

# IMPACT OF COVID-19 ON AIR QUALITY – A PRELIMINARY ANALYSIS

---

## Metropolitan Washington Air Quality Committee

Sunil Kumar

Metropolitan Washington Air Quality Committee – TAC  
April 14, 2020



Metropolitan Washington  
Council of Governments

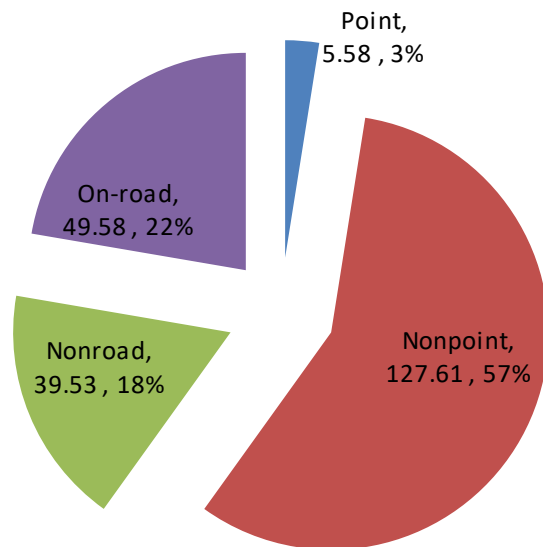
# INTRODUCTION

---

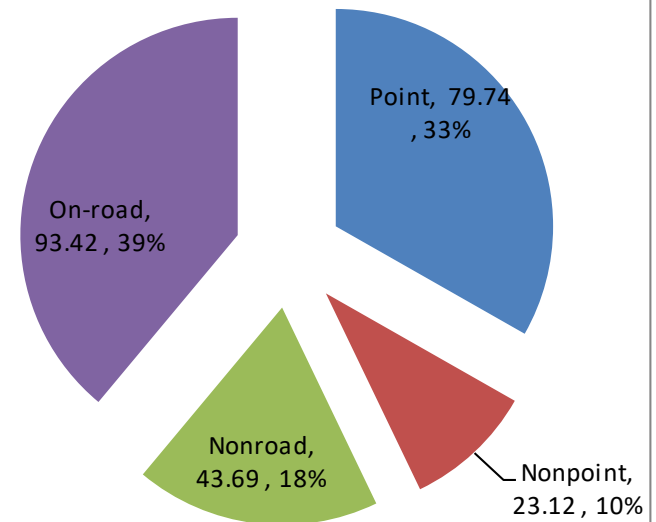
- COVID-19 virus has affected how educational institutions, offices, businesses, and governments operate across the country and in the Washington region since early March.
- Students are being taught online.
- Employees are teleworking where possible.
- As a result, public and private transportation has been affected quite significantly. This has resulted in significant reduction in traffic in the region.
- There has also been impact on the energy and fuel consumption in the region due to office and business closures and people teleworking/staying at home.

# Emission by Source

**Draft OSD 2017 VOC Emissions (tpd)**  
(Washington DC-MD-VA 2015 Ozone NAAQS NAA)

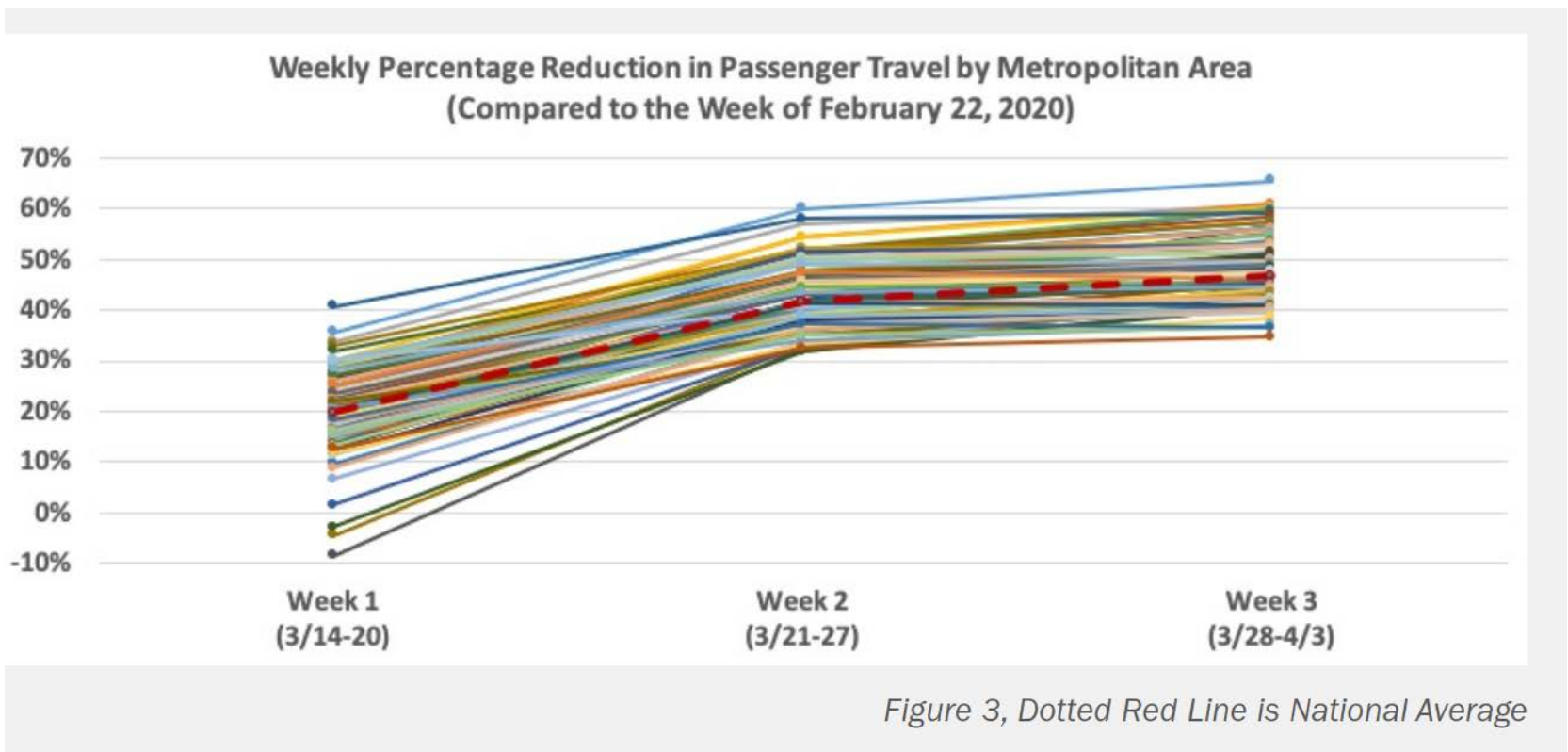


**Draft OSD 2017 NOx Emissions (tpd)**  
(Washington DC-MD-VA 2015 Ozone NAAQS NAA)



- Since COVID-19 has affected operation of all sources, emissions have been affected accordingly.

# IMPACT ON ON-ROAD SECTOR



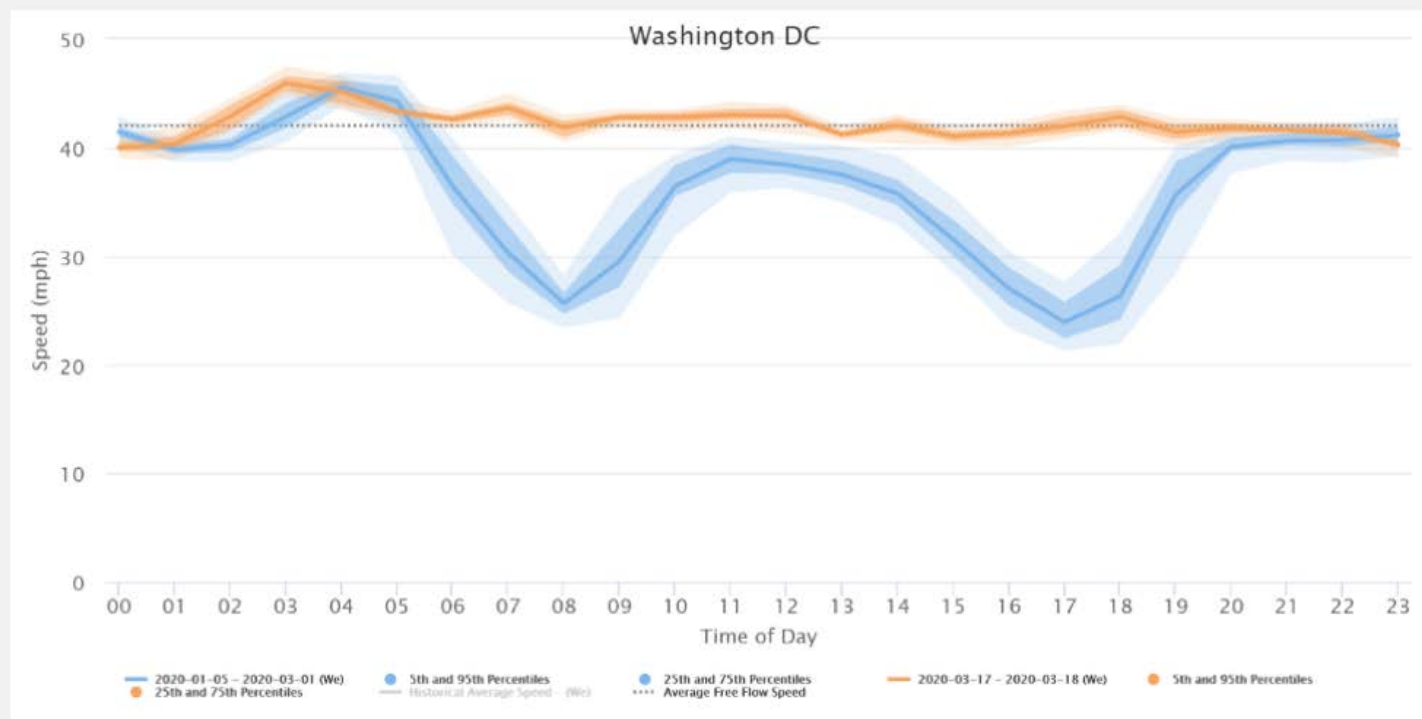
- Source: INRIX



# IMPACT ON ON-ROAD SECTOR

## Washington DC

Similar to Boston, Washington DC is achieved free-flow travel speeds for all hours of Wednesday. For morning drivers, this equates to speed increases of up to 16 MPH faster than average and 17 MPH faster for the morning and afternoon rush hours, respectively.

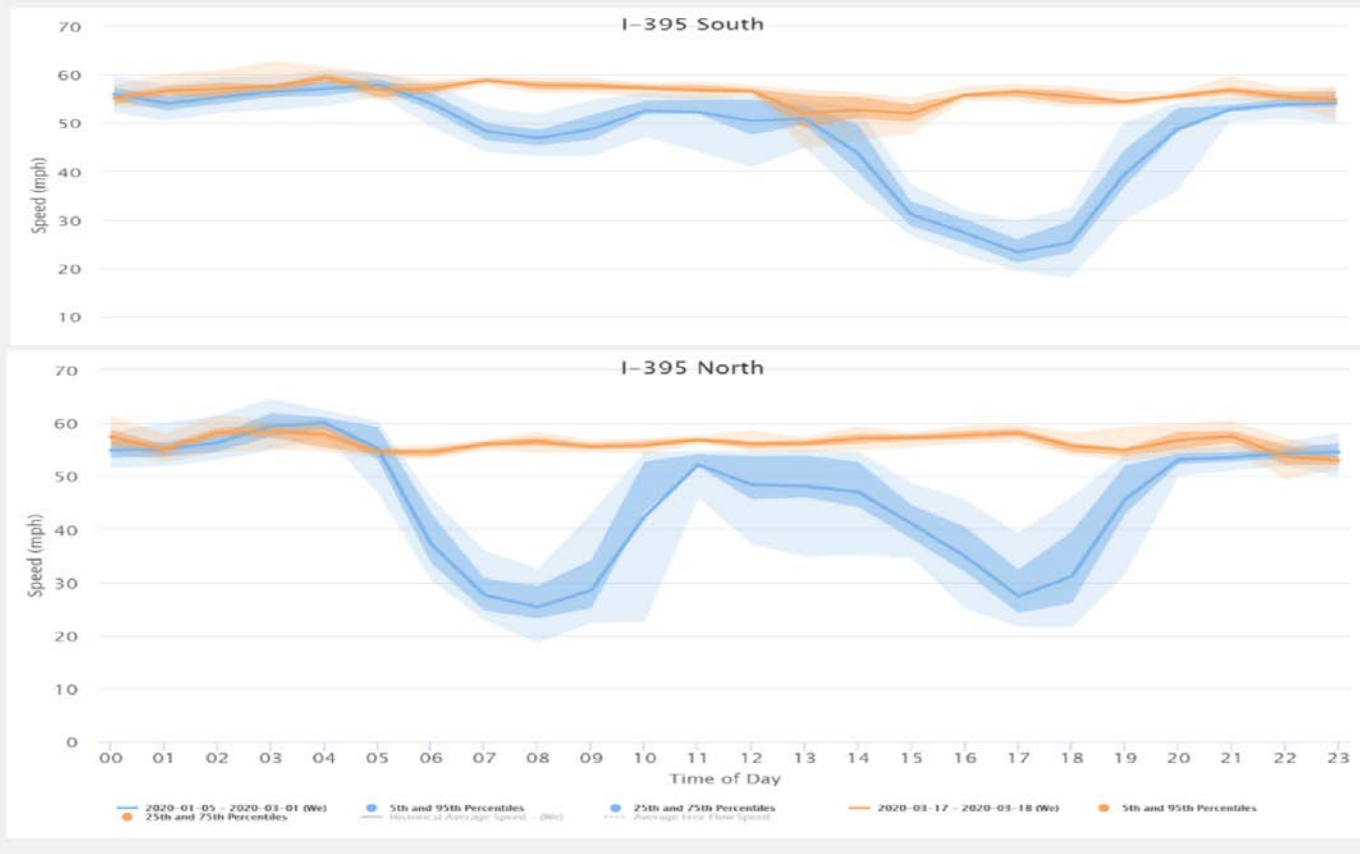


- Source: INRIX



# IMPACT ON ON-ROAD SECTOR

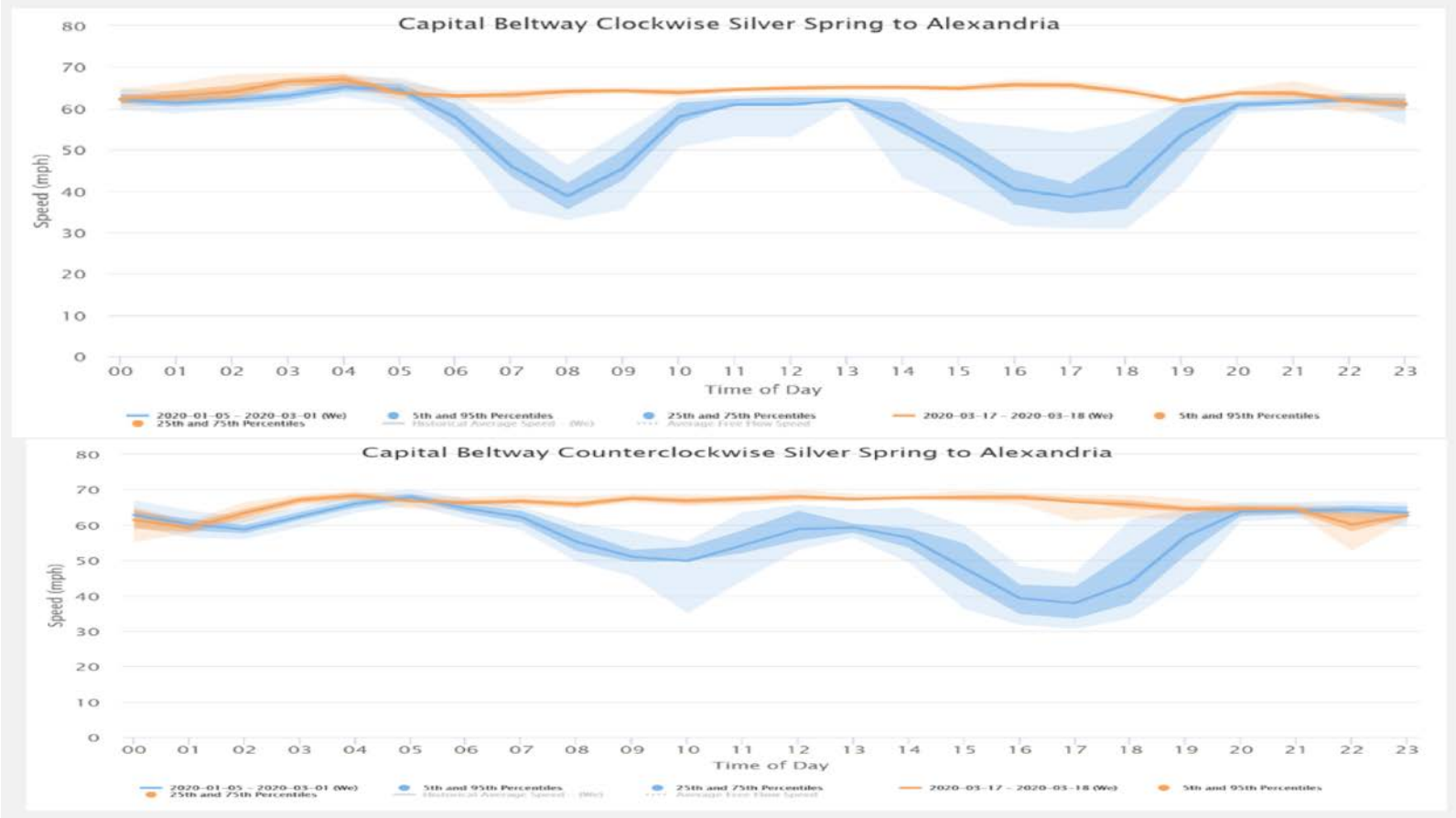
Extending the analysis of travel speeds to major corridors in Washington DC, travelers on I-395 did not experience congestion conditions for an hour traveling northbound or southbound. Southbound travelers saw morning speed increases of 11 MPH and afternoon increases of 23 MPH. Northbound drivers saw a remarkable increase of up to 21 MPH on average for both morning and afternoon.



- Source: INRIX

# IMPACT ON ON-ROAD SECTOR

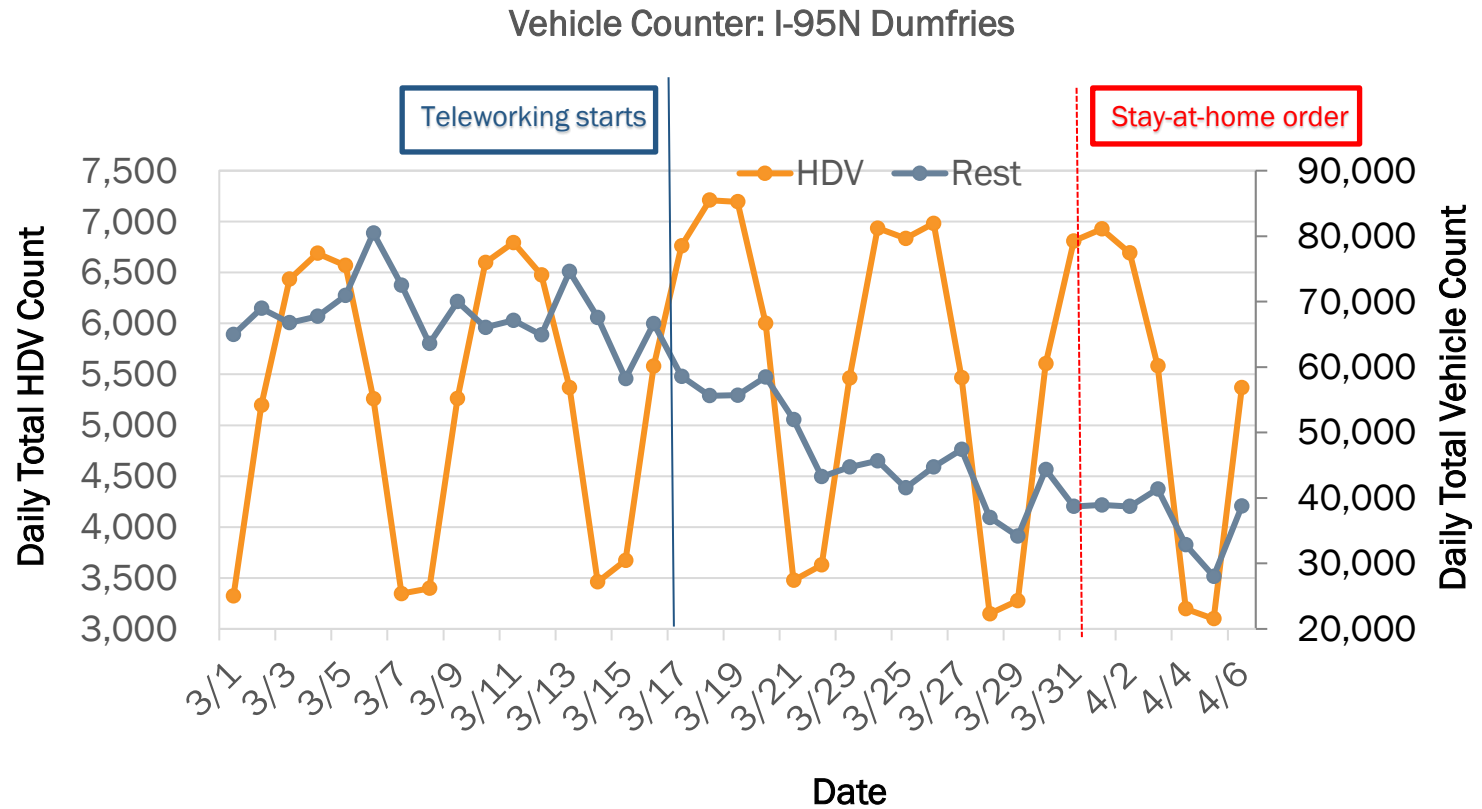
The Intramural Beltway also recorded congestion free conditions going both clockwise and counterclockwise between Silver Spring and Alexandria. The morning and afternoon running clockwise saw speed increases of 23 and 27 MPH, while counterclockwise saw increases of 17 and 28 MPH.



- Source: INRIX



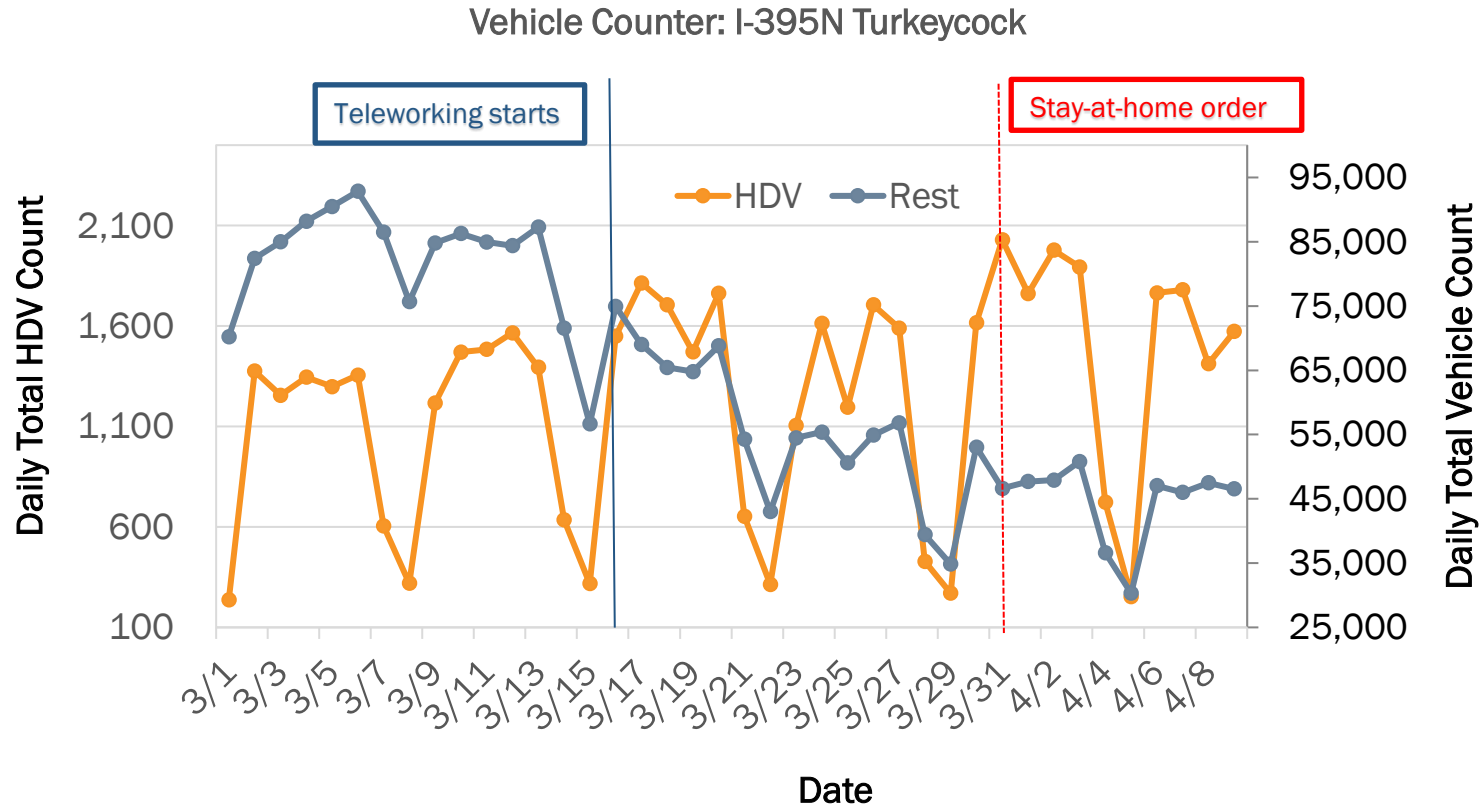
# IMPACT ON ON-ROAD SECTOR



- Not much change in heavy-duty vehicles visible. Other vehicles show downward trend.
- Source: VDOT

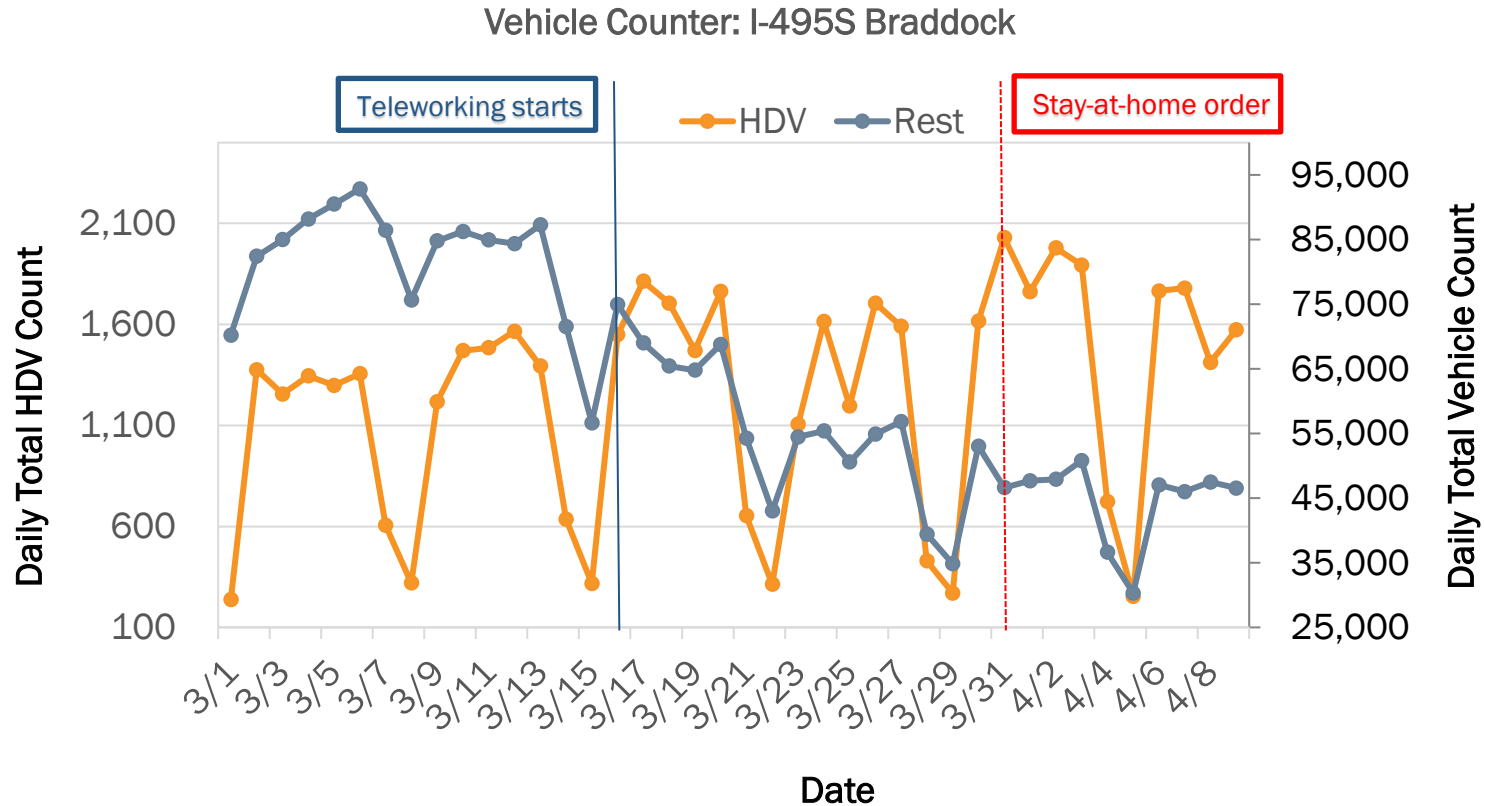


# IMPACT ON ON-ROAD SECTOR



- Not much change in heavy-duty vehicles visible. Other vehicles show downward trend.
- Source: VDOT

# IMPACT ON ON-ROAD SECTOR



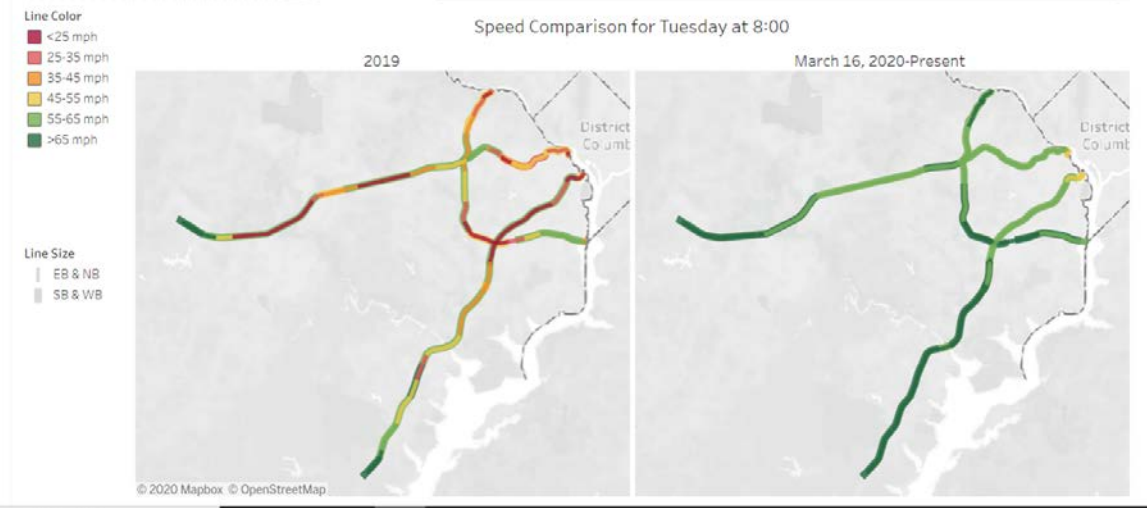
- Not much change in heavy-duty vehicles visible. Other vehicles show downward trend.
- Source: VDOT

# IMPACT ON ON-ROAD SECTOR

## Daily Volume for Northern Virginia - Tuesday

	03/17/20	03/24/20	03/31/20
24-Hour Volume	1,270,077	998,008	811,108
% Change from March 2019	-22.5%	-39.1%	-48.4%
Number of Links Reporting	49	49	48

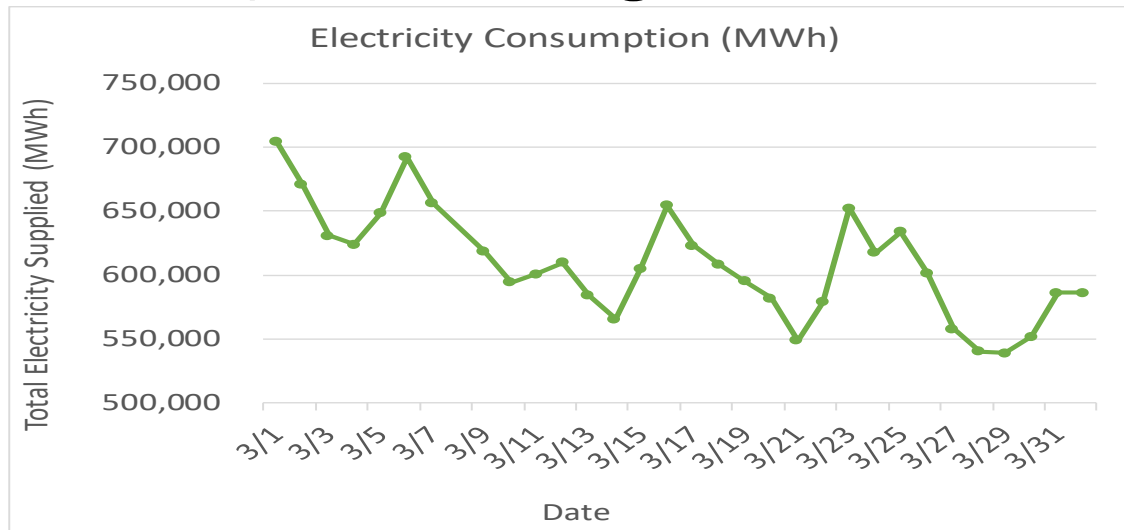
	2019	3/17/2020	3/24/2020	4/7/2020
I-66	11,900	500	0	500
I-95	11,300	2,100	100	400
I-395	1,700	0	0	0
I-495	8,300	0	0	100



- Traffic count shows downward trend in northern Virginia. Much less congestion now. Source: VDOT

# IMPACT ON POINT & NON-POINT SECTORS

- There has also been impact on the energy consumption in the region due to office and business closures and people teleworking/staying at home.
- Electricity consumption data, in general shows downward trend.



- Preliminary electricity supply data provided by utilities serving metro Washington region. Source: VDOT



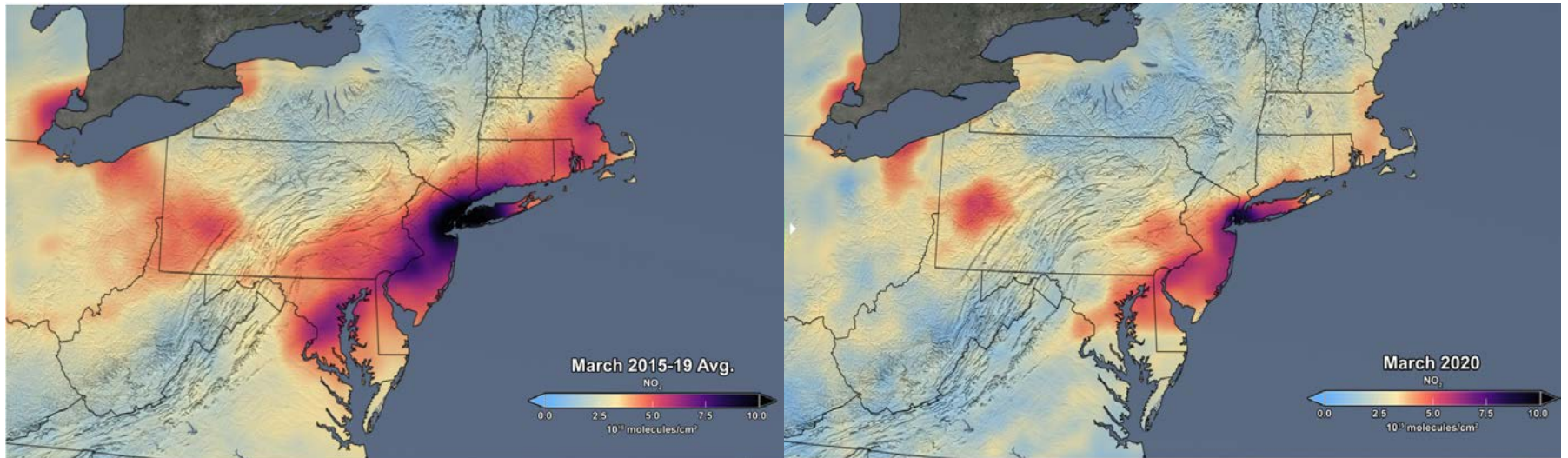
# IMPACT ON NONROAD SECTOR

---

- Data showing change in emissions is not available for this sector yet.
- However, emissions can be expected to decline similar to other sectors as activities related to nonroad sources (e.g., construction, commercial, industrial, aircraft, railroad, etc) have also declined.



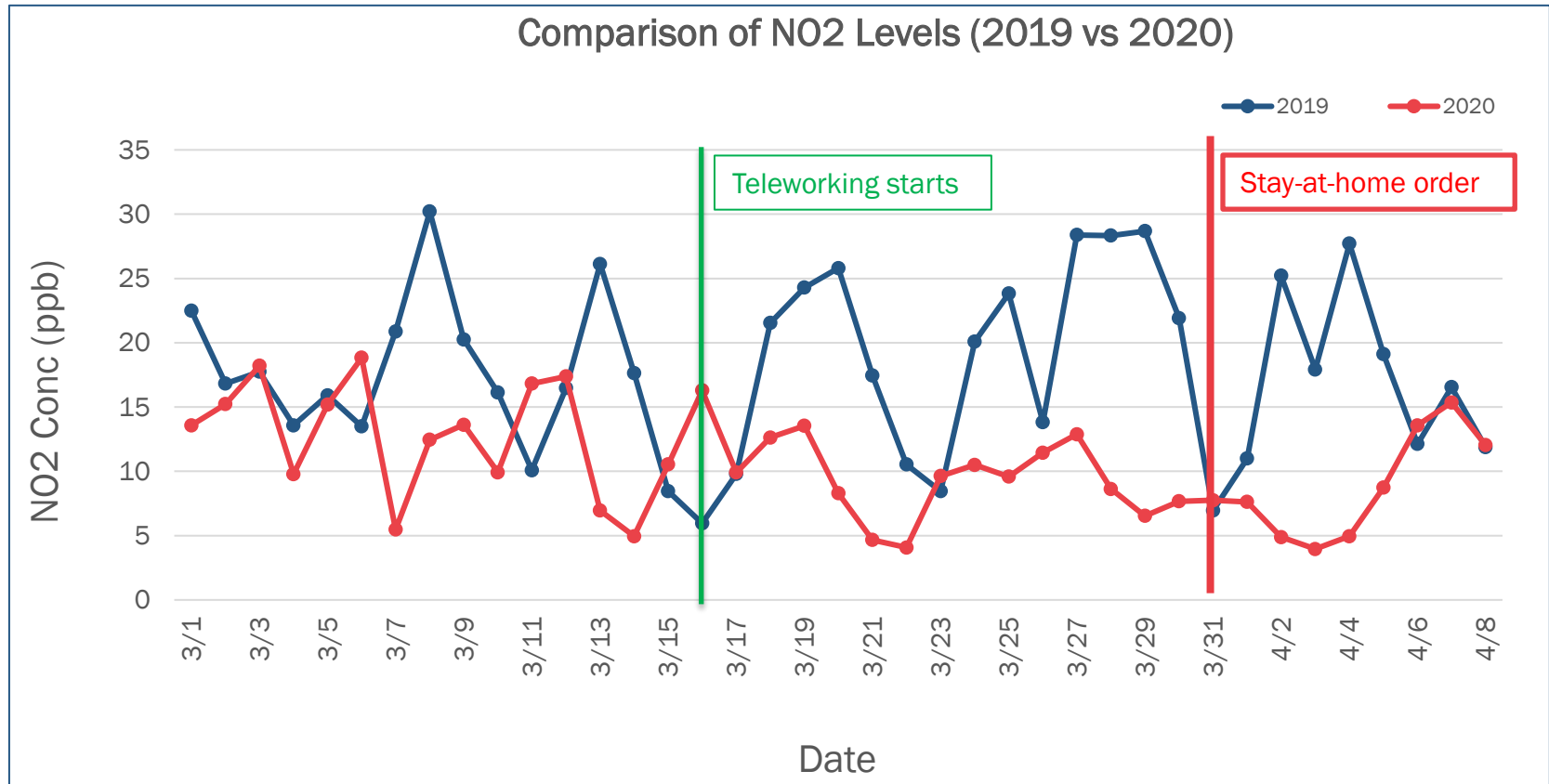
# SATELLITE NO2 DATA TREND



- Decline visible in NO<sub>2</sub> levels in March 2020 compared to March 2015-2019 average.
- NASA cautions that “Further analysis is required to rigorously quantify the amount of the change in NO<sub>2</sub> levels associated with changes in pollutant emissions versus natural variations in weather.”
- Source – NASA (<https://airquality.gsfc.nasa.gov/>)

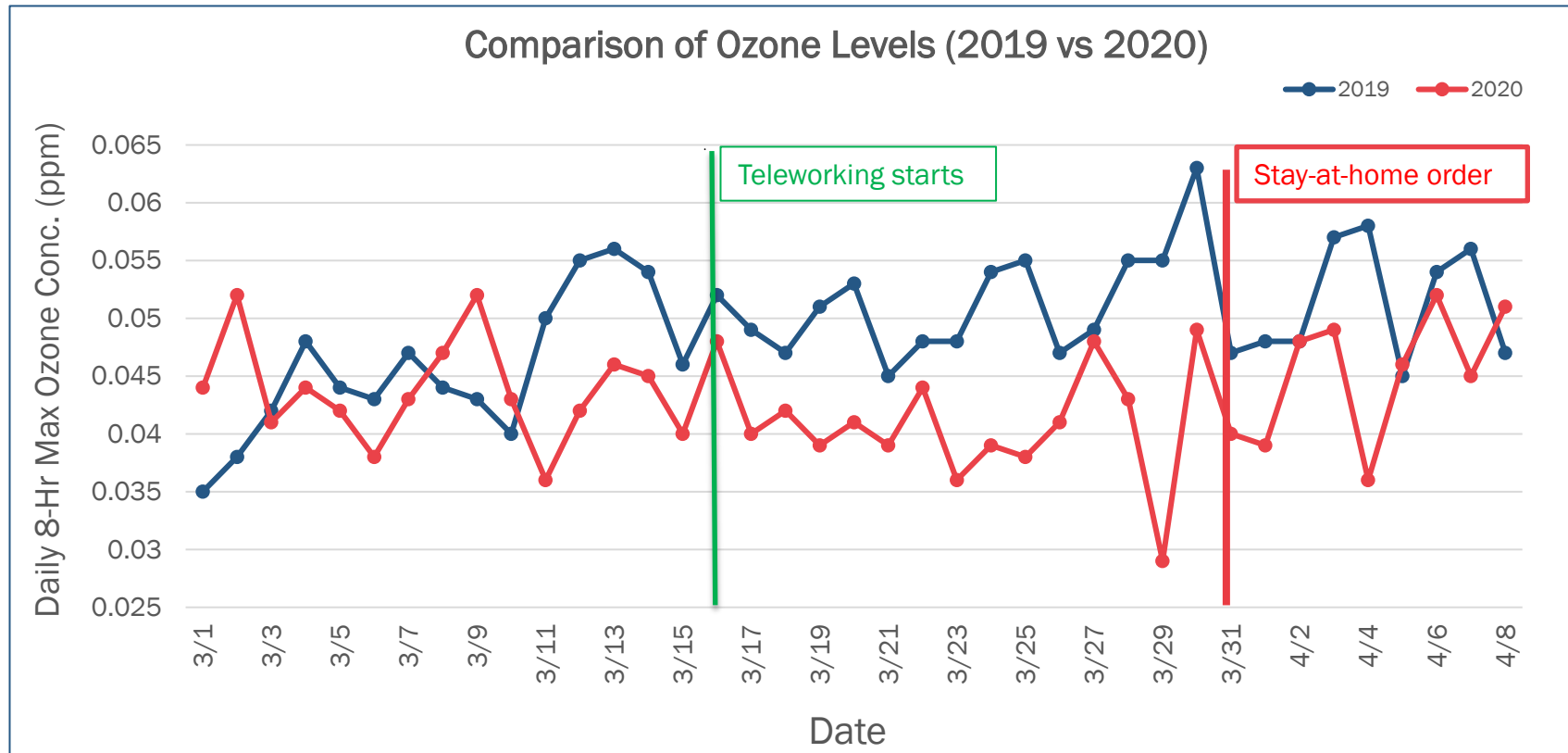


# IMPACT ON MONITORED NO2 LEVELS



- Draft NO2 levels seem lower compared to 2019 both before and after lockdown, but difference seems more after lockdown. Role of weather needs to be studied.

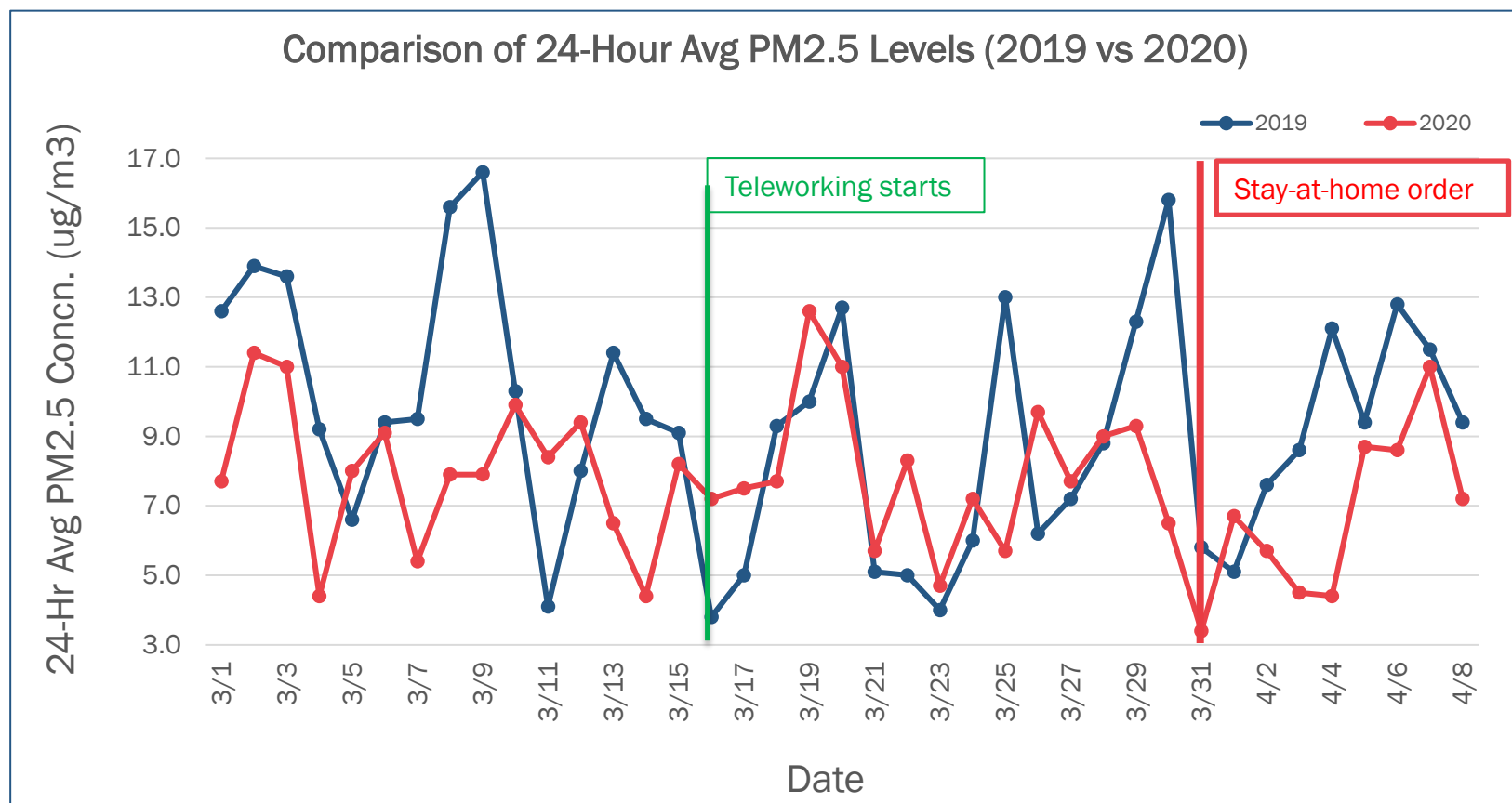
# IMPACT ON OZONE LEVELS



- Draft ozone levels generally seem lower compared to 2019 both before and after lockdown. Impact of NO<sub>2</sub> reduction not clearly visible yet. Role of weather needs to be studied.



# IMPACT ON PM2.5 LEVELS



- Draft PM2.5 levels generally on low side, but no clear impact visible yet.



# CONCLUSIONS

---

- NO<sub>2</sub>, ozone, and PM<sub>2.5</sub> levels seem a bit lower after COVID-19 lockdown though it is too early to tell if that is happening due to lower emissions. Role of weather needs to be investigated to determine how much that is affecting pollutant levels.
- Reduction in NO<sub>2</sub> levels not resulting in ozone levels yet. Ozone is generally low in March and early April as weather is generally not very conducive for ozone formation in those months.
- Impact of lockdown is expected to be more visible in summer, if it gets extended to those months.