GPI Greenman - Pedersen, Inc.
Engineering and Construction Services

REF. MAX-2009027.00

August 26, 2011

Mr. Thomas Broderick, PE
Acting Chief Engineer
Massachusetts Department of Transportation
Ten Park Plaza
Boston, MA 02116

ATTN: Mr. Thomas Currier, P.E.
Project Manager

SUBJECT: Project Number: 604813
Oak Bluffs – Intersection Improvement Project
Edgartown-Vineyard Haven Road at Barnes and Airport Road
Questions from the Martha's Vineyard Commission

Dear Mr. Broderick:

On August 21, 2011, GPI received a series of questions from the Martha's Vineyard Commission pertaining to the design of the roundabout at the above location. These questions have come up as a result of the MVC reviewing the project as a Development of Regional Impact. GPI and MassDOT will be attending a meeting on September 1, 2011 to address the merits of the proposed roundabout. GPI has provided the following responses on behalf of MassDOT and will forward a copy of the responses to the MVC for their review prior to the September 1, 2011 meeting.

<u>Roundabout – Some Questions to Address - August 21, 2011</u>

1 <u>Safety</u>

1.1 What is the relative safety compared to other kinds of intersection?

- Single lane roundabouts like the one currently proposed offer the safest form of intersection control when compared to STOP control or SIGNAL control. Roundabouts significantly increase safety when compared to traditional intersections.

  The following is information published by the Insurance Institute for Highway Safety

BENEFITS OF MODERN ROUNDABOUTS
Visit the Insurance Institute for Highway Safety (IIHS), check out Research and Stats then locate roundabouts for more information on safety factors. Some of the most important benefits of the modern roundabout are:

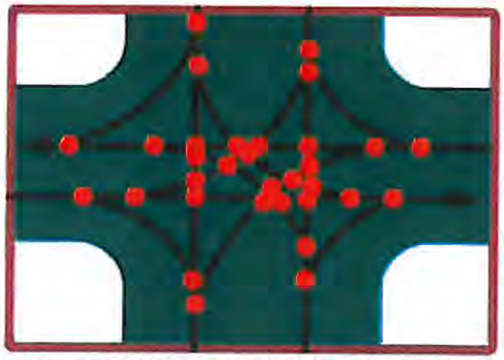
Reduces injury accidents by 75 percent and fatal accidents by 90 percent.

Increases efficient traffic flow up to 50 percent.

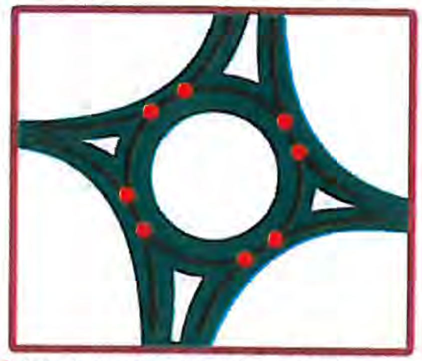
Helps the environment by reducing carbon emissions by double digits.

Decreases fuel consumption by as much as 30 percent.

Costs less than traffic signals and does not require expensive equipment or maintenance.



Red dots indicate 32 Vehicle to Vehicle conflict points in a standard four way intersection.



Red dots indicate 8 Vehicle to Vehicle conflict points in a Modern Roundabout.

1.2 What data is available and how reliable is it?

- Insurance Institute for Highway Safety – ***www.iihs.org***
- Roundabouts USA – ***www.roundaboutsusa.org***
- Arizona DOT – ***www.azdot.gov***
- New York DOT – ***www.nydot.gov***
- Transportation Research Board – ***www.trb.org***
- TRB's National Cooperative Highway Research Program (NCHRP) Report 572: *Roundabouts in the United States*
- TRB's National Cooperative Highway Research Program (NCHRP) Report 672: *Roundabouts an Informational Guide: Second Edition*
- Institute of Transportation Engineers – ***www.ite.org***
- Federal Highway Administration – ***www.fhwa.org***

2 Congestion

2.1 What is the current congestion?

- See Capacity Results excerpts from the Functional Design Report (FDR) completed as part of the MassDOT 25% Design for a comparison of 2010 & 2030 Average and Summer Conditions – (Attached)
- Under 2010 Existing Average Month Conditions, operations during the morning peak hour are approaching capacity along the EB approach (LOS E)
  - Worst delays occur along the EB approach where delays average approximately 40 seconds
  - Overall average delay through the intersection is approximately 30 seconds
- Under 2010 Existing Average Month Conditions, operations during the evening peak hour for the entire intersection approach capacity (LOS E) with the EB approach experiencing failures (LOS F)
  - The EB approach experiences delays of over a minute (66 seconds)

   - Overall average delay through the intersection is approximately 42 seconds
- Under 2010 Summer Conditions, during the morning peak hour the entire intersection is over capacity (LOS F) with the EB and WB approaches failing (LOS F) and the NB approach at or near capacity (LOS E)
   - EB delay is over 2 minutes
   - WB delay is approximately 1.5 minutes
   - Overall average delay through the intersection is approximately 1.5 minutes
- Under 2010 Summer Conditions, during the evening peak hour the entire intersection is over capacity (LOS F) and all approaches are failing (LOS F).
   - EB delay is over 3 minutes
   - WB delay is nearly 2 minutes
   - NB delay is over 2 minutes
   - Overall average delay through the intersection is approximately 2.5 minutes
- Based on 2005 traffic data collected by the MVC and used in the "Blinker Report" all approaches were over capacity and failing during the summer period (LOS F).

2.2 How will this change with a roundabout?

- See Capacity Results excerpts from the Functional Design Report (FDR) completed as part of the MassDOT 25% Design for a comparison of 2010 & 2030 Average and Summer Conditions – (Attached)
- Under 2010 Existing Average Month Conditions, 2010 Summer Conditions as well as 2030 Average and summer month conditions, all approaches are expected to operate at a LOS C or better.
   - ***Under the worst case scenario (2030 Summer PM Peak Hour) the delays are significantly reduced to:***

ROUNDABOUT	*4-WAY STOP*	*REDUCTION*
SB – 20 sec	*4.2 min*	*3.7 min*
WB – 17 sec	*4.4 min*	*4.1 min*
NB – 16 sec	*5.2 min*	*4.9 min*
EB – 13 sec	*6.9 min*	*6.7 min*
OVERALL 16 sec	*5.3 min*	*5.0 min*

2.3 Will relieving congestion at the Blinker lead to additional traffic at the ends:

2.3.1 If the overall volume on the ED-VH Road remains the same?

- In order to address this issue, GPI researched available data. In 2005, the MVC collected summer traffic counts at all three locations. Since this is the only data that was available from the same time period for all three intersections it was utilized for a comparison of the operations, including LOS, delays, hourly exiting rate (how the traffic is being processed) and vehicle queues. The analysis was run for a one hour peak period and the only change to the network was to convert the "Blinker" intersection into a roundabout. The analysis was done utilizing SYNCHRO Version 8 and SimTraffic Version 8 since the newest version produces LOS results for roundabouts.
- In addition, the MVC had summer count data at the Edgartown-Vineyard Have Road intersection at County Road. Based on a review of the 2010 summer data collected for the roundabout study at the Barnes Road intersection and those counts at County Road, there is a "loss" of 54 vehicles EB and an "increase" of 20 vehicles westbound between the two intersections. This indicates that there are origin-destination points between the study intersection and County Road.
- It should also be noted that while the analysis did account for the distances between the three intersections it does not account for various uses along the corridor (YMCA, High School, County Road, etc.) and assumes that every vehicle leaving the study intersection will arrive at the two intersections and vice versa.
- See the attached "4-Way STOP vs. Roundabout Network Traffic Operations Comparison"
- The Hourly Exit Rate of Traffic represents the amount of traffic processed along each approach of the intersection (hourly output).

- Simply converting from the 4-Way STOP control to a roundabout results in an increase of only 14 vph EB and approximately 5 vph WB.
- *This translates to one additional vehicle approximately every 4-5 minutes EB, which given that the intersection of Beach Road is more than 4 miles away is insignificant.*
- *This translates to one additional vehicle approximately every 12 minutes WB, which given that the intersection of State Road is more than 2 miles away is insignificant.*
- *It should also be noted that the operations along the corridor will experience an overall reduction in delay, number of stops and fuel consumption.*

2.3.2 If the overall volume increases?

- Based on historic traffic counts obtained from the MVC (attached) traffic volumes have continued to rise at the intersection even after the conversion from a 2-Way to 4-Way STOP control. This would indicate that very few drivers have been "avoiding" the intersection and will therefore return to the intersection if changed to a roundabout.
- The roundabout will unquestionably result in improved operations, and if in fact minor amounts of traffic due return to the intersection there is ample capacity to process that traffic. Furthermore, if the traffic is being diverted back to this location, it will be resulting in less cut-through traffic on more residential streets and putting the traffic back on the major roadways where it is desired. If in fact this were to happen, it would be an overall positive impact for the Town and region.

3 Comparison with Traffic Light - Summary of Differences

- Based on the MUTCD Section 4B.04 Alternatives to Traffic Control – "Since vehicular delay and the frequency of some types of crashes are sometimes greater under traffic signal control than under STOP sign control, consideration should be given to providing alternatives to traffic control signals even if one or more of the signal warrants has been satisfied."
- Furthermore, Section 4C.01 Studies and Factors for Justifying Traffic Control Signals states "The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal." "A traffic control signal should not be installed unless an engineering study indicates that installing a traffic control signal will improve the overall safety and/or operation of the intersection."
- Based on National Cooperative Highway Research Program (NCHRP) reports roundabouts reduce collisions by approximately 60%-67% when compared to a signalized intersection.
- Therefore, it does not make sense to eliminate the "safest" improvement option in lieu of signals, which have been shown to have an increased crash rate.
- See comparison performed by Wisconsin DOT (attached)

4 Funding

4.1 What would happen if funds are not spent?

- The funds would first revert back to the Regional Planning Organization in which the project is located and a substitute project that is ready for advertisement in the same fiscal year could be advanced. Since there are no projects available on the island, the monies would be lost to the area and be redistributed to other Planning Organizations in the Commonwealth.

4.2 Are there alternative projects in Dukes County that could be funded in time?

- Based on discussions with the MVC Staff there are no other projects ready for the 2012, 2013 or 2014 TIP years that could be substituted for this project. While there may be ideas for additional projects, it takes approximately three years for a project to be ready to advertise since funds have to be found for engineering, the design has to be completed, right-of-way needs to be secured and any environmental issues need to be addressed.

5 <u>Open Space and Scenic Values</u>

5.1 How many trees will be removed? How many of these are for the bus stops?

- We are still in the process of doing the final grading which will determine the impacts to trees. In addition, in some areas, we may be able to use tree pits or small walls to preserve existing trees. We will also be planting additional trees and landscaping as part of the project.
- In order to construct the roadway portion of the roundabout will require removal of 2-3 trees.
- There are approximately 18-20 trees required to relocate the bike path away from the roadway on the southwest and southeast corners.
- Along Airport Road, there are a series of several trees on the westerly side between the bike path and the roadway (10-12) trees varying from about 7"-10". Most of these will have to be removed because of the grading and to accommodate any type of bus stop (paved or unpaved) and associated bikepath.
- Along the easterly side of Airport Road, again the grading will be difficult and contribute to the tree removal. With any paved or unpaved bus stop and associated sidewalk we would need to remove 11-13 trees varying from about 7"-12".

5.2 What will curbs, sidewalks, paths be? Why are they needed?

- There will be granite curbs adjacent to the sidewalk where the sidewalk directly abuts the roadway. Where we can achieve the minimal 5' separation between the sidewalk and roadway, a cape cod berm will be utilized. Curbing is required where the sidewalk is adjacent to the roadway to provide vertical separation between pedestrians and vehicles. In addition, curbing and berm is also critical to provide a controlled drainage system.
- The sidewalks and bike path will be bituminous concrete with cement concrete wheelchair ramps.
- Sidewalks are needed to provide ADA access and connections to the bus stops and to allow for potential future sidewalk construction.

5.3 What lighting is required?

- Street lighting will be provided on the four corners of the intersection.

5.4 What will signage be?

- We understand the concern about over-signing projects and will make every attempt to keep signing to a minimum. However, the design has to be consistent with MUTCD and FHWA guidelines for signage. In addition, typical "Island" Origin Destination signs will be provided and their design will be coordinated with MVC and Town Officials.

6 <u>Bus Pull-Offs</u>

6.1 What is current usage?

- This is really a question for the RTA. In general, there are no signed bus stops at the intersection and buses routinely stop along all four approaches and departures depending on demand.

6.2 What is the latest proposal (number, location, surface materials)?

- In order to maintain the current service a minimum of 6 stops is required. These are located along Edgartown Vineyard Haven Road, east and west of the intersection as well as along Airport Road south of the intersection. Stops will be provided on the approaches and departures.
- The surface treatment has not yet been finalized. Potential treatments include; bituminous concrete, "brick" stamped concrete or crushed stone/gravel. These will all meet MassDOT and FHWA requirements provided they are maintained to ADA compliant standards for smoothness and stability.

6.3 What are MassDOT/FHWA requirements?

- The entire sidewalk adjacent to the bus stop must be ADA accessible
- Bus stops must be a minimum of 60 ft in length and 10 ft wide for a 40' bus. We are currently showing a 6' curb cut out and providing the additional 4' in the 4' shoulder areas.

6.4 What would happen if the pull-offs were not built as part of this proposal? Could the buses continue to stop on the shoulder? Would this reduce the number of sidewalks required? What would the cost difference be?

- Typically there would be a 5 yr period where the newly constructed road surface could not be altered – unless for emergency repairs.
- The existing bus stops are not ADA compliant. There are no ADA compliant landing areas provided, nor are there ADA compliant paths connecting the stops. Since we are reconstructing the intersection, we are required to provide ADA access to and between all the bus stops. Therefore, buses could continue to stop on the shoulders, but we would still be required to provide ADA compliant landing areas and sidewalk connections between the stop locations.
- The cost associated with the bus stops has not been broken out in detail, and would vary depending on the surface treatment. It is estimated that it could be between $50,000-$75,000 depending on the materials.

We hope these responses clarify the benefits associated with the roundabout project. Should you have any questions or require additional copies of any of the above materials please do not hesitate to call me at (781) 279-5500 ext 3008.

Very truly yours,

GREENMAN – PEDERSEN, INC.

John W. Diaz, PE, PTOE
Vice President/Director of Traffic Engineering

Attachments

c. Martha's Vineyard Commission via email

Comparison of Traffic Signals vs. Roundabout

		TRAFFIC SIGNALS	ROUNDABOUT
Safety	**Crash Frequency**	Higher than a roundabout	Lower than a traffic signal
	Crash Severity	Higher due to higher speeds and higher speed differential	Lower due to lower speeds and lower speed differential. Elimination of high-speed T-bone (angle) crashes.
	Number of conflict points between vehicles	32	Reduced to 8
	Number of driver decisions.	Higher than a roundabout since drivers need to be aware of vehicles to the left, right and straight ahead.	Reduced since drivers only need to be aware of vehicles to their left at entry.
	Severity of driver errors	Higher due to higher speeds and larger speed differentials.	Reduced since overall speeds are lower and the relative differences in speeds are also lower.
	Traffic Calming	Not effective as a traffic calming measure.	Entering and circulating geometry constrains the speed to 18 – 30 mph. Geometrics ensure lower speeds.
Traffic Operations	**Trucks (turning movements)**	May encroach on adjacent lanes while turning	May encroach on adjacent lanes while turning. May require the use of the truck apron on the inside of the roundabout when making a left turn.
	Capacity	Constrained by green time in cycle length	Greater capacity than a traffic signal due to the high volume of vehicles traveling on WIS 172.
	Operational Benefits	More delay to all vehicles than a roundabout.	Less delay.
	Traffic Signing	Typical Intersection Signing	Same signing as signalized intersection except YIELD signs are used to control the traffic entering the roundabout.
	Traffic Speed	Not limited by geometrics. Speed on side roads, which previously had stop signs, will increase.	Geometric features ensure slow entering and circulating speeds. Speed is restrained to 18- 30 mph by the geometrics.
	User Familiarity	Drivers are very familiar with using intersections with separate left turn and right turn lanes.	Would be the 16th, 17th and 18th roundabouts in Brown County. Currently there are 12 multi-lane roundabouts in Wisconsin.

Comparison of Traffic Signals vs. Roundabout

		TRAFFIC SIGNALS	ROUNDABOUT
Right-of-Way Impacts	**Overall**	Typically requires additional area on the approaches to the intersection.	Typically require more area at the junction of the roadways but not as much area on the approaches
	WIS 54	No additional right-of-way required.	Right-of-way required in the northwest and southeast quadrants of the intersection.
	County GE	Right-of-way required along both sides of County GE	Right-of-way required along the west side of County GE
	Airport/Radisson Hotel Entrance	No additional right-of-way required.	Right-of-way required on the south side of WIS 172.
Community Impacts	**Community Enhancements**	Community enhancements are available on the perimeter of the intersection.	In addition to the perimeter the central island may be developed as a "gateway" to the community.
	Environmental Benefits	Increase in fuel consumption and emissions due to stopped and riding vehicles during red light phases.	Overall reduction in fuel consumption and vehicle emissions since delay at the intersection is reduced.
Cost	**Maintenance**	Signals are susceptible to care and trucks hitting them, power outages and malfunctions. Routine signal head repair, and replacement, loop repair, and maintenance required.	Pavement markings and landscaping. No impact on intersection due to power outages.
	WIS 54	$500,000	$650,000
	County GE	$1,500,000	$740,000
	Airport/Radisson Hotel Entrance	$260,000	$640,000

The source of the information in the table above which is non-project specific (i.e. generalizations between signals and roundabouts) can be found in "Roundabouts: An Information Guide:" published by the US Department of Transportation, Federal Highway Administration (FHWA Publication No. FHWA-RD-00-67).

Comparison of Traffic Signals vs. Roundabout

According to research done by the Insurance Institute for Highway Safety (www.iihs.org):

At locations where roundabouts have replaced stop signs and/or traffic signals:

- Crashes (23 locations studied)
  - Decreased 39%
  - Involving injuries decreased 76%
  - Involving fatalities and/or incapacitating injuries decreased 90%
- Vehicle delay was reduced by 62 – 74% resulting in (10 locations studied)
  - Saving 325,000 hours of motorists' time annually
  - Reduction in fuel consumption of 235,000 gallons annually
  - Environmental benefit of reduction in vehicle emissions
- Saved $5,000 per year per intersection in electricity and maintenance costs

Public opinion in favor of or opposed to new roundabouts

PUBLIC OPINION ON ROUNDABOUT	BEFORE CONSTRUCTION	AFTER CONSTRUCTION
Strongly Favor	17%	26%
Somewhat Favor	19%	24%
Total in favor	**36%**	**50%**
Somewhat Oppose	19%	9%
Strongly Oppose	35%	26%
Total opposed	**54%**	**36%**
Don't Know	9%	14%

Two thirds of drivers over 65 years of age supported the roundabouts.

Active multi-lane roundabout locations in Wisconsin:

Sixth Street, city of Milwaukee (opened in 2002)
Canal Street & 25th Avenue, city of Milwaukee (opened in 2005)
WIS 78 and WIS 92, city of Mount Horeb (opened in 2005)
WIS 54/73 & 17th Avenue, city of Wisconsin Rapids (opened in 2004)
Canal Street & 25th Street, city of Milwaukee (opened in 2004)
WIS 30/Thompson Drive Interchange, city of Madison (two multi-lane roundabouts, opened in 2004)
WIS 35 Interchange, city of Hudson (two multi-lane roundabouts, opened in 2005)
Main Street @ County C, Mallard Drive and Thompson Road, city of Sun Prairie (opened in 2005)

Future multi-lane roundabout locations in Wisconsin:

WIS 32 & WIS 57, cit of De Pere (construction in 2007)
Old WIS 12 and Parmenter, city of Middleton (construction in 2006)

For additional information contact:

Charles A. Karow, P.E.
Project Manager
Wisconsin DOT – Northeast Region
PO Box 28080
Green Bay, WI 54324-0080
(920) 492-5997
charles.karow@dot.state.wi.us

Ed Hoefferle, P.E.
Project Engineer
Wisconsin DOT – Northeast Region
PO Box 28080
Green Bay, WI 54324-0080
(920) 492-7702
edward.hoefferle@dot.state.wi.us

Table 6
2010 Capacity Analysis Summary for Average Month Conditions
Existing Operations vs. Proposed Operations

	Existing Operations				Roundabout Operations			
Intersection/Peak Hour/Lane	V/C[a]	Del.[b]	LOS[c]	Q[d]	V/C	Del.	LOS	Q
Weekday AM:								
Vineyard Haven EB	0.88	41.3	E	--	0.41	6.6	A	72
Vineyard Haven WB	0.77	29.4	D	--	0.38	6.8	A	60
Airport Rd NB	0.59	20.8	C	--	0.29	9.3	A	46
Barnes Road SB	0.41	16.1	C	--	0.21	7.7	A	30
Overall Intersection	--	**29.9**	**D**	--	--	**7.4**	**A**	--
Weekday PM:								
Vineyard Haven EB	1.00	66.5	F	--	0.43	6.7	A	76
Vineyard Haven WB	0.79	34.2	D	--	0.37	6.9	A	59
Airport Rd NB	0.70	27.9	D	--	0.33	9.4	A	54
Barnes Road SB	0.53	20.2	C	--	0.25	8.0	A	37
Overall Intersection	--	**41.8**	**E**	--	**--**	**7.6**	**A**	--

Table 7
2030 Capacity Analysis Summary for Average Month Conditions
Existing Operations vs. Proposed Operations

	Existing Operations				Roundabout Operations			
Intersection/Peak Hour/Lane	V/C[a]	Del.[b]	LOS[c]	Q[d]	V/C	Del.	LOS	Q
Weekday AM:								
Vineyard Haven EB	1.49	254.4	F	--	0.59	7.4	A	131
Vineyard Haven WB	1.26	160.1	F	--	0.55	8.2	A	118
Airport Rd NB	0.91	54.7	F	--	0.44	10.4	B	83
Barnes Road SB	0.66	28.1	D	--	0.33	9.1	A	58
Overall Intersection	--	**152.7**	**F**	--	--	**8.5**	**A**	--
Weekday PM:								
Vineyard Haven EB	1.65	327.0	F	--	0.60	7.5	A	138
Vineyard Haven WB	1.25	159.8	F	--	0.55	8.6	A	120
Airport Rd NB	1.06	92.9	F	--	0.51	11.3	B	111
Barnes Road SB	0.81	41.7	E	--	0.39	9.3	A	69
Overall Intersection	--	**184.2**	**F**	--	--	**9.0**	**A**	--

[a]Volume-to-capacity ratio. [b]Average control delay in seconds per vehicle. [c]Level of service.
[d]95th Percentile Queue Length (ft).

Table 8
2010 Capacity Analysis Summary for Summer Month Conditions
Existing Operations vs. Proposed Operations

	Existing Operations				Roundabout Operations			
Intersection/Peak Hour/Lane	V/C[a]	Del.[b]	LOS[c]	Q[d]	V/C	Del.	LOS	Q
Weekday AM:								
Vineyard Haven EB	1.17	127.8	F	--	0.51	7.8	A	100
Vineyard Haven WB	1.06	91.0	F	--	0.46	7.7	A	81
Airport Rd NB	0.87	48.5	E	--	0.41	9.9	A	74
Barnes Road SB	0.68	30.2	D	--	0.31	9.7	A	51
Overall Intersection	--	**82.9**	**F**	--	--	**8.6**	**A**	--
Weekday PM:								
Vineyard Haven EB	1.37	209.8	F	--	0.51	8.1	A	101
Vineyard Haven WB	1.12	113.5	F	--	0.48	8.9	A	94
Airport Rd NB	1.19	140.3	F	--	0.49	9.6	A	98
Barnes Road SB	1.10	105.6	F	--	0.49	9.2	A	101
Overall Intersection	--	**146.0**	**F**	--	--	**8.9**	**A**	--

Table 9
2030 Capacity Analysis Summary Summer Month Conditions
Existing Operations vs. Proposed Operations

	Existing Operations				Roundabout Operations			
Intersection/Peak Hour/Lane	V/C[a]	Del.[b]	LOS[c]	Q[d]	V/C	Del.	LOS	Q
Weekday AM:								
Vineyard Haven EB	1.77	378.4	F	--	0.76	12.3	B	259
Vineyard Haven WB	1.60	303.9	F	--	0.70	11.3	B	205
Airport Rd NB	1.27	168.1	F	--	0.66	14.6	B	189
Barnes Road SB	0.95	66.6	F	--	0.52	13.3	B	123
Overall Intersection	--	**257.1**	**F**	--	--	**12.7**	**B**	--
Weekday PM:								
Vineyard Haven EB	1.85	415.7	F	--	0.77	12.5	B	272
Vineyard Haven WB	1.50	265.4	F	--	0.79	16.8	B	282
Airport Rd NB	1.61	310.1	F	--	0.78	16.0	B	279
Barnes Road SB	1.48	252.9	F	--	0.84	20.1	C	330
Overall Intersection	--	**316.8**	**F**	--	--	**16.1**	**B**	--

[a]Volume-to-capacity ratio. [b]Average control delay in seconds per vehicle. [c]Level of service.
[d]95th Percentile Queue Length (ft).

4-WAY STOP vs. ROUNDABOUT NETWORK TRAFFIC OPERATIONS COMPARISON

2010 Summer AM Volumes

Intersection	EB Dep	EB Arrival	WB Arrival	WB Dep
Edgartown-Vineyard Haven Rd at Airport Rd & Barnes Rd	437		428	
Edgartown-Vineyard Haven Rd at County Road		383		408
Difference (loss of vehicles between intersections)	(54.00)		(20.00)	

4-WAY STOP-SIMTRAFFIC

	State Road				Barnes Road				Beach Road		
	State Rd EB	State Rd WB	Edg-VH NB	Look St SB	Edg-VH EB	Edg-VH WB	Airport NB	Barnes SB	Edg-VH EB	Upper Main NB	Beach Rd SB
LOS (From SYNCHRO)	A	A	F	F	F	F	F	F	C	A	A
DEL	5.10	16.20	1237.60	272.80	132.40	45.30	39.20	35.80	43.90	22.30	2.30
Hourly Exit Rate	598.00	524.00	183.00	83.00	442.00	405.00	371.00	378.00	282.00	750.00	326.00
95th Queue (ft)	11.00	298.00	4076.00	275.00	898.00	333.00	379.00	313.00	240.00	487.00	16.00
95th Queue (veh)	1	15	204	14	45	17	19	16	12	24	1
Total Network Delay (hr)	208.60										
Total # of STOPS in Network	5668.00										
Network Fuel Consumption (gal)	237.60										

ROUNDABOUT-SIMTRAFFIC

	State Road				Barnes Road				Beach Road		
	State Rd EB	State Rd WB	Edg-VH NB	Look St SB	Edg-VH EB	Edg-VH WB	Airport NB	Barnes SB	Edg-VH EB	NB	SB
LOS (From SYNCHRO)	A	A	F	F	B	C	B	C	C	A	A
DEL	5.10	16.30	1279.00	268.30	13.00	21.40	7.00	9.70	52.40	22.40	2.80
Hourly Exit Rate	598.00	524.00	179.00	82.00	456.00	410.00	371.00	378.00	291.00	750.00	326.00
95th Queue (ft)	19.00	299.00	4116.00	370.00	160.00	192.00	107.00	157.00	311.00	485.00	43.00
95th Queue (veh)	1	15	206	19	8	10	5	8	16	24	2
Total Network Delay (hr)	192.20										
Total # of STOPS in Network	4855.00										
Network Fuel Consumption (gal)	234.80										

CHANGE-SIMTRAFFIC

	State Road				Barnes Road				Beach Road		
	State Rd EB	State Rd WB	Edg-VH NB	Look St SB	**Edg-VH EB**	**Edg-VH WB**	**Airport NB**	**Barnes SB**	Edg-VH EB	NB	SB
LOS (From SYNCHRO)	A	A	F	F	**F to B**	**F to C**	**F to B**	**F to C**	C	A	A
DEL	0.00	0.10	41.40	(4.50)	**(119.40)**	**(23.90)**	**(32.20)**	**(26.10)**	8.50	0.10	0.50
Hourly Exit Rate	0.00	0.00	(4.00)	(1.00)	**14.00**	**5.00**	**0.00**	**0.00**	9.00	0.00	0.00
95th Queue (ft)	8.00	1.00	40.00	95.00	**(738.00)**	**(141.00)**	**(272.00)**	**(156.00)**	71.00	(2.00)	27.00
95th Queue (veh)	0	0	2	5	**(37)**	**(7)**	**(14)**	**(8)**	4	(0)	1
Total Network Delay (hr)	(16.40)										
Total # of STOPS in Network	(813.00)										
Network Fuel Consumption (gal)	(2.80)										

(xxx) Represents a Reduction

Based on 2005 Volumes from MVC

Edgartown-Vineyard Haven Road, west of Blinker

8/24/2011

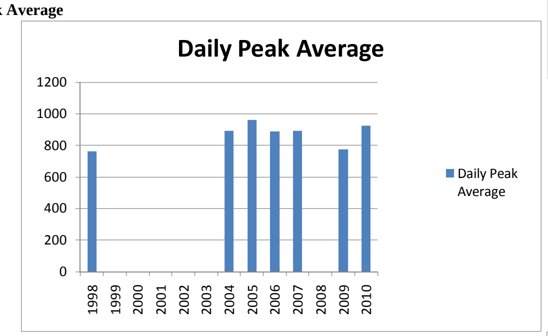
Both ways and directional (Vineyard Haven towards Blinker) included

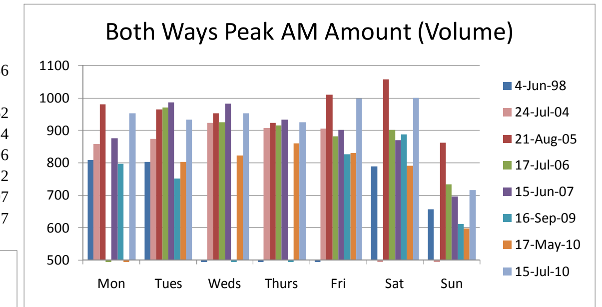
Date / Direction		Mon	Tues	Weds	Thurs	Fri	Sat	Sun	
4-Jun-98	Peak AM	8:00	8:15	N/A	N/A	N/A	11:00	11:00	
Both ways	Amount	809	802	N/A	N/A	N/A	789	656	
	Peak PM	4:00	4:15	N/A	N/A	4:15	12:00	1:45	
	Amount	874	906	N/A	N/A	956	753	645	
21-Aug-05	Peak AM	11:00	11:00	8:00	8:00	11:00	11:00	11:00	
Both ways	Amount	981	964	952	924	1010	1057	862	
	Peak PM	6:00	4:00	4:00	4:00	3:00	1:00	N/A	
	Amount	749	952	1056	998	1051	920	N/A	
21-Aug-05	Peak AM	11:00	11:00	11:00	11:00	11:00	11:00	11:00	
VH toward Blinker	Amount	573	517	497	477	544	601	441	
	Peak PM	6:00	4:00	4:00	4:00	3:00	1:00		
	Amount	400	532	589	564	594	531		
17-Jul-06	Peak AM	N/A	11:00	8:00	11:00	11:00	10:00	11:00	
Both ways	Amount	N/A	970	926	915	881	902	734	
	Peak PM	N/A	4:00	4:00	4:00	3:00	12:00	12:00	
	Amount	N/A	997	997	990	957	789	705	
17-Jul-06	Peak AM	N/A	11:00	8:00	11:00	9:00	10:00	11:00	
VH toward Blinker	Amount	N/A	508	452	470	464	451	355	
	Peak PM	N/A	3:00	4:00	2:00	3:00	12:00	12:00	
	Amount	N/A	455	494	477	471	398	393	
15-Jun-07	Peak AM	8:00	8:00	8:00	8:00	8:00	11:00	11:00	
Both ways	Amount	876	986	983	934	902	871	696	
	Peak PM	4:00	4:00	2:00	4:00	4:00	2:00	12:00	
	Amount	992	1116	873	969	1009	833	721	
16-Sep-09	Peak AM	8:00	8:00	N/A	N/A	11:00	11:00	11:00	
Both ways	Amount	798	751	N/A	N/A	826	888	612	
	Peak PM	4:00	4:00	N/A	N/A	4:00	1:00	4:00	
	Amount	893	896	N/A	N/A	989	718	591	
17-May-10	Peak AM	N/A	8:00	8:00	8:00	8:00	11:00	11:00	
Both ways	Amount	N/A	802	822	861	830	791	597	
	Peak PM	4:00	4:00	4:00	4:00	4:00	2:00	12:00	
	Amount	885	872	883	904	914	700	609	
17-May-10	Peak AM	N/A	8:00	8:00	8:00	8:00	11:00	11:00	
VH toward Blinker	Amount	N/A	395	409	429	429	425	272	
	Peak PM	4:00	4:00	3:00	4:00	4:00	2:00	12:00	
	Amount	425	418	424	440	447	374	305	
15-Jul-10	Peak AM	8:00	8:00	9:00	11:00	11:00	11:00	11:00	
Both ways	Amount	953	934	953	925	998	1001	717	
	Peak PM	4:00	4:00	4:00	4:00	4:00	12:00	1:00	
	Amount	1058	1017	1019	1016	1036	929	730	
15-Jul-10	Peak AM	8:00	8:00	9:00	8:00	11:00	11:00	9:00	
VH toward Blinker	Amount	515	481	484	481	467	489	327	
	Peak PM	4:00	4:00	4:00	4:00	4:00	12:00	1:00	
	Amount	477	465	455	460	456	464	372	
		Daily Average							
15-Jun-95	Peak AM	10:45							
Both ways	Amount	1072							
Barnes Rd near Blink	Peak PM	4:15							
	Amount	2346							
		Daily Average							
18-Jun-95	Peak AM	9:45							
Both ways	Amount	1097							
Barnes Rd near Blink	Peak PM	4:00							
	Amount	2214							
		Daily Average							
10-Jun-99	Peak AM	11:00							
Both ways	Amount	1427							
Barnes Rd near Blink	Peak PM	4:15							
	Amount	2941							
		Daily Average							
13-Jun-99	Peak AM	10:30							
Both ways	Amount	1281							
Barnes Rd near Blink	Peak PM	4:15							
	Amount	2353							
Edg-VH east of Blinker									
24-Jul-04	Peak AM	11:00	8:00	8:00	8:00	8:00	N/A	N/A	
Both ways	Amount	858	873	924	908	905	N/A	N/A	**894**
EdgVH @MSPCA	Peak PM	4:00	4:00	4:00	5:00	5:00	N/A	N/A	
	Amount	916	998	1003	937	971	N/A	N/A	**965**

Both Ways, Peak AM Amount (Volume)

	Daily Aver	Mon	Tues	Weds	Thurs	Fri	Sat	Sun
4-Jun-98	**764**	809	802	N/A	N/A	N/A	789	656
24-Jul-04	**894**	858	873	924	908	905	N/A	N/A
21-Aug-05	**964**	981	964	952	924	1010	1057	862
17-Jul-06	**888**	N/A	970	926	915	881	902	734
15-Jun-07	**893**	876	986	983	934	902	871	696
16-Sep-09	**775**	798	751	N/A	N/A	826	888	612
17-May-10	**784**	N/A	802	822	861	830	791	597
15-Jul-10	**926**	953	934	953	925	998	1001	717

	Daily Peak Average
1998	**764**
1999	N/A
2000	N/A
2001	N/A
2002	N/A
2003	N/A
2004	**894**
2005	**964**
2006	**888**
2007	**893**
2008	N/A
2009	**775**
2010	**926**





Both Ways, Peak PM Amount (Volume)

	Daily Aver	Mon	Tues	Weds	Thurs	Fri	Sat	Sun
4-Jun-98	**827**	874	906	N/A	N/A	956	753	645
24-Jul-04	**965**	916	998	1003	937	971	N/A	N/A
21-Aug-05	**954**	749	952	1056	998	1051	920	N/A
17-Jul-06	**906**	N/A	997	997	990	957	789	705
15-Jun-07	**930**	992	1116	873	969	1009	833	721
16-Sep-09	**817**	893	896	N/A	N/A	989	718	591
17-May-10	**824**	885	872	883	904	914	700	609
15-Jul-10	**972**	1058	1017	1019	1016	1036	929	730

	Daily Peak Average
1998	**827**
1999	N/A
2000	N/A
2001	N/A
2002	N/A
2003	N/A
2004	**965**
2005	**954**
2006	**906**
2007	**930**
2008	N/A
2009	**817**
2010	**972**