, and a comprehensive wayfinding signage system.

The core routes and primary connections established by the recommended Bicycle Network are:

- Poplar Trail: City Dock to the Annapolis Mall
  - extend the existing trail route west to Gibraltar Avenue as well as northwest along Admiral Drive and across US 50/301 to the Annapolis Mall and eventually the South Shore Trail
  - extend the existing trail east along the Loew's service road into the West Street Arts District, including a connection through the Loew's parking lot to Washington Street
  - Connect the West Street Arts District to the City Dock and across the Spa Creek Bridge via on-street facilities following Cathedral Street, Franklin Street and Duke of Gloucester Street; as well as cycle track along Church Circle, Main Street and Compromise Street
- Spa Creek Trail: neighborhood and trail route connecting City Dock to

# Annapolis Bicycle Master Plan

## Existing Conditions



**Existing Routes**

- Colonial Maritime Trail
- East Coast Greenway Route
- Race Across America Route

Future W,B, & A "South Shore" Trail

To B & A Trail

- Desire Line
- Existing Facility
- Bike Lanes
- Paved Shoulder
- Shared Use Path
- Community Center
- Library
- School

September 15 2011



0 0.2 0.4 0.8 Miles

#### Parole Town Center

- neighborhood and recreation loop around the water
- primary missing link is a trail connection from the end of Ritchie Court to Cherry Grove Avenue
- establish neighborhood gateway along Forest Drive between Solomons Island Road (MD-2) and Link Street
- formalize the dirt trail connecting Truxton Park at the end of Primrose Road to Eastport at Windsor Avenue
- West Annapolis/Hilltop/Bay Ridge Loop
  - connect the City Dock to West Annapolis and the Naval Academy Bridge
  - connect the City Dock to Eastport and Hillsmere/Quiet Waters Park beyond
  - connect both West Annapolis and Eastport to the Spa Creek Trail, Poplar Trail, and routes and destinations on the west side
- Forest Trail: a separated trail along the entire southern edge of Forest Drive

It should be noted that while the network concept seeks to establish core routes as the guiding vision and to inform the implementation strategy detailed in this Plan, dedicated bicycle facilities are still required for many additional roadway segments and locations to complete a full Bicycle Network for Annapolis. Furthermore, the core routes and connections as presented are not intended to substitute for providing bicycle accommodations on all other roadways as development and capital projects arise, whether the locations are specifically addressed in this Plan or not.

The Bicycle Facility Recommendations map indicates the full network of specific facilities that are recommended as desired and achievable based on stakeholder comment and technical analysis. These routes and facilities recommendations are location-specific and are based on a range of factors including:

- Addresses an existing safety issue or barrier
- Contributes to a city-wide network of connected facilities
  - Connects to destinations (including employment, recreation, transit, and residential attractors)
  - Completes the Bicycle Network by overcoming a barrier or filling a gap
  - Importance of the connection for the regional Bicycle Network
- Implementability
  - cost and complexity of implementation
  - existing roadway lane widths and surrounding land uses
  - potential to partner with existing maintenance or capital

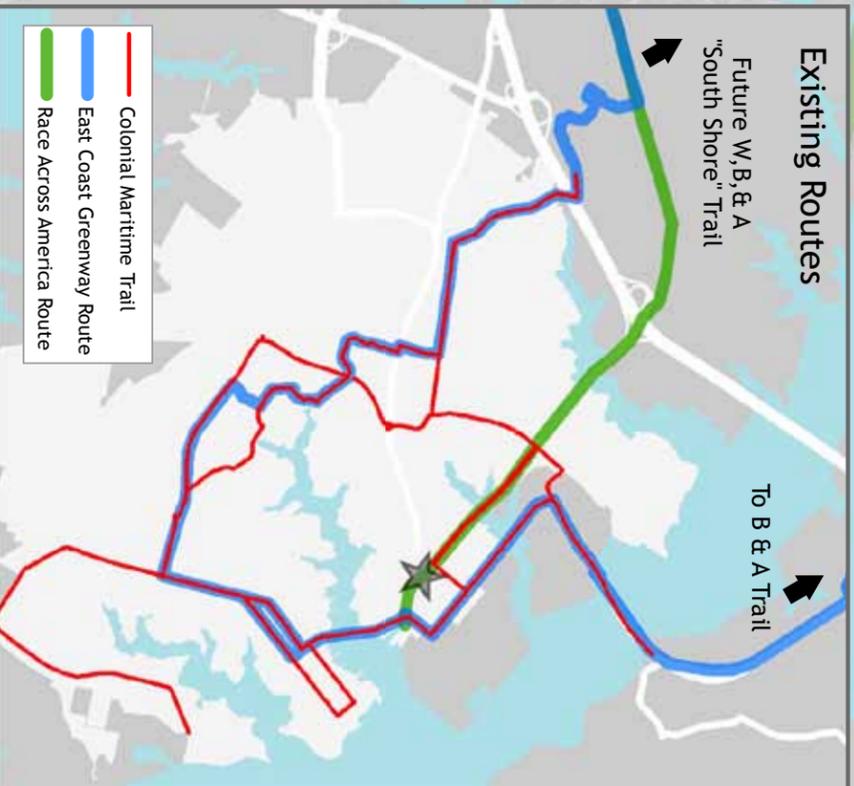
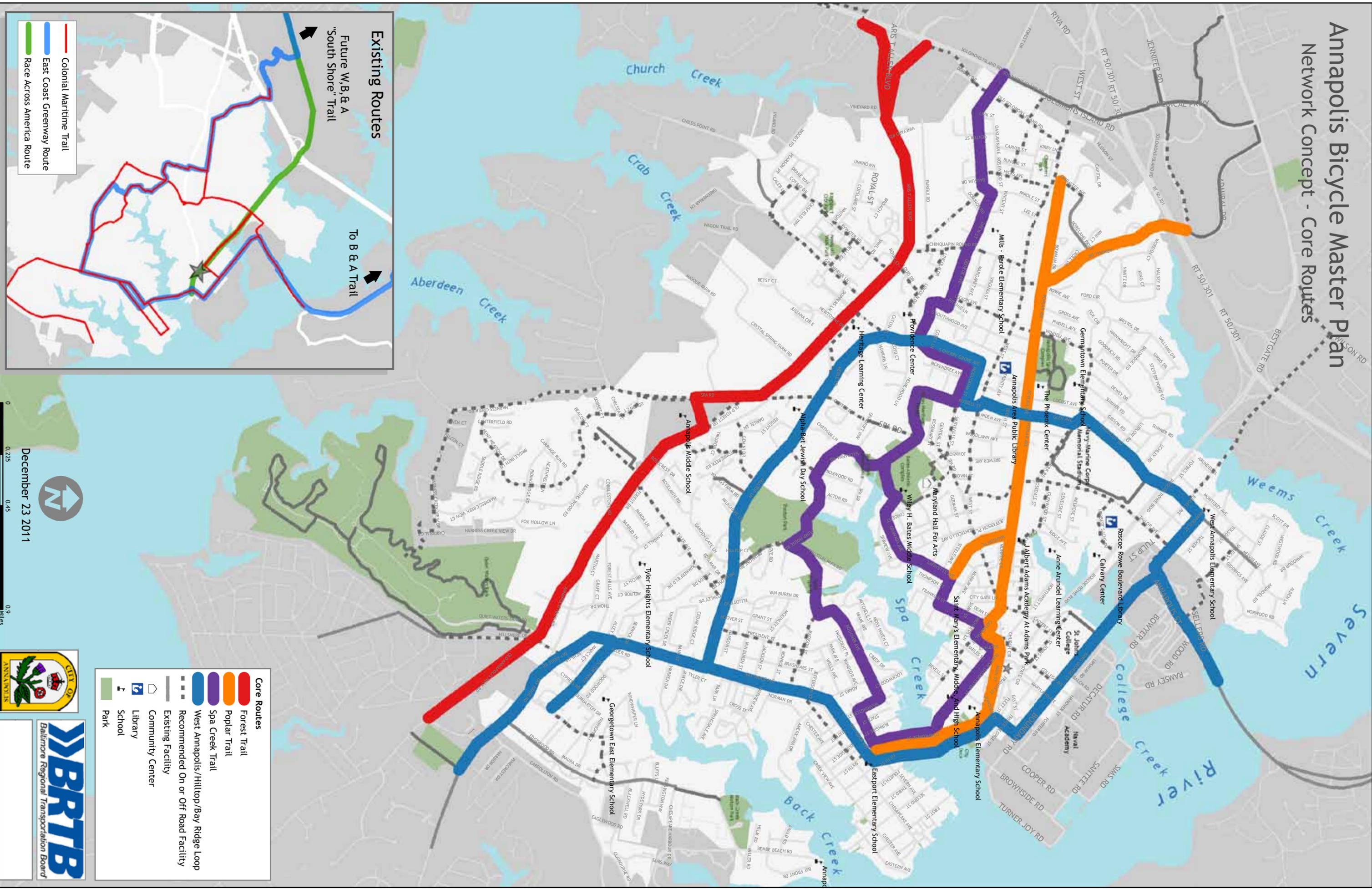
- improvement project
  - impact on vehicle capacity
- Community support

In addition to the existing shared use paths and 3.3 miles of bicycle lanes and paved shoulders in Annapolis, this Plan recommends the following facilities to create the Bicycle Network.

Recommended Bicycle Network Overview	
Facilities	Length (miles)
Bike Lanes	4.7
Paved Shoulder	1.2
Shared Lane Markings	15.3
Signed Route	9.1
Cycle Track	0.8
Shared Use Path	3.5
Sidewalk Bikes Permitted	1.5
<b>Grand Total</b>	<b>36.1</b>

Finally, a system of off-road trails should be established in Waterworks Park. Such a trail system will require preparation of a separate master plan and is not detailed in this Plan's Implementation Chapter.

# Annapolis Bicycle Master Plan Network Concept - Core Routes



- █ Core Routes
- █ Forest Trail
- █ Poplar Trail
- █ Spa Creek Trail
- █ West Annapolis/Hilltop/Bay Ridge Loop
- Recommended On or Off Road Facility
- Existing Facility
- Community Center
- Library
- School
- █ Park

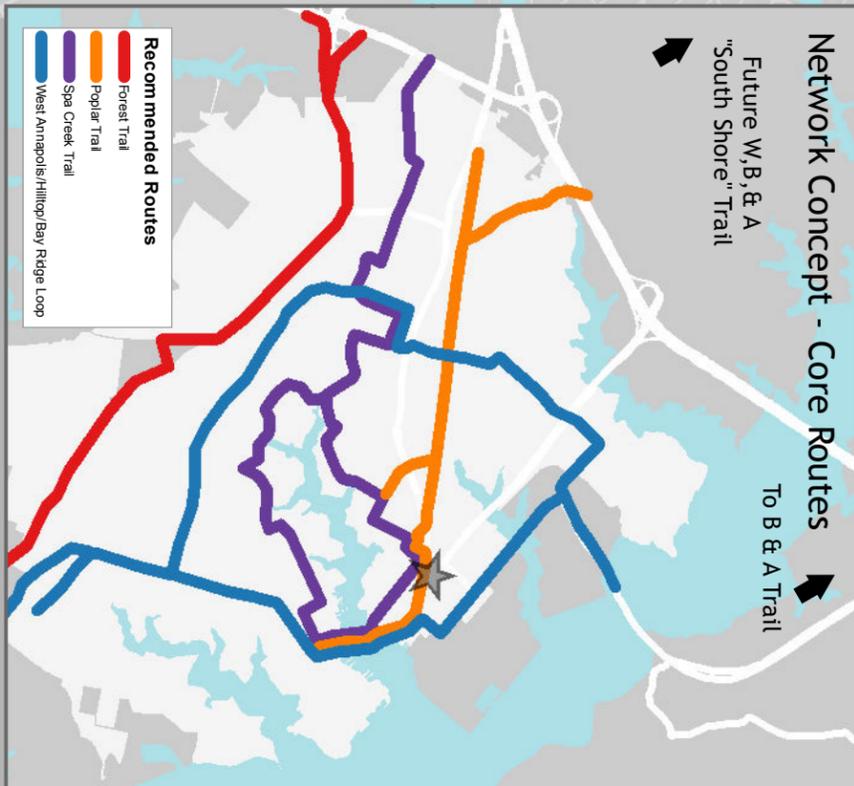
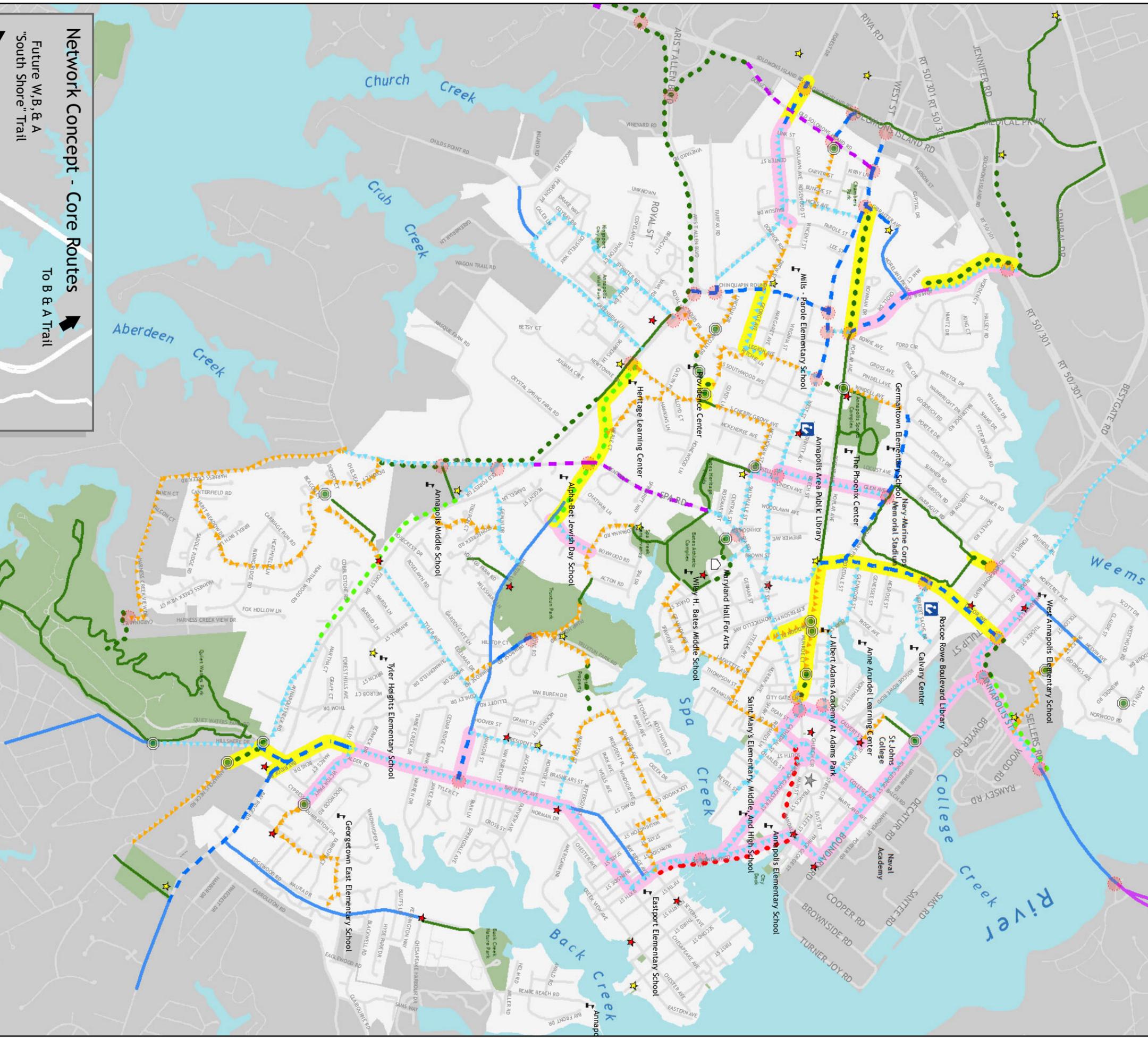


December 23 2011



# Annapolis Bicycle Master Plan

## Recommended Facilities



- Recommended Routes**
- Forest Trail
  - Poplar Trail
  - Spa Creek Trail
  - West Annapolis/Hilltop/Bay Ridge Loop

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>Recommended On-Road Facility</li> <li>Signed Route</li> <li>Shared Lane Markings</li> <li>Bike Lanes</li> <li>Paved Shoulder</li> <li>Recommended Off-Road Facility</li> <li>Cycletrack</li> <li>Shared Use Path</li> <li>Sidewalk with Bikes Permitted</li> <li>Add Bike Share Station/Bike Parking</li> <li>Add Bike Parking</li> <li>Intersection Improvement Needed</li> <li>Connector Path</li> </ul> | <ul style="list-style-type: none"> <li>Phasing</li> <li>0-2 years</li> <li>3-5 years</li> <li>Existing Facility</li> <li>Bike Lanes</li> <li>Sharrow</li> <li>Paved Shoulder</li> <li>Shared Use Path</li> <li>Community Center</li> <li>Library</li> <li>School</li> <li>Park</li> </ul> |
|---|---|

December 23 2011

0 0.225 0.45 0.9 Miles

Baltimore Regional Transportation Board

## 5. IMPLEMENTATION STRATEGY

This chapter details the strategy and steps required to implement the Plan's recommended Bicycle Network and Programs.

### IMPLEMENTATION PHASING

This 36.1 miles of facilities recommended in this Plan are intended to be implemented over the following decade. The total estimated cost to implement the entire Bicycle Network recommended in this Plan will be approximately \$3.6 million. The Plan identifies two phases of projects to be implemented over the next five years to strategically realize miles 10.9 miles of core routes of the Bicycle Network envisioned in this Plan, costing just under \$1.2 million. The following section provides details on the phases of projects recommended to implement the Bicycle Network.

The Steering Committee established for this project should continue to meet semi-annually to track progress of Plan implementation, including annually updating this project listing to reflect completed projects and identifying additional projects based on opportunities that arise and the goals of this Plan. Formal review of this Plan should be conducted in 4 to 6 years, at which time an assessment of Phase One & Two implementation can be made. Additionally, Phase Two and Three activities can be reviewed for continued relevance and be reprioritized as appropriate. By this time, new needs are likely to have emerged, and new strategies and initiatives can be formulated and adopted.

Construction cost estimates were developed for the individual recommendations by identifying pay items and establishing rough quantities by the length of recommended facilities. Unit costs are based on 2011 dollars and were assigned based on historical cost data from state departments of transportation and other sources (see Appendix.) Rough costs have been assigned to some general categories such as grading, utility impacts, drainage, etc., however these costs can vary widely depending on the exact details and nature of the work. The overall estimates are intended to be general and used for planning purposes. Construction costs will vary based on the ultimate project scope (i.e. potential combination of projects) and economic conditions at the time of construction.

As discussed in the Facility Design Guidance section in the Bicycle Network Chapter, detailed design is needed for each recommended facility and location. Please note that the individual facility cost estimates do not include additional required project planning, engineering analysis and design, easement or Right-of-Way acquisition, or the cost for ongoing maintenance. Generalized estimates of these additional costs to implement the Phase One and Two recommendations are included in the Implementation Cost Table.

<b>Recommended Facilities by Phase</b>		
	Length (miles)	Approximate Cost
<b>Near Term</b>		
Bike Lanes	0.5	\$26,000
Shared Lane Markings	6.4	\$69,000
	6.9	\$95,000
<b>Medium Term</b>		
Bike Lanes	1.4	\$334,000
Shared Lane Markings	0.3	\$3,000
Signed Route	0.5	\$2,000
Shared Used Path	1.1	\$557,000
Sidewalk with Bikes Permitted	0.7	\$186,000
	4.0	\$1,082,000
<b>Long Term</b>		
Bike Lanes	2.8	\$343,000
Paved Shoulder	1.2	\$253,000
Shared Lane Markings	8.6	\$92,000
Signed Route	8.6	\$24,000
Cycle Track	0.8	\$661,000
Shared Use Path	2.4	\$899,000
Sidewalk with Bikes Permitted	0.8	\$160,000
	25.2	\$2,432,000
<b>Grand Total</b>	<b>36.1</b>	<b>\$3,609,000</b>

The Network Phases Map identifies the stages of the evolving Bicycle Network as each phase of projects is implemented. It emphasizes how much of the Bicycle Network can be completed with the cost-effective Phase One recommendations and the connectivity importance of the Phase 2 recommendations. The Implementation Costs Overview Table identifies funding targets for the next five years to implement the Plan recommendations through Phases One and Two.

### Phase One (Years 0-2)

The Phase One Plan recommendations seek to make the maximum impact with a relatively small investment in the next two years. The first element is to enact the Policy and Program recommendations. Also recommended is to begin installing bicycle parking in high need locations, perhaps as a part of ongoing bus shelter rehabilitation. Finally, the early implementation Bicycle Network facility projects identified below can be created almost exclusively requiring paint and signage.

Existing Connections that need to be enhanced and formalized in Phase One include:

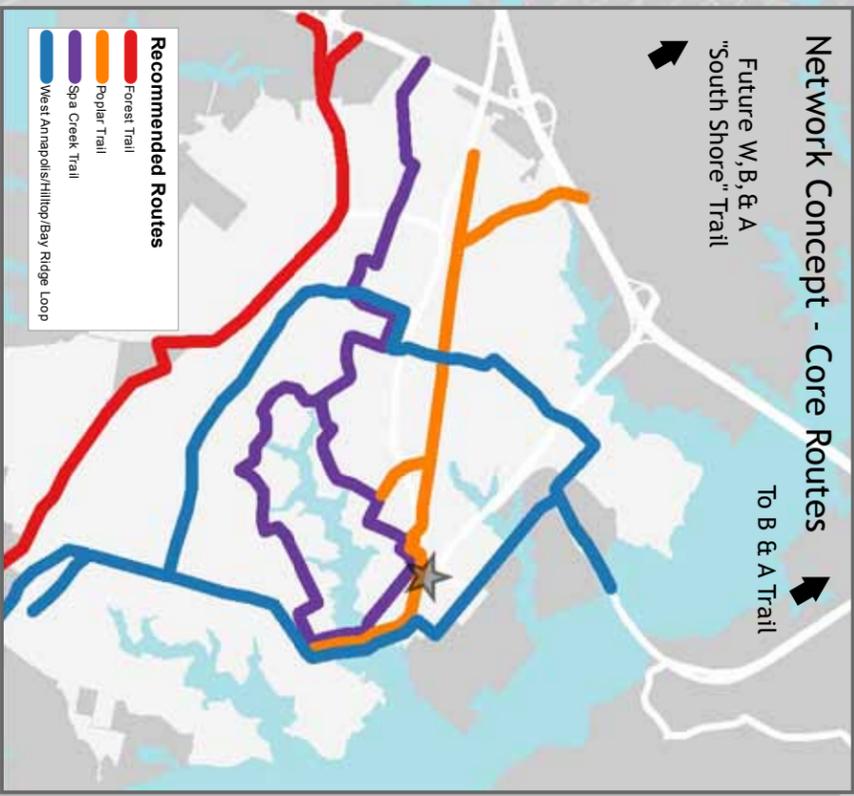
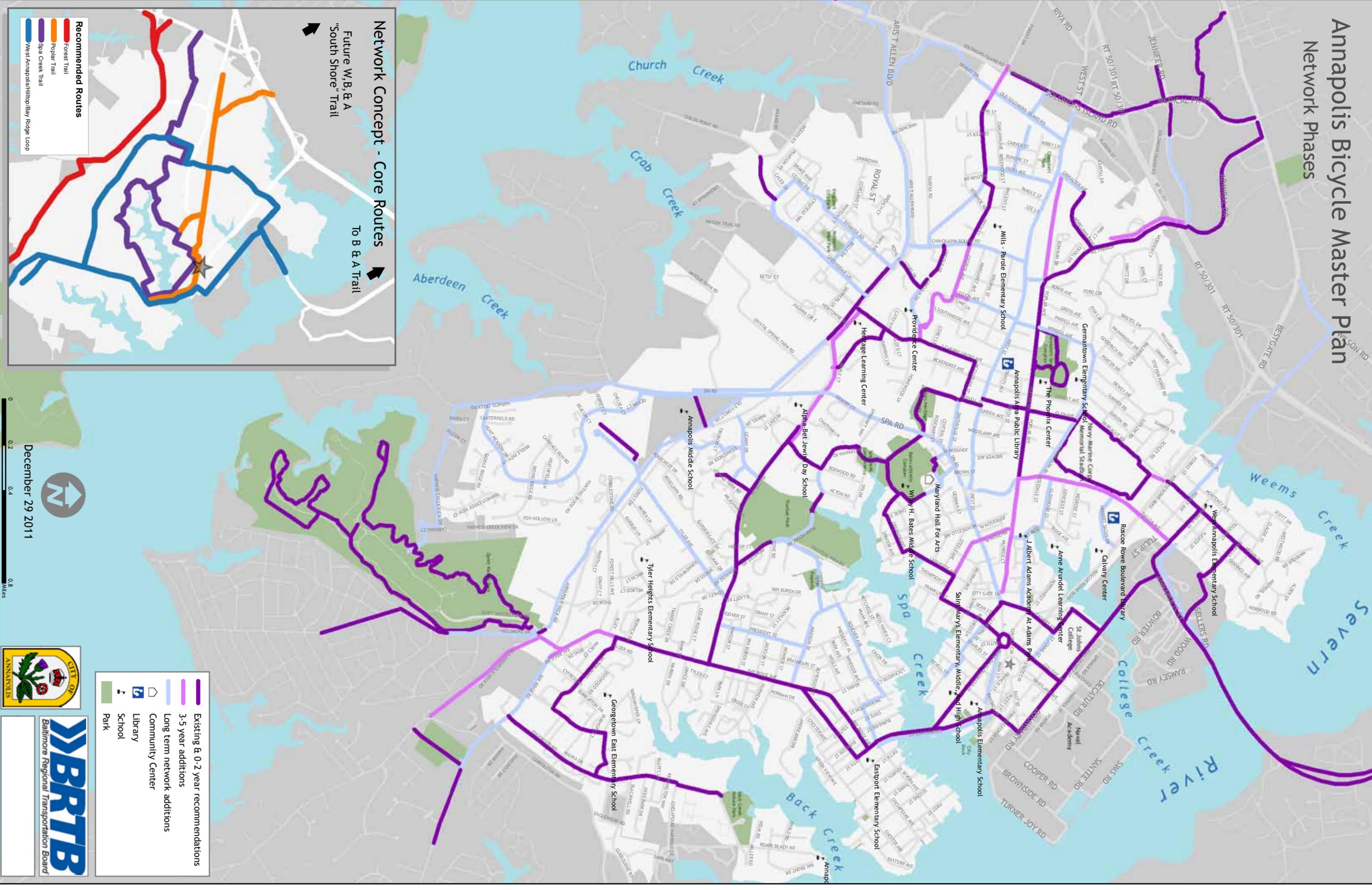
- McGuckian Street, connected east to Russell Street
- Victor Parkway, between Cypress Road and Georgetown Road (remove gate)

Intersections and crossings that need detailed design considerations to accommodate bicycles in Phase One include:

- Various crossings of West Street, including at:
  - Russell Street/Glen Avenue
  - Calvert Street/Cathedral Street
- Various crossings of Forest Drive, including at:
  - Cherry Grove Avenue
- Tyler Avenue, at Bay Ridge Avenue
- Cedar Park Road, at Glen Avenue
- Annapolis Street/Taylor Avenue
- Annapolis Street/King George Street
- Admiral Drive, at Poplar Trail
- Bay Ridge Avenue, at Adams Avenue
- Bay Ridge Avenue, at Washington Street
- Bay Ridge Avenue, at Fairview Avenue

# Annapolis Bicycle Master Plan

## Network Phases



- Recommended Routes**
- Forest Trail
  - Poplar Trail
  - Spa Creek Trail
  - West Annapolis/Hilltop/Bay Ridge Loop

- Existing & 0-2 year recommendations
- 3-5 year additions
- Long term network additions
- Library
- Community Center
- School
- Park

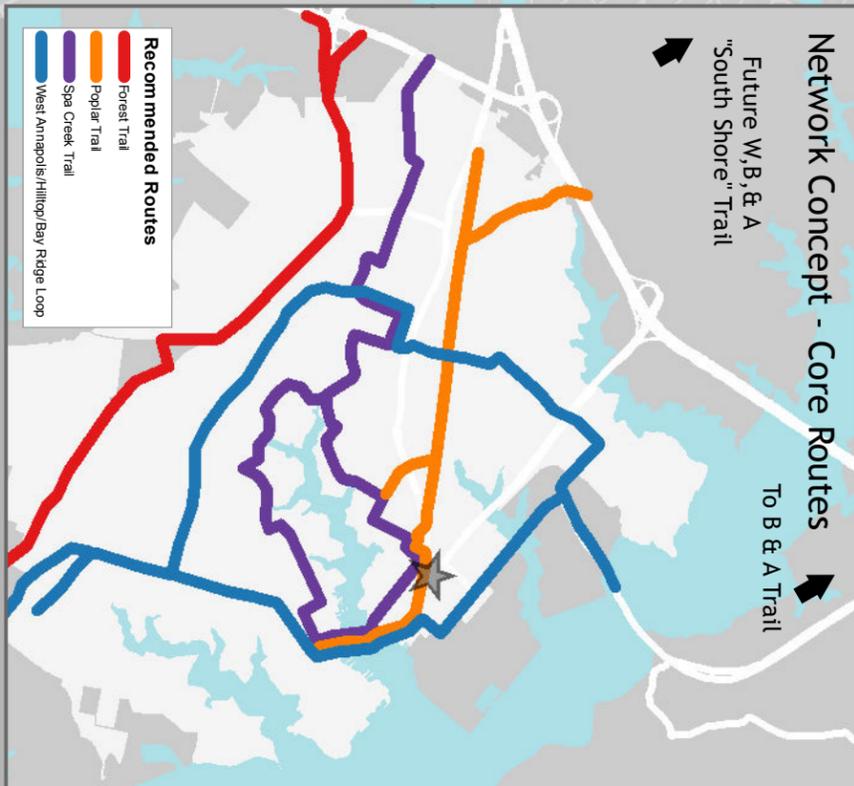
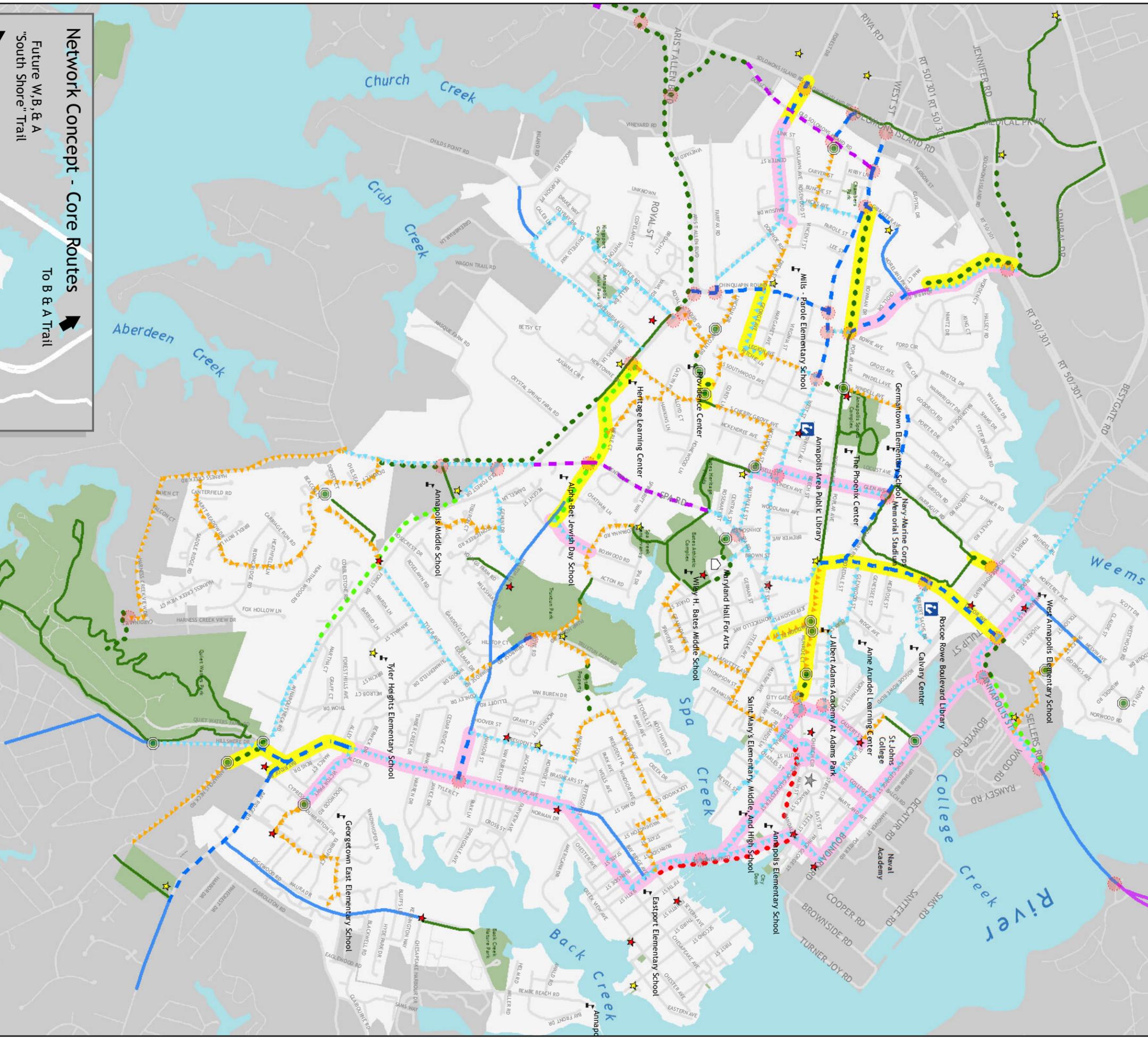


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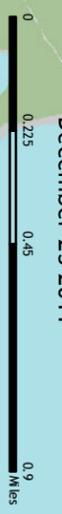
# Annapolis Bicycle Master Plan

## Recommended Facilities



- Recommended Routes**
- Forest Trail
  - Poplar Trail
  - Spa Creek Trail
  - West Annapolis/Hilltop/Bay Ridge Loop

December 23 2011



- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>Recommended On-Road Facility</li> <li>Signed Route</li> <li>Shared Lane Markings</li> <li>Bike Lanes</li> <li>Paved Shoulder</li> <li>Recommended Off-Road Facility</li> <li>Cycletrack</li> <li>Shared Use Path</li> <li>Sidewalk with Bikes Permitted</li> <li>Add Bike Share Station/Bike Parking</li> <li>Add Bike Parking</li> <li>Intersection Improvement Needed</li> <li>Connector Path</li> </ul> | <ul style="list-style-type: none"> <li>Phasing</li> <li>0-2 years</li> <li>3-5 years</li> <li>Existing Facility</li> <li>Bike Lanes</li> <li>Sharrow</li> <li>Paved Shoulder</li> <li>Shared Use Path</li> <li>Community Center</li> <li>Library</li> <li>School</li> <li>Park</li> </ul> |
|---|---|

<b>Phase 1 (0-2 Year) Projects</b>			
Project	Length (miles)	Approximate Cost	Extent
<b>Bike Lanes</b>			
Admiral Drive	0.3	\$15,000	Poplar Avenue to Moreland Parkway (remove parking)
Tyler Avenue	0.2	\$11,000	President Street to Bay Ridge Avenue
	0.5	\$26,000	
<b>Shared Lane Markings</b>			
Admiral Drive	0.3	\$4,000	Jennifer Road to Captains Circle
Melvin Avenue/ Annapolis Street	0.8	\$7,000	Ridgley Avenue to Naval Academy Bridge
Compromise Street/Randall Street/ King George Street	1.1	\$13,000	Spa Creek Bridge to Annapolis Street
Duke of Gloucester Street	0.5	\$5,000	Church Circle to Compromise Street
College Avenue/ Church Circle/ Franklin Street	0.6	\$6,000	Cathedral Street to King George Street
Victor Parkway/ Bay Ridge Avenue/ Chesapeake Avenue/ Sixth Street	1.6	\$17,000	Cypress Road to Severn Avenue
Boxwood Road	0.2	\$2,000	Hilltop Lane to Silopanna Road
Calvert Street/Cathedral Street	0.4	\$4,000	St. Johns Street to Franklin Street
Forest Drive/ Parole Street	0.4	\$5,000	Drew Street to Old Solomons Island Road
Russell Street/ Glen Avenue	0.5	\$6,000	Spa Creek Trail to Cedar Park Road
	6.4	\$69,000	
<b>Grand Total</b>	<b>6.9</b>	<b>\$95,000</b>	

### Phase Two (Years 3-5)

The Phase 2 Plan recommendations seek to continue implementing the Policy, Program, and bicycle parking recommendations. Building on the Bicycle Network expansions completed in Phase One, Phase Two will create an updated bicycle map and destination-oriented wayfinding system to educate bicyclists about the established Bicycle Network and their improved route options.

The Bicycle Network facility projects identified below are a set of 4.0 miles of capital projects. These projects will require more time and resources to design and implement than the Phase One facilities, however they make essential connections in the Bicycle Network as shown in the Network Phases Map.

<b>Phase 2 (3-5 Year) Projects</b>			
Project	Length (miles)	Approximate Cost	Extent
<b>Bike Lanes</b>			
Bay Ridge Avenue	0.5	\$31,000	Victor Pkwy. to Bay Ridge Rd. and Quiet Waters Farm Rd.
Taylor Avenue	0.7	\$257,000	Annapolis Street to Poplar Avenue
Forest Drive	0.2	\$25,000	Solomons Island to Link Street
	14	\$334,000	
<b>Shared Lane Markings</b>			
George Ave./ Legion Ave.	0.3	\$3,000	Chinquapin Round Road to Margaret Avenue
	0.3	\$3,000	
<b>Signed Route</b>			
Extend Poplar Trail	0.4	\$2,000	Taylor Avenue to Loew's parking lot
Madison Place	0.1	-	West Street to Poplar Trail
	0.5	\$2,000	
<b>Shared Use Path</b>			
Stadium Trail Connector	0.1	\$24,000	Melvin Avenue to the Stadium Trail
Poplar Trail Segment	0.1	\$134,000	Loew's parking lot to Washington St. (includ. \$100,000 towards a required structure, actual cost may vary)
Poplar Trail Segment	0.5	\$170,000	Admiral Drive to Gibraltar Avenue
Poplar Trail Segment	0.2	\$58,000	From just past Moreland Parkway to Jennifer Road
Spa Creek Trail Segment	0.1	\$128,000	Connects Ritchie Ct. to Cherry Grove Ave. (includ. estimated \$100,000 for bridge, actual cost may vary)
Forrest Trail Segment	0.1	\$43,000	Connects Hillsmere Road to Annapolis Neck Road
	1.1	\$557,000	
<b>Sidewalk with Bikes Permitted</b>			
Forest Dr./ Hilltop Ln.	0.7	\$186,000	Cherry Grove Avenue to Boxwood Road
	0.7	\$186,000	
<b>Facilities Total</b>	<b>4.0</b>	<b>\$1,082,000</b>	
<b>Wayfinding Plan</b>			
Design/Planning		\$60,000	
Installation	50	\$60,000	
		\$120,000	
<b>Bike Map</b>			
Redesign		\$10,000	
Printing		\$30,000	
		\$40,000	
<b>Phase 2 Grand Total</b>		<b>\$1,242,000</b>	

Missing connections that are essential to completing Phase 2 of the envisioned Bicycle Network include:

- Connections to the east end of the Poplar Trail, including at:
  - Madison Place, from West Street
  - Washington Street, by ascending the retaining wall in Loew's parking lot and a trail connection
- Ritchie Court, connected east to Cherry Grove Avenue (segment of Spa Creek Trail)

Existing Connections that need to be enhanced and formalized in Phase 2 include:

- Annapolis Neck Road, connected across Quiet Waters Road and Hillsmere Drive

Intersections and crossings that need detailed design considerations to accommodate bicycles in Phase 2 include:

- US 50/301, at the Admiral Drive underpass
- Solomons Island Road/MD-2, at Forest Drive
- West Street, at Washington Street
- Forest Drive, at Bay Ridge Avenue/Hillsmere Drive
- Hilltop Lane, at Spa Road
- Rowe Boulevard, at Farragut Road
- Rowe Boulevard, at Taylor Avenue

### Phase Three (Years 6+)

The Phase Three recommendations are capital projects that complete the Bicycle Network. Many of these recommended facilities will require new construction or roadway reconfiguration, which will be completed as development or larger capital roadway reconstruction projects occur.

Larger capital projects should be initiated in this phase, including:

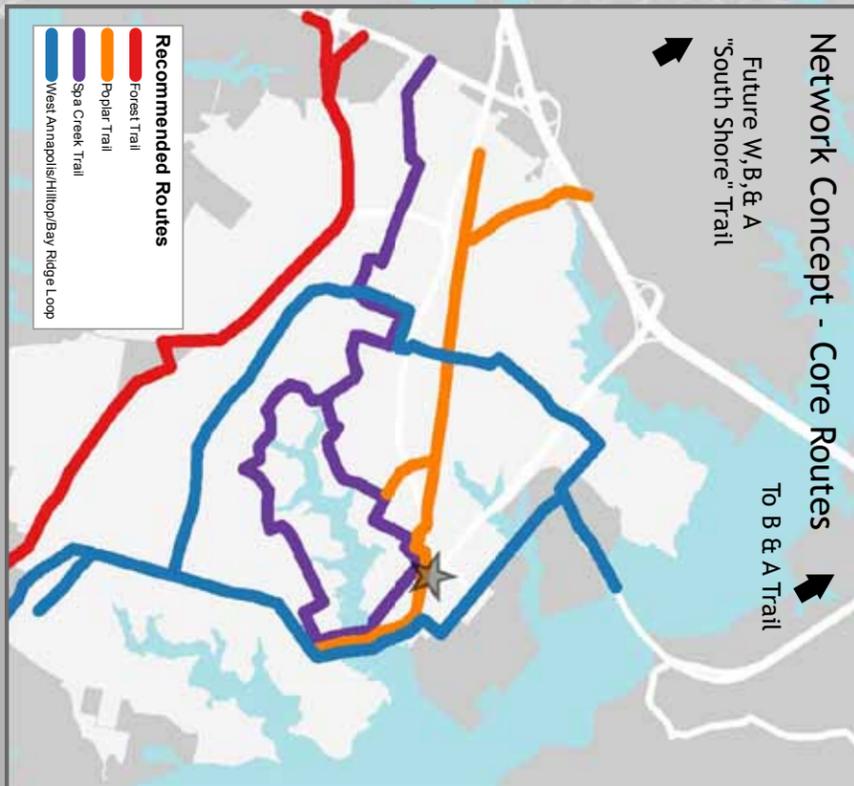
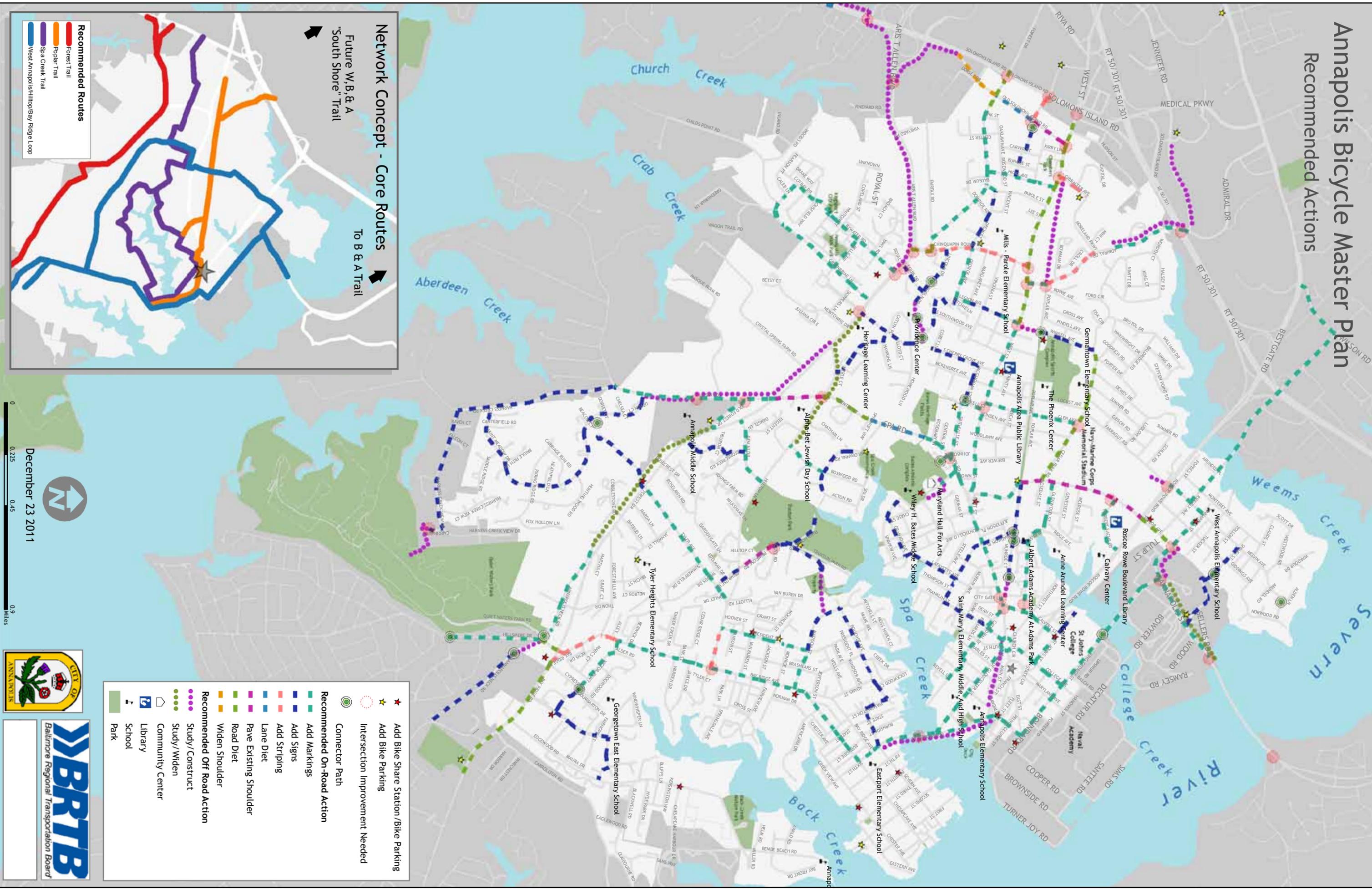
- Compromise Street and Main Street Cycle Tracks
- Forest Drive Trail segments (Bywater Road to MD State Highway 2 including Church Creek bridge and Aris T. Allen Boulevard underpass, Hilltop Lane to Annapolis Middle School, Annapolis Middle School to Old Annapolis Neck Road)
- Spa Creek Trail segments (Compromise Street to Shipwright Street, Vytar Property connection from Primrose Road to Madison Street, Bates Heritage Fields to Lincoln Drive)

Bicycle facilities can also be created through larger roadway Complete Streets reconstruction projects in this phase, including:

- Taylor Avenue/Annapolis Street from the Poplar Trail to the Naval Academy Bridge,

# Annapolis Bicycle Master Plan

## Recommended Actions



- Recommended Routes**
- Forest Trail
  - Poplar Trail
  - Spa Creek Trail
  - West Annapolis/Hilltop Bay Ridge Loop



- ★ Add Bike Share Station/Bike Parking
- ★ Add Bike Parking
- ★ Intersection Improvement Needed
- Connector Path
- Recommended On-Road Action**
  - Add Markings
  - Add Signs
  - Add Striping
  - Lane Diet
  - Pave Existing Shoulder
  - Road Diet
  - Widen Shoulder
- Recommended Off Road Action**
  - Study/Construct
  - Study/Widen
  - Community Center
  - Library
  - School
  - Park