



MEMORANDUM

TO: City Councilor Bok
CC: Vineet Gupta, Stefanie Seskin, John Monacelli
FROM: Amy Cording, *Director of Engineering*
DATE: February 14, 2022
RE: Traffic Observations & Queuing Study – Charles Street & Surrounding Area
– Connect Downtown – Public Garden Crossings – BHAC Concerns

This memorandum presents and summarizes the context, observations, and assessments made relating to concerns raised by the Commissioners of the Beacon Hill Architectural Commission relating to the conditions of traffic and aggressive behaviors of motorists in the area of Charles Street downtown.

Purpose:

On October 21, 2021, the Boston Transportation Department (BTD) presented to the Beacon Hill Architectural Commission (BHAC) for Advisory Review the Connect Downtown – Public Garden Crossings – Phase 2 intent, scope, and material application. The Commissioners of the BHAC responded with several anecdotes about their experiences driving around this area of the downtown street network. Of particular emphasis was Charles Street as it approaches northbound to Beacon Street, between the Public Garden and the Boston Common.

Concerns were stated about the aggression of motorists, the prevalence of double-parking (on Charles Street and on Beacon Street west of the intersection of the two streets), the presence of school buses, and the perceived travel time to drive on Charles Street between Boylston Street and Beacon Street.

These concerns were attributed specifically to the introduction of the separated bicycle lane on the western side of Charles Street and the required reduction in northbound left-turn lanes to accommodate this. With one less lane, the queues extending back from Beacon Street were alleged to extend to Boylston Street. Under this stated condition, motorists became so frustrated that numerous aggressive and dangerous behaviors were taking place. The Commissioners stated that these unsafe (often dangerous) behaviors - primarily perpetrated by motorists - were most common during the weekday evening hours.

Based on the traffic models derived and implemented using Synchro software, it was assessed that the vehicular queues would be contained between the northern half of Charles Street and nearly all of the normalized traffic volumes would be processed within the signalized intersections of this area. To this effect, the BTD enlisted the services of the on-call traffic consultant for this program, McMahan Associates, to conduct field observations at various locations in this immediate area and record relevant data for consideration.

Study Overview:

The observations were conducted on the following dates, between 4:00-6:00pm:

- Tuesday, November 30, 2021
- Wednesday, December 1, 2021
- Thursday, December 2, 2021
- Tuesday, December 7, 2021
- ****NOTE** – Wednesday, December 8, 2021 was not observed due to inclement weather conditions
- Thursday, December 9, 2021

The following items were given to the consultants for recording:

- Vehicular queues were observed for the northbound approach of Charles Street extending back from Beacon Street, with the maximum queues being recorded in ten-minute intervals within the study times.
- Observations of behaviors of all users (motorists, cyclists, and pedestrians) as they contributed to unsafe/dangerous conditions:
 - At the intersection of Boylston Street & Charles Street
 - In the street segment on Charles Street between Boylston Street and the midblock pedestrian crossing (between the Public Garden and the Boston Common)
 - In the street segment on Charles Street between the midblock pedestrian crossing and the approach to Beacon Street
 - At the intersection of Charles Street & Beacon Street
 - In the street segment on Beacon Street between Charles Street and Brimmer Street.
- Other Observational Items Noted:
 - Traffic conditions on Beacon Street between Charles Street and Brimmer Street as they impacted the vehicular operations at Charles Street.
 - Double-parking
 - Parking maneuvers, as they impacted vehicular flow
 - Motorists running red lights
 - Motorists making illegal turning movements

Study Conclusion and Recommendations:

As noted in the Purpose, the network of signalized intersections in this area downtown were analyzed using the latest version of Synchro. The most current available traffic count data was modeled and field calibrated during internal review.

The majority of what is being observed is a combination of illegal and dangerous behaviors which occurred prior to the implementation of the separated bicycle facility. Turning movement violations, red light running, speeding, dangerous merging/weaving into/across lanes, and double-parking on heavily-traffic streets is directly causing obstructions, disruptions, and

turbidity to the general flow of traffic.

While the reduction of the northbound Charles Street left-turn lanes from two-to-one effectively consolidates the volume of vehicles into a single lane, the operations of the signals have been changed in order to accommodate the majority of this difference.

The queue lengths recorded, in feet and the associated number of vehicles, are included on the following pages. The original notes and diagrams from the consultant are also provided herein.

Based on the observations collected by the McMahon team, the following assessments/recommendations can be made by the BTM:

- Numerous motorists are making the illegal and dangerous eastbound left-turn from the southern barrel of Boylston Street to Charles Street at the intersection
 - **Recommendation:** Refer this to the Boston Police Department
- Vehicles departing the intersection of Charles St & Boylston Street northbound occasionally encounter a red light at the midblock pedestrian crossing.
 - **Recommendation:** As these signals were programmed to operate on a regularized program, this should happen very rarely. The BTM will review the internal timing settings of these intersections to confirm that the most efficient operations are expected.
- Parking maneuvers and double-parking on Charles Street do have an effect on the flow of vehicles on this corridor, though they are very minor.
 - **Recommendation:** No actions necessary
- One motorist was observed making a westbound left-turn from Beacon Street to Charles Street, driving some distance in the wrong direction, and then parallel parking into a space on Charles Street. No one was injured due to this action.
 - **Recommendation:** Refer this to the Boston Police Department
- Double-parking on Beacon Street, west of Charles Street is highly active and significantly disruptive to the processing of vehicles through the intersection at Beacon Street & Charles Street. Personal vehicles and school buses are participating in this and routinely occupy the entirety of the rightmost lane between Brimmer Street and Charles Street.
 - **Recommendation:** Refer this to the Boston Transportation Department Enforcement Division
- Motorists are routinely running red lights at all signalized locations within the study area
 - **Recommendation:** Refer this to the Boston Police Department. Automated enforcement could resolve much of this dangerous behavior.
- Cyclists on Charles Street occasionally travel northbound in the travel lanes for a short distance before joining the separated facility on the western side of the street.
 - **Assessment:** Phase 2 constructed improvements, bicycle-specific signals, and increased markings and signage will further assist cyclists in identifying where the separated and safe paths of travel are in this area.
- Motorists generally yielded to pedestrians and cyclists crossing in marked locations.
- The amount of green time provided to motorists at several signalized intersections was more than required and pedestrians were crossing against the WALK light because no vehicles were approaching.
 - **Assessment:** The BTM will look into any changes in traffic volumes that may be

normally experienced in this area and how they might differ from the count data collected and modeled. Reducing delays for all users and increasing logical operations is a core goal of the Connect Downtown program.

- Motorists on Charles Street merging into the left lane near the intersection with Beacon Street, presumably to skip an excessive queue of vehicles.
 - **Assessment:** This behavior was observed to occur on few occasions. At least one incident was a motorist that had a right-turning blinker on until reaching the intersection, presumably someone visiting the City and trying to navigate the street networks. The BTD will continue to inquire and look at this occurrence in the future. Aside from these occasions, most motorists utilized the leftmost lane appropriately, noticing that a majority of the queue was processed within the green time provided.
- It was a regular occurrence for numerous motorists over the period of several days to be observed weaving, merging into and across multiple lanes of travel. This was related primarily to the entrance and exit ramps of the garage structure beneath the Boston Common.
 - **Recommendation:** Refer this to the Boston Police Department. Aside from constructing more appropriate channelization for motorists on Charles Street, a very linear street with multiple lanes of travel, there are few simple tools to deploy in countering this.
- A very significant number of motorists are crossing over the travel lanes on Beacon Street west of Charles Street. Those in the northern barrel weave to the leftmost lane on Beacon Street, and those on Charles Street making the northbound left-turn weave to the middle lane (the rightmost lane is nearly unusable due to double-parking).
 - **Assessment:** This disruption to the flow of vehicular traffic so close to the intersection of Beacon Street & Charles Street certainly can have frustrating effects for motorists on all approaches. As the Phase 2 design is being considered, reviewed, and refined internally, specific attention will be paid to this issue to assess how changes might be incorporated to attend to this behavior and lessen the effects of it on general traffic.

Queue Study

Charles Street Northbound Approaching Beacon Street

Boston, MA

Date: 11/30/2021

10-Minute Max Queue

Start Time	End Time	Left Lane (ft)	# of Vehicles	Middle Lane (ft)	# of Vehicles	Right Lane (ft)	# of Vehicles
4:00PM	4:10PM	99	5	99	5	217	11
4:10PM	4:20PM	48	3	180	9	217	11
4:20PM	4:30PM	302	16	141	8	227	12
4:30PM	4:40PM	340	17	160	8	170	9
4:40PM	4:50PM	155	8	190	10	155	8
4:50PM	5:00PM	103	6	168	9	250	13
5:00PM	5:10PM	104	6	185	10	180	9
5:10PM	5:20PM	104	6	104	6	140	7
5:20PM	5:30PM	518	26	110	6	190	10
5:30PM	5:40PM	97	5	75	4	155	8
5:40PM	5:50PM	71	4	110	6	270	14
5:50PM	6:00PM	106	6	142	8	196	10
Median		104	6	142	8	193	10

Queue Study

Charles Street Northbound Approaching Beacon Street

Boston, MA

Date: 12/1/2021

10-Minute Max Queue

Start Time	End Time	Left Lane (ft)	# of Vehicles	Middle Lane (ft)	# of Vehicles	Right Lane (ft)	# of Vehicles
4:00PM	4:10PM	10	1	172	9	212	11
4:10PM	4:20PM	115	6	208	11	335	17
4:20PM	4:30PM	128	7	208	11	172	9
4:30PM	4:40PM	165	9	76	4	155	8
4:40PM	4:50PM	230	12	127	7	117	6
4:50PM	5:00PM	75	4	120	6	211	11
5:00PM	5:10PM	120	6	152	8	210	11
5:10PM	5:20PM	10	1	95	5	193	10
5:20PM	5:30PM	125	7	142	8	250	13
5:30PM	5:40PM	82	5	173	9	245	13
5:40PM	5:50PM	175	9	137	7	230	12
5:50PM	6:00PM	71	4	140	7	330	17
Median		118	6	141	8	212	11

Queue Study

Charles Street Northbound Approaching Beacon Street

Boston, MA

Date: 12/2/2021

10-Minute Max Queue

Start Time	End Time	Left Lane (ft)	# of Vehicles	Middle Lane (ft)	# of Vehicles	Right Lane (ft)	# of Vehicles
4:00PM	4:10PM	95	5	167	9	220	11
4:10PM	4:20PM	175	9	87	5	174	9
4:20PM	4:30PM	54	3	63	4	124	7
4:30PM	4:40PM	583	30	45	3	185	10
4:40PM	4:50PM	350	18	187	10	260	13
4:50PM	5:00PM	75	4	53	3	150	8
5:00PM	5:10PM	25	2	145	8	210	11
5:10PM	5:20PM	275	14	67	4	260	13
5:20PM	5:30PM	50	3	80	4	178	9
5:30PM	5:40PM	78	4	54	3	210	11
5:40PM	5:50PM	226	12	67	4	203	11
5:50PM	6:00PM	145	8	98	5	178	9
Median		120	6	74	4	194	10

Queue Study

Charles Street Northbound Approaching Beacon Street

Boston, MA

Date: 12/7/2021

10-Minute Max Queue

Start Time	End Time	Left Lane (ft)	# of Vehicles	Middle Lane (ft)	# of Vehicles	Right Lane (ft)	# of Vehicles
4:00PM	4:10PM	329	17	150	8	175	9
4:10PM	4:20PM	325	17	110	6	110	6
4:20PM	4:30PM	135	7	135	7	200	10
4:30PM	4:40PM	310	16	104	6	178	9
4:40PM	4:50PM	350	18	55	3	114	6
4:50PM	5:00PM	281	15	110	6	110	6
5:00PM	5:10PM	295	15	126	7	215	11
5:10PM	5:20PM	217	11	122	7	292	15
5:20PM	5:30PM	144	8	85	5	85	5
5:30PM	5:40PM	255	13	67	4	205	11
5:40PM	5:50PM	134	7	66	4	173	9
5:50PM	6:00PM	142	8	110	6	150	8
Median		268	14	110	6	174	9

Queue Study

Charles Street Northbound Approaching Beacon Street

Boston, MA

Date: 12/9/2021

10-Minute Max Queue

Start Time	End Time	Left Lane (ft)	# of Vehicles	Middle Lane (ft)	# of Vehicles	Right Lane (ft)	# of Vehicles
4:00PM	4:10PM	368	19	44	3	130	7
4:10PM	4:20PM	252	13	115	6	171	9
4:20PM	4:30PM	436	22	48	3	125	7
4:30PM	4:40PM	265	14	125	7	179	9
4:40PM	4:50PM	526	27	120	6	59	3
4:50PM	5:00PM	338	17	60	3	75	4
5:00PM	5:10PM	368	19	148	8	120	6
5:10PM	5:20PM	587	30	135	7	157	8
5:20PM	5:30PM	252	13	69	4	135	7
5:30PM	5:40PM	135	7	91	5	104	6
5:40PM	5:50PM	389	20	68	4	35	2
5:50PM	6:00PM	218	11	68	4	159	8
Median		353	18	80	4	128	7