Technical Report

Professional Services
Delaware Valley Regional Planning Commission
New Jersey Traffic Signal Retiming Initiative

Center Square Road, Gloucester County Route 620,
From Sharptown Road/Commerce Boulevard to Beckett Road
In Logan Township,
Gloucester County, New Jersey

December 29, 2021

Prepared For:

Prepared By:

I. Summary

A. Project Overview

Under contract with Delaware Valley Regional Planning Commission (DVPRC), in cooperation with the New Jersey Department of Transportation, Gloucester County, and Logan Township, the Taylor Wiseman & Taylor consultant project team has completed traffic signal retiming work at five (5) signalized intersections along Center Square Road (Gloucester County Route 620) in southwest Gloucester County. New Jersey.

The Center Square Road included four Gloucester County-maintained signalized intersections and one intersection maintained by the New Jersey Department of Transportation (Center Square Road and Interstate 295 Exit 10 SB Off Ramp). The retiming work started in the Spring of 2019 and concluded in August 2021 with the installation of new coordinated timing plans on the project corridor.

Between the initial project meetings in 2017 and implementation in 2021, field data collection activities were conducted, including peak hour turning movement counts, automatic traffic recorder counts, controller assessments and 'before' travel time runs. The collected data was analyzed using traffic engineering software including Synchro™ and Tru-Traffic™. Implementation of the timing plans was impacted by the COVID-19 pandemic, which has dramatically changed travel patterns in March 2020 to the present day. Fine-tuning and field observations were conducted throughout implementation, resulting in minor timing changes to those initially implemented. Follow-up field verifications, and 'after' travel time runs, were done in August 2021. This brief report summarizes the activities, observations, and results of this project.

B. Project Description

Center Square Road, Gloucester County Route 620, is a County Route which within the project area is oriented north-south. Center Square Road has been designated as an urban major collector by the New Jersey Department of Transportation. Center Square Road extends from US Route 130 to the west, crosses Interstate 295, and continues to a traffic circle to the east formed by CR 620 and CR 605. At this traffic circle, in Swedesboro, CR 620 turns to a primarily southern orientation where it terminates at Oldman's Creek, which is at the Salem County line. The speed limit within the project corridor is 40 miles per hour.

Land use along Center Square Road is primarily commercial. Pureland Industrial Park is located west of Interstate 295. "Pureland Industrial Park is a 3,000-acre industrial park making it the largest one in New Jersey. Companies with offices, warehouses or manufacturing facilities in Pureland include Amazon.com, Mitsubishi, VWR Scientific, Mercedes-Benz, Mannington Mills, US Postal Service, Home Depot, Lockheed Martin, Pep Boys, and Target Corporation."[1]

[1] Wikipedia contributors. (2021, December 4). Pureland Industrial Complex. In *Wikipedia, The Free Encyclopedia*. Retrieved 22:09, December 12, 2021, from https://en.wikipedia.org/w/index.php?title=Pureland_Industrial_Complex&oldid=1058614146

Land use to the east on Center Square Road is also primarily commercial. Pureland Drive provides access to three motels/hotels and a heavily used Wawa convenience store (all to the south). North of Pureland Drive and closer to Interstate I-295, a gas station, Dunkin' and McDonalds are located. Immediately to the east of Pureland Drive, a Community Shopping Center exists on the north side. The southern side of Center Square Road is developed by a medical practice, as well as the Center Square School and Logan Township Library. Within the project limits, five (5) signalized intersections were included as part of the retiming project:

1. Center Square Road (CR 620) and Commerce Boulevard/Sharptown Road
2. Center Square Road (CR 620) and Heron Drive
3. Center Square Road (CR 620) and Interstate I-295 Southbound Off Ramp (Exit 10) *This signal is maintained by the New Jersey Department of Transportation.*
4. Center Square Road (CR 620) and Pureland Drive
5. Center Square Road (CR 620) and Beckett Drive

The New Jersey Department of Transportation did allow the project team to modify timings at the Interstate I-295 Southbound Off Ramp. The project location is shown in **Figure 1**.

C. Existing Signal Documentation/Operation:

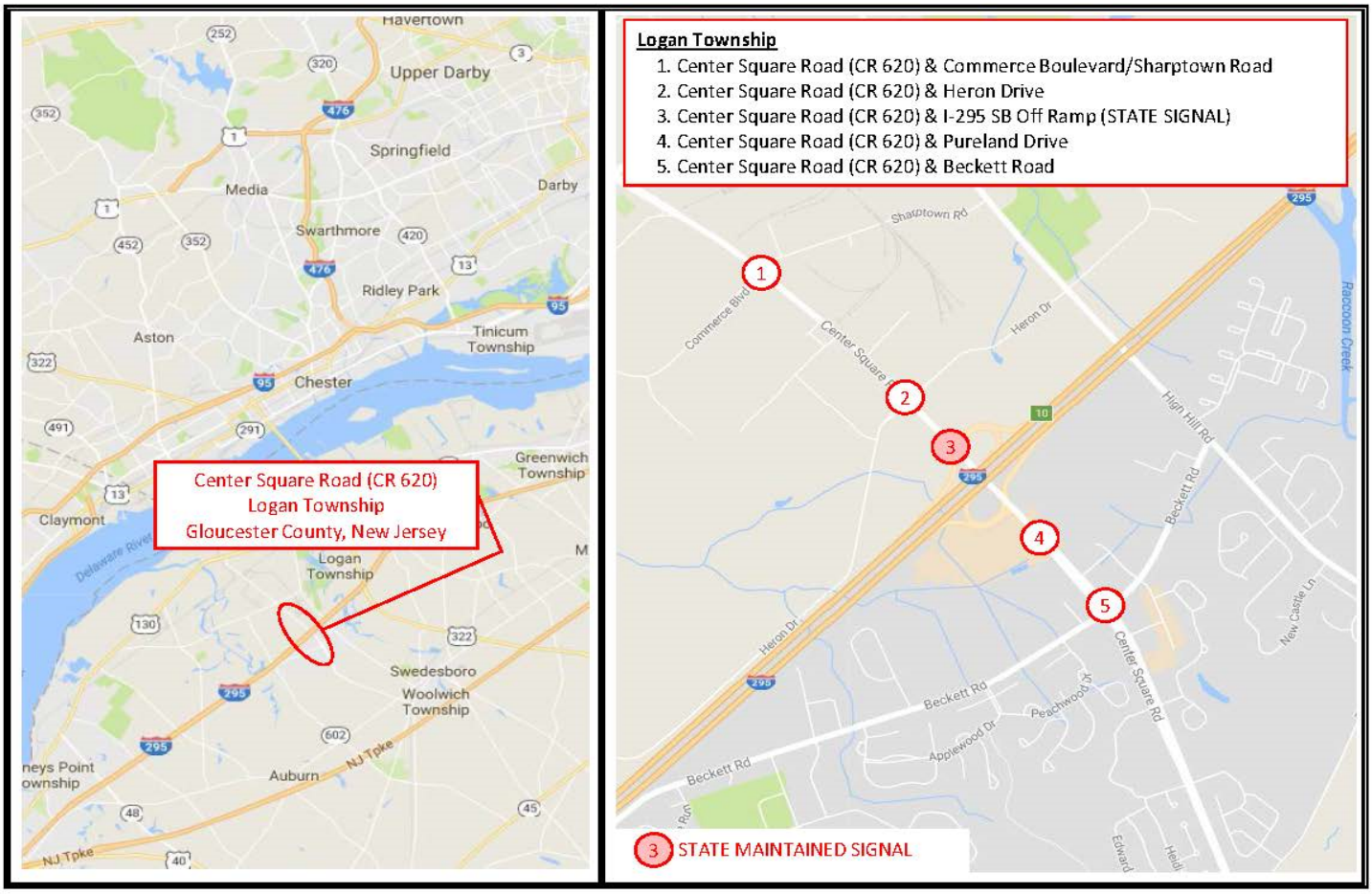
Typically, signalized intersections in New Jersey may have signal timing directives, electrical plans, and signal layout plans. The consultant team requested records from Gloucester County and Logan Township with a focus on signal timing documentation. The consultant team requested and received available records from the New Jersey Department of Transportation and Gloucester County. The existing timing directives are presented in **Appendix A.**

D. Results

With implementation of the updated timing plans as well as modifications to the corridor's time-of-day schedule, the project consultant team has documented significant reductions in corridor travel times and delay. Northbound weekday morning, mid-day, evening, and weekend mid-day peak travel times have been reduced by 25.2%, 13.5%, 19.2% and 11.5% respectively. Southbound weekday morning, mid-day, evening, and weekend mid-day peak travel times have been reduced by 10.4%, 8%, 18.0% and 1.1%. Cumulative weekday morning, mid-day, evening and weekend mid-day peak travel times have been reduced by 17%, 11%, 19% and 6%. Cumulative number of vehicle stops have been reduced by 48.7%, 19.30%, 40.70% and 28% in the weekday morning, mid-day, evening and weekend mid-day peak travel periods.

" Cumulative number of vehicle stops have been reduced by 48.7%, 19.30%, 40.70% and 28% in the weekday morning, mid-day, evening and weekend mid-day peak travel periods. "

Figure 1
Location Map



II. Data Collection

E. Project Impact of COVID-19 Pandemic

COVID-19, a highly contagious respiratory illness caused by a virus, impacted the Center Square Road Signal Retiming Effort as both the State of New Jersey and the Federal Government imposed restrictions which influenced travel behavior in 2020 and 2021. Important milestones in the COVID-19 fight included:

- New Jersey Governor Murphy Executive Order 104, March 16, 2020: Closed Movie Theaters, Casinos, Gyms. Restricted Restaurants and Bars to take out and delivery services. Closed all public and private schools (including pre-kindergarten, colleges, and universities).
- New Jersey Governor Murphy Executive Order 107, March 21, 2020: Directs all New Jersey residents to effectively "stay at home" until further notice. This order resulted in non-essential businesses closing or telecommuting from home.

- New Jersey Governor Murphy Executive Order 150, June 3, 2020: Provided for outdoor dining protocols for New Jersey restaurants.
- New Jersey Governor Murphy Executive Order 157, June 26, 2020: Provided guidance for non-essential retail operations and individualized instruction at gyms and fitness centers.
- New Jersey Governor Murphy Executive Order 175, August 13, 2020: Provided guidance for schools to reopen subject to critical health and safety protocols.
- New Jersey Governor Murphy Executive Order 183, September 1, 2020: Allowed for reopening of indoor dining (25% capacity) on September 4, 2020.
- Executive Order 219 on February 3, 2021: Governor Murphy increases capacity limit from 25% to 35% for certain business including indoor dining and religious services.
- Executive Order 220 on February 12, 2021: Governor Murphy provides instruction for allowing parent and guardian spectators at youth sporting events and setting indoor capacity to 35%.
- Executive Order 225 on February 22, 2021: Governor Murphy increases capacity limit on indoor gatherings and religious gatherings to 50%.
- Executive Order 230 on March 11, 2021: Governor Murphy increases capacity limit on indoor dining to 50%.
- Executive Order 238 on May 3, 2021: Governor Murphy removed all percentage capacity limits for indoor and outdoor businesses; a lifting of the prohibition on indoor bar seating and an end to the outdoor gathering limit.
- Executive Order 242 on May 24, 2021; Governor Murphy eliminated major COVID-19 restrictions, moves forward with most significant reopening steps since the beginning of the crisis.

From a traffic engineering perspective, traffic volumes decreased significantly as New Jersey residents complied with stay-at-home directives. Business operations changed significantly to comply with social distancing and other public health protocols. According to direction from Gloucester County, the consultant team delayed implementation of new timings waiting for traffic volumes to stabilize and increase from the height of the restrictive period in March-September 2020.

In August 2021 the consultant team, working with Gloucester County, the New Jersey Department of Transportation, Logan Township, and the Delaware Valley Regional Planning Commission, moved forward with implementation of the new signal timings on the Center Square Road corridor. By August 2021 travel conditions had stabilized to the new "normal". Even though traffic volumes have normalized, corridor traffic has been influenced by:

- Businesses implementation of telecommuting and remote work policies to protect health of employees.
- Ridership on public transit reduced due to potential exposure to COVID-19.
- Many businesses closed in New Jersey directly attributed to COVID-19 protocols and restrictions.

A. Turning Movement Counts

Weekday peak hour intersection counts were conducted on May 14, 2019 at the five project intersections during the weekday morning (6:15 AM to 8:45 AM), weekday mid-day (12:00 PM to 2:00 PM), evening (3:15 PM to 5:45 PM) and off-peak (6:30 PM to 7:30 PM) hour periods. Saturday counts were taken on May 11, 2019 between 8:00 AM to 10:00 AM and 11:30 AM to 3:30 PM, It should be noted that while no state orders were restricting gatherings, occupancy or behavior, the spread of COVID-19 was being monitored and companies, government, institutions, and individuals were implementing work from home policies at this time. The TMCs are available on the project website, http://dvrpc.taylorwiseman.com.

B. Automatic Traffic Recorder (ATR) Counts

In May 2019, automatic traffic recorder counts were taken at several locations on Center Square Road. Volumes were recorded twenty-four hours a day over the week starting May 10, 2019. The summarized data is presented in **Table 1**. The automatic traffic recorder (ATR) counts are available on the project website, http://dvrpc.taylorwiseman.com.

Table 1
2019 Average Daily Traffic (ADT) – Center Square Road

Location of ATR and Traffic Direction	Average Daily Traffic
Interstate 295 Southbound Exit 10 Off-Ramp	**13199**
Interstate 295 Southbound Exit 10 On-Ramp	**5191**
Total ADT	**18390**
Center Square Road between Village Center Road and Pureland Drive-NB	**12049**
Center Square Road between Village Center Road and Pureland Drive-SB	**9830**
Total ADT	**21879**
Center Square Road, between Heron Drive and Commerce Blvd.—NB	**4676**
Center Square Road, between Heron Drive and Commerce Blvd.---SB	**7263**
Total	**11939**

C. Travel Time Runs

The TWT project team conducted travel time runs before and after optimized signal timings were implemented to determine stops and travel time along the corridor. Initial travel time runs were conducted during May 2019. After improvement travel time runs were conducted during September 2021. The data was collected with GPS enabled laptops and recorded using TruTraffic Version 10.0 software. Runs were conducted during AM weekday, Mid-day weekday, PM weekday, and mid-day weekend time periods. The travel time runs were the primary data sets used to compare the improvements along the corridor; analysis of this data can be found in a later section.

D. Traffic Signal Timing and Phasing Data

Phasing and field inventories were collected during Phase I in May 2019. Traffic signal timings and phasing were uploaded from the controllers at each of the intersections (except for Center Square Road and Interstate 295 SB, Exit 10, On/Off Ramps which is a NJDOT maintained signal) along Center Square Road in October 2019. As noted previously, the Existing Timing Directives are presented in **Appendix A** of this report.

E. Field Review of Existing Operations

A field review was conducted to gather controller information and operational issues at each of the signals along Center Square Road. An initial intersection inventory in October 2019 recorded corridor directions, major and minor streets, controller types, controller accessories, location of controller, issues with controller clocks and timing, pedestrian facilities, and signal phasing.

At the start of the timing work in 2019, the existing corridor controllers included the Econolite ASC/3, Econolite ASC/2, and Naztec 980 TS2. The NJDOT signal at the Interstate 295 ramps had a Naztec 980 TS2. The remaining four intersections, all maintained by Gloucester County, were managed by either Econolite ASC/2 or Econolite ASC/3 controllers. In general, minor variances with time of day were observed in the controllers. One intersection had the wrong date. The variations in time/date recorded are to be expected with controllers not included in a system or equipped with a GPS puck. **Table 2** documents the controller manufacturer and model as well as time/date drift observed in the existing controllers in 2019. To establish time, the consultant team utilized a smart phone and the http://www.time.gov web site.

Table 2
Time/Date Variances Recorded on Center Square Road Signal Controllers
October 2019

Intersection Cross Road	Controller Manufacturer and Model	Time Variation	Date Variation
Commerce Boulevard/Sharptown Road	Econolite ASC/3-2100	-16 seconds	None
Heron Drive	Econolite ASC/2S-2100	-45 seconds	None
I-295 SB On/Off Ramps	Naztec TS2	-1 second	None
Pureland Drive	Econolite ASC/2S-2100	+12 hours, 4 minutes	+1 day
Beckett Road	Econolite ASC/2S-2100	-42 seconds	None

The major time difference observed at Pureland was most likely due to a programming error. In addition to the time and date issues, operational issues were recorded in October 2019 during Phase I and again in August 2021 during Phase II. The following is a summary of the observed operational issues observed in August 2021:

- Commerce Boulevard/Sharptown Road: No operational issues identified. During implementation of the new timing a seven (7) second delay time on the side street detectors was installed. This delay will allow for a right-turn on red to happen without actuating the side street, improving main street traffic flow.
- Heron Drive: No operational issues identified. During implementation of the new timing a seven (7) second delay time on the side street detectors was installed. This delay will allow for a right-turn on red to happen without actuating the side street, improving main street traffic flow.
- Interstate 295 Exit 10 SB On/Off Ramps: No operational issues were identified. Signing for pedestrian traffic could be improved at this intersection. NJDOT maintenance crews did install a GPS puck at this location.
- Pureland Drive: No operational issues were identified. Signing for pedestrian traffic could be improved at this intersection.
- Beckett Road: The pedestrian pushbuttons crossing Center Square Road are programmed to call Phase 4 and Phase 8, but are serviced under Phase 4. This results in the westbound left-turn (Phase 7) servicing at the same time as the eastbound pedestrian phase. This conflict could be eliminated if the eastbound pedestrian phase is rewired to call Phase 8. Recommend signing to clearly communicate pedestrian paths at this location.

The only intersection to have a coordinated program was the NJDOT signal at the Interstate I-295 Exit 10 Southbound Off Ramp. The four remaining corridor signals operated with a "free" program.

It should be noted that the only intersection with a GPS-puck in the cabinet was the NJDOT-maintained controller at the Interstate 295 Exit 10 SB Off Ramp. Installation of GPS pucks by Gloucester County at the remaining four intersections would minimize controller clock drift which may impact the coordination on the corridor over time.

F. Interstate 295 Southbound Off-Ramp Queuing

The consultant team observed excessive queuing on the Interstate 295 Southbound Exit 10 Southbound Ramp during the weekday AM and PM peak periods. During both commuter hours, traffic backed up the entire length of the ramp. The Midday and Saturday maximum queues were contained within the ramp area. **Table 3** provides information on the observed queue lengths prior to and after the signal optimization project. Graphics summarizing the queue lengths on the highway system before and after the signal timing optimization are presented in **Appendix B.**

Table 3
Center Square Road, Gloucester County Route 620
Interstate 295 Exit 10 Southbound Off Ramp—Observed Queuing
(Weekday and Weekend, before and after signal optimization)

Time Period	Before Retiming Queuing (feet)	After Retiming Queuing (feet)	Difference
Weekday AM Peak	1142'	462'	700' (approx. 28 passenger cars)
Weekday Midday Peak	791'	Not Measured	N/A
Weekday PM peak	1809'	1160'	649' (approx. 26 passenger cars)
Saturday Peak	447'	Not Measured	N/A

III. Analysis and Implementation

A. Modeling

The Project Team developed a set of base Synchro™ Version 10 models for management of the new traffic data, initial analysis of the intersection with and without various timing and a screening level review of each intersection's overall potential for capacity-level improvements using the Intersection Capacity Utilization (ICU) Methodology. Microscopic simulation using SimTraffic™ was used to assess the impact of unmet demand, turn pocket overflow, metering and spillback, and the effects of origin-destination pairs. TruTraffic™ was used to assist in offset determination to assess early release issues created when minor phases gap out and unused cycle time is typically sent back to the coordinated phases.

It is important to note that the delay minimization focus of the optimization routine in Synchro™ is helpful to a point in deriving improved cycle lengths and splits; however, this method does not necessarily favor corridor progression and bandwidth requirements. After development of the base models and supplemental evaluations in SimTraffic™, the UTDF file transfer feature with various spreadsheets were used to create base TruTraffic™ models for more in-depth optimization.

B. Initial Results—Modeling

Using the data collected to date and the modeled (i.e. theoretical) timing plans, several network-wide measures of effectiveness were presented for the then pre-existing conditions without retiming (Existing), and with the proposed signal retiming (Proposed). The results showed significant time savings, reductions in delays and reductions in fuel consumption throughout the

project area. Weekday total delays decrease by approximately 16% during the AM peak hour, 9% during the Mid-Day peak hour and 18% during the PM peak hour. Weekend total delays decrease by approximately 11% during the Mid-Day. **Table 4** presents the results of the modeling effort.

Table 4
Center Square Road, Gloucester County Route 620
Synchro 10.0 Network Performance Measures
(Weekday and Weekend- Modeled)

	Existing	Implemented	Difference
Total Delay (hr)	69	43	-37.7%
Total Stops	4,919	4,031	-18.1%
Total Travel Time (hr)	134	108	-19.4%
Fuel Consumed (gal)	181	153	-15.5%

C. Implementation

During the week of August 16, 2021, the consultant team implemented the optimized timing plans into each of the original township-maintained controllers. The consultant team entered the timings manually and/or uploaded the timings via laptop connection. As a result of the new timing plan, NJDOT maintenance officials installed a GPS puck at the intersection with the Interstate 295 Exit 10 SB Off Ramp.

Optimized timing plans were implemented in the existing controllers during the week of August 16, 2021. In developing the new timing plans, pedestrian times and change/clearance intervals were checked against current standards and updated as necessary.

The two signals north (west if you consider I-295 as a north-south road) of 295, Heron Drive and Commerce Boulevard/Sharptown Road operated as a subsystem. The Commerce Boulevard/Sharptown Road operated in free all the time. Commerce/ Sharptown is fully actuated and spaced such that coordination did not appear to be the best choice. Heron Drive also operated free on weekends. The I-295 Off Ramp signal is coordinated to the north, south or with the entire system. The two signals to the south (east) of I-295, Pureland Drive and Beckett Road is also defined as a subsystem. These two signals are coordinated with I-295 alone, or with Heron Drive, depending on time of day.

Coordination programs were developed for the AM weekday peak, mid-day weekday peak, weekday PM peak. Programs were also developed for the Saturday/Sunday AM peak, Saturday mid-day peak and Saturday PM peak. In total ten coordination programs were developed and

implemented on the Center Square Road corridor. Further details about the installed programs are presented in the corridor implemented timing report included in **Appendix C.**

D. Fine-Tuning of Signal Timings

The Project Team observed each new timing plan at every intersection during its respective peak hour to ensure each phase split was appropriate for the traffic conditions present. If a movement or intersection is over capacity, split adjustments were made to manage queue spillback and blockage. In addition to fine-tuning splits, offset adjustments often have a larger effect on the performance of the network. Offsets were adjusted at the coordinated intersections by conducting travel time runs along the corridor. Travel time runs were conducted using Tru-Traffic ™ in conjunction with a Windows 10 computer outfitted with a USB GPS antenna. Tru-Traffic™ tracks the location of the probe vehicle within the traffic signal system. This provides the user dynamic information about the performance of the traffic signal system such as travel time and delay. Results of the travel time runs under existing timings (the "before" runs) and implemented signal timings (the "after" runs) are discussed in the next section of this report. The fine tuning of the signal timings occurred immediately following implementation (week of August 16, 2021) and after school was back in session (September 8, 2021). The optimized timing directives are presented in **Appendix D** of this report.

IV. Results

A. Before and After Data

Travel time data along the corridor was collected before and after implementation of the initial timing plans during the weekday morning, mid-day, evening, off-peak and the weekend morning, mid-day, and evening peak hour periods. Refer to **Tables 5** and **6** which include the cumulative measures of effectiveness for the before and after conditions, as well as the percent differences between the two scenarios, per peak period based on actual field data, as opposed to the theoretical values highlighted in the previous section.

With implementation of the new timing plans and maintenance of a common time standard between project controllers, progression along Center Square Road improved significantly in both directions. For all four peak hour periods, there are significant savings in travel time, delay, the number of stops, and travel speed in both directions. A detailed summary of travel time data is provided in **Appendix E.**

Table 5
Center Square Road—Gloucester County Route 620
Peak Hour Travel Time and Delay Improvements
Tru-Traffic™ 10 Floating Car Studies

		AM Peak		Mid-day Peak		PM Peak		Weekend Mid-day Peak	
		Travel Time (s)	Delay (s)	Travel Time (s)	Delay (s)	Travel Time (s)	Delay (s)	Travel Time (s)	Delay (s)
Northbound	Existing	163	73	156	65	151	61	130	40
	Implemented	122	32	135	44	122	31	115	25
	Difference	-41		-21		-29		-15	
	% Difference	**-25.2%**	**-56%**	**-13.5%**	**-32%**	**-19.2%**	**-48%**	**-11.5%**	**-38%**
Southbound	Existing	193	97	199	102	256	160	181	85
	Implemented	173	77	183	87	210	114	179	83
	Difference	-20		-15		-46		-2	
	% Difference	**-10.4%**	**-21%**	**-8%**	**-15%**	**-18%**	**-29%**	**-1.1%**	**-2%**
Cumulative	Existing	178	85	177	84	206	113	157	64
	Implemented	147	54	157	64	167	74	147	54
	Difference	-21		-20		-39		-10	
	% Difference	**-17%**	**-36%**	**-11%**	**-23%**	**-19%**	**-34%**	**-6%**	**-15%**

Table 6
Center Square Road—Gloucester County Route 620
Peak Hour Stop and Fuel Consumption Improvements
Tru-Traffic™ 10.0 Floating Car Studies

		AM Peak		Mid-day Peak		PM Peak		Weekend Mid-day Peak	
		Stops	Fuel Cons (gal/hr)	Stops	Fuel Cons (gal/hr)	Stops	Fuel Cons (gal/hr)	Stops	Fuel Cons (gal/hr)
Northbound	Existing	1.8	40.2	1.3	25.2	1.7	20.1	1.2	17.8
	Implemented	0.4	22.5	0.9	17.9	0.8	12.9	0.8	10.6
	Difference	-1.4	-17.8	-0.4	-7.2	-0.9	-7.2	-0.4	-7.2
	% Difference	**-74.7%**	**-44.10%**	**-28.9%**	**-28.8%**	**-52.9%**	**-35.7%**	**-35.2**	**-40.4%**
Southbound	Existing	2.8	27.7	2.3	34.2	3.1	60.8	2.6	28.5
	Implemented	1.9	22.8	2.0	29.7	2.0	46.7	2	25.5
	Difference	-0.9	-5	-0.3	-4.4	-1.1	-14.1	-0.6	-3
	% Difference	**-31.9%**	**-17.90%**	**-11.1%**	**-13.0%**	**-34.2%**	**-23.2%**	**-22.4%**	**-10.5%**
Cumulative	Existing	2.3	34	1.8	29.7	2.4	41.3	1.9	23.4
	Implemented	1.2	22.6	1.5	23.5	1.4	30.3	1.4	18.0
	Difference	-1.1	-11.4	-0.3	-6.2	-1.0	-11	-0.5	-5.4
	% Difference	**-48.70**	**-33.40%**	**-19.3%**	**-20.9%**	**-40.7%**	**-26.7%**	**-28.0%**	**-23.0%**

B. Opportunities for Improvement

Center Square Road (CR 620) roadway is in Logan Township, Gloucester County, New Jersey and serves largely residential, educational facility, commercial and industrial traffic. Center Square Road intersects with Interstate I-295 providing convenient access to the region and the national highway system. At the onset of this project, the traffic signals along Center Square Road were, operating in "free" mode with no attempt at coordination with adjacent signals.

This report has documented significant improvements in traffic flow associated with this project. Average delay, travel time and vehicle stops have all been positively impacted by new signal timing.

There are numerous opportunities for improvement on this corridor, including the following general and specific recommendations:

General Recommendations:

1. The corridor would benefit from the installation of GPS-pucks in the four Gloucester County-maintained intersections. This technology would limit the amount of time clock drift which, in time, will impact the efficiency of the implemented timing plans.
2. Additional signals exist to the south of Beckett Road. The County may wish to consider extending the limits of coordination on Center Square Road.

Specific Recommendations:

1. Center Square Road and Commerce Boulevard/ Sharptown Road
    a. No recommendations.
2. Center Square Road and Heron Drive
    a. Installation of pedestrian detectors to cross Heron Drive would provide for quicker service to the side street as these movements are currently on pedestrian recall.
    b. Improve pedestrian guidance.
3. Interstate I-295 Exit 10 Southbound Off Ramp
    a. Investigate the preemption phase for the SB Off-Ramp Phase.
    b. Improve pedestrian guidance.
4. Pureland Drive
    a. Install missing pedestrian guidance signs.
5. Beckett Road
    a. Consider wiring eastbound pedestrian movement to call Phase 8.
    b. Improve pedestrian signing and guidance.

G. Additional Resources/Project Data

Additional information, including project data, analysis files, and other detailed reports will be available on the Project website at: http://dvrpc.taylorwiseman.com.

Appendix A

Appendix B

Appendix C

Appendix D

Appendix E