

Town of Hilton Head Island

Adaptive Traffic Signal Management System Update

*Town Council
June 4, 2024*

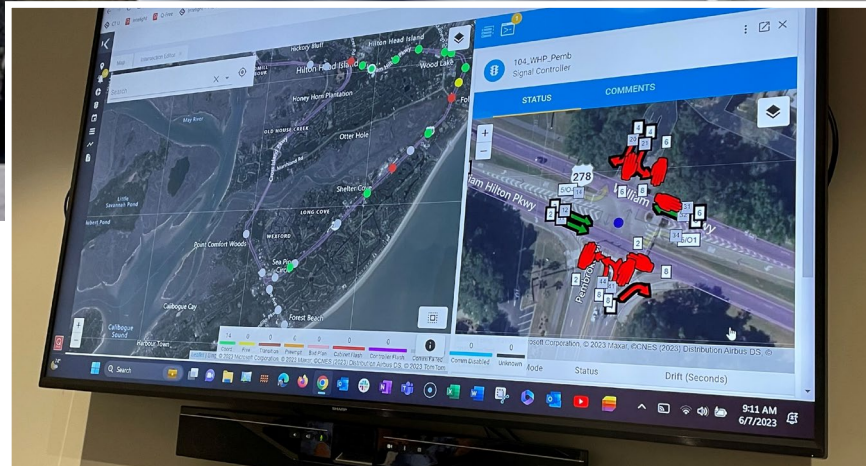
Jim Iwanicki, PE
Transportation Program Manager



Adaptive Traffic Signal Management System Project Update

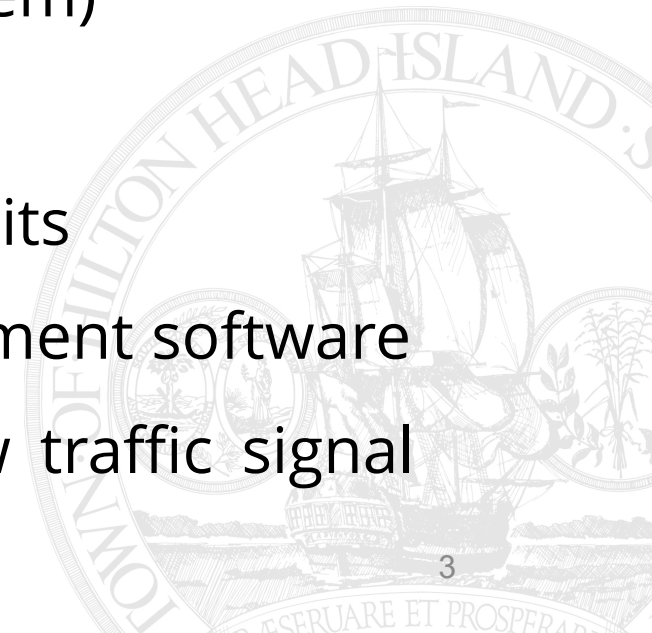
ATSM Overview

- Changes/modifies signal timing in real time in response to actual traffic conditions.
- Reduces delay times for motorists.
- Improves safety for non-motorized users.
- Allows staff to maintain/monitor system's components remotely.



Project Overview

- Installation of 25 new traffic signal controllers
- Conversion of signal timings to MAXTIME
- Installation and configuration of 96 radar vehicle detection units with creation of 2,250 new detector zones (vs 200 in old system)
- 86 of the detection units have cameras.
- Installation of 129 new thermal pedestrian detection units
- Deployment of new cloud-based central signal management software
- Deployment of new adaptive software on the 25 new traffic signal controllers



Project Overview cont'd.

- Installation of pedestrian poles and buttons on 32 side street crossing to improve safety.
- Installation of 36 new ADA-compliant pedestrian stations (touchless actuation, audible locator tones, and voice guidance)
- Installation of 25 new remotely manageable power outlet strips
- Initial grounding improvements at signal cabinets and mast arms



Adaptive Traffic Signal Management System Project Update

Pre-Project Conditions

- In Pavement Loop Detection
- Fixed Time-of-Day Coordination Plan Schedule
- Pedestrian Push Button Only for Major Street Crossings

Day Plan #4 (M-F)

Time	Plan	Cycle Length
0000-0559	Free	
0600-0929	14	150
0930-1419	15	130
1420-1859	16	170
1900-2129	13	120
2130-2359	Free	

Day Plan #5 (Sat.)

Time	Plan	Cycle Length
0000-0659	Free	
0700-0859	13	120
0900-1129	17	180
1130-1829	18	190
1830-2059	13	120
2100-2359	Free	

Day Plan #6 (Sun.)

Time	Plan	Cycle Length
0000-0829	Free	
0830-1029	13	120
1030-1329	19	160
1330-1759	20	190
1800-2029	13	120
2030-2359	Free	



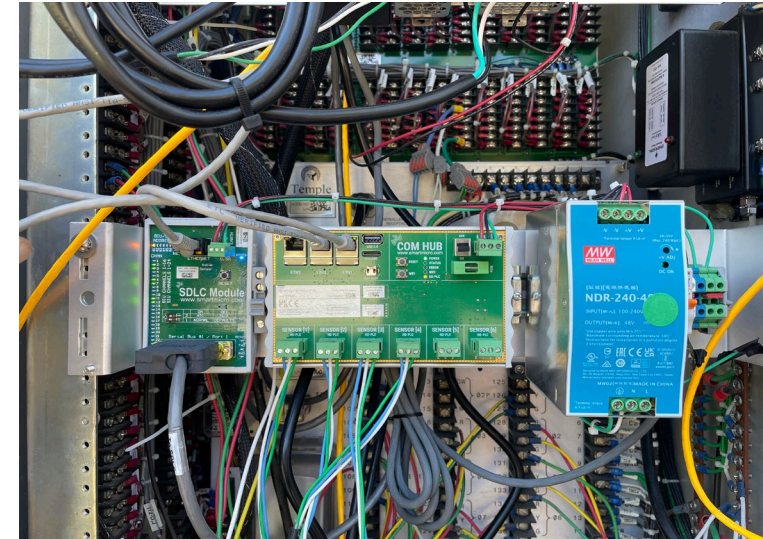
New Detection Equipment

1. Ubiquiti AirMax™ Point-to-Point Radio Antennae 5 GHz
2. FLIR TrafiSense2™ Thermal Imaging Cameras for Passive Ped/Bike Detection
3. Campbell Guardian Wave™ Accessible Ped Stations
4. SmartMicro TRUGRD™ Microwave Radar Sensors w/ High-Resolution Cameras



New Cabinet Equipment

1. SmartMicro™
Communication Hub
Interface
2. Q-FREE™ Model 2070 LX
Controllers with New
Software Systems
3. ITS Commander™
Power Management
4. FLIR™ Thermal Imaging
Camera Edge Card
Video Detectors



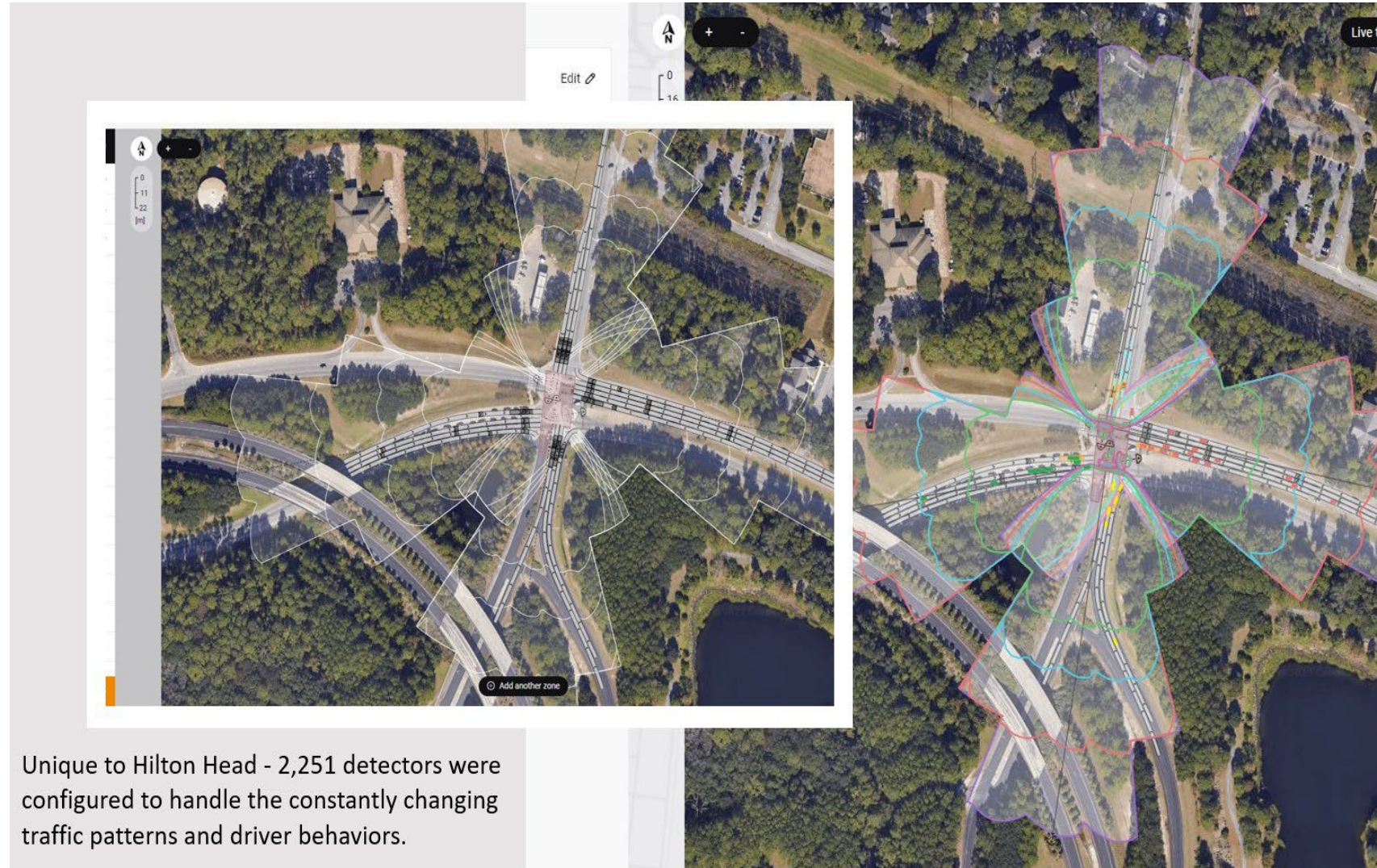
Continuous Real-time Signal System & Traffic Conditions Monitoring

- 24-Hour Live Monitoring
- Real-Time Traffic Management
- Incident Management



Continuous Real-time Signal System & Traffic Conditions Monitoring

- Vehicle Detection Zone Monitoring



Unique to Hilton Head - 2,251 detectors were configured to handle the constantly changing traffic patterns and driver behaviors.

Continuous Real-time Signal System & Traffic Conditions Monitoring

- Pedestrian/
Bicyclist
Detection
Thermal
Imaging
Cameras



Adaptive Traffic Signal Management System Project Update

Continuous Real-time Signal System & Traffic Conditions Monitoring

- System Management Software



161_Palm_Target/161_Palm_Target
Signal Controller

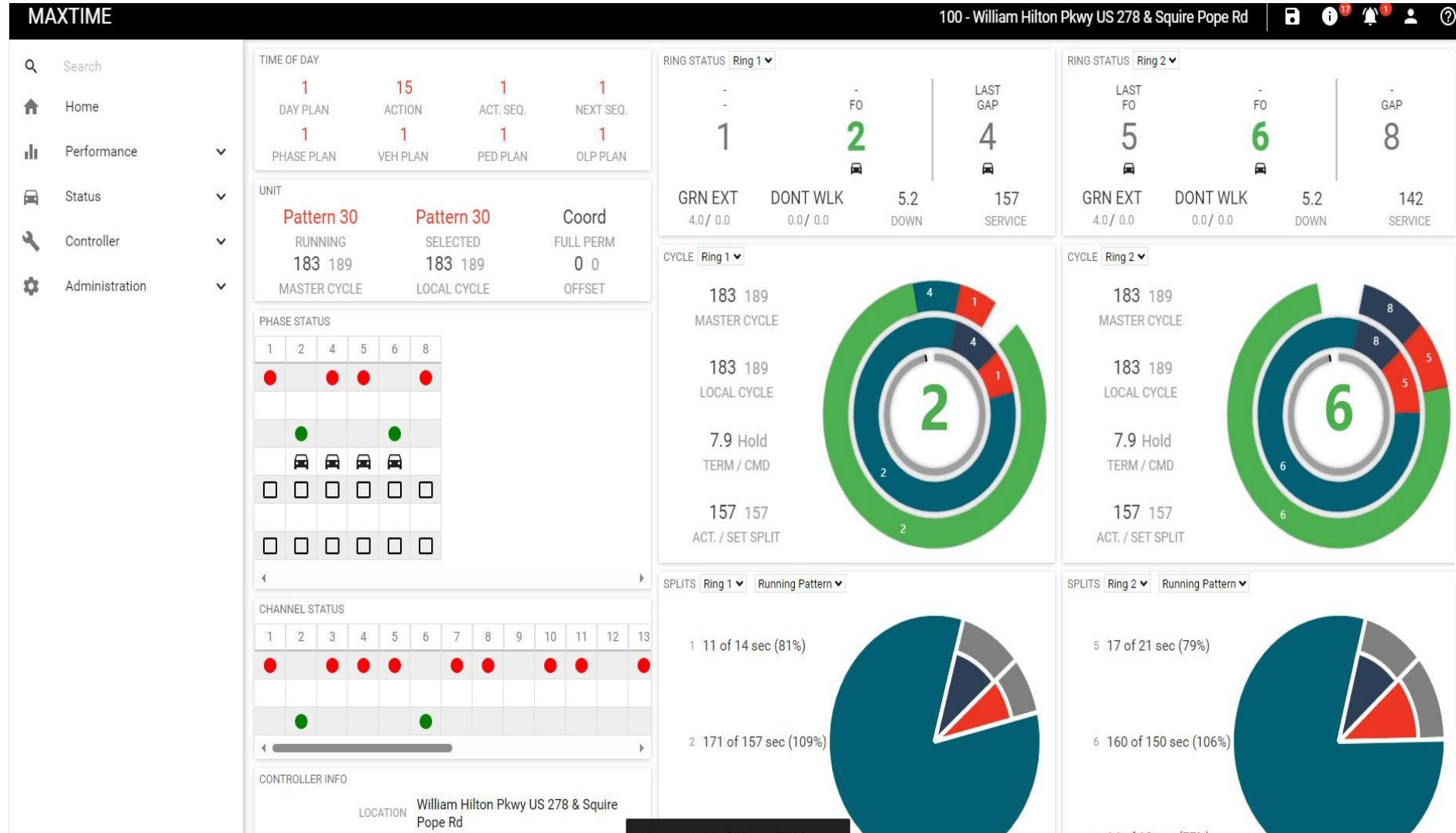
STATUS COMMENTS

Last Cycle	Mode	Status	Drift (Seconds)			
158/135	Transition	PATTERN 30	0			
Local	Master	Set Offset	Act Offset			
40	63	70	23			
Phase	1	2	4	5	6	8
Split	11	86	22	13	11	22
Set	25	75	35	20	80	35
Last	GAP	FO	GAP	???	FO	GAP

Controller Time: 10:22:02 Device Api: MAXTIME_2

Continuous Real-time Signal System & Traffic Conditions Monitoring

- Remote Controller Access



Adaptive Traffic Signal Management System Project Update

Old System vs New System

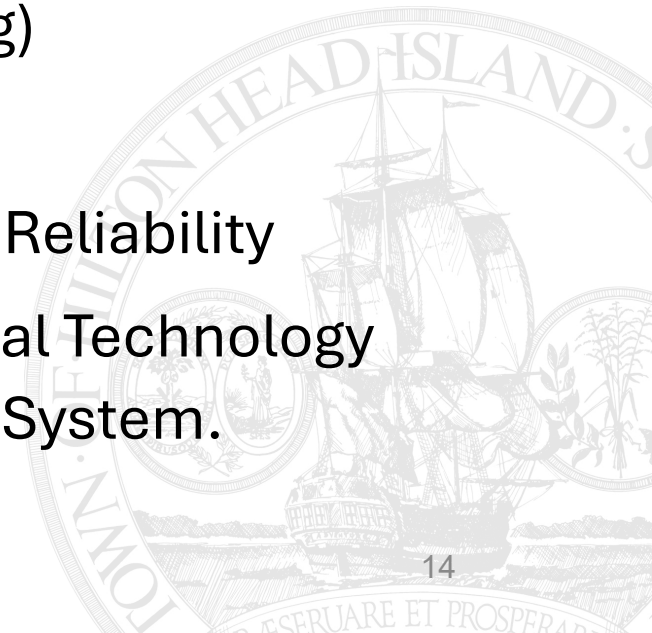
During the adaptive operations more vehicles are progressing through the intersection with less stops and the vehicle delay time is lower for both mainline and side street traffic throughout the Town.

Parameter	Adaptive	Old System
Cycle Length	100 - 190 sec	120 -170 sec
Timing Updates	25 - 45 per day	6 max per day

		Time of Day Schedule (TOD)			Adaptive Operation	
		Time	Pattern	Cycle	Min Cycle	Max Cycle
Segment 1	Sig 100 - 106	0600-0929	14	150	140	188
		0930-1419	15	130	152	175
		1420-1859	16	170	152	190
		1900-2129	13	120	110	145
Segment 2	Sig 201 - 205	0700-0929	6	160	125	155
		0930-1514	4	140	125	155
		1515-1829	5	160	125	150
		1830-1959	4	140	120	130
		2000-2159	2	130	125	145
Segment 3	Sig 206 - 303	0700-0929	4	150	130	150
		0930-1059	3	120	115	122
		1100-1530	6	160	112	144
		1530-1814	5	160	130	142
		1815-2000	6	160	130	142
		2000-2159	3	120	115	130
Segment 6	Sig 40x, 50x, 16x	0600 - 0659	1	125	125	160
		0700 - 0929	4	150	125	140
		0930 - 1514	3	140	125	144
		1515 - 1829	5	150	125	145
		1830 - 2129	3	140	125	135
		2130 - 2259	2	130	125	142

Ongoing System Refinements and Improvement

- Improve Detection Reliability
 - Grounding upgrades – City of Charleston
 - Commitment by Equipment Manufacture and Contractor to Continue to Improve Vehicle Detection Equipment and Field Operations.
- Adaptive Algorithm (Regular Updates to Computer Programing)
- Internal Efforts to Optimize Performance and Reliability.
- Contractor's Efforts to Enhance System Wide Operations and Reliability
- Engaging an Independent Engineering Firm with Adaptive Signal Technology Expertise to Assist Staff in Maximizing the Performance of the System.



What's Next

- Collaboration with Beaufort County
- Collaboration with SCDOT
- Fiber Optic Communication
- Additional Intelligent Transportation System Function
 - Enhanced Traveler Information
 - Connected vehicles
 - Artificial Intelligence



Adaptive Traffic Signal Management System Project Update

What About Traffic?

Top 10 Traffic Days Since January 1, 2022

SCDOT WHP Traffic Count Station at Jenkins Island

Rank	Date	Year	Day of Week	Volume (ADT)
1	April 6	2023	Thursday	71,837
2	June 30	2023	Friday	70,671
3	April 7	2023	Friday	70,373
4	July 7	2023	Friday	70,238
5	April 5	2023	Wednesday	70,003
6	April 4	2024	Thursday	69,392
7	June 16	2023	Friday	68,862
8	April 8	2022	Friday	68,780
9	April 21	2023	Friday	68,746
10	April 15	2022	Friday	68,688

Memorial Day Weekend

SCDOT WHP Traffic Count Station at Jenkins Island

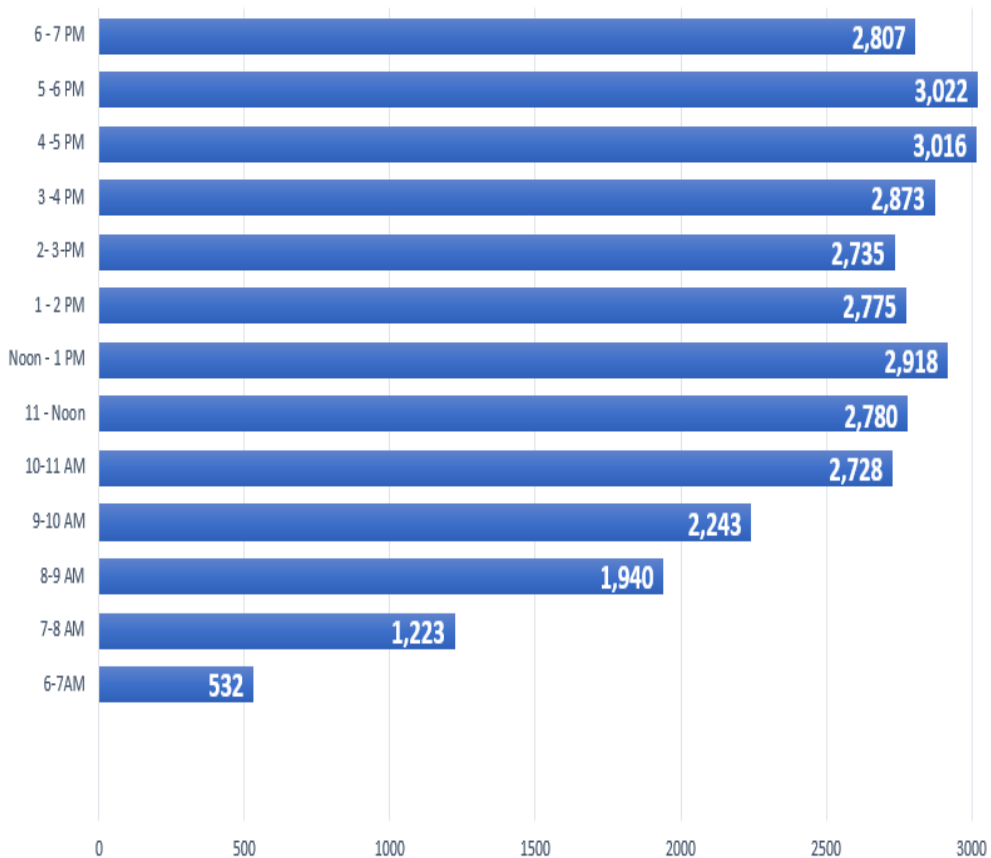
2023			2024			Difference
Day	Date	Volume	Day	Date	Volume	
Friday	May 26	68,217	Friday	May 24	68,201	-16
Saturday	May 27	54,472	Saturday	May 25	63,890	9,418
Sunday	May 28	49,063	Sunday	May 26	55,756	6,693
Monday	May 29	52,687	Monday	May 27	51,859	-828



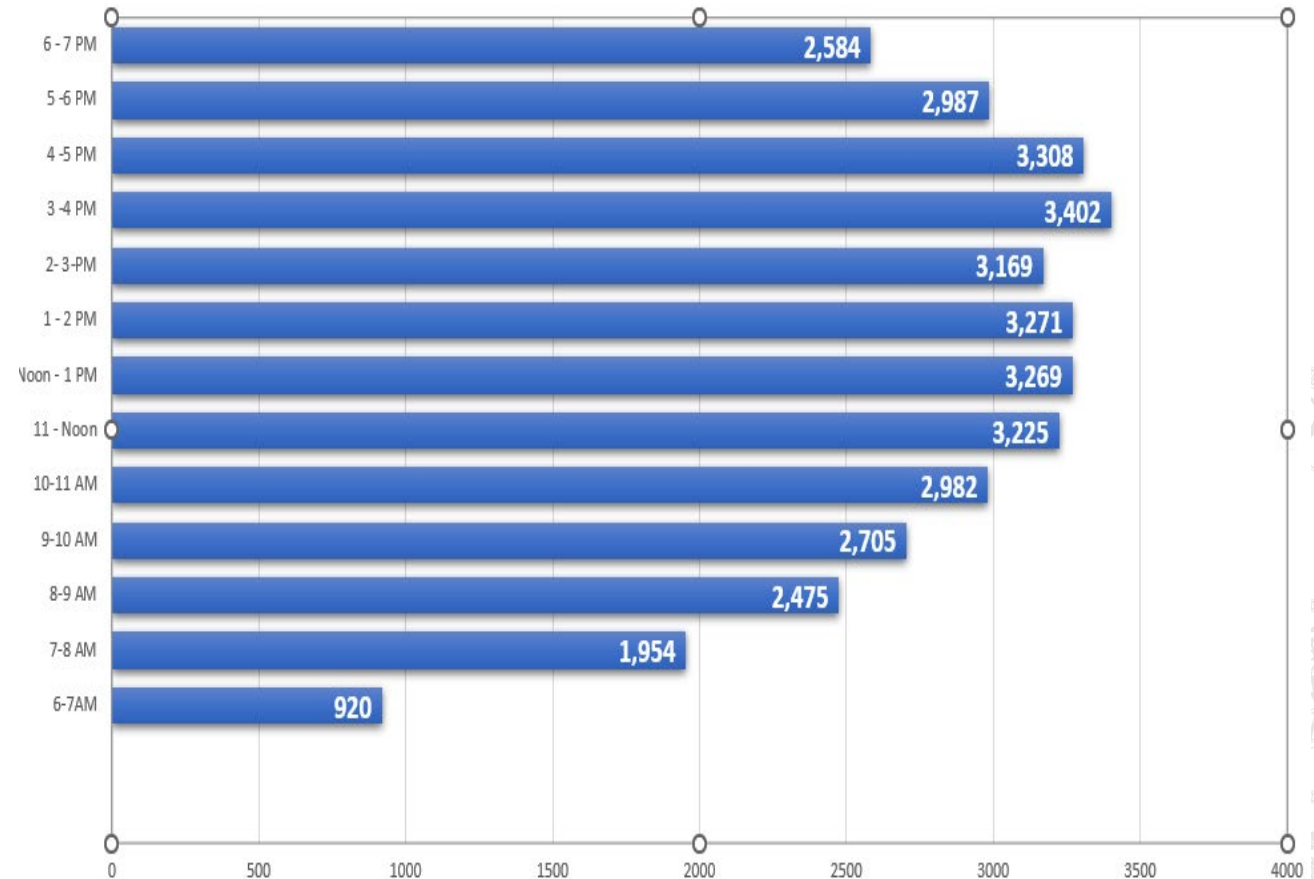
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What About Traffic?

Pope Avenue - New Orleans Road / Office Park Road
Tuesday July 11, 2023 Traffic Count



William Hilton Parkway - Mathews Drive / Folly Field Road
Tuesday July 11, 2023 Traffic Count



Questions?

