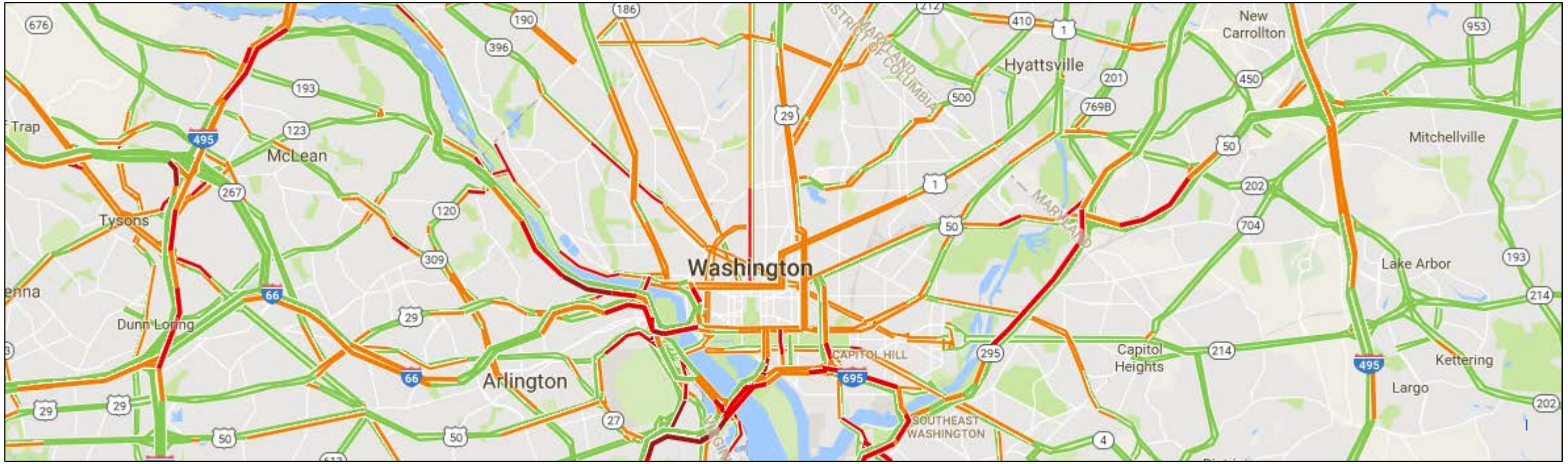
EXAMINATION OF A FLEXTIME INCENTIVE APPLICATION

A NEW FINANCIAL INCENTIVE PROGRAM FOR COMMUTERS IN THE METROPOLITAN WASHINGTON AREA



INTRODUCTION

- Commuter Connections has explored the implementation of a flextime-incentive pilot program for the Washington D.C. metropolitan region
- This program would offer a financial benefit to commuters who are able and willing to commute during off-peak hours to avoid congestion along major corridors in the region, specifically, during a major incident
- This program will reward commuters and reinforce the importance of mitigating traffic during the peak period

OVERVIEW

- Literature Review
  - Includes three scholarly works and data from the 2016 State of the Commute Survey
- Corridors of Interest
  - Includes a table of the 2015 Top-10 Bottlenecks for the metropolitan area
  - Levels of service on selected segments are presented
- Implementation
  - Theories for pilot-program implementation are reviewed

LITERATURE REVIEW

- A literary review is performed to learn about scholarly research regarding flextime incentive programs. An analysis of past incentive programs is included to learn and understand best practices, financial implications and positive impacts of flextime on corridors and commuters
- This includes three scholarly works and a review of relevant data from the 2016 State of the Commute Survey

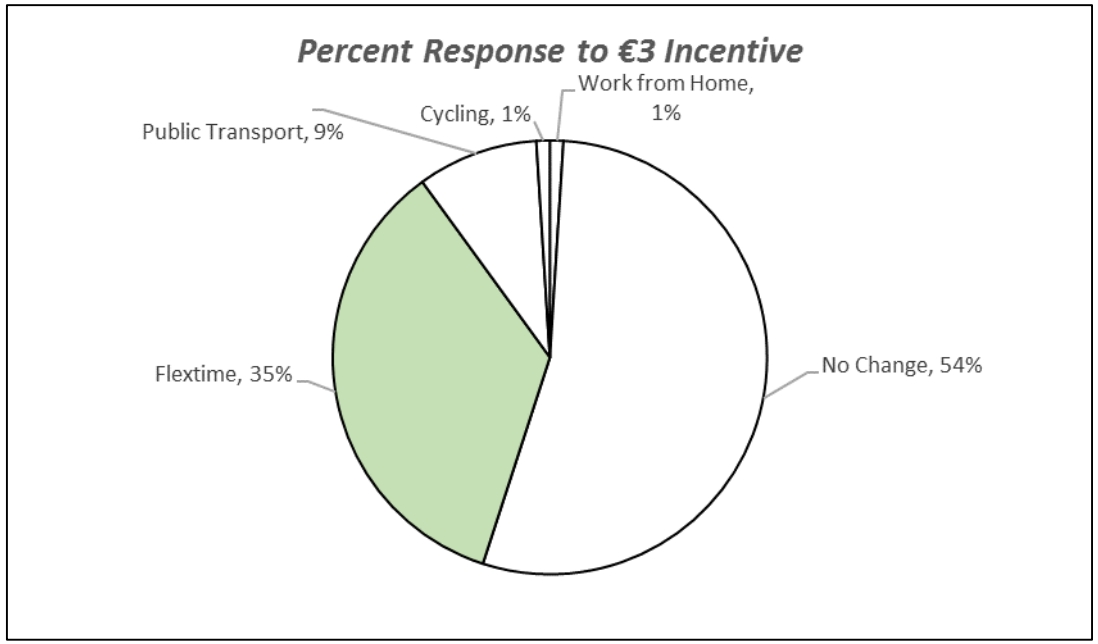
1: "REWARDING FOR AVOIDING THE PEAK PERIOD: A SYNTHESIS OF THREE STUDIES IN THE NETHERLANDS"

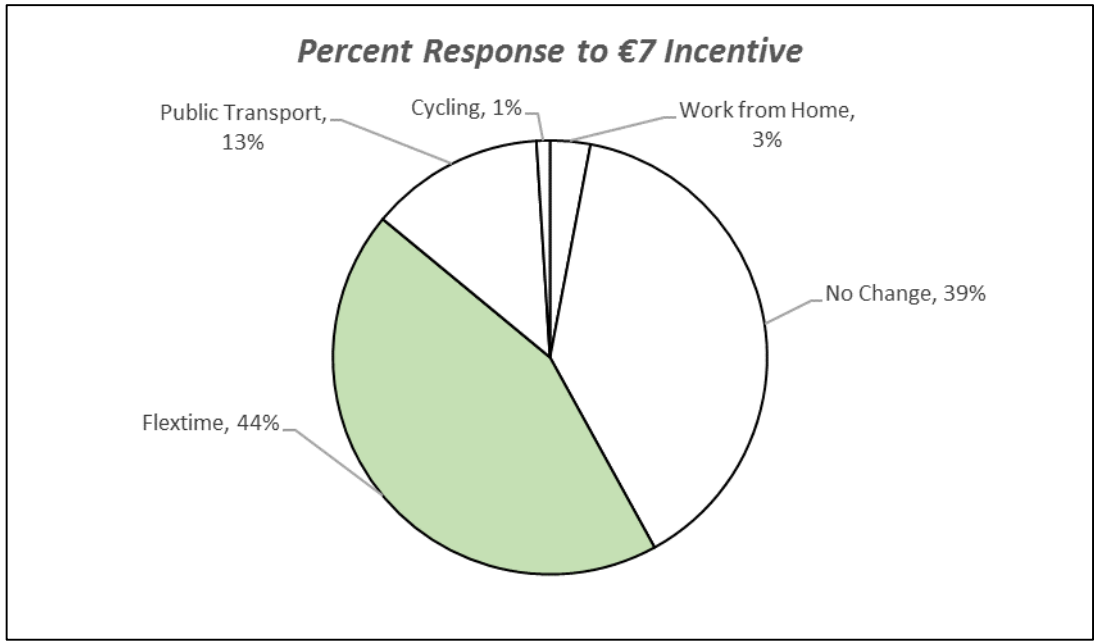
- In 2006, a series of three experiments being conducted in the Netherlands began to assess the effects of monetary rewards given to travelers who avoided the peak period

NETHERLANDS CONT'D: EXPERIMENT ONE

- Experiment One: Netherlands' A12 Motorway
  - Intended to gauge receptiveness to the idea, not to necessarily solve the congestion problem
  - It took place from October through December 2006 during 10 consecutive weeks
  - Participants were chosen based on those who frequently traveled the motorway. Invitations were given and participation was validated using a license plate detection system
  - Participants could earn €3 to €7. For three weeks, €3 could be earned each day commuters avoided the morning peak by car. For another four weeks, they could earn €7 each day. And for yet another three weeks, they could earn €3 per day, which increased to €7 if they were not detected at all in the morning peak

NETHERLANDS CONT'D: EXPERIMENT ONE





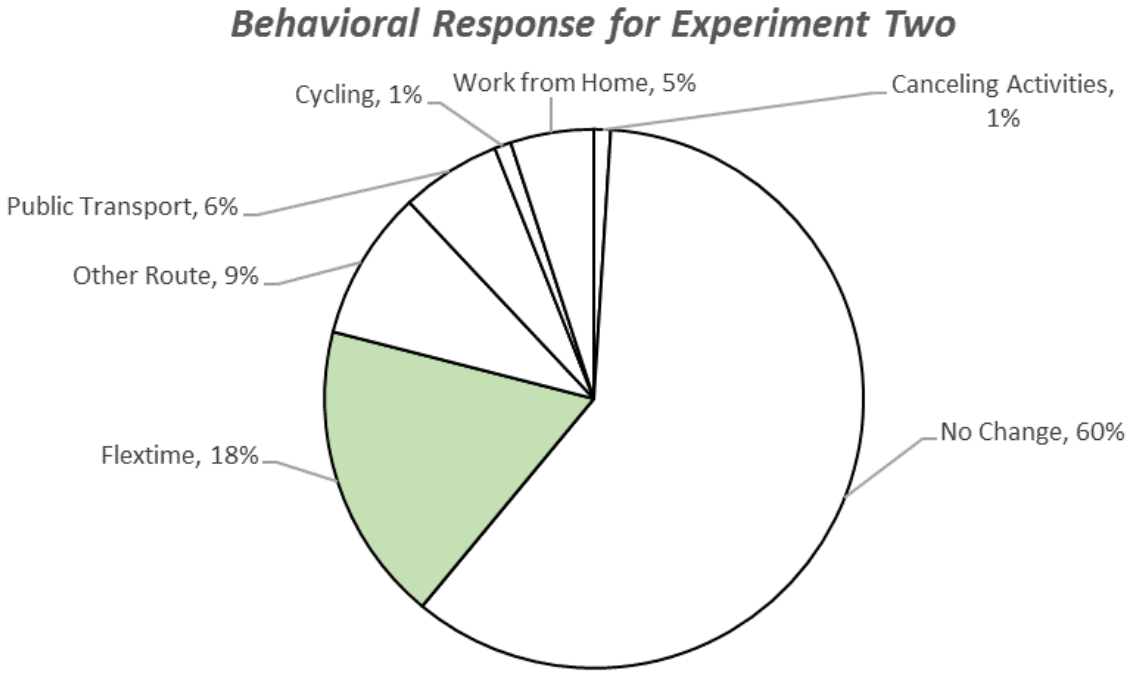
As shown, most commuters who changed their travel behavior decided to travel during off-peak hours. The percentage of flextime used sees a relatively modest rise when commuters are offered a 133% increase from €3 to €7 per day. The third reward scheme where participants who earned €3, with an increase to €7, saw an almost identical percentage as the flat €7 reward scheme. Experiment one concluded that a relatively low reward sufficed for most participants to be affected.

NETHERLANDS CONT'D: EXPERIMENT TWO

- Experiment Two: Netherlands' Hollandse Bridge
  - The second experiment conducted had a clear goal in mind: avoid a significant increased level of congestion during a year-long construction project
  - It was estimated that the motorway needed a reduction of 1,000 to 1, 500 trips per week during the morning peak
  - Mobility management measures included free public transport, vanpools and a monetary reward for those traveling by car to avoided the peak hour
  - A reward of €4 per work day could be earned by participants for avoiding the morning peak (6 a.m. – 10 a.m.)

NETHERLANDS CONT'D: EXPERIMENT TWO

- Experiment two yielded a behavioral change response of 40%, with the largest change (18%) belonging to those who chose to travel outside of the peak hours
- The 18% of commuter choosing to use their flextime made up about 425 cars, or, 2.6% of the total traffic flow along the bridge

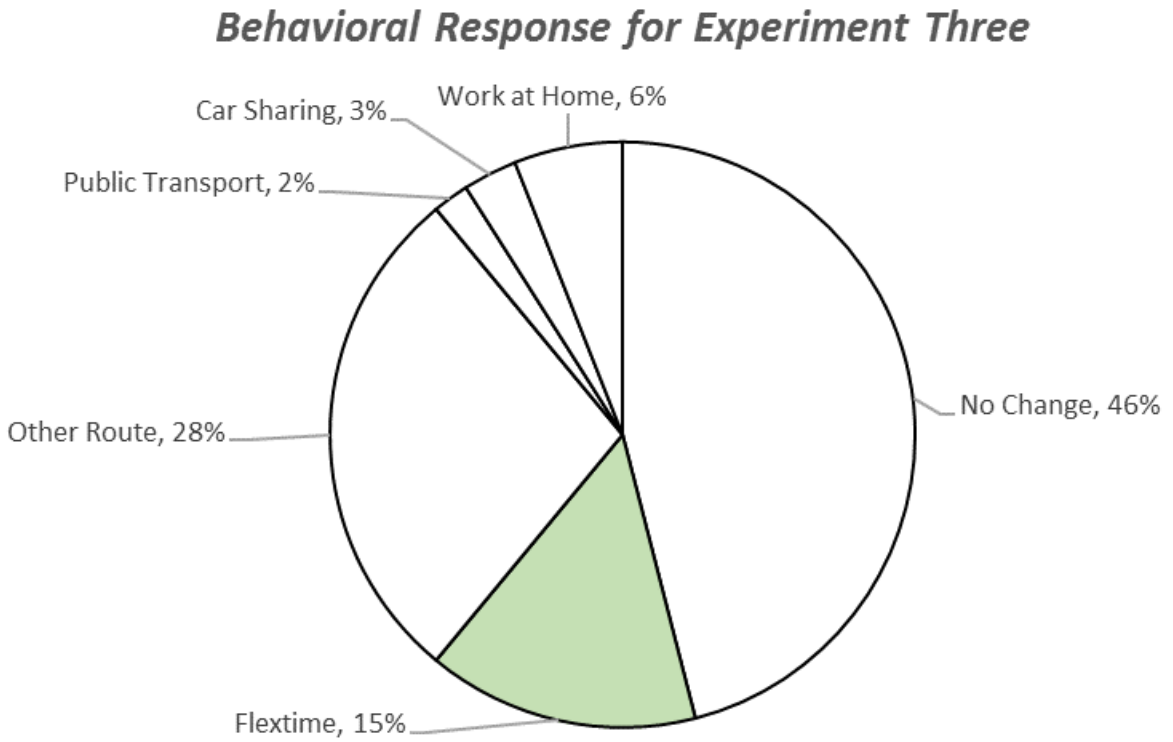


NETHERLANDS CONT'D: EXPERIMENT THREE

- Experiment Three: Netherlands' Moerdijk Bridge
  - Much like experiment two, experiment three aimed to avoid a significant increase in traffic congestion due to roadwork. However, the duration of this experiment only lasted 2.5 months, from April to July, 2008.
  - This experiment's reward scheme payed €4 per day to those traveling south on the bridge during evening peak hours (3 p.m. – 7p.m.)
  - The key difference in experiment three being that there were two feasible alternate routes, unlike experiment one (A12 Motorway) and experiment two (Hollandse Bridge).

NETHERLANDS CONT'D: EXPERIMENT THREE

- Analyzing data from experiment three showed that the total number of bridge passengers decreased by about 920 vehicles per evening peak, or, 4.6% of the total traffic flow along the bridge.



NETHERLANDS CONT'D

- The monetary incentives were effective in causing behavior change and had significant impacts during the temporary reward periods
- The experiments proved to be so effective for their region, the Netherlands continued to implement flextime incentive programs for future construction projects along major corridors throughout the country
- It is anticipated that a national study of those results will be published in English sometime this year

2: "REDUCING ROAD CONGESTION THROUGH INCENTIVES: A CASE STUDY"

- This paper also studied the use of incentives to increase the willingness of commuters at Stanford University to travel outside of the peak period
- Stanford University first designed and implemented their incentive program, called CAPRI (Congestion and Parking Relief Incentives), in 2012
- A total of 3,082 registered to participate in the program. The study lasted for approximately two and a half years

STANFORD CONT'D

- Those who enrolled were given passive RFID (Radio-Frequency Identification) tags to be placed on the windshield of their vehicle
- The CAPRI program had a "gamified" rewards scheme: for each vehicle detected by the sensors during the off-peak hour, the participant was awarded 10 points. They were given a random "boost" day, which allowed them to earn 30 points instead of their usual 10
- Participants could then redeem 100 points for $1, or, spend their points on a lottery-type game to receive anywhere from $1-$50

STANFORD CONT'D

- The gamification aspect to their reward scheme also included a four-tier system: the more off-peak trips an individual consistently made, the higher their tier would be. Failure to continue traveling during off-peak hours would result in a downgrading of their status
- Participants with a higher status had a higher chance of earning a higher reward while playing the incentive game

STANFORD CONT'D

- To summarize their main findings: compared to the general Stanford population, CAPRI participants are 21.2% less likely to commute during the morning peak hours of 8-9 a.m., and 13.1% less likely to commute during the evening peak hours of 5-6 p.m.
- Over the program's two-year lifespan, CAPRI gave out a total of $211,989 in incentives

BEHAVIORAL ECONOMICS AND PSYCHOLOGY OF INCENTIVES

- A research paper published in 2012 by the University of Chicago's Booth School of Business offers some insight on the psychology of structuring a successful incentive
- The author recognizes two broad patterns that can lead to a successful incentive structure: less money and fewer options
  - Applying this idea to a flex-time incentive program would mean offering a modest reward for those flexing time and not offering other options, such as rerouting or teleworking

2016 STATE OF THE COMMUTE SURVEY

- The State of the Commute Report serves several purposes, including the documentation of trends in commuting behavior, such as availability, receptiveness and use of a flexible work schedule
- This report defines the morning peak period for the region as being from 6:30 a.m. to 9:30 a.m.
- Of the total individuals who have responded to the survey:
  - 50% use the flextime they have available
  - 13% have flextime available but do not use it
  - 37% do not have flextime available

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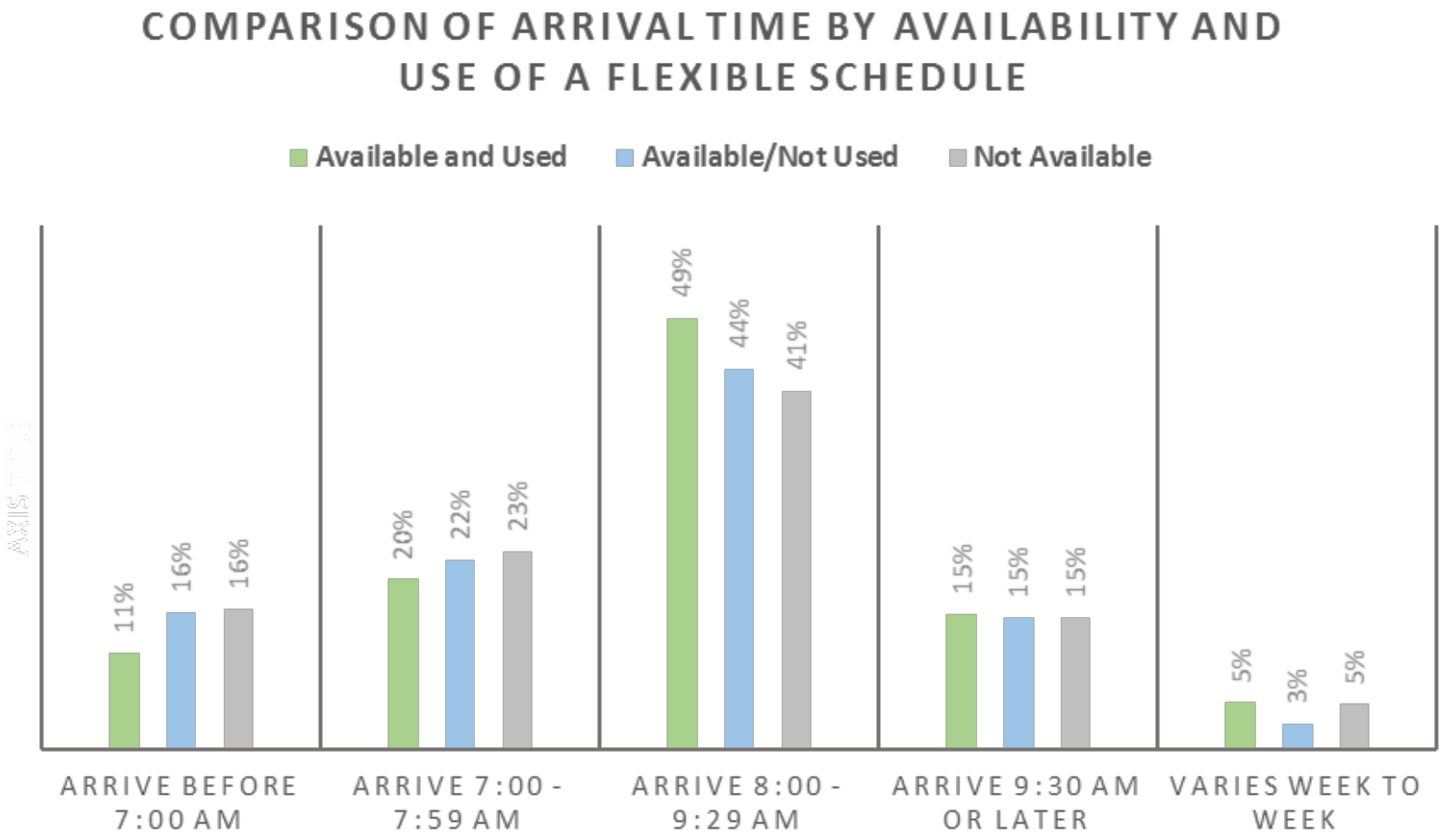
2016 STATE OF THE COMMUTE CONT'D



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2016 STATE OF THE COMMUTE CONT'D

- Flexibility of working commuters by work jurisdiction:
  - Alexandria; 85% are flexible by over 30 minutes or more
  - Arlington County; 72% are flexible by over 30 minutes or more
  - D.C.; 70% are flexible by over 30 minutes or more
  - Fairfax County; 71% are flexible by over 30 minutes or more
  - Montgomery County; 69% are flexible by over 30 minutes or more
  - Prince William County; only 34% are flexible by over 30 minutes or more
  - Prince George's County; 52% are flexible by over 30 minutes or more

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2016 STATE OF THE COMMUTE CONT'D

- The State of the Commute Report also gauged respondents on their receptiveness to accepting a small monetary reward for using the flextime they have available
- The report asked, "*If you could receive $3 per day for each day that you arrive at work before 7:00 am or at 10:00 am or later, how likely would you be to make this change in your work schedule?*"
- The question implied a repeated or ongoing incentive, rather than a one-time or occasional incentive. So the percentages of commuters who would be interested in a one-time reward might be higher or lower than estimated in the SOC survey

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2016 STATE OF THE COMMUTE CONT'D

- Likelihood of work jurisdictions to use their flextime when commuting workers are offered a small reward:
  - Alexandria: Very likely: 18%; Somewhat Likely: 42%
  - Arlington County: Very Likely 27%; Somewhat Likely 24%
  - D.C.: Very Likely 22%; Somewhat Likely 28%
  - Fairfax County: Very Likely 30%; Somewhat Likely 21%
  - Montgomery County: Very Likely 30%; Somewhat Likely 24%
  - Prince William County: Very Likely 36%; Somewhat Likely 27%
  - Prince George's County: Very Likely 42%; Somewhat Likely 21%

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CORRIDORS OF INTEREST

- Corridors from the region are examined to determine which would most benefit from instituting a flextime incentive program. Criteria for selecting corridors are based off the State of the Commute Report produced by Commuter Connections and by observing data on the top-10 traffic bottlenecks in the region. The top-10 bottlenecks in the region are published as part of COG/TPB's 2016 "Congestion Management Process Technical Report."

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CORRIDORS OF INTEREST CONT'D

This table provides a list of top bottlenecks in the Washington region for peak periods only, i.e., non-holiday weekday 6:00-9:00 a.m. and 4:00-7:00 p.m. The bottlenecks are ranked by either the combination of Travel Time Index (TTI) and length or the multiplication of TTI, length and Annual Average Daily Traffic volume (AADT). The Travel Time Index is the ratio of the peak-period travel time as compared to the free-flow travel time. Smaller numbers indicate freer flowing traffic patterns.

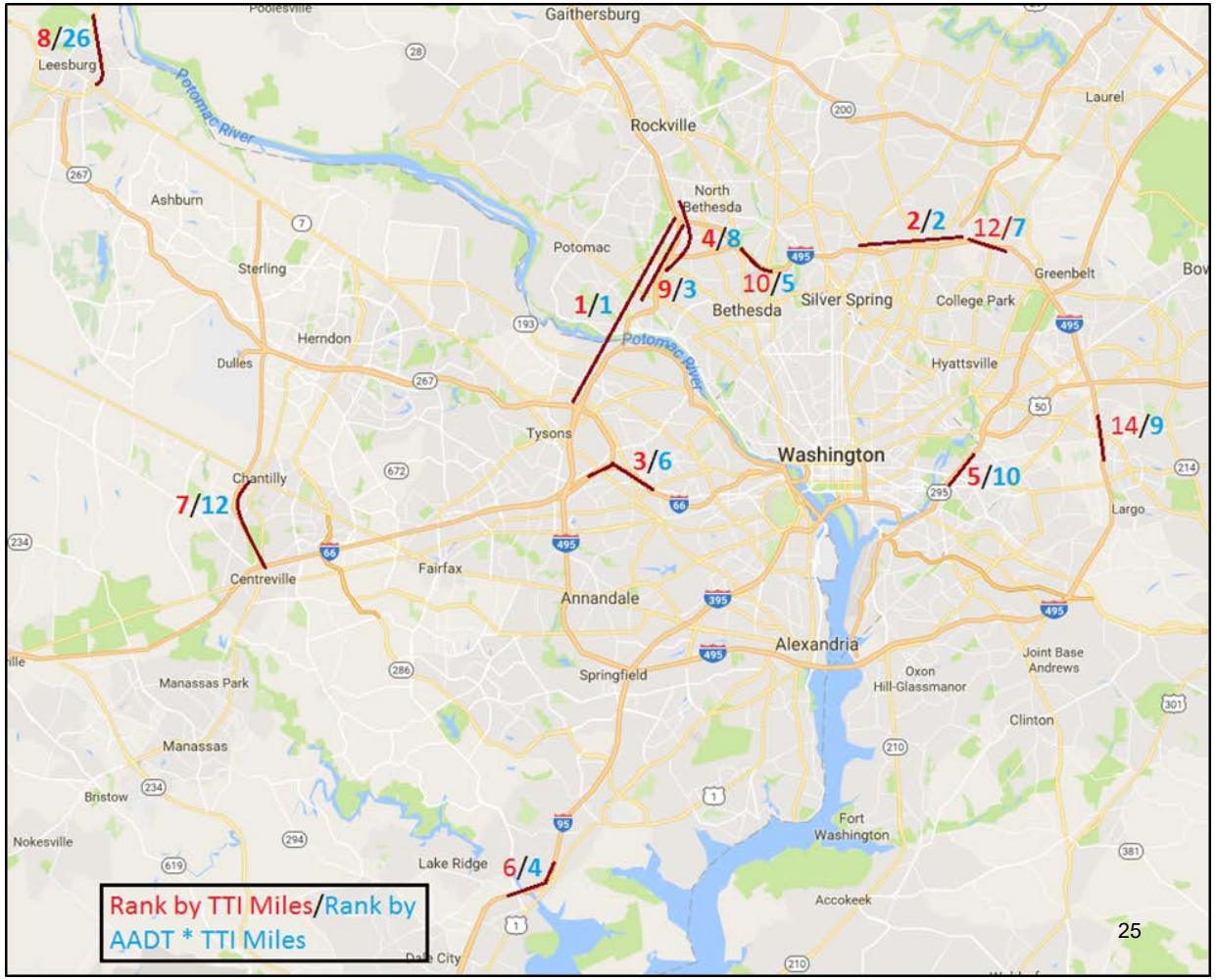
2015 Top Bottlenecks - Peak Periods

Location	State	Ave. TTI	Length (miles)	TTI Miles	Rank by TTI Miles	AADT	AADT × TTI Miles	Rank by AADT × TTI Miles
I-495 IL between VA-267 and I270 Spur	VA, MD	2.69	8.36	22.47	1	110,376	2,480,129	1
I-495 OL between I-95 and MD-193	MD	2.57	4.35	11.17	2	104,670	1,168,848	2
I-66 EB at VA-267	VA, MD	2.47	2.83	6.99	3	65,500	548,043	6
I-270 SPUR SB	MD	3.21	2.04	6.56	4	65,406	429,242	8
DC-295 SB at Benning Rd.	DC	2.59	2.28	5.89	5	59,376	349,827	10
I-95 SB at VA-123	VA, MD	2.34	2.46	5.75	6	104,000	597,810	4
VA-28 SB between VA-7 and N. King St.	VA, MD	2.32	2.3	5.33	7	50,000	266,469	12
US-15 NB between VA-7 and N. King St.	VA, MD	2.56	2.02	5.19	8	8,800	45,656	26
I-495 OL between I-270 and MD-190	MD	2.26	2.22	5.01	9	122,010	611,335	3
I-495 IL between MD-355 and MD-185	MD	2.23	1.96	4.38	10	110,876	485,635	5
I-495 IL between I-95 and US-1	MD	2.32	1.68	3.91	12	111,740	437,336	7
I-495 OL at MD-202 / Landover Rd.	MD	2.09	1.54	3.22	14	113,390	364,755	9

CORRIDORS OF INTEREST CONT'D

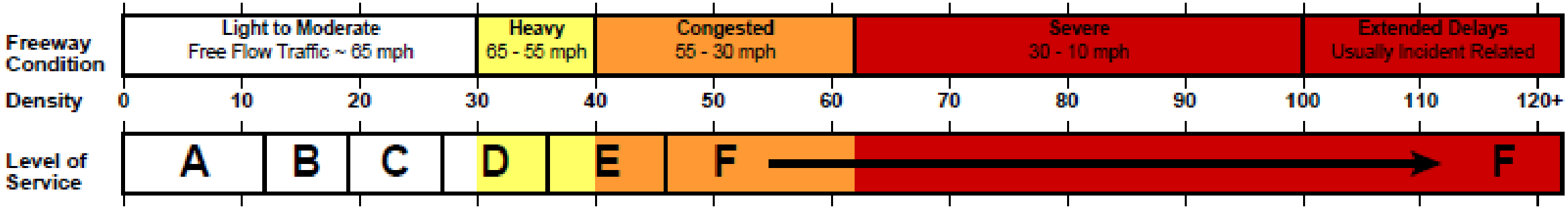
Four of the region's top-10 bottlenecked segments have been chosen for a Flextime Incentive pilot:

- I-270 spur down past the American Legion Bridge – Inner Loop (1/1)
- Along the Beltway between I-95 and MD-193 – Outer Loop(2/2)
- I-66 EB at VA 267 (3/6)
- D.C. 295 SB at Benning Rd. (5/10)



CORRIDORS OF INTEREST: LEVELS OF SERVICE

- **Levels of Service:**
  - COG/TPB staff produced an ongoing mobility-monitoring report in 2014 titled "Traffic Quality on the Metropolitan Washington Area Freeway Systems."
  - Peak-period freeway congestion is monitored on a tri-annual cycle during the a.m. and p.m. peak periods. Survey data was collected using aerial photography flights conducted on weekdays, excluding Monday mornings, Friday evenings and mornings after holidays
  - Data were then extracted from the aerial photographs to measure average traffic flow density and determine levels of service:



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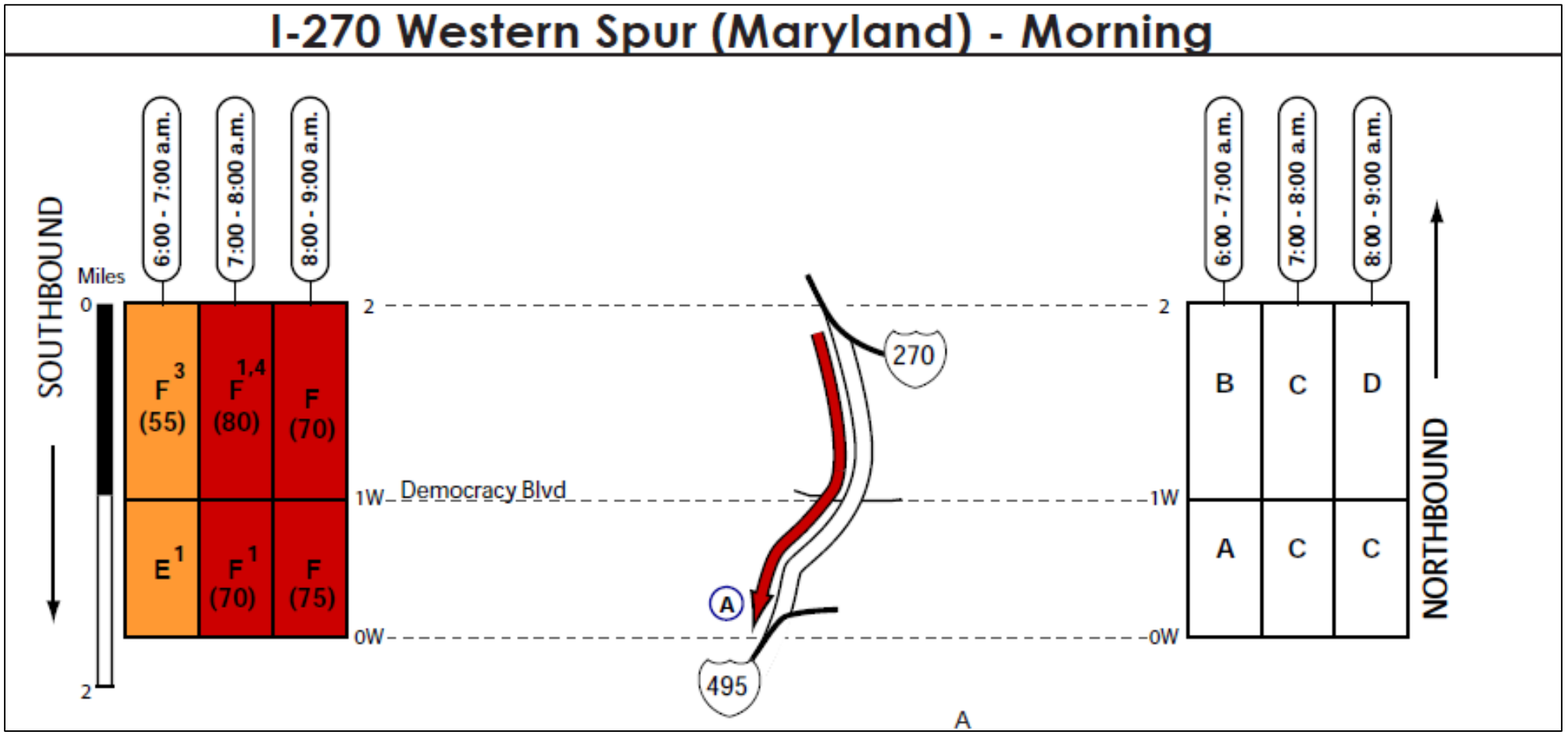

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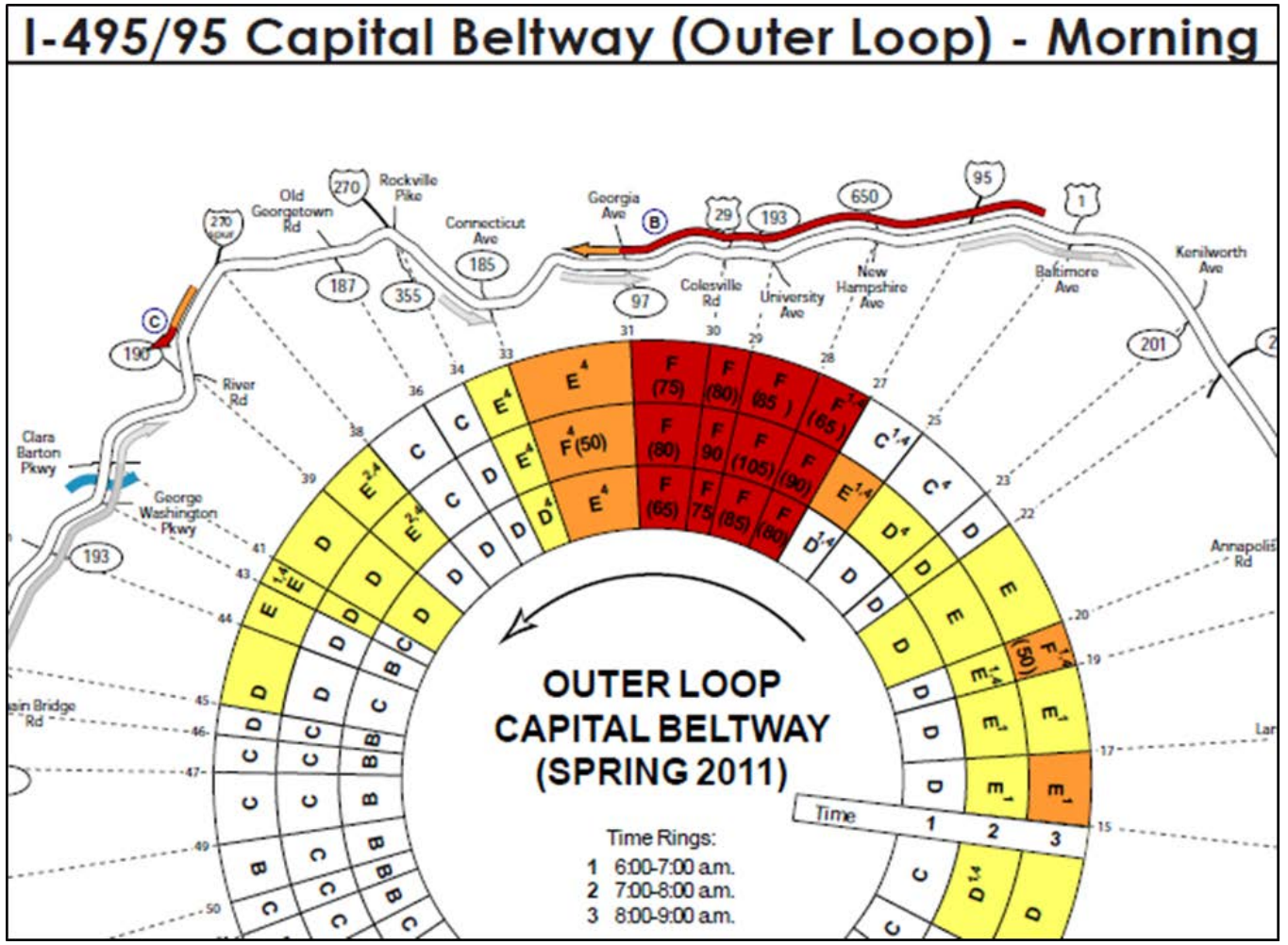

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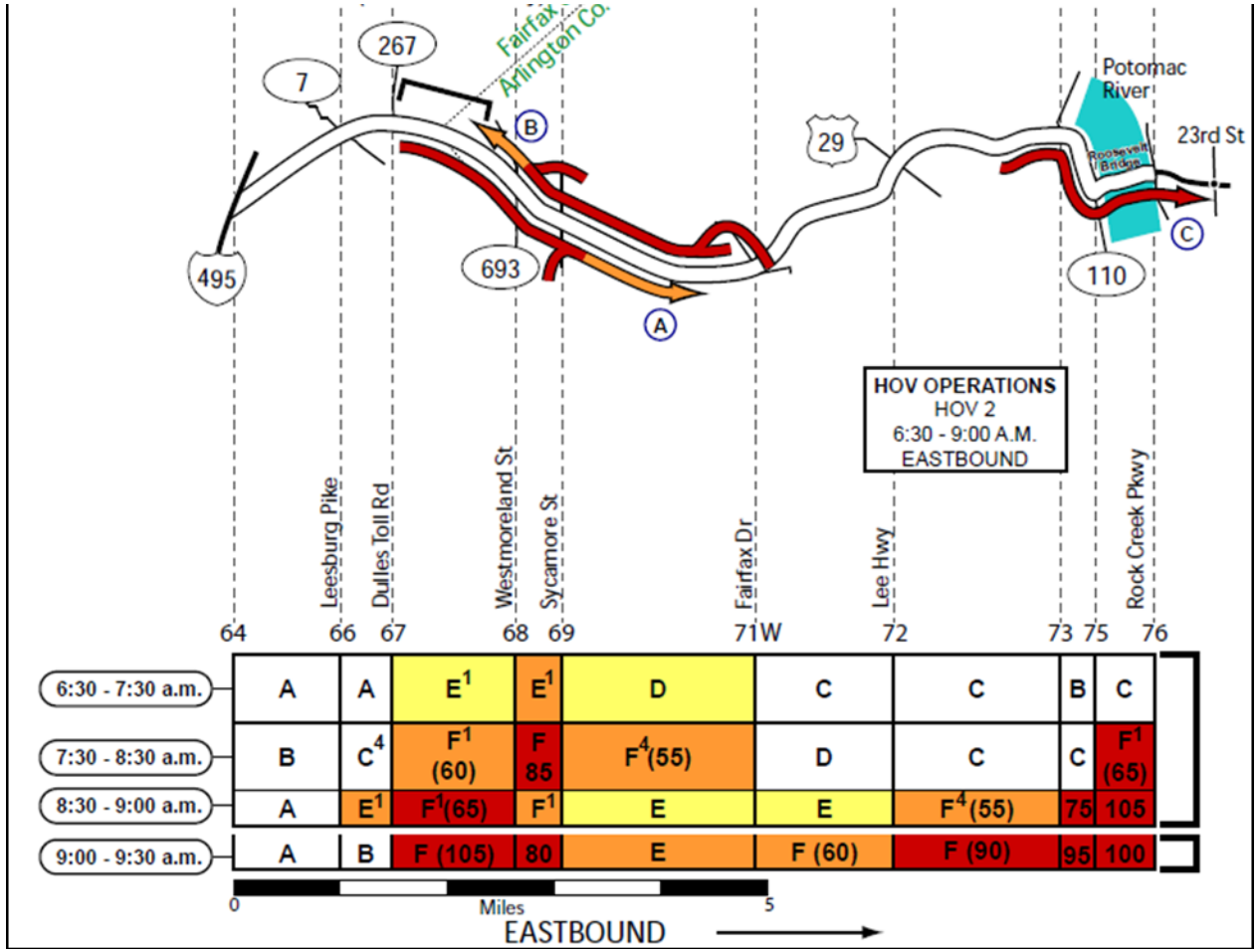

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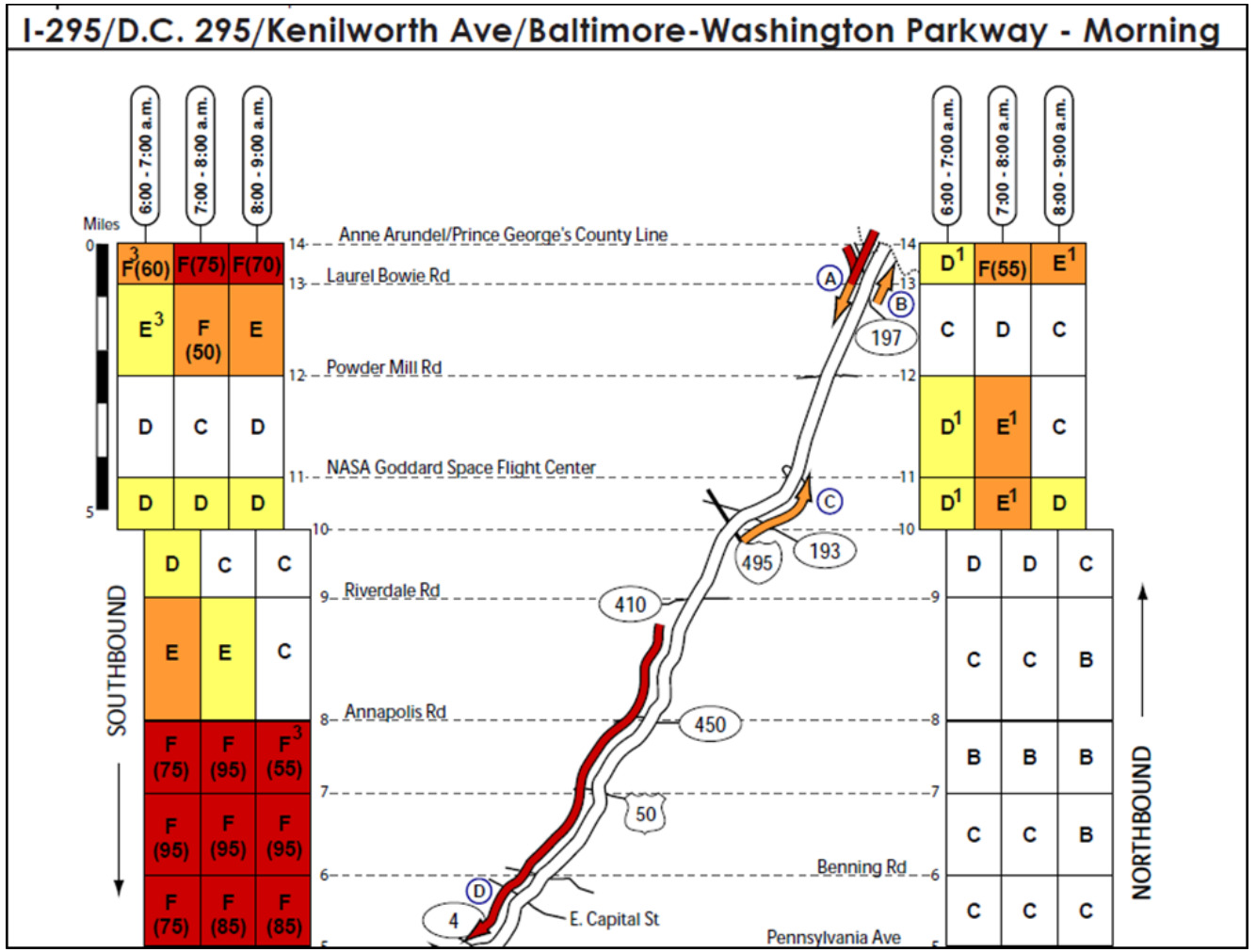

IMPLEMENTATION

- While the Flextime White Paper concentrates on a handful of specific corridors in the Washington region, these selected corridors of interest are not the only possible in which to implement a flextime incentive program
- The corridors selected for observation were purposely chosen in the event that a pilot program is initially launched

IMPLEMENTATION CONT'D

- This incentive program will have a registration process modeled after Commuter Connection's current benefit and incentive programs applications
- The applications received from individuals traveling along select corridors will be reviewed and either approved or denied by COG/TPB staff. Careful attention is given during this process to determine eligibility associated with implementing an incentive program of this type.

IMPLEMENTATION CONT'D

- A major concern of this incentive program is verifying the accuracy of commute time to minimize/eliminate cheating or defrauding the incentive program
- Commuter Connections plans on using a variety of verification techniques to confirm the legitimacy of a user's trip. This includes the mandatory use of location services to verify departure and arrival times, as well as verify the route the individual has traveled.
- This verification will help Commuter Connections Staff confirm the participants are traveling to their registered work place, particularly for those receiving a cash incentive. It will also help Commuter Connections Staff verify that the participant is truly flexing their time and rerouting the trip.
- For those participants choosing not to use geo-location services or without a smartphone, self-verification along with a supervisor's verification would be needed to enter into a prize drawing. They would be required to use an on-line logging feature similar to other Commuter Connections incentive programs.

IMPLEMENTATION CONT'D

- Within a Commuter Connections app, the user must receive and accept a notification pushed to their phone. They must turn on their location services so Commuter Connections can verify that the trip was taken outside their regularly scheduled work hours.
- Individuals already registered with Commuter Connections have elected to provide their home address, work address, contact information and schedule flexibility
- The user will indicate when their trip has begun and when they have reached their destination
- Commuter Connections may have to verify some of the information provided, such as schedule flexibility, with the user's employer. Commuter Connections may also have to restrict the user's ability to edit certain information after it has been confirmed, i.e., locking a user's work schedule and/or employer address to prevent individuals from changing this information before or after accepting a notification.

CONCLUSION

- After analyzing various sources of literature and data pertaining to incentive programs and peak-period travel, it is our recommendation that a pilot program will be most effective along these sections of congested corridors. If successful, Commuter Connections plans to permanently install this program to operate among our already existing benefit and incentive programs for the Washington metropolitan region.

PROGRAM COSTS

- The cash incentive costs are still under development and additional data on average number of non-recurring events and increased congestion on the selected roadways will need to be added to the cost formula currently shown in the White Paper.
- Underrun funds from the FY2017 CCWP will be used to implement the pilot program during FY2018.

QUESTIONS OR CONCERNS?

Any questions or concerns can be directed to:

Steven Osborn
Email: sosborn@mwcog.org
Direct: 202-962-3323