

A Method of Estimating the Impact of Crossing Closures in Hampton Roads

With Volumes, Diversion Rates, and Capacities to Aid Estimation

October 2013



Estimating the Impact of Closing a Crossing

Source: *Regional Procedures for Planned Closures at River Crossings* (HRTPO, July 2013)

One method of estimating the impact follows:

1. Select the key hour of the subject closure time period .
 - a. The key hour is the hour with the highest volumes.
 - b. For example, the key hour of a one-night 8pm-to-5am closure is 8-9pm.

2. For the key hour, look up the expected volume of the subject direction/crossing.
 - a. One may refer to the volumes spreadsheet prepared by HRTPO staff. ATTACHED

3. Spread this volume across other crossings in the subject Crossing Group.
 - a. One may use the diversion spreadsheet prepared by HRTPO staff. ATTACHED

4. Look up key-hour volumes of affected crossings and add diverted volumes to them.
 - a. One may refer to the volumes spreadsheet prepared by HRTPO staff. ATTACHED

5. Look up capacities of each affected crossing and compare them to above total volumes.
 - a. One may refer to the capacity spreadsheet prepared by HRTPO staff. ATTACHED

If the expected volume exceeds or nears¹ the capacity of any crossings, the Responsible Person will typically pick another *Desired* Closure Time and Date.

¹ Because the hourly volumes provided by HRTPO staff to the operators are *average* hourly volumes, actual volumes may be higher. It is recommended, therefore, that Responsible Persons reconsider closures for which calculations indicate that diverted volumes will give other crossings total volumes *near* capacity.

APPENDICES

Volumes, Diversion Rates, and Capacities

For Use in Estimating the Impact
of Desired Crossing Closures in Hampton Roads

- A. Volumes
- B. Diversion Rates
- C. Capacities

Average Hourly Traffic Volumes On River Crossings in Hampton Roads

By time of day, day of week, season, and direction

Note:

These volumes are expected to **change significantly** with the implementation of tolls on Downtown and Midtown Tunnels, not only on those tunnels, but also on other crossings.

Annual Average Volumes by Day of Week, Time of Day, Season, and Direction

► James River Bridge

Year: 2012

James River Bridge - Northbound							
Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	69	74	81	84	100	126	126
1:00	44	72	93	102	100	110	86
2:00	38	64	72	71	73	89	61
3:00	66	73	80	87	82	79	48
4:00	272	294	301	308	290	168	84
5:00	905	1,018	1,029	1,039	982	345	186
6:00	1,448	1,650	1,697	1,658	1,504	396	203
7:00	1,686	1,890	1,906	1,845	1,702	493	303
8:00	990	1,135	1,147	1,092	1,032	605	432
9:00	721	793	829	796	844	730	598
10:00	667	706	696	738	794	775	682
11:00	665	666	660	691	821	846	659
12:00	649	659	678	682	852	972	733
13:00	688	694	665	704	826	841	812
14:00	723	740	732	771	912	788	792
15:00	669	669	688	721	829	735	752
16:00	724	755	783	808	876	748	701
17:00	782	835	917	900	1,049	729	671
18:00	606	658	743	706	844	648	570
19:00	419	430	460	480	567	532	495
20:00	319	343	353	388	443	448	425
21:00	286	294	324	333	396	389	340
22:00	221	226	239	256	295	286	281
23:00	112	113	124	134	207	206	145

Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	69	68	68	72	79	131	122
1:00	45	75	89	97	97	121	92
2:00	43	66	75	76	82	97	72
3:00	65	70	70	75	76	73	49
4:00	253	263	263	250	245	172	101
5:00	919	973	980	957	895	396	208
6:00	1,612	1,770	1,770	1,743	1,566	408	223
7:00	1,806	1,981	1,986	1,921	1,761	545	323
8:00	1,033	1,118	1,207	1,096	1,072	680	460
9:00	747	778	804	781	804	824	654
10:00	678	682	682	690	753	885	752
11:00	631	618	620	649	713	954	701
12:00	635	607	609	632	709	940	779
13:00	661	644	632	658	744	934	845
14:00	707	728	700	739	834	898	795
15:00	659	659	668	700	843	855	781
16:00	717	743	761	781	930	881	760
17:00	770	811	856	854	967	820	707
18:00	601	659	666	688	839	735	591
19:00	376	399	399	436	568	559	481
20:00	272	278	290	315	409	420	385
21:00	230	224	261	269	362	360	295
22:00	189	195	203	221	295	284	249
23:00	103	101	108	126	206	200	131

James River Bridge - Southbound							
Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	114	207	229	220	240	300	208
1:00	62	73	78	90	102	151	132
2:00	44	47	55	66	71	100	103
3:00	35	33	36	39	49	69	55
4:00	79	92	90	99	94	75	47
5:00	260	298	306	315	281	133	70
6:00	387	423	436	447	413	212	118
7:00	472	559	514	540	509	323	181
8:00	445	466	494	485	508	431	285
9:00	436	448	449	484	533	501	398
10:00	480	472	498	500	593	594	499
11:00	550	562	563	600	705	711	575
12:00	651	638	671	681	867	775	727
13:00	677	699	712	752	935	800	794
14:00	948	1,044	1,032	1,059	1,266	977	895
15:00	1,400	1,618	1,597	1,643	1,825	956	834
16:00	1,740	1,855	1,899	1,887	1,900	871	790
17:00	1,758	1,804	1,872	1,774	1,643	841	778
18:00	1,012	1,135	1,185	1,224	1,096	765	675
19:00	685	737	754	817	807	663	601
20:00	539	619	668	681	652	631	533
21:00	445	495	577	555	600	568	384
22:00	300	327	356	371	481	445	290
23:00	235	263	255	286	386	354	225

Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	106	205	216	210	229	318	226
1:00	51	61	67	79	83	146	135
2:00	39	43	47	58	62	102	117
3:00	31	31	35	39	44	67	65
4:00	86	91	88	94	91	89	47
5:00	263	300	301	299	276	182	82
6:00	412	457	454	455	429	267	128
7:00	489	547	514	529	501	341	207
8:00	463	494	488	504	517	453	291
9:00	427	442	440	453	479	534	418
10:00	474	469	459	484	552	646	525
11:00	547	549	554	576	662	754	609
12:00	627	612	639	664	780	853	807
13:00	682	675	690	722	854	902	889
14:00	876	906	946	946	1,126	1,120	974
15:00	1,565	1,643	1,641	1,644	1,756	1,132	927
16:00	1,830	1,990	1,964	1,921	1,963	1,024	872
17:00	1,687	1,879	1,788	1,839	1,696	951	839
18:00	1,050	1,129	1,121	1,127	1,101	847	714
19:00	656	689	720	749	787	710	605
20:00	521	556	609	608	671	632	490
21:00	418	435	505	492	641	580	333
22:00	249	281	280	309	504	463	257
23:00	198	216	222	243	382	377	195

Source: HRTPO analysis of VDOT permanent count station data. Summer is defined as June, July, and August.

Annual Average Volumes by Day of Week, Time of Day, Season, and Direction

► **Hazelwood Bridge**

Dates Collected: 10/19/2011 & 10/20/2011

Hazelwood Bridge - Northbound			
10/19/2011 & 10/20/2011	Time Start	Wednesday	Thursday
	0:00	28	43
	1:00	21	26
	2:00	11	27
	3:00	30	23
	4:00	52	60
	5:00	164	173
	6:00	321	332
	7:00	408	432
	8:00	358	405
	9:00	352	327
	10:00	371	354
	11:00	343	420
	12:00	459	411
	13:00	764	390
	14:00	635	505
	15:00	610	591
	16:00	752	774
	17:00	747	727
	18:00	558	628
	19:00	394	395
	20:00	268	306
	21:00	223	244
	22:00	133	167
23:00	63	81	

Hazelwood Bridge - Southbound			
10/19/2011 & 10/20/2011	Time Start	Wednesday	Thursday
	0:00	32	25
	1:00	21	35
	2:00	22	30
	3:00	24	23
	4:00	85	107
	5:00	292	301
	6:00	532	602
	7:00	682	650
	8:00	566	586
	9:00	466	497
	10:00	394	409
	11:00	391	427
	12:00	359	414
	13:00	398	452
	14:00	389	426
	15:00	510	570
	16:00	623	640
	17:00	572	669
	18:00	427	469
	19:00	266	264
	20:00	180	177
	21:00	139	154
	22:00	79	108
23:00	50	60	

Source: HRTPO analysis of VDOT raw count station data.

Annual Average Volumes by Day of Week, Time of Day, Season, and Direction

► **Godwin Bridge**

Dates Collected: 10/19/2011 & 10/20/2011

Godwin Bridge - Northbound			
10/19/2011 & 10/20/2011	Time Start	Wednesday	Thursday
	0:00	40	49
	1:00	26	31
	2:00	14	31
	3:00	31	23
	4:00	46	53
	5:00	152	160
	6:00	311	332
	7:00	422	477
	8:00	408	482
	9:00	413	417
	10:00	429	479
	11:00	454	582
	12:00	562	511
	13:00	946	544
	14:00	770	622
	15:00	796	792
	16:00	1,017	971
	17:00	1,015	1,023
	18:00	751	801
	19:00	509	546
	20:00	372	397
	21:00	300	328
	22:00	156	192
23:00	90	102	

Godwin Bridge - Southbound			
10/19/2011 & 10/20/2011	Time Start	Wednesday	Thursday
	0:00	37	23
	1:00	20	35
	2:00	23	28
	3:00	24	29
	4:00	102	116
	5:00	376	379
	6:00	711	777
	7:00	943	898
	8:00	762	793
	9:00	647	667
	10:00	521	579
	11:00	501	526
	12:00	507	552
	13:00	533	549
	14:00	464	566
	15:00	587	667
	16:00	698	735
	17:00	642	781
	18:00	520	573
	19:00	340	341
	20:00	228	223
	21:00	167	191
	22:00	94	112
23:00	46	68	

Source: HRTPO analysis of VDOT raw count station data.

Annual Average Volumes by Day of Week, Time of Day, Season, and Direction

► Monitor-Merrimac Memorial Bridge-Tunnel

Year: 2012

MMMBT - Northbound							
Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	282	248	261	305	299	405	399
1:00	168	150	159	173	179	249	261
2:00	131	133	127	150	154	229	227
3:00	175	161	155	175	179	187	167
4:00	522	529	511	569	546	387	192
5:00	1,603	1,614	1,539	1,631	1,607	759	373
6:00	2,717	2,747	2,682	2,841	2,544	1,013	576
7:00	3,009	3,038	2,896	3,096	2,915	1,372	784
8:00	2,153	2,233	2,056	2,225	2,106	1,670	1,027
9:00	1,650	1,580	1,617	1,732	1,776	1,904	1,457
10:00	1,578	1,350	1,449	1,605	1,781	2,031	1,670
11:00	1,521	1,436	1,540	1,640	1,898	2,239	1,935
12:00	1,584	1,474	1,523	1,674	2,107	2,121	2,070
13:00	1,581	1,532	1,586	1,676	2,082	2,244	2,082
14:00	1,791	1,822	1,896	2,105	2,488	2,059	2,034
15:00	2,015	2,109	2,041	2,339	2,606	1,786	1,923
16:00	2,317	2,517	2,399	2,629	2,379	1,666	1,780
17:00	2,112	2,264	2,242	2,437	2,330	1,516	1,594
18:00	1,648	1,644	1,719	1,859	2,089	1,371	1,465
19:00	1,002	1,087	1,181	1,228	1,628	1,158	1,145
20:00	790	777	888	956	1,174	1,045	994
21:00	707	736	811	848	988	1,008	850
22:00	637	674	802	807	890	910	753
23:00	348	408	520	518	618	666	430

Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	200	186	194	206	229	328	316
1:00	128	124	127	137	162	231	234
2:00	107	106	112	127	148	218	213
3:00	144	156	151	164	168	176	150
4:00	379	445	433	446	454	325	185
5:00	1,363	1,618	1,656	1,606	1,542	700	370
6:00	2,463	2,884	2,901	2,878	2,736	765	473
7:00	2,711	3,091	3,033	3,076	2,944	981	564
8:00	1,930	2,147	2,122	2,165	2,092	1,174	690
9:00	1,458	1,530	1,576	1,576	1,623	1,358	990
10:00	1,334	1,329	1,346	1,409	1,578	1,466	1,175
11:00	1,365	1,302	1,361	1,424	1,612	1,594	1,282
12:00	1,415	1,358	1,388	1,460	1,695	1,666	1,401
13:00	1,424	1,427	1,439	1,485	1,863	1,655	1,505
14:00	1,693	1,724	1,738	1,791	2,172	1,631	1,499
15:00	1,903	2,038	2,041	2,138	2,404	1,507	1,441
16:00	2,213	2,420	2,383	2,446	2,511	1,509	1,368
17:00	1,960	2,108	2,169	2,253	2,353	1,415	1,271
18:00	1,378	1,532	1,559	1,664	1,908	1,273	1,146
19:00	914	1,012	975	1,089	1,348	1,042	936
20:00	709	739	731	813	904	837	792
21:00	640	674	697	755	788	826	641
22:00	573	594	622	669	724	736	559
23:00	308	336	349	390	493	518	341

MMMBT - Southbound							
Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	328	438	465	467	517	650	474
1:00	177	163	169	177	207	353	317
2:00	128	127	131	175	170	283	267
3:00	143	134	129	149	167	202	157
4:00	293	289	292	309	334	202	135
5:00	955	919	948	995	1,012	436	227
6:00	1,888	1,870	1,846	1,927	1,798	750	415
7:00	2,095	2,057	1,978	2,030	1,903	1,151	570
8:00	1,633	1,637	1,531	1,620	1,572	1,494	780
9:00	1,305	1,382	1,185	1,342	1,411	1,752	1,104
10:00	1,270	1,225	1,258	1,339	1,464	1,656	1,376
11:00	1,371	1,291	1,345	1,438	1,656	1,613	1,475
12:00	1,486	1,419	1,392	1,506	1,924	1,740	1,591
13:00	1,578	1,490	1,423	1,613	2,017	1,951	1,638
14:00	2,171	2,119	2,075	2,219	2,677	2,497	1,749
15:00	2,919	2,983	2,820	3,101	3,286	2,438	1,754
16:00	3,234	3,336	3,189	3,361	3,137	2,272	1,719
17:00	2,873	2,826	2,823	2,950	2,852	2,239	1,666
18:00	1,545	1,844	1,743	2,028	2,143	2,011	1,497
19:00	1,070	1,131	1,141	1,258	1,427	1,484	1,257
20:00	826	901	988	999	1,276	1,171	1,087
21:00	724	791	878	930	1,090	1,063	936
22:00	573	641	715	780	972	998	845
23:00	397	442	472	540	738	778	547

Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	245	386	426	434	476	631	527
1:00	135	125	132	160	173	302	355
2:00	105	107	119	145	150	242	280
3:00	122	129	129	142	159	166	155
4:00	266	298	308	298	302	198	138
5:00	854	957	999	973	959	434	241
6:00	1,633	1,884	1,886	1,892	1,783	638	381
7:00	1,718	1,962	2,013	1,978	1,907	880	483
8:00	1,374	1,595	1,602	1,610	1,575	1,024	563
9:00	1,119	1,287	1,298	1,345	1,370	1,111	745
10:00	1,124	1,184	1,204	1,254	1,360	1,210	944
11:00	1,171	1,214	1,244	1,292	1,453	1,371	1,048
12:00	1,268	1,297	1,334	1,405	1,682	1,538	1,228
13:00	1,356	1,355	1,406	1,503	1,816	1,585	1,335
14:00	1,730	1,798	1,847	1,922	2,323	1,952	1,539
15:00	2,670	2,900	2,948	3,015	3,184	1,798	1,446
16:00	3,069	3,378	3,360	3,428	3,341	1,737	1,396
17:00	2,459	2,786	2,848	2,905	2,685	1,668	1,352
18:00	1,468	1,651	1,662	1,821	1,873	1,472	1,230
19:00	936	997	994	1,137	1,369	1,182	1,013
20:00	735	792	847	927	1,053	1,043	874
21:00	636	711	734	822	1,012	1,037	733
22:00	484	534	536	624	978	972	611
23:00	326	353	358	440	701	778	425

Source: HRTPO analysis of VDOT permanent count station data. Summer is defined as June, July, and August.

Annual Average Volumes by Day of Week, Time of Day, Season, and Direction

► Hampton Roads Bridge-Tunnel

Year: 2012

HRBT - Eastbound							
Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	648	475	525	539	621	937	845
1:00	355	255	265	303	348	516	549
2:00	258	204	223	270	279	396	456
3:00	271	240	248	257	288	320	307
4:00	681	605	591	614	599	387	298
5:00	2,156	2,138	2,017	2,107	1,947	716	464
6:00	3,101	3,165	3,018	3,210	3,151	1,227	695
7:00	3,480	3,546	3,210	3,478	3,311	1,732	926
8:00	3,071	2,948	2,982	3,004	2,810	2,232	1,244
9:00	2,390	2,500	2,557	2,621	2,569	2,661	1,738
10:00	2,334	2,462	2,537	2,574	2,657	2,749	2,289
11:00	2,384	2,439	2,617	2,692	2,839	2,842	2,587
12:00	2,478	2,546	2,545	2,734	2,947	2,764	2,669
13:00	2,498	2,543	2,561	2,730	2,930	2,659	2,688
14:00	2,888	2,887	2,889	3,024	2,828	2,668	2,717
15:00	3,045	3,146	3,009	3,119	2,977	2,655	2,671
16:00	3,164	3,180	3,148	3,169	2,975	2,624	2,741
17:00	3,047	3,034	3,029	3,056	2,910	2,668	2,733
18:00	2,290	2,474	2,507	2,780	2,739	2,690	2,537
19:00	1,639	1,737	1,777	2,084	2,587	2,521	2,265
20:00	1,401	1,455	1,542	1,734	2,286	2,093	2,002
21:00	1,192	1,283	1,450	1,525	2,126	1,993	1,587
22:00	1,009	1,063	1,174	1,288	1,862	1,897	1,386
23:00	665	722	806	972	1,464	1,461	1,083

Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	461	388	398	441	510	775	712
1:00	282	207	207	248	285	502	519
2:00	198	168	187	209	247	451	489
3:00	217	196	238	219	255	285	282
4:00	543	560	574	579	580	358	279
5:00	1,754	1,961	1,972	1,966	1,824	674	462
6:00	2,648	3,039	3,058	3,046	2,901	1,109	689
7:00	2,890	3,304	3,259	3,264	3,116	1,501	867
8:00	2,674	2,850	2,987	2,917	2,736	1,920	1,102
9:00	2,167	2,341	2,437	2,458	2,429	2,156	1,464
10:00	2,092	2,122	2,201	2,313	2,399	2,405	1,896
11:00	2,170	2,169	2,253	2,325	2,632	2,566	2,176
12:00	2,237	2,218	2,282	2,410	2,699	2,700	2,329
13:00	2,247	2,253	2,293	2,420	2,730	2,719	2,440
14:00	2,583	2,622	2,735	2,735	2,991	2,705	2,397
15:00	2,965	3,094	3,047	3,154	3,035	2,687	2,411
16:00	2,836	3,182	3,166	3,142	3,103	2,584	2,452
17:00	2,688	2,830	2,974	3,041	2,984	2,609	2,365
18:00	2,067	2,312	2,352	2,507	2,718	2,407	2,111
19:00	1,492	1,603	1,577	1,759	2,321	2,010	1,855
20:00	1,214	1,268	1,295	1,456	1,958	1,726	1,612
21:00	1,031	1,104	1,134	1,262	1,685	1,647	1,253
22:00	839	897	930	1,080	1,514	1,534	1,010
23:00	545	592	590	772	1,127	1,116	727

HRBT - Westbound							
Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	724	406	512	638	590	873	958
1:00	314	252	279	355	399	615	635
2:00	257	182	216	241	305	579	673
3:00	275	214	207	233	262	333	378
4:00	591	542	473	533	553	430	315
5:00	1,687	1,582	1,534	1,554	1,514	829	480
6:00	2,699	2,641	2,488	2,590	2,471	1,484	881
7:00	2,949	3,016	2,885	2,966	2,868	2,109	1,304
8:00	2,792	2,776	2,680	2,860	2,847	2,652	1,794
9:00	2,622	2,557	2,590	2,685	2,812	2,811	2,416
10:00	2,503	2,484	2,355	2,689	2,726	2,730	2,659
11:00	2,542	2,484	2,561	2,707	2,578	2,631	2,547
12:00	2,551	2,580	2,393	2,599	2,646	2,610	2,472
13:00	2,577	2,533	2,607	2,528	2,698	2,614	2,556
14:00	2,779	2,856	2,817	2,883	2,697	2,618	2,541
15:00	2,941	3,026	2,803	2,906	2,820	2,515	2,568
16:00	2,909	2,991	2,889	2,870	2,747	2,492	2,583
17:00	2,941	2,945	2,760	2,868	2,793	2,502	2,549
18:00	2,725	2,625	2,711	2,782	2,678	2,315	2,525
19:00	1,815	1,920	2,203	2,377	2,495	2,036	2,237
20:00	1,406	1,491	1,622	1,765	1,923	1,822	1,877
21:00	1,154	1,190	1,228	1,286	1,706	1,863	1,381
22:00	987	1,042	1,171	1,184	1,500	1,644	1,162
23:00	675	845	1,019	908	1,139	1,406	927

Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	414	359	378	426	470	699	691
1:00	246	203	215	247	284	507	529
2:00	214	163	177	191	271	525	581
3:00	224	194	190	200	232	300	316
4:00	456	454	440	457	466	356	252
5:00	1,412	1,523	1,534	1,509	1,470	637	412
6:00	2,250	2,554	2,546	2,594	2,455	1,104	691
7:00	2,575	2,899	2,927	2,824	2,722	1,579	986
8:00	2,471	2,674	2,650	2,747	2,674	2,008	1,309
9:00	2,242	2,253	2,325	2,366	2,500	2,278	1,797
10:00	2,095	2,050	2,125	2,266	2,531	2,468	2,255
11:00	2,132	2,093	2,174	2,329	2,737	2,533	2,426
12:00	2,219	2,200	2,332	2,467	2,628	2,650	2,421
13:00	2,219	2,270	2,353	2,521	2,715	2,663	2,534
14:00	2,536	2,582	2,753	2,808	2,942	2,576	2,517
15:00	2,833	3,027	3,015	3,029	2,975	2,528	2,433
16:00	2,854	3,039	3,060	3,094	2,930	2,458	2,398
17:00	2,717	2,997	2,992	3,025	2,922	2,421	2,288
18:00	2,129	2,475	2,511	2,716	2,685	2,231	2,010
19:00	1,567	1,750	1,691	2,007	2,236	1,860	1,673
20:00	1,251	1,347	1,359	1,490	1,664	1,573	1,421
21:00	1,026	1,095	1,184	1,210	1,477	1,494	1,061
22:00	893	932	1,014	1,067	1,320	1,368	873
23:00	553	631	634	802	974	1,003	628

Source: HRTPO analysis of VDOT permanent count station data. Summer is defined as June, July, and August.

Annual Average Volumes by Day of Week, Time of Day, Season, and Direction

► Midtown Tunnel

Year: 2012

Midtown Tunnel - Eastbound								
Summer	Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	0:00	101	89	121	83	65	184	217
	1:00	46	45	60	48	34	113	129
	2:00	38	41	45	41	33	104	98
	3:00	80	55	64	58	55	91	79
	4:00	350	379	357	364	375	149	80
	5:00	1,284	1,315	1,205	1,256	1,193	346	215
	6:00	1,510	1,518	1,431	1,507	1,434	545	326
	7:00	1,513	1,459	1,407	1,503	1,450	488	294
	8:00	1,442	1,471	1,408	1,458	1,346	588	369
	9:00	1,169	1,234	1,174	1,225	1,189	661	513
	10:00	1,032	1,126	1,014	1,066	1,121	705	624
	11:00	999	1,074	1,049	1,134	1,154	781	646
	12:00	1,046	1,058	1,061	1,087	1,209	874	665
	13:00	1,038	1,060	990	1,096	1,152	843	683
	14:00	1,116	1,163	1,116	1,196	1,215	890	707
	15:00	1,305	1,373	1,281	1,387	1,323	904	695
	16:00	1,413	1,473	1,376	1,466	1,360	919	652
	17:00	1,350	1,423	1,311	1,403	1,156	937	677
	18:00	973	1,031	1,059	1,068	1,167	938	698
	19:00	566	582	669	659	759	701	513
	20:00	387	441	454	447	553	497	445
	21:00	305	368	409	351	473	478	345
	22:00	255	251	237	189	429	444	265
23:00	154	160	147	144	291	324	166	
Non-Summer	Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	0:00	113	102	112	87	94	194	203
	1:00	56	57	59	52	55	116	129
	2:00	46	46	48	46	52	96	97
	3:00	72	72	73	77	86	88	83
	4:00	311	365	375	362	359	135	95
	5:00	1,088	1,283	1,317	1,270	1,194	332	214
	6:00	1,316	1,506	1,531	1,497	1,484	517	362
	7:00	1,319	1,498	1,480	1,481	1,504	531	349
	8:00	1,282	1,471	1,486	1,475	1,417	657	382
	9:00	1,115	1,301	1,332	1,297	1,205	726	514
	10:00	964	1,108	1,125	1,149	1,088	787	653
	11:00	963	1,012	1,083	1,066	1,129	844	636
	12:00	959	1,057	1,073	1,088	1,169	917	696
	13:00	943	1,030	1,028	1,058	1,135	860	702
	14:00	1,037	1,133	1,169	1,157	1,227	872	710
	15:00	1,176	1,331	1,341	1,355	1,406	889	693
	16:00	1,294	1,489	1,478	1,472	1,395	857	638
	17:00	1,187	1,367	1,401	1,427	1,264	887	654
	18:00	905	1,068	1,069	1,126	1,119	875	647
	19:00	525	603	605	627	759	618	475
	20:00	387	407	407	440	526	454	424
	21:00	321	339	334	350	465	433	341
	22:00	292	315	248	265	438	419	287
23:00	183	180	139	154	308	313	184	

Midtown Tunnel - Westbound								
Summer	Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	0:00	146	143	135	160	196	284	267
	1:00	79	75	74	79	110	210	204
	2:00	63	51	51	66	86	164	213
	3:00	52	52	51	58	82	113	131
	4:00	115	125	115	121	123	89	85
	5:00	515	529	526	527	516	169	130
	6:00	1,211	1,278	1,227	1,241	1,097	388	242
	7:00	1,306	1,356	1,319	1,325	1,246	495	302
	8:00	924	970	986	976	923	456	289
	9:00	874	829	837	891	873	510	361
	10:00	857	862	839	912	922	635	525
	11:00	959	992	1,018	1,064	1,177	779	633
	12:00	1,083	1,107	1,088	1,166	1,356	891	788
	13:00	1,147	1,204	1,190	1,270	1,332	870	894
	14:00	1,374	1,420	1,373	1,424	1,324	892	924
	15:00	1,390	1,425	1,376	1,449	1,364	935	882
	16:00	1,469	1,528	1,418	1,513	1,434	804	789
	17:00	1,498	1,566	1,415	1,539	1,335	819	752
	18:00	1,330	1,368	1,393	1,434	1,347	710	719
	19:00	818	862	1,003	1,030	966	668	591
	20:00	635	696	768	774	708	578	513
	21:00	541	605	762	671	657	585	435
	22:00	341	345	432	472	544	550	297
23:00	227	281	303	329	413	440	238	
Non-Summer	Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	0:00	143	124	137	167	184	276	253
	1:00	77	63	75	94	107	206	197
	2:00	58	47	63	65	88	176	184
	3:00	57	57	60	65	66	103	110
	4:00	110	121	120	127	128	99	88
	5:00	468	545	551	541	512	166	131
	6:00	1,080	1,260	1,291	1,253	1,194	348	273
	7:00	1,173	1,377	1,362	1,370	1,279	479	338
	8:00	831	970	981	979	947	462	293
	9:00	697	839	821	834	836	514	362
	10:00	737	836	863	865	912	609	513
	11:00	896	968	1,022	1,035	1,101	718	548
	12:00	1,005	1,105	1,132	1,158	1,269	849	717
	13:00	1,062	1,154	1,201	1,199	1,405	836	762
	14:00	1,298	1,383	1,456	1,432	1,479	899	796
	15:00	1,305	1,434	1,448	1,456	1,475	964	793
	16:00	1,340	1,492	1,509	1,481	1,451	924	756
	17:00	1,333	1,507	1,517	1,529	1,451	850	717
	18:00	1,116	1,381	1,371	1,410	1,278	808	669
	19:00	822	949	966	1,034	911	679	564
	20:00	616	701	732	774	689	574	455
	21:00	530	614	723	674	671	598	362
	22:00	295	354	453	456	599	535	295
23:00	199	231	297	326	444	395	239	

Source: HRTPO analysis of VDOT permanent count station data. Summer is defined as June, July, and August.

Annual Average Volumes by Day of Week, Time of Day, Season, and Direction

► Downtown Tunnel

Year: 2012

Downtown Tunnel - Eastbound							
Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	500	455	570	586	573	786	767
1:00	285	277	329	339	363	532	552
2:00	251	247	287	292	326	506	496
3:00	273	286	293	310	323	420	366
4:00	590	546	558	585	579	411	310
5:00	1,820	1,810	1,707	1,788	1,726	718	470
6:00	3,156	3,118	2,976	3,115	3,053	1,236	816
7:00	3,214	3,215	3,077	3,267	3,108	1,588	1,136
8:00	2,845	2,713	2,857	2,957	2,864	1,825	1,203
9:00	2,275	2,344	2,278	2,313	2,461	2,011	1,566
10:00	2,417	2,539	2,404	2,580	2,712	2,287	1,970
11:00	2,464	2,484	2,361	2,561	2,731	2,511	2,032
12:00	2,515	2,559	2,546	2,641	2,791	2,579	2,169
13:00	2,458	2,467	2,459	2,418	2,514	2,629	2,314
14:00	2,699	2,597	2,666	2,759	2,710	2,692	2,338
15:00	2,769	2,920	2,926	3,001	2,912	2,594	2,290
16:00	2,999	2,995	2,977	3,004	2,862	2,416	2,164
17:00	2,857	2,898	2,817	2,881	2,723	2,508	2,025
18:00	2,280	2,407	2,440	2,537	2,637	2,457	1,945
19:00	1,698	1,800	1,946	1,935	2,271	2,056	1,691
20:00	1,422	1,496	1,594	1,675	1,932	1,774	1,513
21:00	1,238	1,289	1,421	1,469	1,770	1,689	1,412
22:00	1,045	1,074	1,224	1,262	1,601	1,584	1,208
23:00	768	820	960	1,018	1,232	1,235	869
Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	432	409	432	431	490	748	729
1:00	275	266	270	278	346	542	564
2:00	239	229	237	262	330	513	526
3:00	260	269	272	287	327	415	352
4:00	532	549	556	548	577	392	317
5:00	1,701	1,868	1,932	1,866	1,808	748	500
6:00	2,841	3,122	3,245	3,121	3,171	1,256	795
7:00	2,951	3,106	3,258	3,143	3,166	1,611	1,080
8:00	2,650	2,974	3,009	2,921	2,904	1,865	1,151
9:00	2,240	2,487	2,545	2,489	2,516	2,050	1,514
10:00	2,300	2,468	2,499	2,536	2,643	2,268	1,881
11:00	2,241	2,391	2,414	2,483	2,738	2,547	1,895
12:00	2,399	2,484	2,501	2,577	2,816	2,645	2,056
13:00	2,357	2,500	2,498	2,595	2,681	2,659	2,285
14:00	2,700	2,827	2,851	2,874	2,875	2,636	2,280
15:00	2,920	3,082	3,052	3,097	3,018	2,611	2,170
16:00	2,905	3,167	3,074	3,099	3,026	2,553	2,058
17:00	2,721	2,992	3,019	3,053	2,933	2,530	2,023
18:00	2,218	2,453	2,541	2,575	2,693	2,298	1,838
19:00	1,654	1,803	1,853	1,916	2,259	1,988	1,606
20:00	1,308	1,436	1,484	1,547	1,886	1,637	1,379
21:00	1,133	1,223	1,309	1,348	1,698	1,535	1,181
22:00	947	967	988	1,129	1,536	1,421	1,026
23:00	701	751	757	834	1,206	1,147	746

Downtown Tunnel - Westbound							
Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	683	667	762	804	832	1,152	1,140
1:00	410	389	428	468	538	812	838
2:00	394	327	358	392	479	724	751
3:00	344	334	352	376	417	468	440
4:00	651	625	654	656	666	453	366
5:00	2,057	2,040	2,033	2,056	2,051	836	541
6:00	3,003	2,968	2,690	3,020	2,986	1,286	931
7:00	2,963	2,918	2,705	2,944	2,909	1,421	1,018
8:00	2,476	2,706	2,541	2,648	2,574	1,658	1,140
9:00	2,173	2,292	2,134	2,310	2,460	1,992	1,524
10:00	2,304	2,304	2,318	2,345	2,578	2,257	2,029
11:00	2,365	2,379	2,258	2,494	2,679	2,488	2,157
12:00	2,636	2,623	2,574	2,691	2,823	2,692	2,375
13:00	2,597	2,639	2,555	2,701	2,723	2,715	2,544
14:00	2,858	2,756	2,779	2,946	2,871	2,798	2,589
15:00	2,920	3,131	2,876	3,111	3,086	2,795	2,645
16:00	3,109	3,251	3,086	3,104	3,174	2,657	2,485
17:00	3,222	3,109	3,108	3,244	3,173	2,583	2,385
18:00	2,840	2,877	3,058	3,014	3,013	2,526	2,286
19:00	2,048	2,155	2,405	2,372	2,436	2,238	1,951
20:00	1,855	1,921	2,098	2,084	2,199	2,116	1,742
21:00	1,693	1,863	1,847	1,989	2,267	2,134	1,594
22:00	1,361	1,481	1,511	1,639	1,928	1,899	1,311
23:00	979	1,057	1,179	1,217	1,562	1,619	1,020
Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	587	617	651	692	730	1,107	1,028
1:00	366	344	360	402	467	796	798
2:00	352	293	313	333	445	748	775
3:00	322	307	333	343	383	455	426
4:00	616	661	685	689	699	471	352
5:00	1,795	2,123	2,175	2,090	2,038	865	506
6:00	2,636	2,956	3,056	2,939	3,007	1,277	850
7:00	2,651	2,947	3,091	2,960	2,914	1,431	921
8:00	2,467	2,708	2,814	2,723	2,744	1,703	1,052
9:00	2,149	2,344	2,294	2,378	2,428	1,960	1,424
10:00	2,145	2,296	2,315	2,353	2,497	2,171	1,888
11:00	2,232	2,326	2,366	2,440	2,635	2,433	1,988
12:00	2,481	2,619	2,583	2,751	2,884	2,642	2,157
13:00	2,526	2,615	2,594	2,690	2,798	2,667	2,461
14:00	2,815	2,829	2,893	2,957	3,009	2,733	2,444
15:00	3,050	3,137	3,157	3,145	3,249	2,784	2,443
16:00	3,124	3,292	3,271	3,274	3,326	2,809	2,382
17:00	3,102	3,295	3,273	3,264	3,289	2,701	2,305
18:00	2,651	2,991	3,013	3,075	3,005	2,543	2,152
19:00	1,972	2,168	2,231	2,283	2,431	2,205	1,769
20:00	1,740	1,857	1,973	2,042	2,178	2,010	1,577
21:00	1,507	1,700	1,765	1,853	2,180	2,006	1,287
22:00	1,230	1,328	1,380	1,458	1,942	1,765	1,104
23:00	858	946	988	1,115	1,496	1,381	847

Source: HRTPO analysis of VDOT permanent count station data. Summer is defined as June, July, and August.

Annual Average Volumes by Day of Week, Time of Day, Season, and Direction

► Berkley Bridge

Year: 2011

		Berkley Bridge - Eastbound						
Summer	Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	0:00	629	551	599	572	642	998	969
	1:00	364	313	332	345	406	642	626
	2:00	287	272	273	302	356	597	555
	3:00	288	301	301	317	358	422	363
	4:00	615	595	602	619	635	430	321
	5:00	2,133	2,238	2,307	2,267	2,109	911	553
	6:00	4,333	4,599	4,658	4,649	4,337	1,687	943
	7:00	5,158	5,493	5,548	5,553	5,250	2,156	1,282
	8:00	4,544	4,930	5,050	5,041	4,584	2,571	1,355
	9:00	3,215	3,534	3,593	3,431	3,451	2,760	1,964
	10:00	3,142	3,405	3,372	3,529	3,688	3,022	2,546
	11:00	3,234	3,360	3,395	3,426	3,714	3,150	2,633
	12:00	3,322	3,423	3,445	3,572	3,777	3,526	2,881
	13:00	3,148	3,278	3,324	3,334	3,671	3,414	3,038
	14:00	3,482	3,592	3,573	3,708	3,734	3,383	3,024
	15:00	3,948	4,012	4,034	4,106	4,089	3,397	2,928
	16:00	4,080	4,220	4,156	4,238	4,024	3,377	2,728
	17:00	3,662	3,875	3,982	4,033	3,664	3,355	2,688
	18:00	2,879	3,187	3,326	3,347	3,557	3,270	2,457
	19:00	2,045	2,271	2,366	2,461	2,769	2,796	2,060
	20:00	1,734	1,838	1,945	2,017	2,343	2,245	1,814
	21:00	1,539	1,633	1,791	1,779	2,201	2,105	1,653
	22:00	1,292	1,338	1,408	1,514	1,967	1,942	1,400
23:00	932	985	991	1,054	1,531	1,549	1,023	
Non-Summer	Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	0:00	490	507	516	518	574	905	836
	1:00	289	296	296	315	352	585	561
	2:00	278	244	254	273	341	559	519
	3:00	259	280	280	290	324	378	323
	4:00	542	538	539	548	563	368	287
	5:00	2,058	2,236	2,260	2,224	2,111	762	478
	6:00	4,285	4,712	4,743	4,635	4,533	1,457	971
	7:00	5,164	5,594	5,532	5,482	5,300	1,954	1,417
	8:00	4,769	5,213	5,048	5,148	4,938	2,332	1,499
	9:00	3,319	3,684	3,664	3,633	3,585	2,464	1,786
	10:00	3,199	3,422	3,348	3,472	3,521	2,713	2,393
	11:00	3,213	3,273	3,296	3,332	3,582	3,055	2,502
	12:00	3,325	3,336	3,336	3,383	3,832	3,259	2,680
	13:00	3,156	3,228	3,218	3,288	3,631	3,182	2,901
	14:00	3,508	3,541	3,594	3,696	3,920	3,307	2,939
	15:00	4,064	4,262	4,176	4,211	4,233	3,360	2,833
	16:00	4,146	4,345	4,391	4,386	4,288	3,259	2,621
	17:00	3,797	4,086	3,980	4,115	3,914	3,160	2,539
	18:00	2,948	3,270	3,358	3,292	3,540	3,066	2,299
	19:00	2,045	2,132	2,260	2,229	2,823	2,363	1,876
	20:00	1,599	1,704	1,748	1,806	2,213	1,917	1,641
	21:00	1,377	1,491	1,537	1,590	1,971	1,824	1,469
	22:00	1,139	1,140	1,188	1,293	1,791	1,702	1,271
23:00	784	844	818	928	1,350	1,357	873	

Two-day counts supplied here b/c of errors in WB continuous counts.

Year: 2006

Berkley Bridge - Westbound			
Time Start	08/22/06	08/23/06	Weekday
0:00	697	688	693
1:00	422	420	421
2:00	282	268	275
3:00	268	264	266
4:00	697	705	701
5:00	2,567	2,731	2,649
6:00	4,136	3,946	4,041
7:00	3,332	3,119	3,226
8:00	2,849	3,037	2,943
9:00	2,920	2,660	2,790
10:00	2,782	2,488	2,635
11:00	2,346	2,429	2,388
12:00	3,032	2,855	2,944
13:00	3,151	2,859	3,005
14:00	3,930	3,427	3,679
15:00	4,576	4,622	4,599
16:00	5,010	5,217	5,114
17:00	5,533	5,562	5,548
18:00	3,484	4,105	3,795
19:00	2,876	2,933	2,905
20:00	2,491	2,601	2,546
21:00	2,807	2,416	2,612
22:00	1,475	1,752	1,614
23:00	1,123	1,533	1,328

Source: HRTPO analysis of VDOT permanent count station data. Summer is defined as June, July, and August.

Annual Average Volumes by Day of Week, Time of Day, Season, and Direction

► **Jordan Bridge**

Dates Collected: 9/26/2006 & 9/27/2006

Jordan Bridge - Eastbound			
9/26/2006 & 9/27/2006	Time Start	Tuesday	Wednesday
	0:00	11	16
	1:00	12	11
	2:00	12	8
	3:00	7	3
	4:00	8	10
	5:00	26	22
	6:00	124	90
	7:00	452	466
	8:00	366	362
	9:00	150	177
	10:00	149	175
	11:00	173	114
	12:00	189	152
	13:00	407	145
	14:00	273	229
	15:00	528	513
	16:00	441	414
	17:00	278	264
	18:00	141	182
	19:00	149	93
	20:00	107	63
	21:00	47	50
	22:00	45	37
23:00	19	27	

Jordan Bridge - Westbound			
9/26/2006 & 9/27/2006	Time Start	Tuesday	Wednesday
	0:00	17	16
	1:00	10	9
	2:00	9	7
	3:00	6	5
	4:00	28	27
	5:00	190	237
	6:00	462	409
	7:00	294	322
	8:00	194	183
	9:00	101	80
	10:00	88	88
	11:00	102	134
	12:00	97	125
	13:00	145	110
	14:00	144	128
	15:00	243	242
	16:00	388	355
	17:00	338	313
	18:00	212	274
	19:00	91	84
	20:00	91	77
	21:00	63	68
	22:00	43	38
23:00	34	39	

Source: HRTPO analysis of VDOT raw count station data.

Annual Average Volumes by Day of Week, Time of Day, Season, and Direction

► Gilmerton Bridge

Year: 2012

Gilmerton Bridge - Eastbound							
Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	11	10	14	14	14	33	37
1:00	7	7	9	10	11	25	33
2:00	6	7	9	9	8	22	24
3:00	7	5	7	6	7	14	17
4:00	19	19	18	24	21	15	12
5:00	286	294	291	296	291	53	36
6:00	742	740	697	727	706	119	74
7:00	1,021	1,044	1,007	1,046	962	155	104
8:00	778	794	746	758	725	220	129
9:00	559	578	540	559	568	259	168
10:00	527	520	510	524	574	289	209
11:00	537	547	537	539	627	314	199
12:00	558	560	547	576	669	331	239
13:00	555	558	530	584	676	331	242
14:00	670	684	635	685	802	325	231
15:00	888	907	846	864	982	312	198
16:00	1,080	1,095	1,027	1,043	1,084	313	192
17:00	839	908	806	869	888	307	187
18:00	507	522	519	547	632	283	168
19:00	333	344	364	394	443	185	141
20:00	62	73	74	82	113	125	47
21:00	40	48	48	49	76	106	35
22:00	31	30	38	37	62	85	33
23:00	16	19	21	21	40	64	16

Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	22	12	9	11	13	69	71
1:00	11	7	7	9	10	76	56
2:00	9	6	5	6	9	80	45
3:00	8	6	6	6	9	35	29
4:00	20	20	18	20	21	25	20
5:00	241	273	286	280	267	85	52
6:00	656	742	748	729	709	176	99
7:00	950	1,075	1,105	1,091	991	239	150
8:00	736	858	892	860	783	312	189
9:00	523	574	578	569	571	384	294
10:00	484	508	528	509	564	428	344
11:00	510	525	532	527	617	484	315
12:00	541	541	550	547	634	502	397
13:00	532	549	554	562	655	482	398
14:00	617	648	645	663	746	464	374
15:00	795	900	888	899	956	455	327
16:00	949	1,080	1,094	1,052	1,047	440	314
17:00	722	862	850	888	823	404	301
18:00	432	502	530	514	577	338	245
19:00	285	321	329	343	402	268	207
20:00	68	66	64	74	202	190	84
21:00	48	43	41	47	170	164	53
22:00	35	26	28	35	142	138	47
23:00	22	15	17	20	95	95	30

Gilmerton Bridge - Westbound							
Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	9	9	15	14	12	33	53
1:00	5	7	9	9	8	22	38
2:00	5	5	5	7	7	18	42
3:00	5	5	7	6	6	12	23
4:00	18	17	16	16	19	12	12
5:00	316	328	313	335	318	42	24
6:00	852	895	858	877	826	90	56
7:00	743	782	746	765	715	116	93
8:00	516	515	510	492	485	161	111
9:00	475	413	428	420	455	219	152
10:00	485	450	471	473	499	264	181
11:00	501	518	499	516	581	295	163
12:00	568	566	550	567	645	338	205
13:00	546	574	558	573	710	320	223
14:00	644	667	629	678	849	304	214
15:00	830	866	832	842	1,042	287	218
16:00	1,088	1,064	1,017	1,126	1,284	293	208
17:00	1,126	1,142	1,137	1,185	1,214	287	199
18:00	756	747	828	847	870	254	185
19:00	425	457	516	485	522	195	160
20:00	68	83	81	83	129	138	45
21:00	36	43	39	41	81	128	29
22:00	30	30	29	30	69	101	26
23:00	18	18	23	19	44	75	14

Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	27	12	8	10	12	108	103
1:00	16	7	6	8	8	70	70
2:00	12	6	5	5	7	52	58
3:00	10	5	4	6	8	28	31
4:00	17	13	12	13	14	26	21
5:00	268	324	334	318	311	81	35
6:00	719	885	906	874	800	148	86
7:00	699	823	840	833	797	192	158
8:00	476	569	563	528	527	261	192
9:00	396	442	425	429	453	339	277
10:00	427	449	480	450	482	400	356
11:00	481	497	505	501	561	462	305
12:00	528	555	573	564	612	519	362
13:00	548	559	580	565	652	516	410
14:00	636	653	675	667	776	526	409
15:00	781	856	844	873	988	532	409
16:00	989	1,087	1,104	1,106	1,174	508	404
17:00	956	1,109	1,082	1,158	1,148	478	386
18:00	633	746	759	795	785	436	341
19:00	390	428	448	476	530	346	271
20:00	79	69	75	79	302	260	113
21:00	47	37	34	42	279	236	74
22:00	34	21	23	32	243	193	58
23:00	21	13	15	17	171	148	40

Source: HRTPO analysis of VDOT permanent count station data. Summer is defined as June, July, and August.

Annual Average Volumes by Day of Week, Time of Day, Season, and Direction

► **High Rise Bridge**

Dates Collected: 8/26/2009 & 8/27/2009

High Rise Bridge - Towards Suffolk			
8/26/2009 & 8/27/2009	Time Start	Wednesday	Thursday
	0:00	308	332
	1:00	170	191
	2:00	140	157
	3:00	160	199
	4:00	400	451
	5:00	1,062	1,083
	6:00	2,657	2,624
	7:00	3,243	3,131
	8:00	2,631	2,553
	9:00	2,001	1,969
	10:00	1,944	1,991
	11:00	2,000	2,163
	12:00	2,130	2,281
	13:00	2,256	2,397
	14:00	2,559	2,707
	15:00	3,393	3,617
	16:00	3,731	3,870
	17:00	3,635	3,750
	18:00	2,544	2,705
	19:00	1,695	1,748
	20:00	1,418	1,537
	21:00	1,223	1,222
	22:00	859	792
23:00	471	527	

High Rise Bridge - Towards Va Beach			
8/26/2009 & 8/27/2009	Time Start	Wednesday	Thursday
	0:00	251	274
	1:00	144	149
	2:00	112	140
	3:00	169	187
	4:00	310	324
	5:00	1,113	1,089
	6:00	3,057	2,887
	7:00	3,943	3,755
	8:00	3,457	3,338
	9:00	2,579	2,644
	10:00	2,035	2,260
	11:00	2,093	2,105
	12:00	2,209	2,069
	13:00	2,085	2,326
	14:00	2,409	2,741
	15:00	3,274	3,611
	16:00	3,035	3,751
	17:00	3,503	3,682
	18:00	2,458	2,356
	19:00	1,590	1,504
	20:00	1,158	1,128
	21:00	974	941
	22:00	720	773
23:00	525	526	

Source: HRTPO analysis of VDOT raw count station data.

Annual Average Volumes by Day of Week, Time of Day, Season, and Direction

► Steel Bridge

Year: 2012

Steel Bridge - Northbound							
Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	88	84	92	92	100	151	161
1:00	66	56	62	63	76	90	101
2:00	47	48	48	49	59	59	63
3:00	72	60	59	67	69	66	52
4:00	249	233	219	237	221	85	63
5:00	751	770	659	723	681	217	140
6:00	1,367	1,393	1,315	1,370	1,274	413	253
7:00	1,492	1,450	1,398	1,474	1,402	550	341
8:00	1,172	1,193	1,156	1,196	1,171	726	481
9:00	926	925	921	948	949	897	693
10:00	847	881	877	891	937	989	983
11:00	855	864	873	895	943	1,080	847
12:00	924	952	935	956	947	1,072	1,180
13:00	866	845	853	892	914	1,029	1,001
14:00	835	835	829	864	902	911	908
15:00	845	827	832	859	887	889	881
16:00	805	847	834	862	918	869	810
17:00	789	899	866	916	937	915	768
18:00	668	738	780	759	897	868	689
19:00	535	587	614	639	727	687	573
20:00	467	496	566	561	573	573	501
21:00	380	392	470	447	482	496	390
22:00	266	299	288	304	387	403	292
23:00	143	159	170	195	279	284	180

Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	77	75	75	78	90	135	151
1:00	54	53	53	55	67	85	97
2:00	43	44	44	47	55	61	61
3:00	58	57	54	60	66	60	47
4:00	211	228	225	227	219	86	60
5:00	643	746	757	728	687	208	131
6:00	1,224	1,388	1,429	1,388	1,334	386	230
7:00	1,344	1,495	1,526	1,500	1,446	532	322
8:00	1,098	1,225	1,262	1,229	1,196	748	448
9:00	845	923	932	945	934	890	643
10:00	840	846	869	888	900	1,009	931
11:00	840	842	847	863	905	1,054	818
12:00	907	921	905	933	915	1,063	1,151
13:00	855	828	833	844	886	1,037	967
14:00	848	867	853	876	918	984	890
15:00	863	876	869	895	909	946	810
16:00	816	875	866	892	935	927	778
17:00	804	861	879	905	965	926	750
18:00	722	773	796	798	926	842	608
19:00	552	577	593	600	718	638	512
20:00	444	490	550	506	554	510	417
21:00	377	407	486	437	466	425	309
22:00	203	223	236	257	356	344	235
23:00	121	128	125	158	248	241	145

Steel Bridge - Southbound							
Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	155	156	170	178	183	275	254
1:00	81	77	90	91	106	165	159
2:00	62	60	66	70	84	128	133
3:00	53	52	51	50	63	78	77
4:00	65	61	59	65	68	67	58
5:00	156	151	144	160	158	98	66
6:00	371	378	371	392	360	215	157
7:00	563	562	560	564	540	398	392
8:00	635	652	614	656	641	522	411
9:00	611	618	611	651	634	625	595
10:00	688	674	659	681	711	740	772
11:00	726	714	714	763	811	813	681
12:00	810	821	814	830	929	892	804
13:00	816	840	836	864	974	906	854
14:00	931	933	948	944	1,022	894	835
15:00	1,057	1,059	1,051	1,018	1,021	919	867
16:00	1,127	1,127	1,133	1,150	1,115	967	858
17:00	1,218	1,294	1,223	1,285	1,195	929	856
18:00	971	1,053	1,069	1,053	1,056	837	766
19:00	737	789	857	846	875	760	649
20:00	637	692	727	738	753	684	566
21:00	529	591	659	681	718	679	455
22:00	358	410	494	463	550	538	321
23:00	233	269	290	283	391	385	236

Time Start	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0:00	127	129	135	138	154	253	235
1:00	65	68	67	76	90	153	148
2:00	54	47	54	61	77	124	126
3:00	46	44	48	46	59	76	71
4:00	57	53	55	54	65	64	55
5:00	126	130	132	138	130	90	56
6:00	316	363	366	355	343	205	126
7:00	591	644	666	655	601	370	362
8:00	637	724	705	714	695	523	369
9:00	618	662	664	667	629	630	549
10:00	649	682	677	697	673	756	729
11:00	698	700	703	732	790	835	661
12:00	809	817	831	840	905	925	812
13:00	825	850	839	881	955	933	843
14:00	937	958	960	945	1,064	960	873
15:00	1,051	1,068	1,051	1,069	1,053	984	864
16:00	1,092	1,143	1,161	1,133	1,081	998	895
17:00	1,201	1,250	1,265	1,225	1,176	969	852
18:00	1,004	1,131	1,159	1,143	1,037	877	717
19:00	751	792	891	863	860	763	594
20:00	585	646	707	701	735	668	479
21:00	493	545	613	610	691	633	378
22:00	298	346	379	394	555	512	274
23:00	199	220	222	250	374	357	184

Source: HRTPO analysis of VDOT permanent count station data. Summer is defined as June, July, and August.

Annual Average Volumes by Day of Week, Time of Day, Season, and Direction

► **Great Bridge Bridge**

Dates Collected: 5/25/2011 & 5/26/2011

Great Bridge Bridge - Northbound			
5/25/2011 & 5/26/2011	Time Start	Wednesday	Thursday
	0:00	100	95
	1:00	51	54
	2:00	27	39
	3:00	24	38
	4:00	81	74
	5:00	265	299
	6:00	880	943
	7:00	1,699	1,737
	8:00	1,247	1,291
	9:00	1,040	1,104
	10:00	1,018	997
	11:00	975	1,064
	12:00	1,036	1,063
	13:00	1,041	1,034
	14:00	950	1,084
	15:00	1,013	1,079
	16:00	1,119	1,110
	17:00	1,139	1,146
	18:00	962	916
	19:00	723	736
	20:00	681	648
	21:00	452	523
	22:00	260	276
23:00	170	187	

Great Bridge Bridge - Southbound			
5/25/2011 & 5/26/2011	Time Start	Wednesday	Thursday
	0:00	127	126
	1:00	60	61
	2:00	41	101
	3:00	36	44
	4:00	55	48
	5:00	112	122
	6:00	366	393
	7:00	872	830
	8:00	1,032	1,000
	9:00	942	952
	10:00	970	981
	11:00	1,028	1,101
	12:00	1,236	1,225
	13:00	1,156	1,206
	14:00	1,251	1,388
	15:00	1,577	1,643
	16:00	1,798	1,712
	17:00	1,946	1,690
	18:00	1,361	1,448
	19:00	1,045	1,035
	20:00	889	862
	21:00	637	720
	22:00	397	478
23:00	195	305	

Source: HRTPO analysis of VDOT raw count station data.

Annual Average Volumes by Day of Week, Time of Day, Season, and Direction

► Chesapeake Expressway Bridge

Dates Collected: 9/13/2011 & 9/14/2011

Chesapeake Exp Bridge - Northbound			
9/13/2011 & 9/14/2011	Time Start	Tuesday	Wednesday
	0:00	103	106
	1:00	49	55
	2:00	46	53
	3:00	103	82
	4:00	405	396
	5:00	1,432	1,476
	6:00	3,270	3,304
	7:00	4,444	4,464
	8:00	3,357	3,388
	9:00	1,965	1,954
	10:00	1,538	1,604
	11:00	1,475	1,614
	12:00	1,583	1,487
	13:00	1,491	1,468
	14:00	1,478	1,532
	15:00	1,735	1,710
	16:00	1,820	1,811
	17:00	1,754	1,754
	18:00	1,479	1,591
	19:00	1,075	1,039
	20:00	757	702
	21:00	509	511
	22:00	295	343
23:00	208	192	

Chesapeake Exp Bridge - Southbound			
9/13/2011 & 9/14/2011	Time Start	Tuesday	Wednesday
	0:00	251	227
	1:00	87	99
	2:00	63	63
	3:00	69	95
	4:00	126	114
	5:00	324	344
	6:00	826	835
	7:00	1,249	1,305
	8:00	1,191	1,107
	9:00	1,067	1,135
	10:00	1,120	1,176
	11:00	1,323	1,275
	12:00	1,440	1,561
	13:00	1,528	1,596
	14:00	1,984	2,031
	15:00	2,923	2,952
	16:00	3,863	3,853
	17:00	4,265	4,053
	18:00	2,552	2,634
	19:00	1,582	1,623
	20:00	1,213	1,238
	21:00	907	965
	22:00	527	632
23:00	354	357	

Source: HRTPO analysis of VDOT raw count station data.

Annual Average Volumes by Day of Week, Time of Day, Season, and Direction

► Centerville Turnpike Bridge

Dates Collected: 5/18/2011 & 5/19/2011

Centerville Tpke Bridge - Northbound			
5/18/2011 & 5/19/2011	Time Start	Wednesday	Thursday
	0:00	53	29
	1:00	8	18
	2:00	13	13
	3:00	20	14
	4:00	62	51
	5:00	216	184
	6:00	560	577
	7:00	1,029	1,062
	8:00	733	764
	9:00	462	515
	10:00	383	389
	11:00	354	381
	12:00	418	417
	13:00	371	394
	14:00	419	413
	15:00	493	482
	16:00	493	563
	17:00	543	561
	18:00	512	462
	19:00	309	354
	20:00	258	273
	21:00	165	203
	22:00	108	106
23:00	54	56	

Centerville Tpke Bridge - Southbound			
5/18/2011 & 5/19/2011	Time Start	Wednesday	Thursday
	0:00	59	74
	1:00	28	36
	2:00	27	23
	3:00	16	11
	4:00	20	24
	5:00	74	82
	6:00	237	242
	7:00	413	428
	8:00	394	385
	9:00	305	343
	10:00	316	375
	11:00	383	426
	12:00	414	457
	13:00	505	498
	14:00	568	577
	15:00	847	820
	16:00	1,040	1,029
	17:00	1,189	1,217
	18:00	826	864
	19:00	491	554
	20:00	520	514
	21:00	366	343
	22:00	176	216
23:00	106	115	

Source: HRTPO analysis of VDOT raw count station data.

Diversion Rates for Closures of River Crossings in Hampton Roads

August 2013

Note:

These rates are based on existing conditions, i.e. Jordan Bridge is the only tolled river crossing. These rates are expected to **change significantly** with implementation of tolls on Downtown and Midtown Tunnels, not only on those tunnels, but also on other crossings.

Affect of Closings on Volume of Remaining Crossings

Closings in the Direction *away from Va. Beach*

Crossing to Be Closed

	Close HRBT	Close MMBT	Close Godwin Bridge	Close Hazelwood Bridge	Close James River Bridge (JRB)	Close Midtown Tunnel (MTT)	Close Downtown Tunnel (DTT)	Close Berkley Bridge	Close South Norfolk Jordan Bridge (SNJB)	Close Gilmerton Bridge (GB)	Close High-Rise Bridge to Suf	Close Steel Bridge SB	Close Great Bridge (GBB) SB	Close Chesapeake Expressway Bridge (CEB) SB	Close Centerville Turnpike Bridge (CVTB) SB
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Remaining Crossings

portion of volume of closed crossing (%) to be added to / subtracted from volume of given direction of remaining crossings

HRBT	closed	+50% to WB	+20% to WB	+16% to WB	+11% to WB	+10% to WB	+9% to WB	negl. n.a.	negl. n.a.	+6% to WB	+10% to WB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
MMBT	+73% to NB	closed	+41% to NB	+31% to NB	+78% to NB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	-5% to NB	-8% to NB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
Godwin Bridge	+10% to NB	+22% to NB	closed	-40% to NB	+50% to SB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
Hazelwood Bridge	+11% to NB	+24% to NB	-60% to NB	closed	+39% to SB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
James River Bridge (JRB)	+22% to NB	+46% to NB	+50% to SB	+25% to SB	closed	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
Midtown Tunnel (MTT)	+19% to WB	+4% to EB	negl. n.a.	negl. n.a.	negl. n.a.	closed	+18% to WB	+11% to WB	negl. n.a.	+7% to WB	+8% to WB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
Downtown Tunnel (DTT)	+26% to WB	+4% to EB	negl. n.a.	negl. n.a.	negl. n.a.	+37% to WB	closed	-42% to WB	+40% to WB	+17% to WB	+19% to WB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
Berkley Bridge	+21% to WB	+11% to EB	negl. n.a.	negl. n.a.	negl. n.a.	+36% to WB	-50% to WB	closed	+40% to WB	+3% to WB	+12% to WB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
South Norfolk Jordan Bridge (SNJB)	+4% to WB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	+3% to WB	+9% to WB	+1% to WB	closed	+4% to WB	+5% to WB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
Gilmerton Bridge (GB)	+16% to WB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	+17% to WB	+20% to WB	+7% to WB	+40% to WB	closed	+38% to WB	+14% to WB	negl. n.a.	negl. n.a.	negl. n.a.
High-Rise Bridge	+27% to Suf	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	+26% to Suf	+36% to Suf	+18% to Suf	+20% to Suf	+55% to Suf	closed	+27% to Suf	negl. n.a.	-13% to VaB	negl. n.a.
Steel Bridge	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	+4% to SB	closed	+11% to SB	+11% to SB	negl. n.a.
Great Bridge Bridge (GBB)	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	+23% to SB	closed	+39% to SB	+19% to SB
Chesapeake Expressway Bridge (CEB)	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	+23% to SB	+56% to SB	closed	+46% to SB
Centerville Turnpike Bridge (CVTB)	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	+5% to SB	+13% to SB	+19% to SB	closed

Affect of Closings on Volume of Remaining Crossings

Closings in the direction *toward Va. Beach*

Crossing to Be Closed

	Close HRBT	Close MMBT	Close Godwin Bridge	Close Hazelwood Bridge	Close James River Bridge (JRB)	Close Midtown Tunnel (MTT)	Close Downtown Tunnel (DTT)	Close Berkley Bridge	Close South Norfolk Jordan Bridge (SNJB)	Close Gilmerton Bridge (GB)	Close High-Rise Bridge to VaB	Close Steel Bridge NB	Close Great Bridge (GBB) NB	Close Chesapeake Expressway Bridge (CEB) NB	Close Centerville Turnpike Bridge (CVTB) NB
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Remaining Crossings

portion of volume of closed crossing (%) to be added to / subtracted from volume of given direction of remaining crossings

HRBT	closed	+50% to EB	+20% to EB	+16% to EB	+11% to EB	+10% to EB	+9% to EB	negl. n.a.	negl. n.a.	+6% to EB	+10% to EB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
MMBT	+73% to SB	closed	+41% to SB	+31% to SB	+78% to SB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	-5% to SB	-8% to SB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
Godwin Bridge	+10% to SB	+22% to SB	closed	-40% to SB	+50% to NB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
Hazelwood Bridge	+11% to SB	+24% to SB	-60% to SB	closed	+39% to NB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
James River Bridge (JRB)	+22% to SB	+46% to SB	+50% to NB	+25% to NB	closed	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
Midtown Tunnel (MTT)	+19% to EB	+4% to WB	negl. n.a.	negl. n.a.	negl. n.a.	closed	+18% to EB	+11% to EB	negl. n.a.	+7% to EB	+8% to EB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
Downtown Tunnel (DTT)	+26% to EB	+4% to WB	negl. n.a.	negl. n.a.	negl. n.a.	+37% to EB	closed	-42% to EB	+40% to EB	+17% to EB	+19% to EB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
Berkley Bridge	+21% to EB	+11% to WB	negl. n.a.	negl. n.a.	negl. n.a.	+36% to EB	-50% to EB	closed	+40% to EB	+3% to EB	+12% to EB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
South Norfolk Jordan Bridge (SNJB)	+4% to EB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	+3% to EB	+9% to EB	+1% to EB	closed	+4% to EB	+5% to EB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.
Gilmerton Bridge (GB)	+16% to EB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	+17% to EB	+20% to EB	+7% to EB	+40% to EB	closed	+38% to EB	+14% to EB	negl. n.a.	negl. n.a.	negl. n.a.
High-Rise Bridge	+27% to VaB	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	+26% to VaB	+36% to VaB	+18% to VaB	+20% to VaB	+55% to VaB	closed	+27% to VaB	negl. n.a.	-13% to Suf	negl. n.a.
Steel Bridge	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	+4% to NB	closed	+11% to NB	+11% to NB	negl. n.a.
Great Bridge Bridge (GBB)	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. negl.	+23% to NB	closed	+39% to NB	+19% to NB
Chesapeake Expressway Bridge (CEB)	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. negl.	+23% to NB	+56% to NB	closed	+46% to NB
Centerville Turnpike Bridge (CVTB)	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. n.a.	negl. negl.	+5% to NB	+13% to NB	+19% to NB	closed	closed

Capacities of River Crossings in Hampton Roads

Capacities

source: volumes and calculations on sheets in this workbook

Note: Some of these capacities are a function of nearby signals, and not the subject structure itself.

JRB	NB	2,500	vehicles per hour
JRB	SB	2,300	vehicles per hour
Hazelwood	EB or WB	2,000	vehicles per hour
Godwin	EB or WB	2,000	vehicles per hour
MMMBT	NB or SB	3,500	vehicles per hour
HRBT	EB or WB	3,250	vehicles per hour
MTT	EB or WB	1,500	vehicles per hour
DTT	EB or WB	3,300	vehicles per hour
Berkley	EB or WB	5,600	vehicles per hour
Gilmerton (now)	EB or WB	1,200	vehicles per hour
Gilmerton (4 ln's)	EB or WB	2,200	vehicles per hour
High Rise	EB or WB	4,000	vehicles per hour
Steel	NB	1,500	vehicles per hour
Steel	SB	1,300	vehicles per hour
Great Bridge Br	NB or SB	2,400	vehicles per hour
Ches Exp Br	NB or SB	4,400	vehicles per hour
Centerville TnPk Br	NB or SB	1,400	vehicles per hour
SNJB	EB or WB	1,400	vehicles per hour