

Link to Slides
<https://goo.gl/VyR9yr>

CONFIGURATION UTILITY

UDOT Automated Traffic Signal Performance Measures

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ATSPM Configuration

Signal

Signal ID

Street Names

IP Address

Lat/long

Region

Controller Type

Chart Notes

Approach

Direction

Protected Phase

Permissive Phase

Description

Detector

Detector
Channel

Detection
Type

Lane &
Movement
Type

Date Added

Internal
Comment

Detection-
specific
Parameters

ATSPM Configuration - Signal

Signal 7220
Save Copy

Primary Name	Secondary Name	IP Address	Latitude	Longitude	Region
Foothill Drive	1300 South	10.10.10.10	40.74168829	-111.8272567	Region 2 ▼

Controller Type

ASC3 ▼

Display On Map

Chart Notes +

Expand to create notes that will appear when displaying a metric for this signal

Chart Notes +

Comment

Text

- Purdue Phase Termination
- Split Monitor
- Pedestrian Delay
- Preemption Details
- Turning Movement Counts
- Purdue Coordination Diagram
- Approach Volume
- Approach Delay
- Arrivals On Red
- Approach Speed
- Yellow and Red Actuations
- Purdue Split Failure

Create

If unchecked, signal will still show in Signal List. If unchecked and IP is configured, the system will still retrieve data.

ATSPM Configuration – Approach

Phase/Direction

SBL Ph1 (3 Detector(s)) Copy Delete

Direction	Description	Protected Phase	Permissive Phase	Overlap
SB	SBL Ph1	1		<input type="checkbox"/>

Approach direction

Informational text for Phase/Direction header

Detector's primary phase. Usually the phase for through movement and the protected phase for P&P left turns.

Secondary phase for detector. Usually 0 for through movements and protected-only left turns. Input the permissive phase for P&P left turns.



Indicates the number in Protected Phase is the overlap number.

Phase/Direction


SBL Ph1(6) (2 Detector(s)) Copy Delete



Direction	Description	Protected Phase	Permissive Phase	Overlap
SB	SBL Ph1(6)	1	6	<input type="checkbox"/>



ATSPM Configuration – Detection



EBT Ph4 (7 Detector(s))
Copy  Delete 



Direction	Description	Protected Phase	Permissive Phase	Overlap
EB ▼	EBT Ph4	4		<input type="checkbox"/>



Detectors 



Detector 722038
Copy  Delete 



Detector 722039
Copy  Delete 

Detector 722040
Copy  Delete 

Detector 722041
Copy  Delete 

Detector 722042
Copy  Delete 

Detector 722051
Copy  Delete 

Detector 722052
Copy  Delete 

ATSPM Configuration – Detection

Detector [722020](#) Copy Delete

Det Channel	Lane Number (Lane-by-lane Count)	Date Added
20	1	3/27/2015 12:00:00 AM

Detection Types

- Advanced Count
- Advanced Speed
- Lane-by-lane Count
- Lane-by-lane with Speed Restriction
- Stopbar Presence

Movement Type (Lane-by-lane Count) +

Thru-Right

Lane Type (Lane-by-lane Count)

Vehicle

Lane Type (Lane-by-lane Count)

- Vehicle
- Vehicle
- Bike
- Pedestrian
- Exit
- Light Rail Transit
- Bus
- High Occupancy Vehicle

Movement Type (Lane-by-lane Count)

- Thru
- Thru
- Right
- Left
- Thru-Right
- Thru-Left

Detector Comment +

Internal only

Currently unused

ATSPM Configuration – Configuration Table

Configuration Table

Detector ID	Det. Channel	Phase	Perm. Phase	Overlap	Direction	Enabled	Detection Types	Movement Type	Lane Number	Lane Type	MPH	Dist. From StopBar	Decision Point	Move. Delay	Min Speed Filter	Comment
722014	14	2		False	NB	True	Advanced Count Advanced Speed	Thru	1	Vehicle	40	350		15	5	was 6 dt 4-5-13
722016	16	6		False	SB	True	Advanced Count Advanced Speed	Thru	1	Vehicle	40	350		15	5	was 8 dt 4-5-13
722017	17	5		False	NB	True	Stopbar Presence	Left	1	Vehicle						
722018	18	2		False	NB	True	Stopbar Presence	Thru	1	Vehicle	40					
722019	19	2		False	NB	True	Stopbar Presence	Thru	2	Vehicle	40					
722020	20	2		False	NB	True	Stopbar Presence	Thru-Right	1	Vehicle	40					
722021	21	5		False	NB	True	Lane-by-lane Count	Left	1	Vehicle						
722022	22	2		False	NB	True	Lane-by-lane Count	Thru	1	Vehicle	40					3-27-15 - it was WB L1.
722023	23	2		False	NB	True	Lane-by-lane Count	Thru	2	Vehicle	40					3-27-15 - it was WB T1.
722024	24	2		False	NB	True	Lane-by-lane Count	Thru-Right	1	Vehicle	40					3-27-15 - it was WB R1.
722027	27	1		False	SB	True	Stopbar Presence	Left	1	Vehicle						
722028	28	6		False	SB	True	Stopbar Presence	Thru	1	Vehicle	40					
722029	29	6		False	SB	True	Stopbar Presence	Thru	2	Vehicle	40					
722030	30	6		False	SB	True	Stopbar Presence	Thru-Right	1	Vehicle	40					
722031	31	1		False	SB	True	Lane-by-lane Count	Left	1	Vehicle						
722032	32	6		False	SB	True	Lane-by-lane Count	Thru	1	Vehicle	40					
722033	33	6		False	SB	True	Lane-by-lane Count	Thru	2	Vehicle	40					
722034	34	6		False	SB	True	Lane-by-lane Count	Thru	3	Vehicle	40					
722035	35	6		False	SB	True	Lane-by-lane Count	Right	1	Vehicle	40					
722038	38	4		False	EB	True	Stopbar Presence	Left	1	Vehicle						
722039	39	4		False	EB	True	Stopbar Presence	Thru	1	Vehicle						
722040	40	4		False	EB	True	Lane-by-lane Count	Left	1	Vehicle						
722041	41	4		False	EB	True	Lane-by-lane Count	Thru	1	Vehicle						
722042	42	4		False	EB	True	Lane-by-lane Count	Right	1	Vehicle						

DETECTION TYPES

UDOT Automated Traffic Signal Performance Measures


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UDOT Statewide Signal Engineer

Detection		Metric
None		Phase Termination Chart Split Monitor Preemption Details Pedestrian Delay
Lane-by-lane Presence Lane Group Presence		Purdue Split Failure
Lane-by-lane Stop Bar Count		Turning Movement Counts Approach Volume
Advanced Count		Purdue Coordination Diagram Approach Volume
Advanced Speed		Approach Speed (requires detection with speed service)

Detection – Lane-by-lane Presence



[Detector 709519](#)

Det Channel	Lane Number (Lane-by-lane Count)	Date Added
19	1	3/8/2016 12:00:00 AM
Detection Types	Movement Type (Lane-by-lane Count)	Detector Comment 
<input type="checkbox"/> Advanced Count <input type="checkbox"/> Advanced Speed <input type="checkbox"/> Lane-by-lane Count <input type="checkbox"/> Lane-by-lane with Speed Restriction <input checked="" type="checkbox"/> Stopbar Presence	Thru	11/16/2016 Added 4:48:04 PM - 3/8/2016
	Lane Type (Lane-by-lane Count)	
	Vehicle	


Date detector added. Currently has no impact but may be used to set the valid dates for the configuration.

Optional



Detection – Lane-by-lane Count

Detector [709523](#) Copy  Delete 




Det Channel	Lane Number (Lane-by-lane Count)	Date Added
23	1	1/15/2016 3:50:07 PM

Detection Types <input type="checkbox"/> Advanced Count <input type="checkbox"/> Advanced Speed <input checked="" type="checkbox"/> Lane-by-lane Count <input type="checkbox"/> Lane-by-lane with Speed Restriction <input type="checkbox"/> Stopbar Presence	Movement Type (Lane-by-lane Count) Thru ▼	Detector Comment  <div style="border: 1px solid gray; height: 100px;"></div>
	Lane Type (Lane-by-lane Count) Vehicle ▼	

Detection – Lane-by-lane Count w/ Speed Restriction

Detector 709524 Copy  Delete 

Det Channel	Lane Number (Lane-by-lane Count)	Date Added
24	2	1/15/2016 3:52:45 PM

Detection Types	Movement Type (Lane-by-lane Count)	Detector Comment 
<input type="checkbox"/> Advanced Count <input type="checkbox"/> Advanced Speed <input type="checkbox"/> Lane-by-lane Count <input checked="" type="checkbox"/> Lane-by-lane with Speed Restriction <input type="checkbox"/> Stopbar Presence	Thru  Lane Type (Lane-by-lane Count) Vehicle 	

Optional

Detection – Advanced Count & Speed

Detector 709506
Copy Delete

Det Channel	Lane Number (Lane-by-lane Count)	Date Added
6	1	5/9/2016 11:15:57 AM
Detection Types	Movement Type (Lane-by-lane Count)	Detector Comment
<input checked="" type="checkbox"/> Advanced Count <input checked="" type="checkbox"/> Advanced Speed <input type="checkbox"/> Lane-by-lane Count <input type="checkbox"/> Lane-by-lane with Speed Restriction <input type="checkbox"/> Stopbar Presence	Thru	11/16/2016 4:48:04 PM - PCD Added 5/09/2016
	Lane Type (Lane-by-lane Count)	
	Vehicle	
	MPH (Advanced Count, Advanced Speed)	
	45	
	Distance To Stop Bar (Advanced Count)	
	350	
	Min Speed Filter (Advanced Speed)	
	5	
	Decision Point (Advanced Count)	
	0	
	Movement Delay (Advanced Speed)	
	15	

Optional

Applies only to PCD metric:
 Detector distance from stop bar in feet. Detector actuations will be offset to arrival at the stop bar based on the distance and MPH configured.

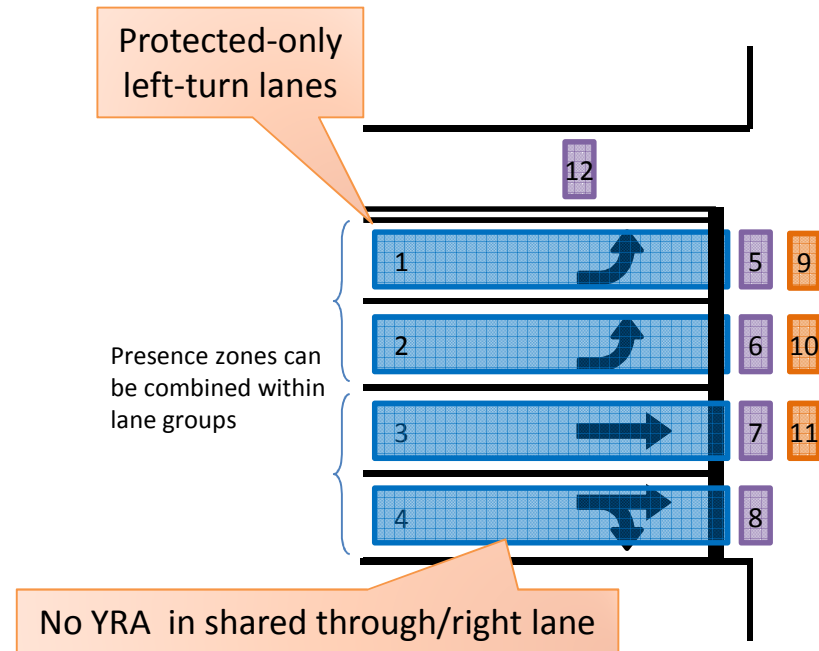
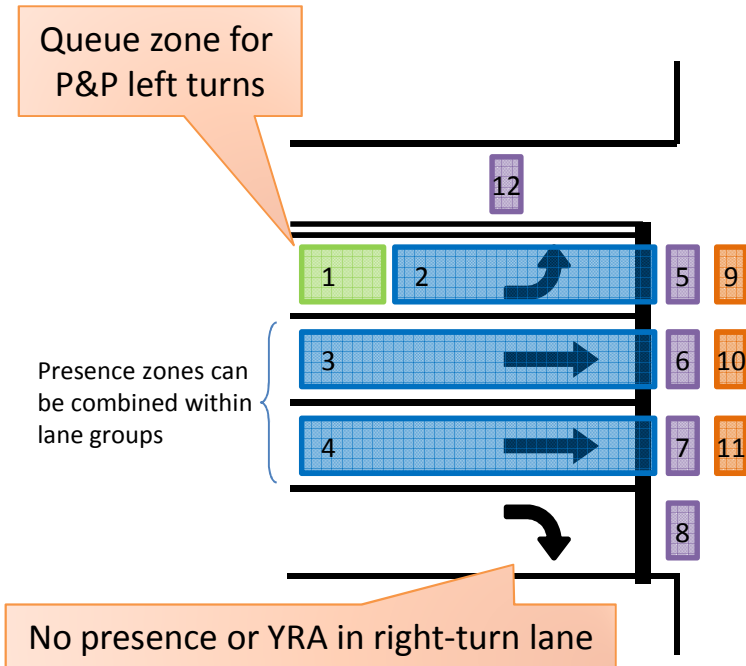
Applies only to PCD metric:
 Number of seconds to offset the detector actuations. Usually 0.

Applies only to Speed metric:
 Speeds below this number (mph) will not be included in the speed metric.

Applies only to Speed metric:
 Number of seconds after start of green to start using speed data. Should be roughly the queue clearance time to the detector. Usually 15s.

Wavetronix Matrix

Standard Detection Layout w/ Click 650



Detection Channel Order

1. Presence zones, inside to outside. If P&P zones, the queue zone is first.
2. Count channels, inside to outside
3. YRA zones, inside to outside
4. Count zones in exit lanes, inside to outside (*often skipped*)

Matrix Sensor Order

1. Phase 2
2. Phase 6
3. Phase 4
4. Phase 8



65' or 50' Presence zone, used for **Split Failure**



15' Presence zone w/ 3-sec delay in controller, not used for SPMs



Small zone, used for **Turning Movement Counts**

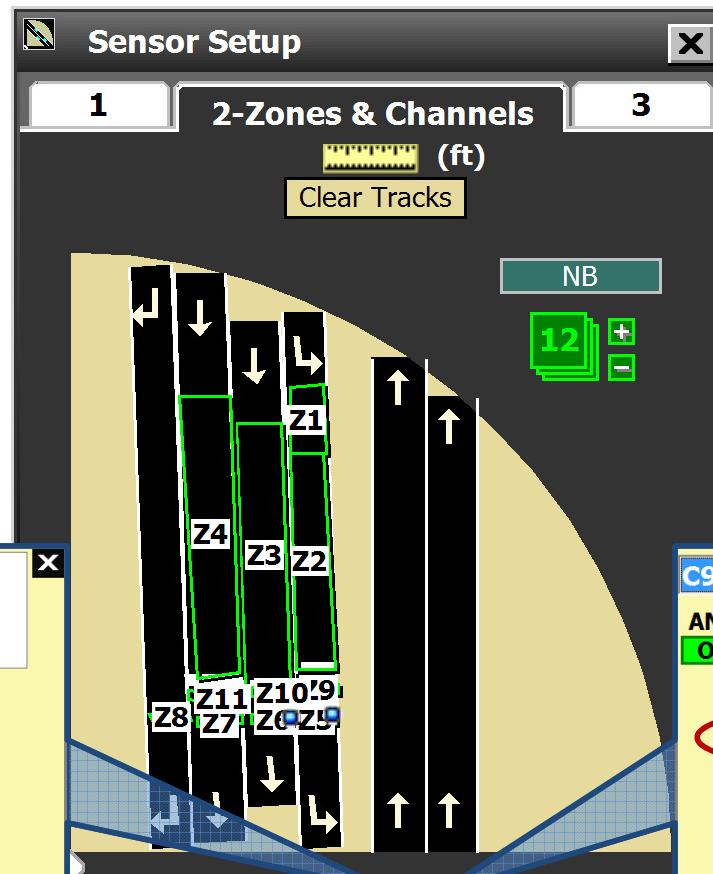


Small zone with 15 mph min speed filter, used for **Yellow & Red Actuations** (Note: Place immediately in front of stop bar and do not use in lanes that permit turns on red)

Wavetronix Matrix Configuration for TMC & YRA

Turning Movement Counts

Yellow & Red Actuations



C5

Z1	Z2	Z3	Z4	Z5	Z6
Z7	Z8	Z9	10	11	

D = -- s
E = -- s
DI = --
Φ = --

Channel Type: **Counting** (circled in red)

Invert:

Min Speed: None
Max Speed: None

C9

Z1	Z2	Z3	Z4	Z5	Z6
Z7	Z8	Z9	10	11	

D = -- s
E = -- s
DI = --
Φ = --

Channel Type: **Counting** (circled in red)

Invert:

Min Speed: **15 mpl** (circled in red)
Max Speed: None

Z5

Delay (secs): 00.0
Extend (secs): 00.0

Make small zone (circled in red)

Z5

Delay (secs): 00.0
Extend (secs): 00.0

Make small zone (circled in red)

Wavetronix Advance Count Setup

Ch1 is for Dilemma Zone and Queue

Setup Channels-Alerts-Zones

1 2-SB Count 3 4 5 6 7 8

Name **SB Count**

Type **Pulse**

Enabled

Zone Settings

Range (feet):
420 to 430

Speed (mph):
035 - 100

OK Undo Cancel

Verify Channels-Alerts-Zones

Ch2-A1-Z1

SB Count Pu

Total: 00006

Reset

460	54	5.8
335	51	4.4
240	50	3.2
175	51	2.3
70	49	0.9

>> Range | Speed | ETA Ch2

Monitor trackers and place count zone at distance with good detection

Wavetronix Advance Speed Setup

Appendix A. Wavetronix SmartSensor Advance Configuration

In order to use a Wavetronix SmartSensor Advance with the ATSPM Speed Listener, it is necessary to configure the hardware to communicate with the system. There are two components of relevance to ATSPM, a Serial to Ethernet converter and the SmartSensor Device itself. UDOT has used the DIGI PortServer TS 4 serial to Ethernet converter (aka "Digi") in order to retrieve speed data from the Wavetronix SmartSensor Advance; however, other serial to Ethernet converters may work as well.

This appendix only covers configuration specifically related to ATSPM connection using Digi PortServers. For further information on SmartSensor configuration, please contact Wavetronix.

A.1. Serial to Ethernet Converter Configuration

Configure each port pushing speed data on the Digi as follows:

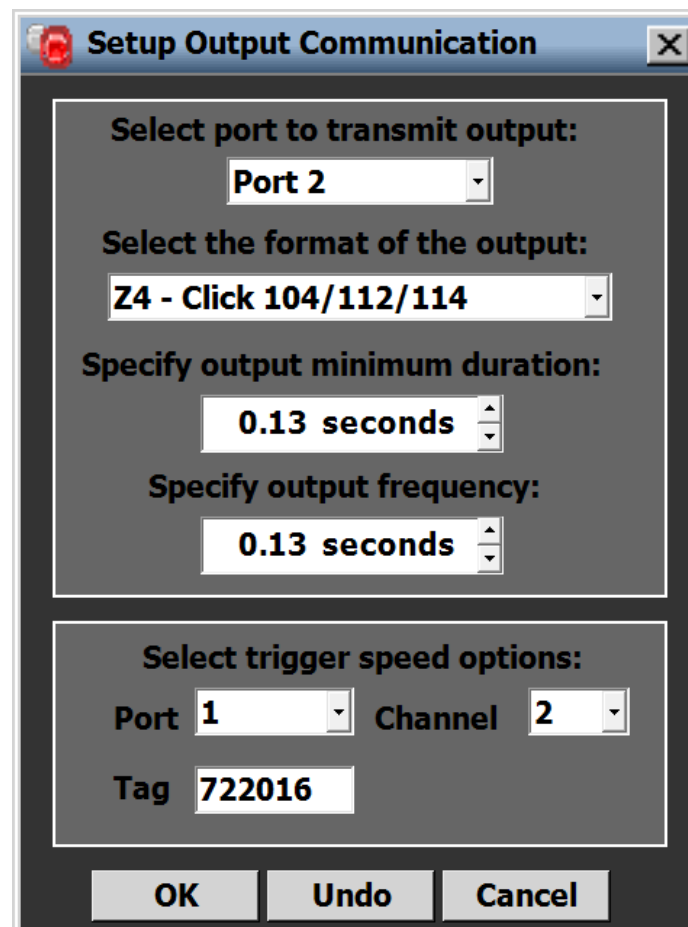
Set the Port Profile to either TCP or UDP Sockets (Select Change Profile to make a change). TCP sockets are preferred as they are more secure, more reliable and are native to the Wavetronix Advance and Matrix SmartSensors (as they are written around TCP internet protocols).

TCP:

1. Under the TCP Server Port Security Settings, check the box **Only allow network access from the following devices or networks**. In the **IP Address**: box, type in the IP address of the server to receive the data. Under the **Advanced Serial Settings Terminal Type**: box, type in "vt100", enable **Verbose connection status message** and enable **Enable RTS Toggle** with 0 ms for both Pre-delay and Post-delay.
2. Click the **Apply** button.

UDP:

1. Under the UDP Client enter the following settings: In the **Send data to**: box, type the name of the SPM server in **Description**, its IP address in **Send To**, "10088" in **UDP Port**, then click the **Add** button. Both this IP address and port must be publicly accessible.



Setup Output Communication

Select port to transmit output:
Port 2

Select the format of the output:
Z4 - Click 104/112/114

Specify output minimum duration:
0.13 seconds

Specify output frequency:
0.13 seconds

Select trigger speed options:
Port 1 Channel 2
Tag 722016

OK Undo Cancel

Econolite Controllers: Count Detector Setup

Detector	ECPI Log	Phase
1	.	4
2	X	0
3	.	8
4	X	0
5	.	2
6	X	0
7	.	6
8	X	0
9	.	0
10	.	0
11	.	0
12	.	0
13	.	0
14	.	0
15	.	0
16	.	0

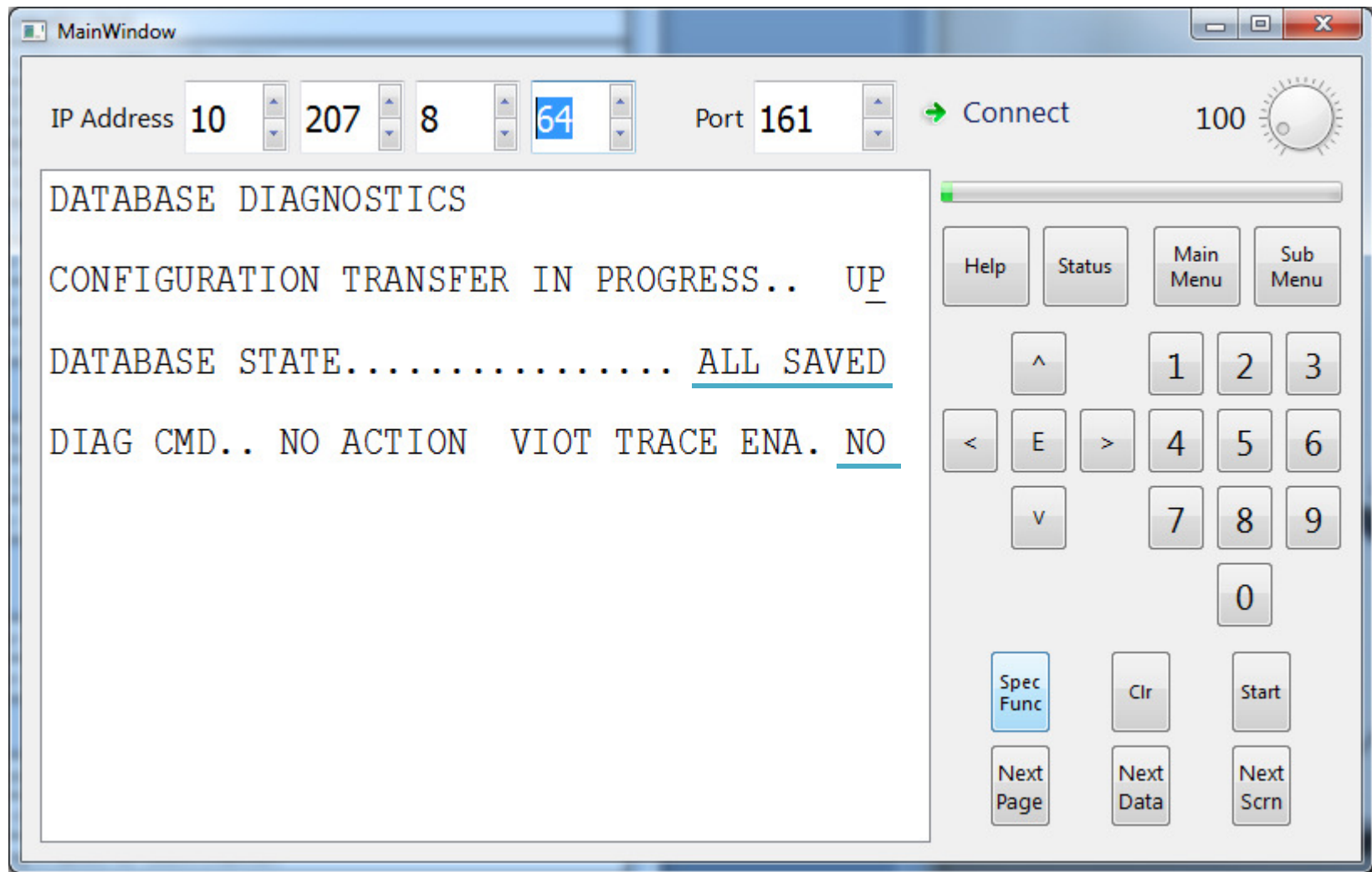
Detector	ECPI Log	Phase
17	.	5
18	.	2
19	.	2
20	.	2
21	.	2
22	X	0
23	X	0
24	X	0
25	X	0
26	X	0
27	.	0
28	.	0
29	.	1
30	.	6
31	.	6
32	.	6

Detector	ECPI Log	Phase
33	.	6
34	X	0
35	X	0
36	X	0
37	X	0
38	X	0
39	.	0
40	.	0
41	.	7
42	.	4
43	.	4
44	.	4
45	X	0
46	X	0
47	X	0
48	X	0

Detector	ECPI Log	Phase
49	.	3
50	.	8
51	.	8
52	.	8
53	X	0
54	X	0
55	X	0
56	X	0
57	.	0
58	.	0
59	.	0
60	.	0
61	.	0
62	.	0
63	.	0
64	.	0

Enable ECPI Log for count zones on channels assigned to Phase 0

Econolite Controllers: Data Logger Setup





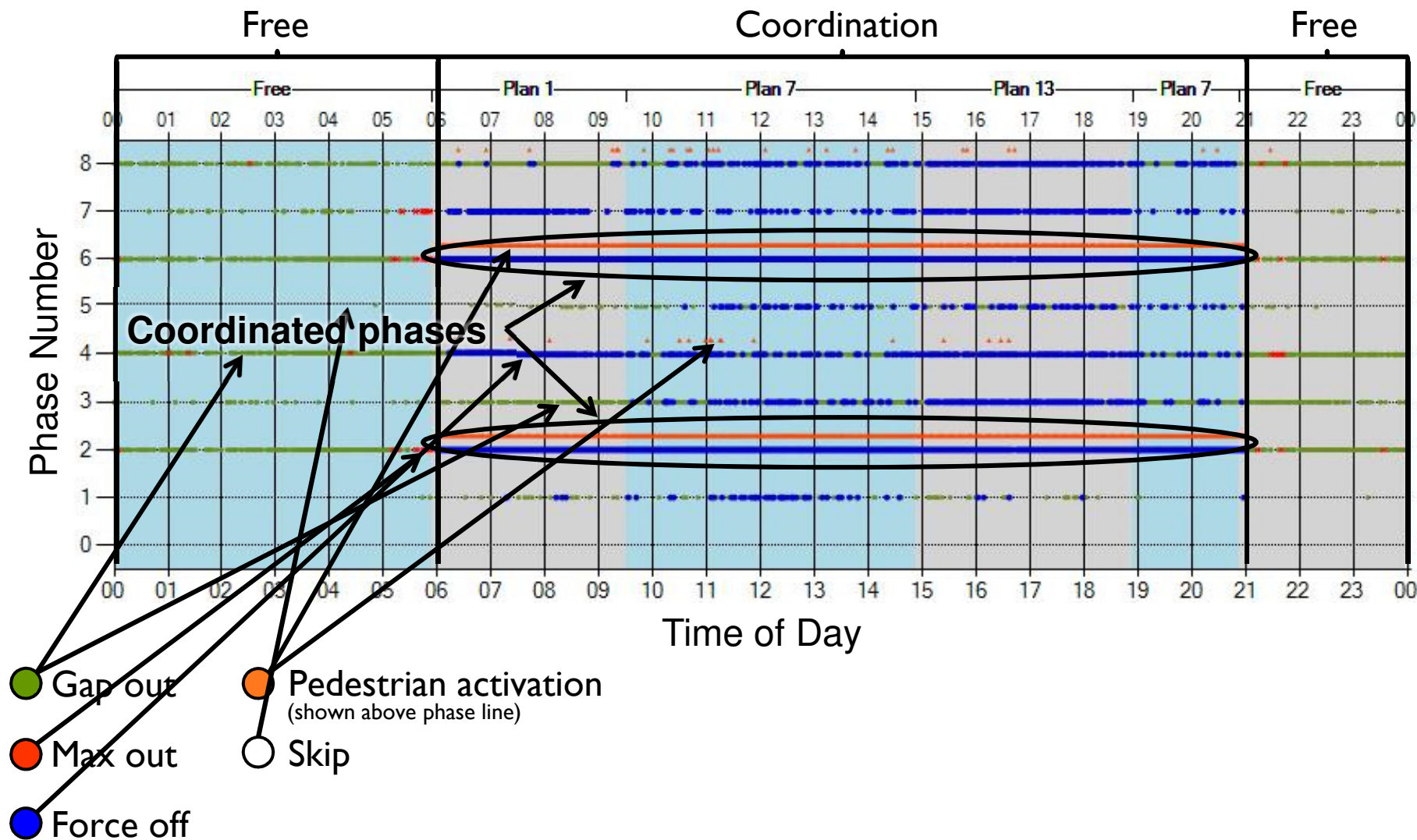
METRICS

UDOT Automated Traffic Signal Performance Measures

Jamie Mackey, P.E, PTOE

UDOT Statewide Signal Engineer

Metric: Phase Termination Chart

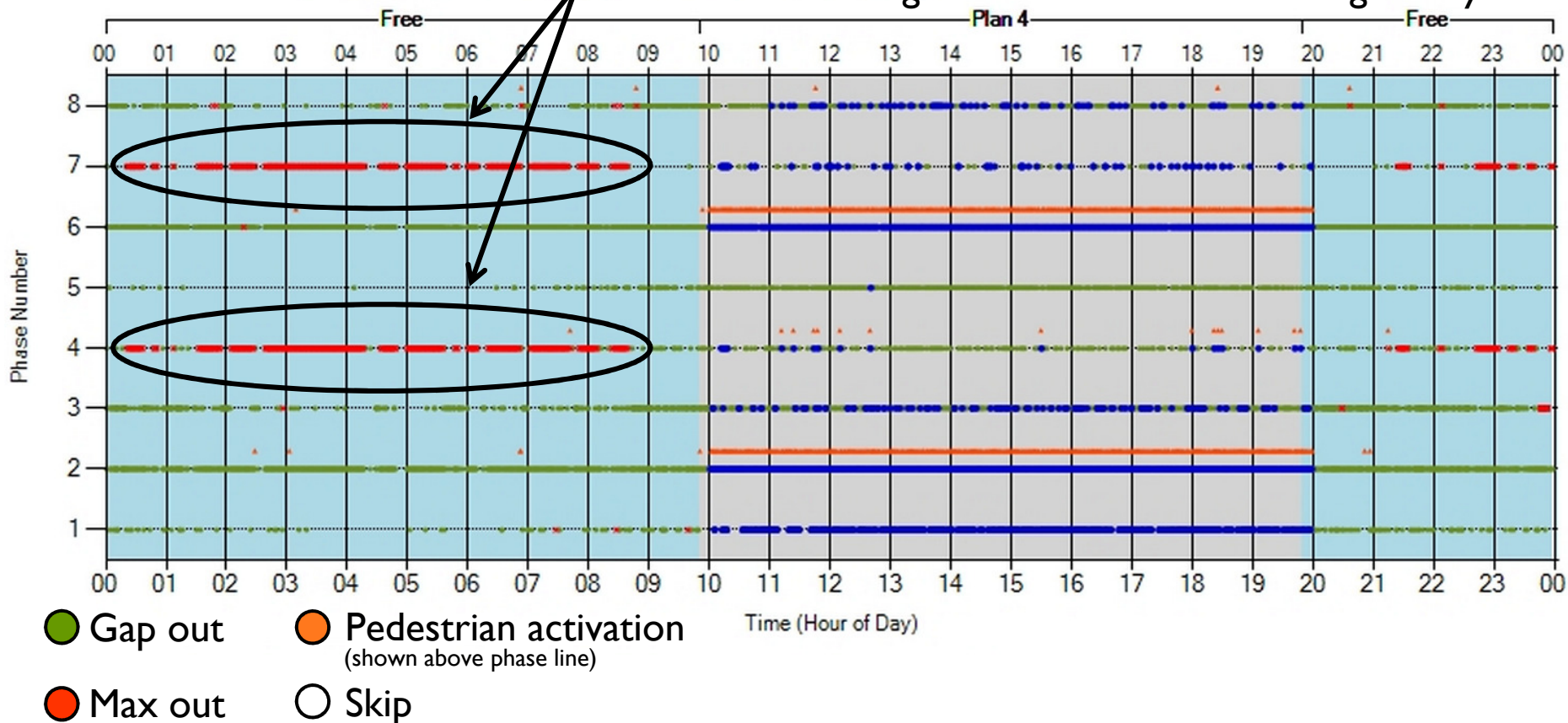


Complaint: Long red at 2 a.m., no other traffic

Before

Video detection not working at night

Minor street through & left turn max out at night only

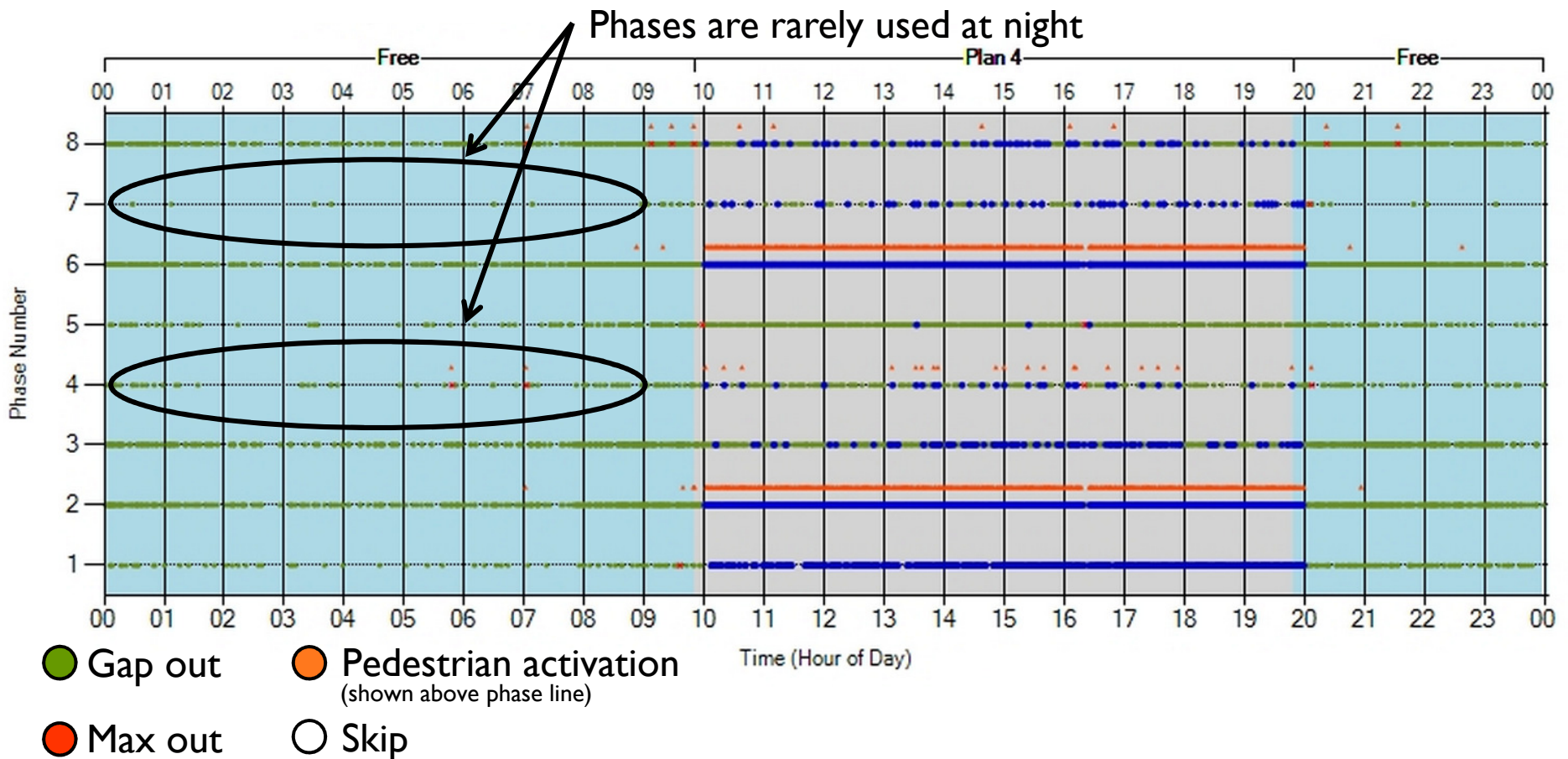


Metric: Purdue Phase Termination
Detection Requirements: None

Complaint: Long red at 2 a.m., no other traffic

After

New detection technology installed

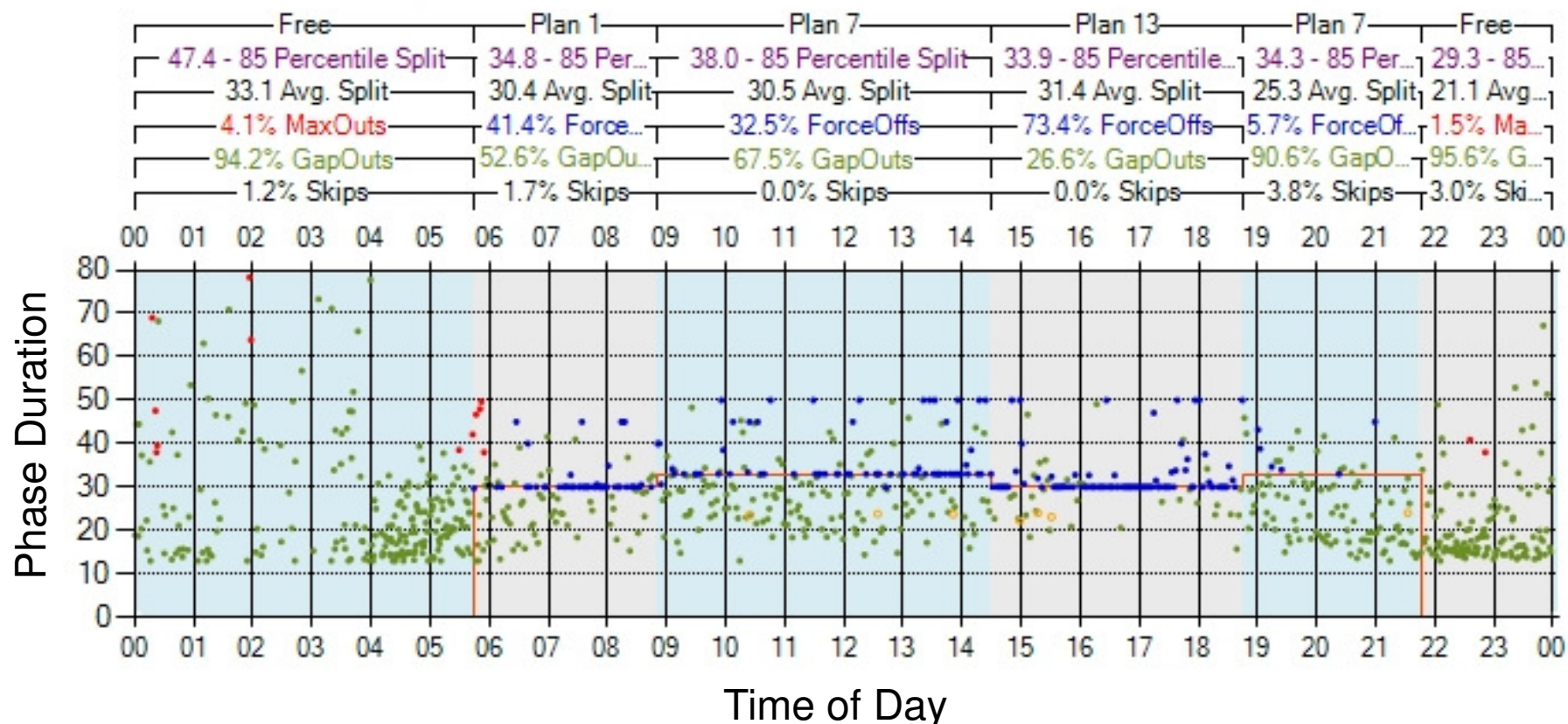


Metric: Purdue Phase Termination
Detection Requirements: None

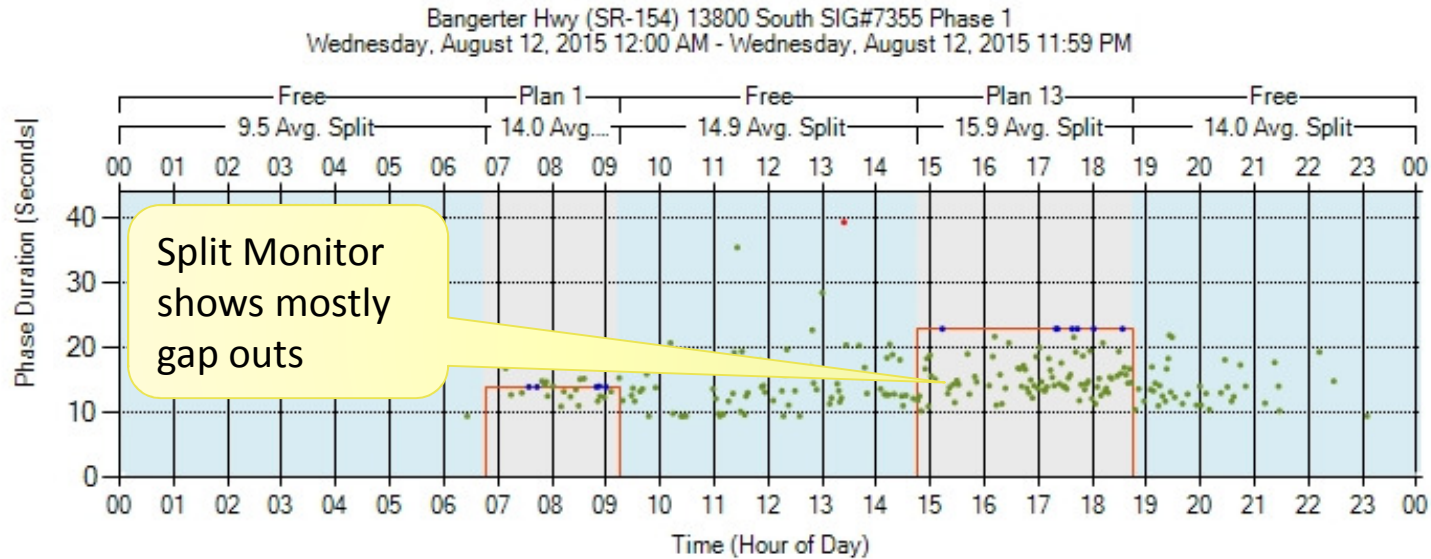
Metric: Split Monitor

Phase 6

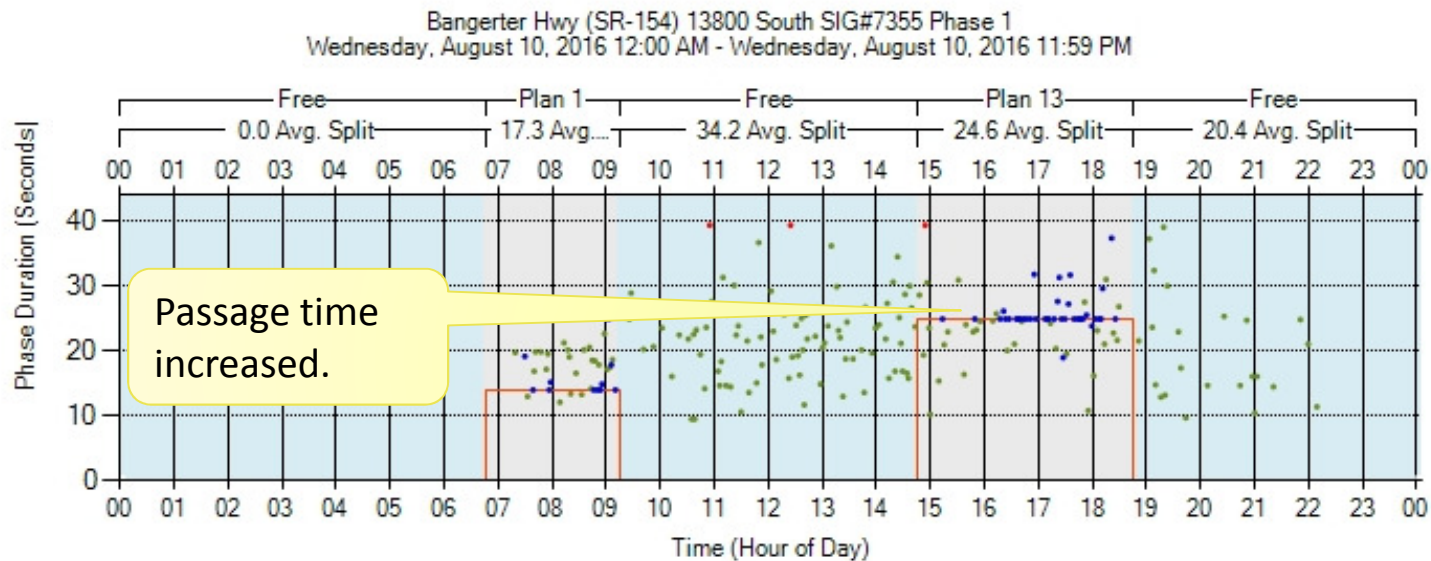
US-89 2700 North SIG#5372 Phase 6
 Wednesday, March 09, 2016 12:00 AM - Thursday, March 10, 2016 12:00 AM



Complaint: Long queue, short green



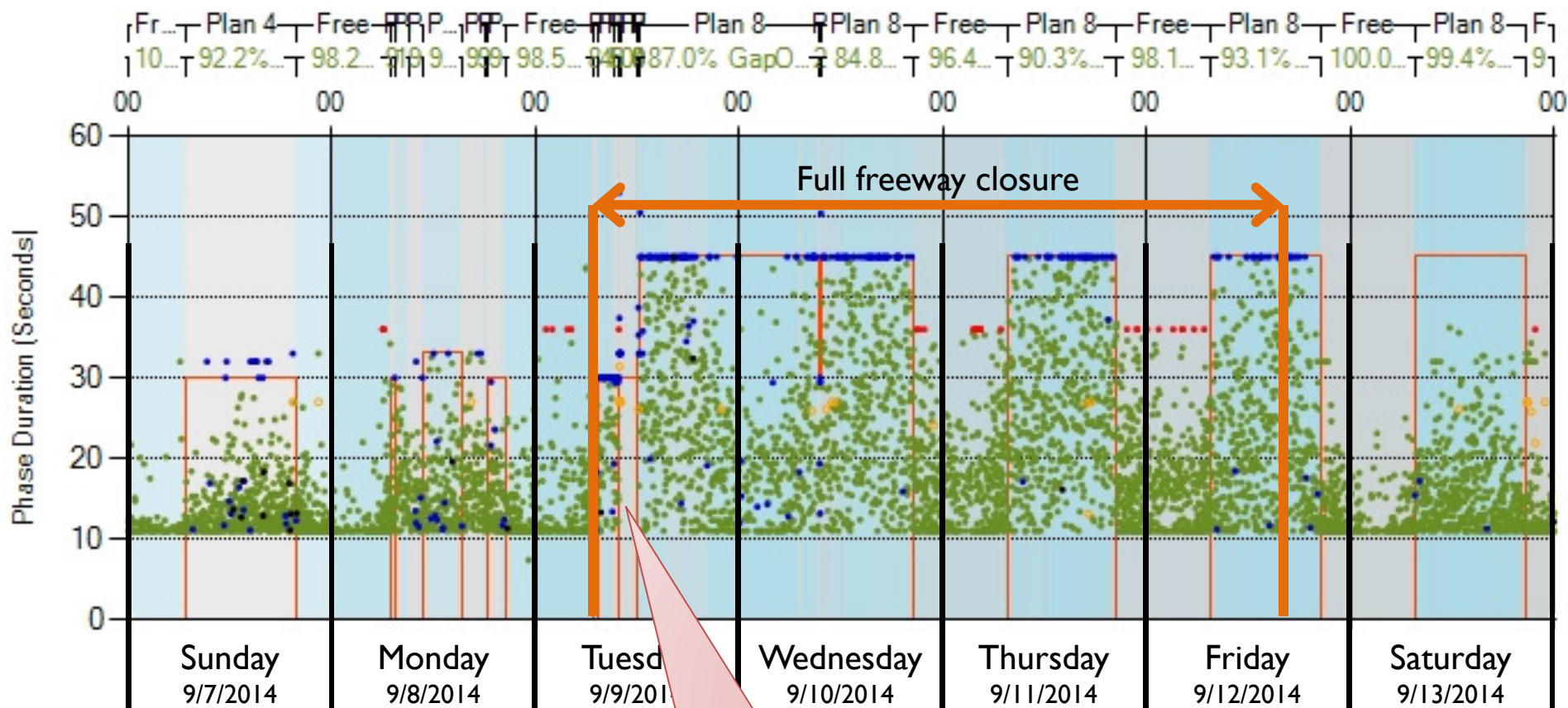
Before



After

Split Monitor for Incident Management

200 N. (Cedar City) @ 1400 W/I-15 SBSIG#8223 Phase 4
 Sunday, September 07, 2014 12:00 AM - Saturday, September 13, 2014 11:59 PM

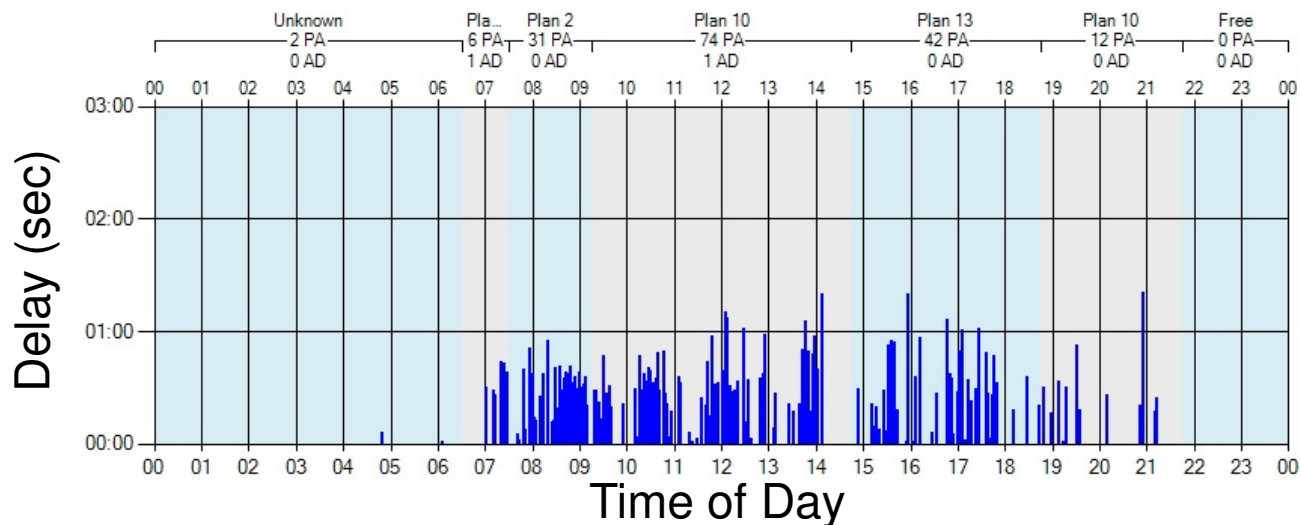


Metric: Pedestrian Delay

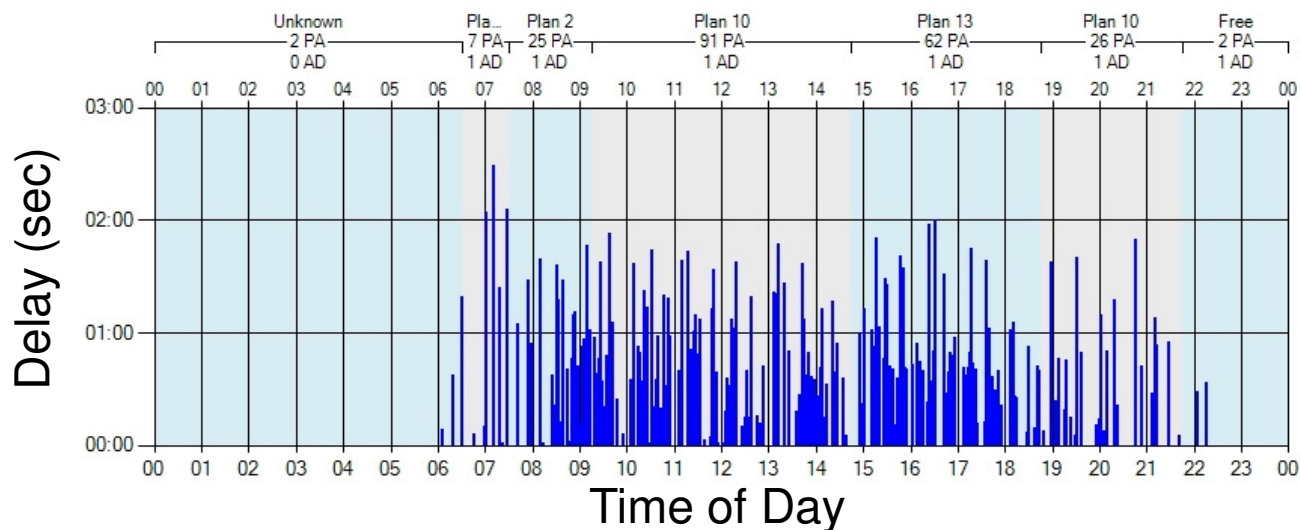
EVENT CODES
 45 – Ped Call on
 21 – Ped Walk on

Pedestrian Delay
 500 South Guardsman Way (1580 E.) Signal 7216
 Tuesday, September 01, 2015 12:00 AM - Wednesday, September 02, 2015 12:00 AM
 Phase 2
 167-Ped Acutations(PA) 00:00-Min Delay 01:20-Max Delay 00:30-Average Delay(AD)

Phase 2
 Coordinated phase



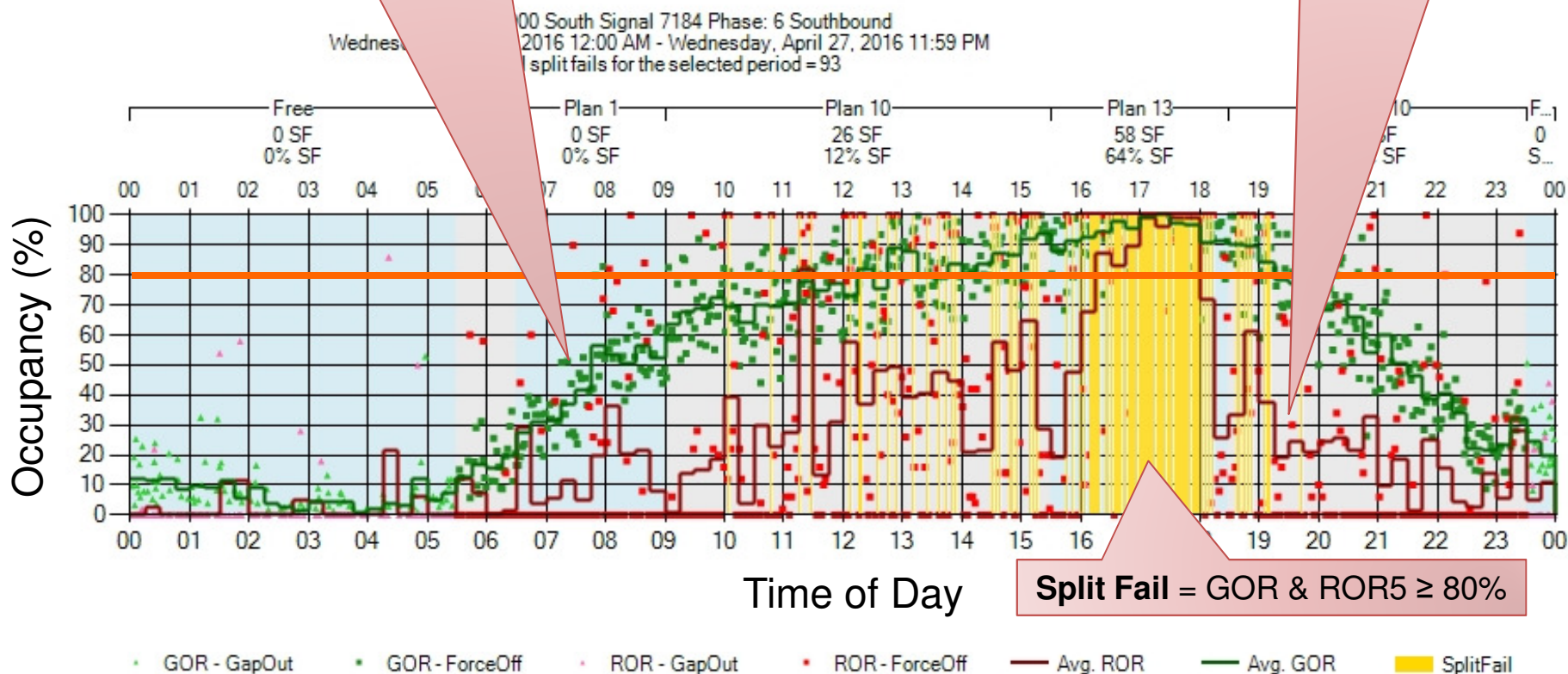
Phase 4
 Side street



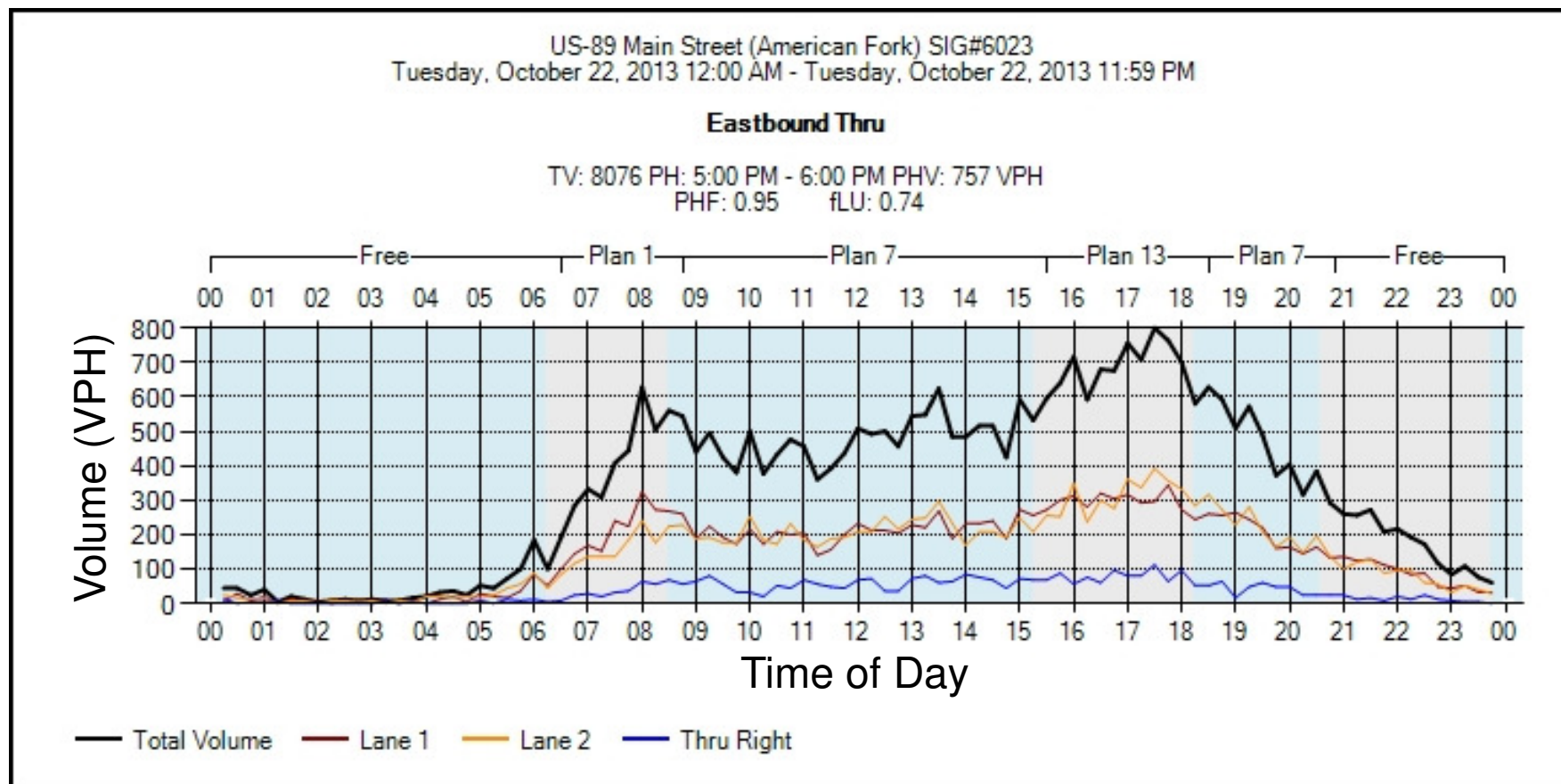
Metric: Purdue Split Failure

Green Occupancy Ratio (GOR) =
 % of time stop bar detector
 is ON during GREEN

Red Occupancy Ratio (ROR5) =
 % of time stop bar detector
 is ON during FIRST 5s of GREEN

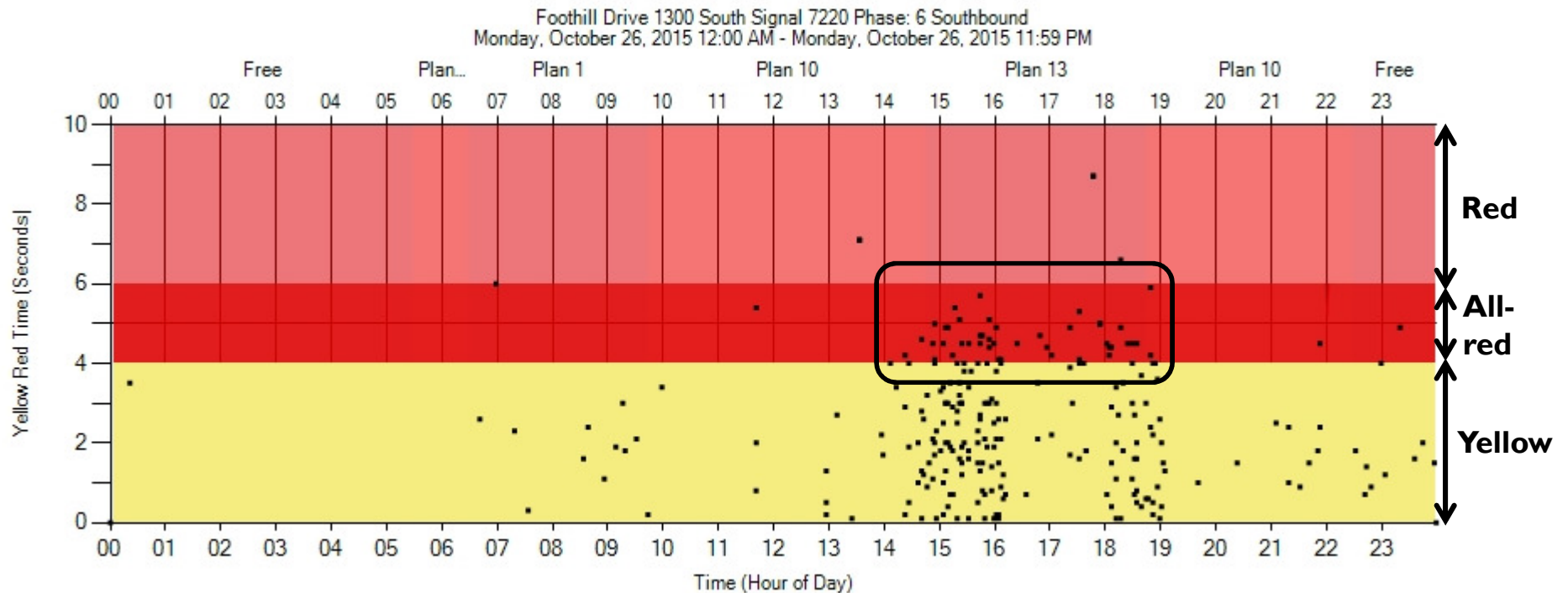


Metric: Turning Movement Counts



Metric: Turning Movement Counts
Detection Requirements: Stop Bar Counters

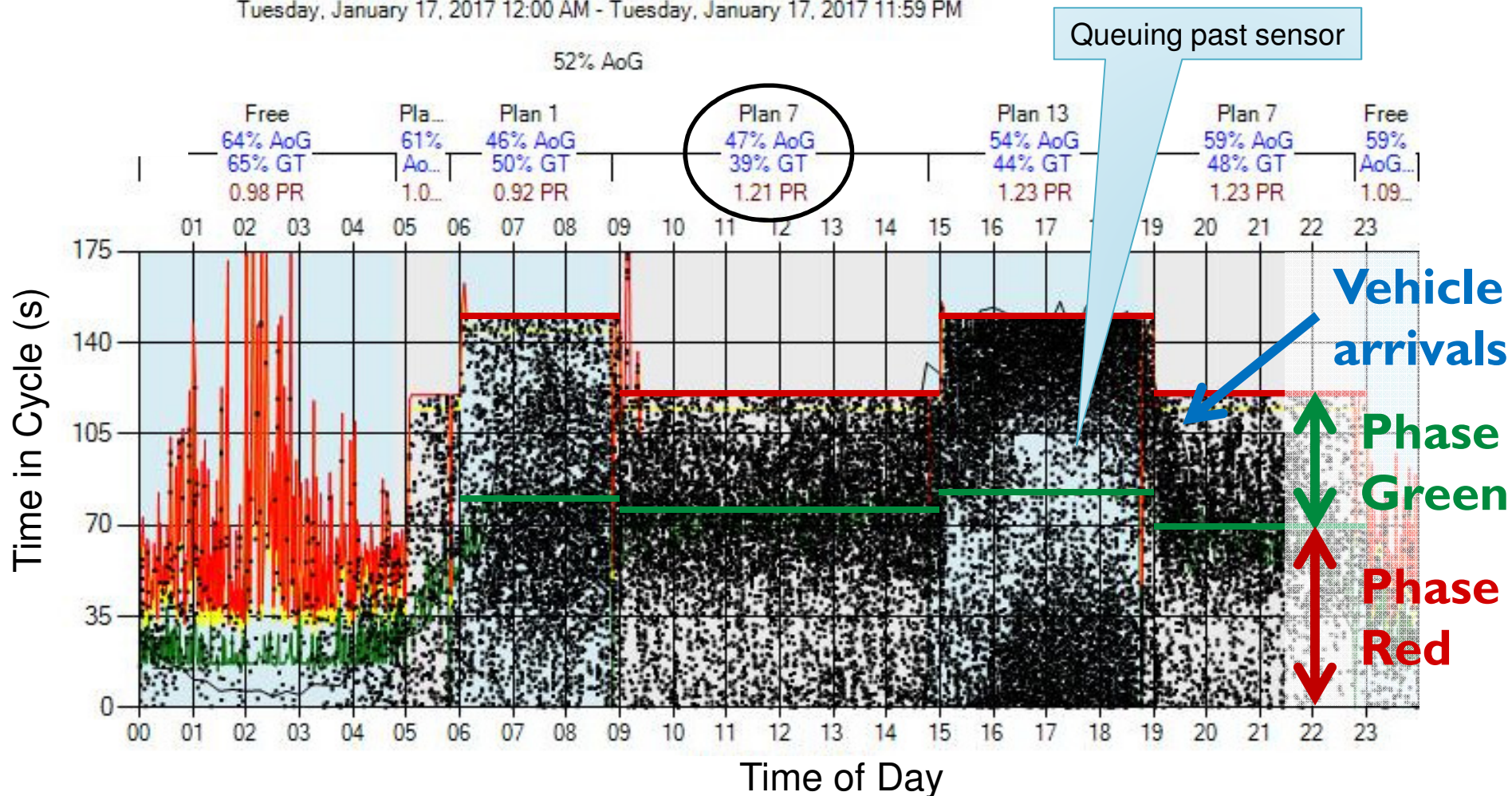
Yellow & Red Actuations



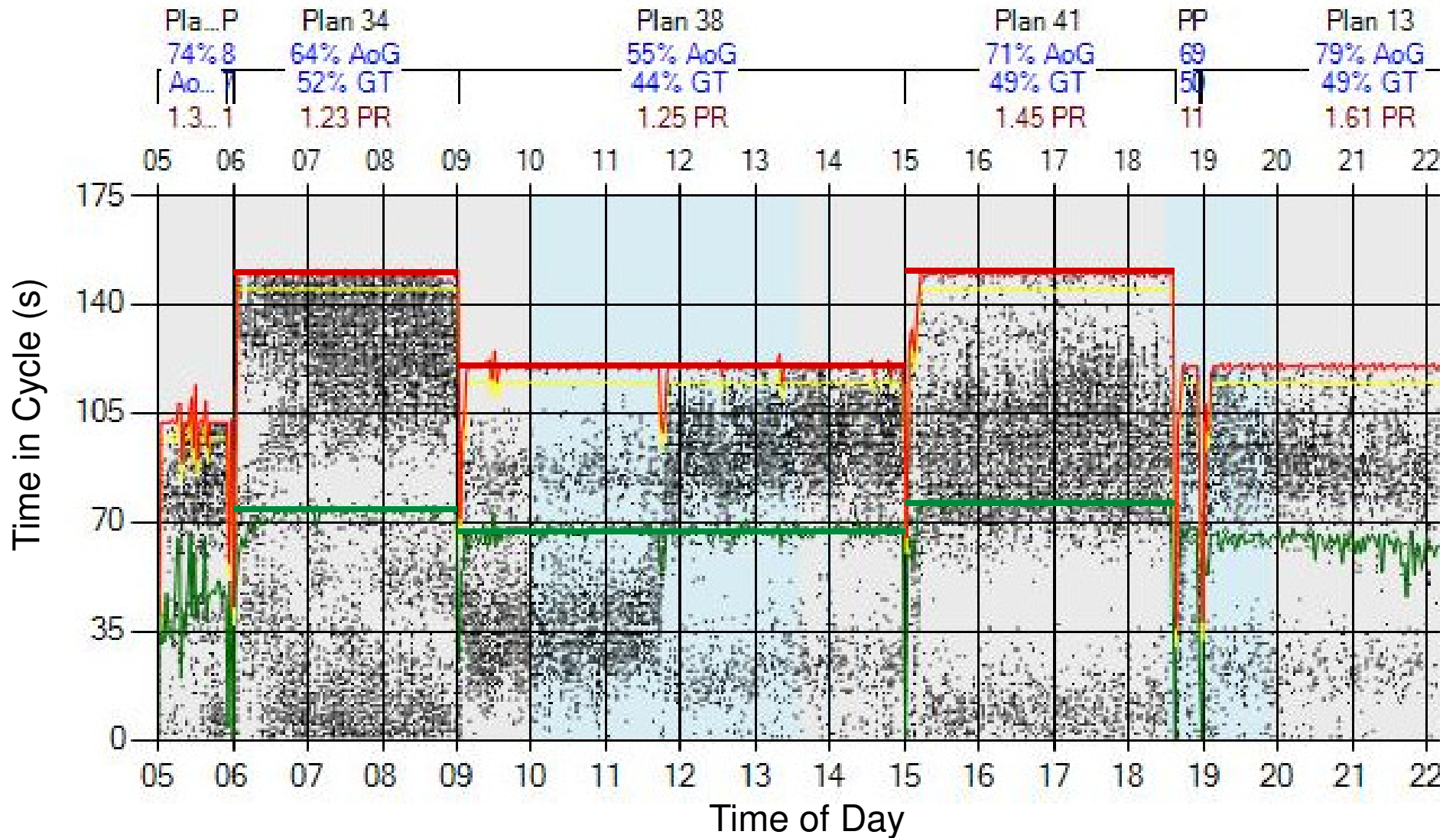
- Is green time too short? – Would increasing the split fix the problem?
- Is coordination poor? – Would more vehicles arriving on green fix this?
- Is sight distance poor? – Are there trucks or other obstructions blocking signal?
- Is law enforcement needed? – Time can be pinned down for law enforcement.

Metric: Purdue Coordination Diagram

Bangerter Hwy (SR-154) @ 9000 South Signal 7067 Phase: 6 Southbound
 Tuesday, January 17, 2017 12:00 AM - Tuesday, January 17, 2017 11:59 PM



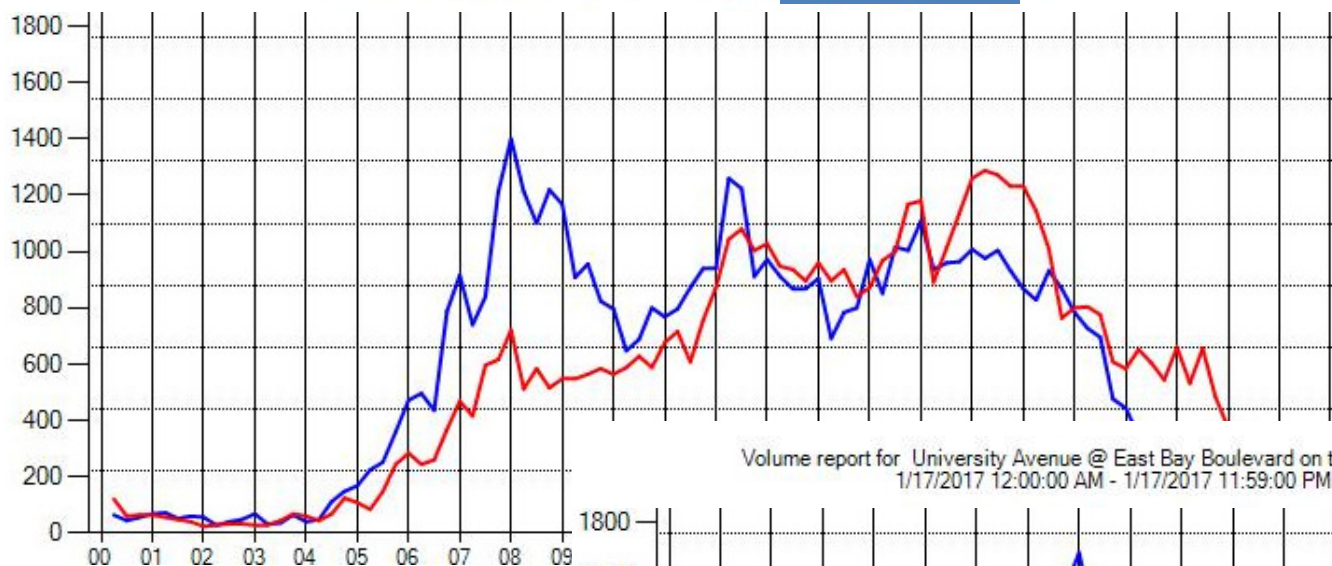
Optimization Example: Progression Quality



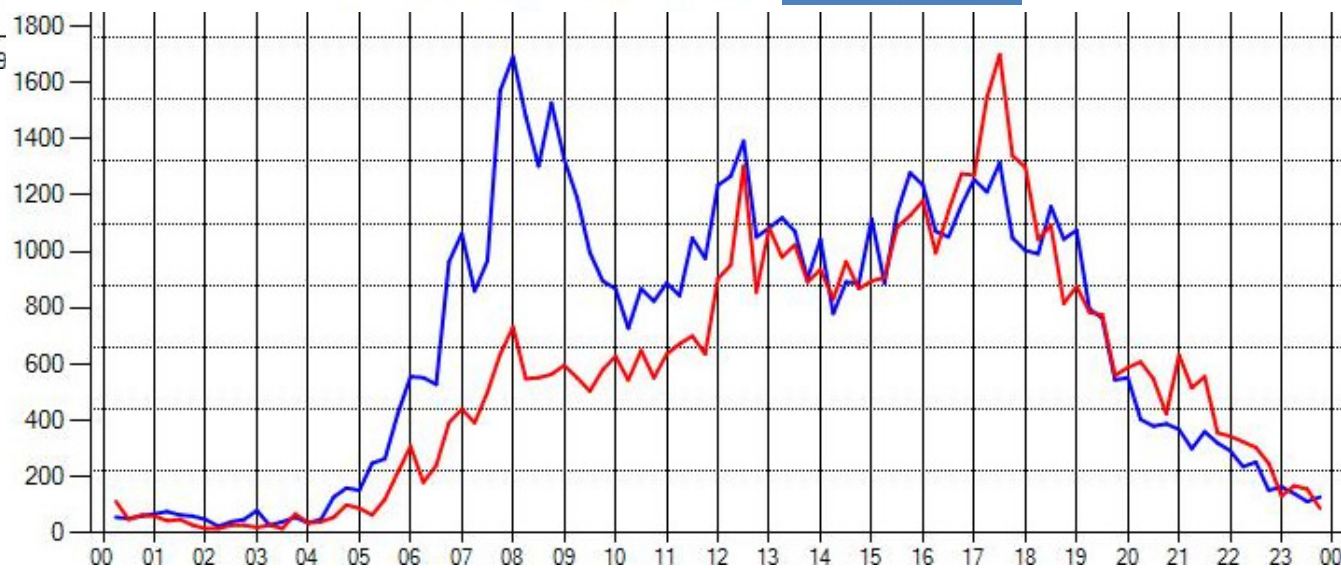
Metric: Approach Volume

— Northbound
— Southbound

Volume report for University Avenue @ East Bay Boulevard on the Northbound and Southbound approaches.
1/17/2017 12:00:00 AM - 1/17/2017 11:59:00 PM - Using Advanced Detection



Volume report for University Avenue @ East Bay Boulevard on the Northbound and Southbound approaches.
1/17/2017 12:00:00 AM - 1/17/2017 11:59:00 PM - Using Stop Bar Detection



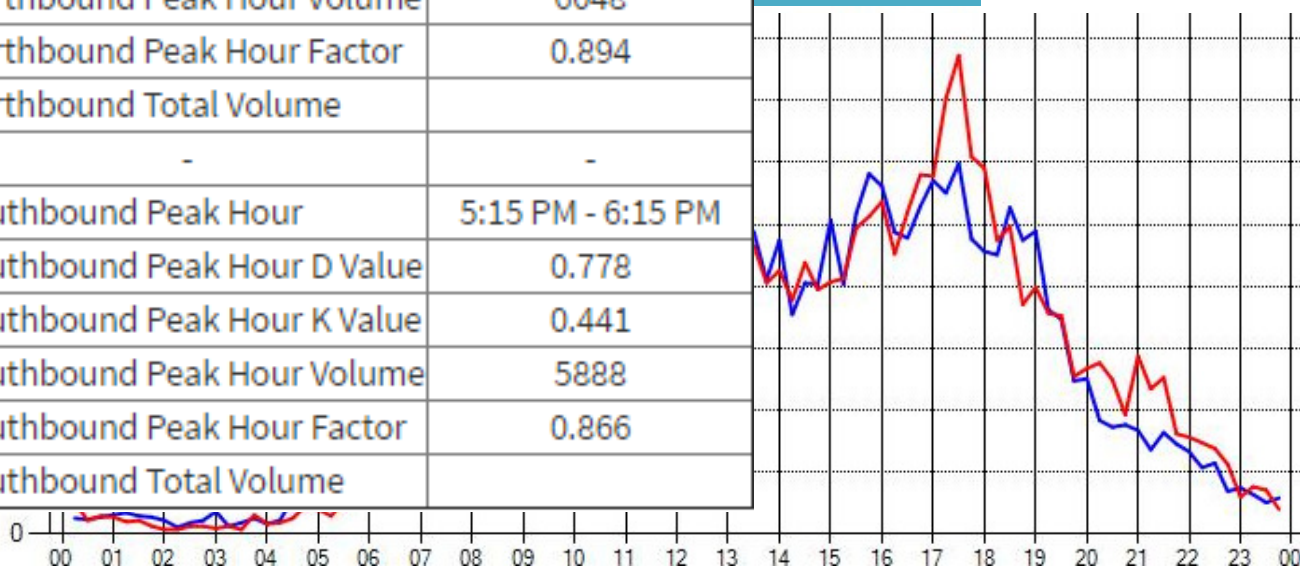
Metric: Approach Volume

— Northbound
— Southbound



Metric	Value
Peak Hour	1/17/2017 4:45:00 PM
Peak Hour Factor	0.362
Peak Hour Volume	10744
Peak Hour Factor	0.891
Total Volume	29653
-	-
Northbound Peak Hour	7:45 AM - 8:45 AM
Northbound Peak Hour D Value	0.408
Northbound Peak Hour K Value	0.371
Northbound Peak Hour Volume	6048
Northbound Peak Hour Factor	0.894
Northbound Total Volume	-
-	-
Southbound Peak Hour	5:15 PM - 6:15 PM
Southbound Peak Hour D Value	0.778
Southbound Peak Hour K Value	0.441
Southbound Peak Hour Volume	5888
Southbound Peak Hour Factor	0.866
Southbound Total Volume	-

Northbound and Southbound approaches using Stop Bar Detection

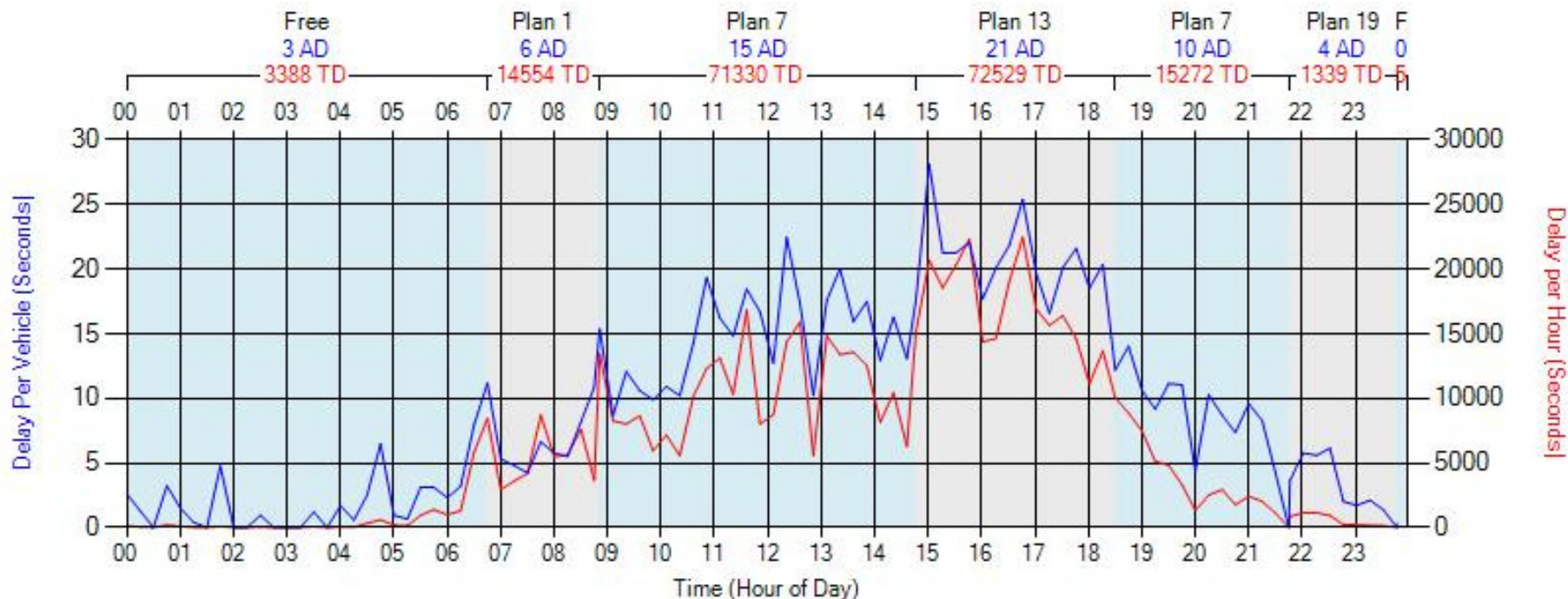


Metric: Approach Delay

- Approach Delay
- Approach Delay Per Vehicle

University Avenue @ East Bay Boulevard Signal 6402 Phase: 2 Northbound
 Tuesday, January 17, 2017 12:00 AM - Tuesday, January 17, 2017 11:59 PM

Average Delay Per Vehicle = 13 Seconds.
 Total Delay For Selected Period = 178416 Seconds



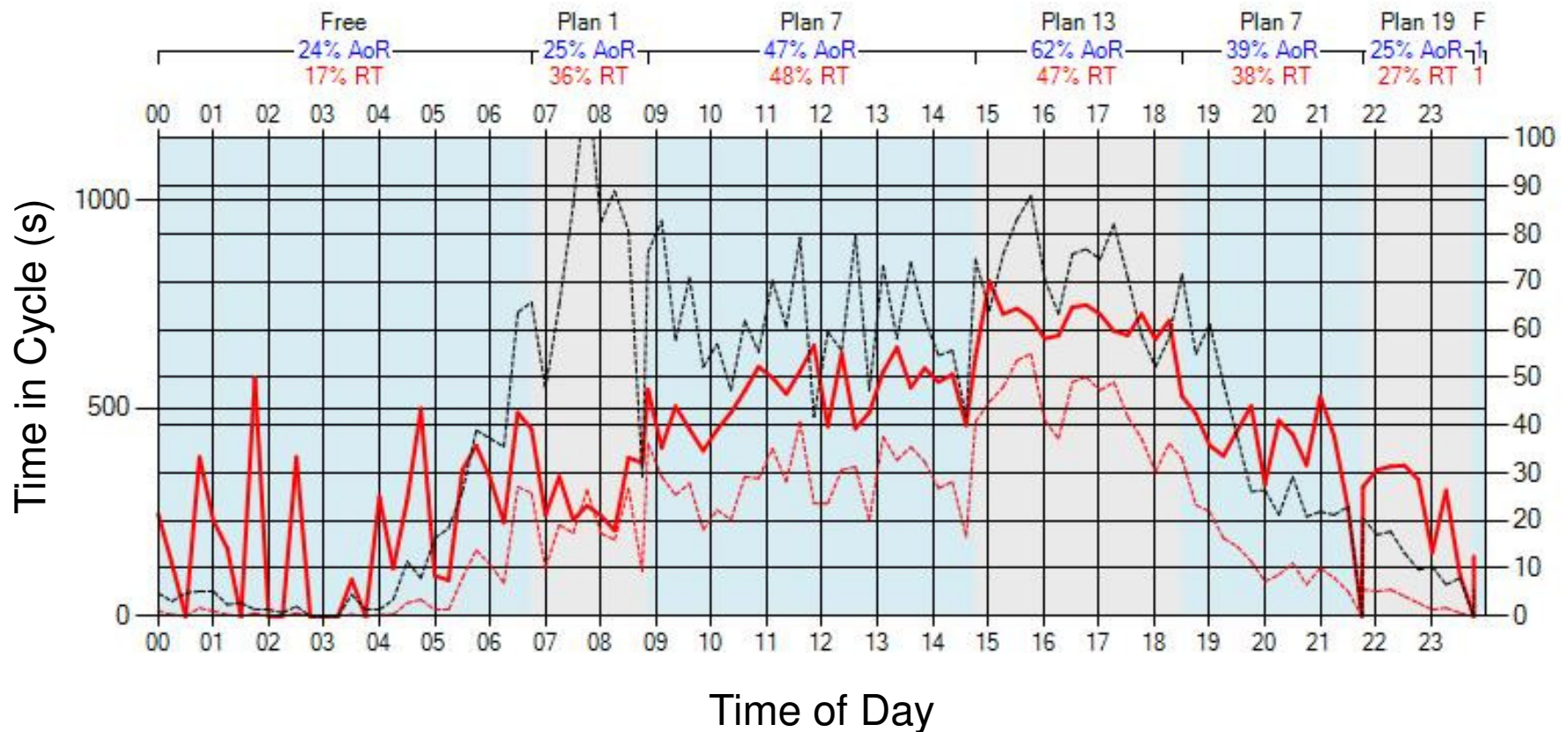
Simplified Approach Delay. Displays time between approach activation during the red phase and when the phase turns green.
 Does NOT account for start up delay, deceleration, or queue length that exceeds the detection zone.

Metric: Arrivals on Red

University Avenue @ East Bay Boulevard Signal 6402 Phase: 2 Northbound
 Tuesday, January 17, 2017 12:00 AM - Tuesday, January 17, 2017 11:59 PM

Total Detector Hits = 11725 Total AoR = 5170
 Percent AoR for the select period = 44

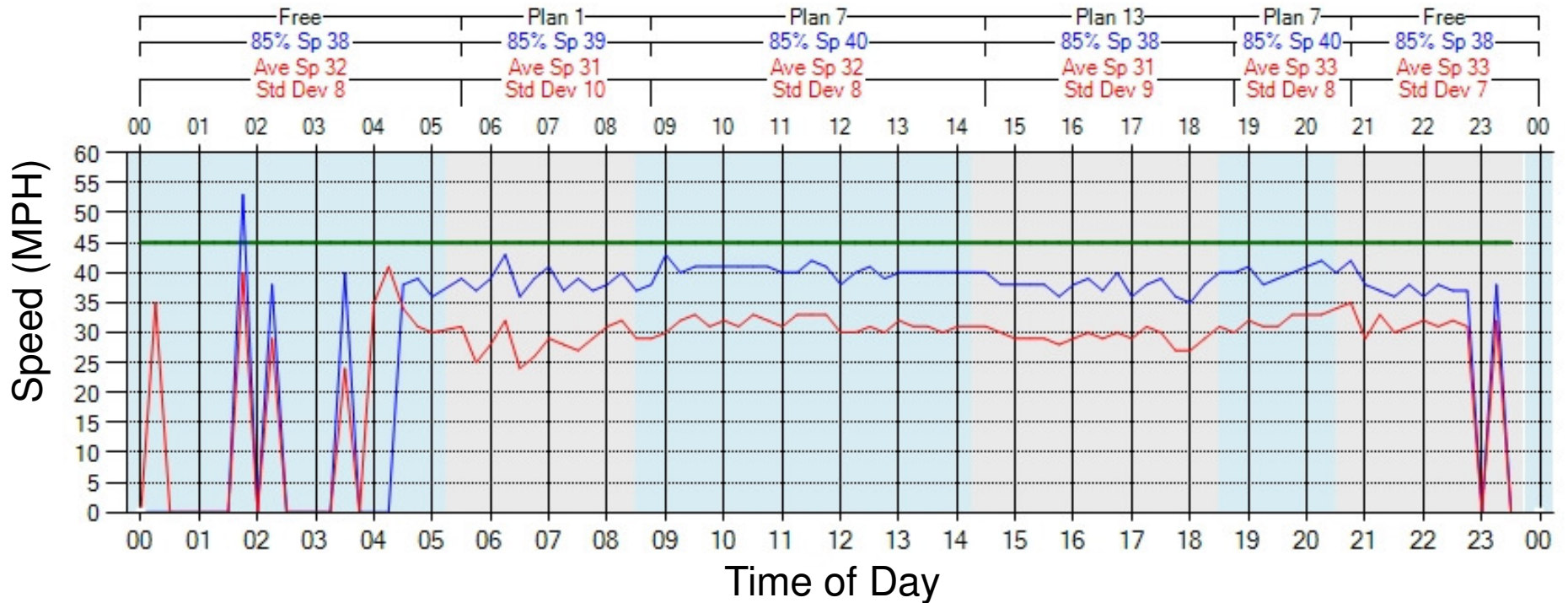
- Arrivals on Red
- Percent Arrivals on Red
- Total Vehicles



Metric: Approach Speed

SR-126 (1900 W) 5700 South (Roy) Signal 5088 Phase 6 Southbound
 Wednesday, September 30, 2015 12:00 AM - Wednesday, September 30, 2015 11:59 PM
 Detector Distance from Stop Bar: 350 feet; Min Speed Filter: 5 MPH;
 Time Filter: 15s after start of green to start of yellow
 Speed Accuracy: + - 5 MPH

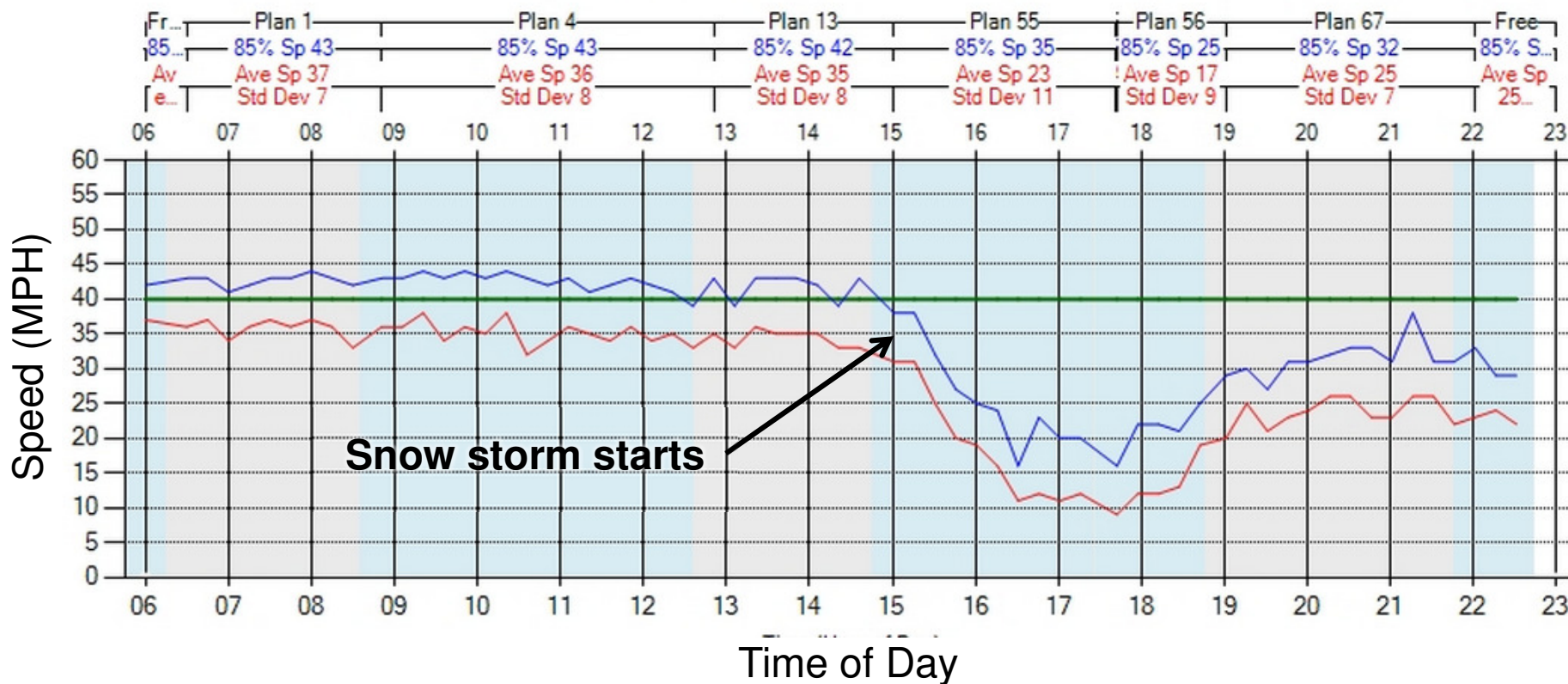
— Posted Speed
 — 85th Percentile Speed
 — Average MPH



Metric: Approach Speed

Riverdale Rd Shopko Signal 5008 Phase 2 Northbound
 Thursday, January 10, 2013 6:00 AM - Thursday, January 10, 2013 11:00 PM
 Detector Distance from Stop Bar: 350 feet; Min Speed Filter: 5 MPH;
 Time Filter: 15s after start of green to start of yellow
 Speed Accuracy: + - 5 MPH

— Posted Speed
 — 85th Percentile Speed
 — Average MPH





ROUTE CONFIGURATION

UDOT Automated Traffic Signal Performance Measures

Jamie Mackey, P.E, PTOE

UDOT Statewide Signal Engineer

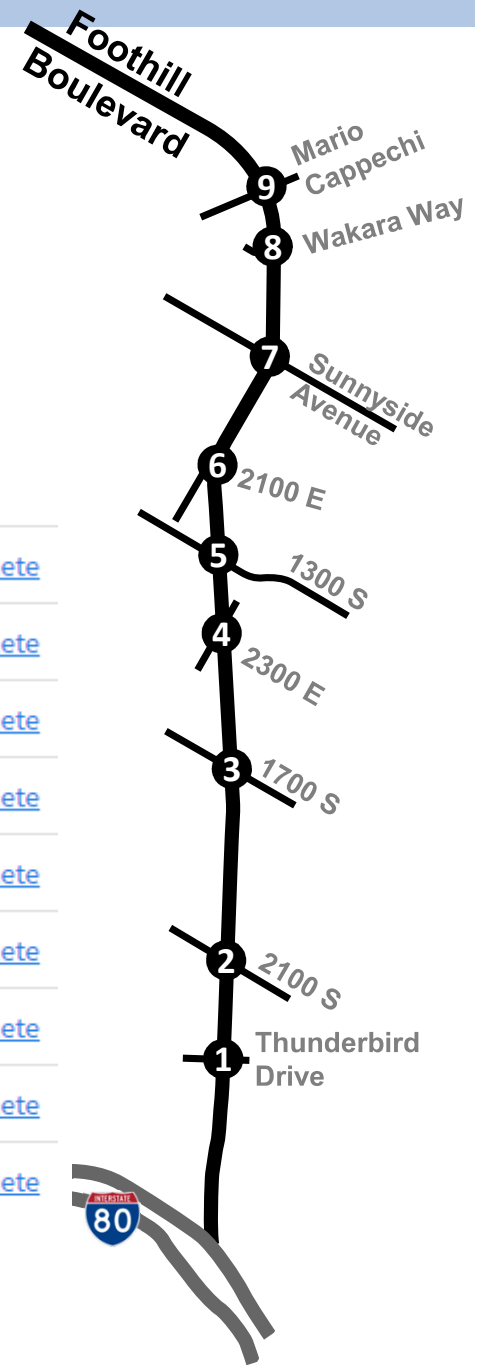
Route Configuration for Link Pivot

R2: Foothill Blvd

[Create New](#)

Direction of travel to next signal

ApproachRouteDescription	ApproachOrder	
7371 - Foothill Drive Thunderbird Northbound Phase 2	1	Edit Details Delete
7223 - Foothill Drive 2100 South Northbound Phase 2	2	Edit Details Delete
7222 - Foothill Drive 1700 South Northbound Phase 2	3	Edit Details Delete
7221 - Foothill Drive 2300 East Northbound Phase 2	4	Edit Details Delete
7220 - Foothill Drive 1300 South Northbound Phase 2	5	Edit Details Delete
7503 - Foothill Drive 2100 East Northbound Phase 2	6	Edit Details Delete
7219 - Foothill Drive Sunnyside Northbound Phase 2	7	Edit Details Delete
7218 - Foothill Drive Wakara Way (660 S.) Northbound Phase 2	8	Edit Details Delete
7217 - Foothill Drive Mario Capecechi Dr (1950 E.) Northbound Phase 2	9	Edit Details Delete



Purdue Link Pivot

Purdue Link Pivot Analysis

Report Options

Route
R2: Foothill Blvd ▼

Signals

Cycle Length
120

Start Date
01/12/2017

End Date
01/12/2017

Start Time
11 AM ▼

End Time
1 PM ▼

Advanced

Days to Include

- Sunday
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday

Starting Point
Downstream ▼

Bias
0

Bias Direction
Downstream ▼

Purdue Link Pivot

Adjustments

Customizable link delta

Final offsets

Link	Signal	Location	Link Delta	Edit Link Delta	Offset(+ to Offset)	Existing Offset	New Offset
1	7371	Foothill Drive Thunderbird	4	<input type="text" value="4"/>	55	<input type="text" value="0"/>	55
2	7223	Foothill Drive 2100 South	7	<input type="text" value="7"/>	51	<input type="text" value="0"/>	51
3	7222	Foothill Drive 1700 South	0	<input type="text" value="0"/>	44	<input type="text" value="0"/>	44
4	7221	Foothill Drive 2300 East	0	<input type="text" value="0"/>	44	<input type="text" value="0"/>	44
5	7220	Foothill Drive 1300 South	40	<input type="text" value="40"/>	44	<input type="text" value="0"/>	44
6	7503	Foothill Drive 2100 East	59	<input type="text" value="59"/>	4	<input type="text" value="0"/>	4
7	7219	Foothill Drive Sunnyside	56	<input type="text" value="56"/>	65	<input type="text" value="0"/>	65
8	7218	Foothill Drive Wakara Way (660 S.)	9	<input type="text" value="9"/>	9	<input type="text" value="0"/>	9
9	7217	Foothill Drive Mario Capecchi Dr (1950 E.)	0	<input type="text" value="0"/>	0	<input type="text" value="0"/>	0

Recommended link delta

Change to offset (link delta propagated up corridor)

User-input existing programmed offsets

Purdue Link Pivot

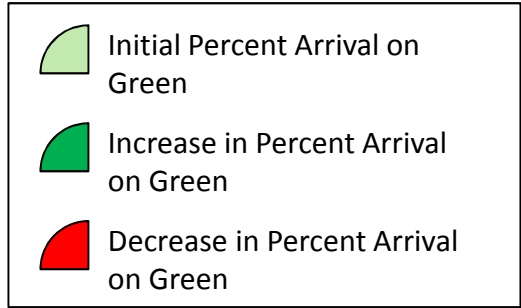
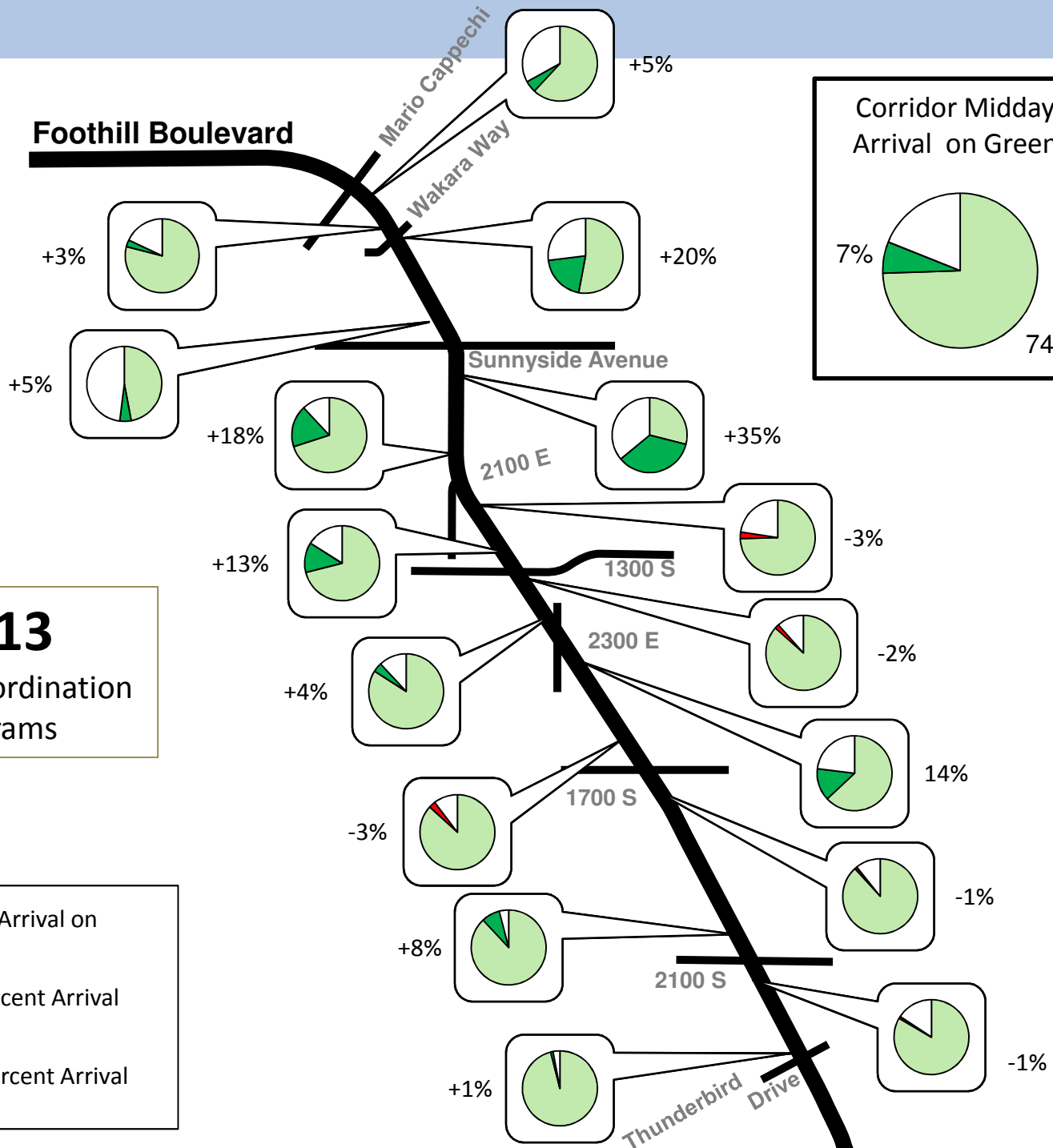
Approach Link Comparison

Red indicates predicted **negative** change in AOG

Link	Approaches		Upstream AOG			Downstream AOG			Total Link AOG			Delta	AOG Chart
	Upstream	Downstream	Existing	Predicted	Change	Existing	Predicted	Change	Existing	Predicted	Change		
2	7223 Southbound	7222 Northbound	5431	5632		5938	5824		11369	11456		6	 PCD Options
	Foothill Drive 2100 South	Foothill Drive 1700 South	85%	88%		90%	88%		88%	88%			
5	7220 Southbound	7503 Northbound	2281	4059		4976	5149		7257	9208		38	 PCD Options
	Foothill Drive 1300 South	Foothill Drive 2100 East	42%	76%		88%	92%		66%	84%			
Corridor Summary			39585	44992		32610	36968		72195	81960			
			72 %	82 %		68 %	77 %		70 %	80 %			

Green indicates predicted **positive** change in AOG

Foothill Boulevard





ATSPM ALERTS

UDOT Automated Traffic Signal Performance Measures

Jamie Mackey, P.E, PTOE

UDOT Statewide Signal Engineer

System Health Alerts

1

No SPM data: identifies signals with less than 500 records in the database between midnight and midnight the previous day

2

Too many max outs: identifies phases with more than 90% max outs in at least 50 activations between 1 a.m. and 5 a.m.

3

Too many force offs: identifies phases with more than 90% force offs in at least 50 activations between 1 a.m. and 5 a.m.

4

Too many ped calls: identifies phases with more than 200 pedestrian activations between 1 a.m. and 5 a.m.

5

Low PCD detector count: identifies phases with PCD detectors that have less than 100 vehicles counted between 5 p.m. and 6 p.m. the previous day.

SPM Alerts for 5/22/2016

 SPMWatchdog@utah.gov

to marktaylor, me, signaldesk, shanejohnson, bryan.meenen, kbarnes, SWinters, tforbush, ja

--The following signals had too few records in the database:
4671 - 13400 South & 4500 West - Phase: 0 (Missing Records)
5701 - 500 South & 400 East (Btfl) - Phase: 0 (Missing Records)

--The following signals had too many force off occurrences:
1224 - North Temple & Main Street - Phase: 3 (Force Offs 97.6%)
7252 - 500 South & Main Street - Phase: 2 (Force Offs 100%)
7252 - 500 South & Main Street - Phase: 6 (Force Offs 100%)

--The following signals had too many max out occurrences:
1123 - Wolcott St & 100 South - Phase: 2 (Max Outs 100%)
1124 - Sunnyside (850 S) & Gaurdsman Way - Phase: 2 (Max Outs 100%)
1124 - Sunnyside (850 S) & Gaurdsman Way - Phase: 6 (Max Outs 100%)
4024 - 7000 South (Fort Union) & 1300 East - Phase: 7 (Max Outs 92.6%)
4029 - 7200 South & 700 East - Phase: 1 (Max Outs 100%)
4103 - 4680 South (Murray-Holladay) & 2320 East (Holladay) - Phase: 5 (Max Outs 100%)
4118 - 6200 South & 3655 West (Dixie) - Phase: 2 (Max Outs 100%)
4511 - 4100 South & 3200 West - Phase: 4 (Max Outs 100%)
4820 - 4835 South & 2700 West - Phase: 2 (Max Outs 100%)
5063 - Lincoln & 24th - Phase: 4 (Max Outs 100%)
5063 - Lincoln & 24th - Phase: 8 (Max Outs 100%)
5080 - Washington & Adams - Phase: 5 (Max Outs 100%)
5170 - 200 N (Kaysville) & Main St. - Phase: 4 (Max Outs 100%)
5305 - Main St. & 200 North (Logan) - Phase: 7 (Max Outs 96.2%)
5900 - 900 W. (Kays Dr.) & 200 North, (Kaysville) - Phase: 4 (Max Outs 90.4%)
6035 - Pioneer Crossing & Millpond Drive - Phase: 8 (Max Outs 91.9%)
6608 - 100 West & 100 North - Phase: 8 (Max Outs 98.5%)
7107 - Redwood Road & 4700 South - Phase: 5 (Max Outs 93.2%)

--The following signals had unusually low detector hits:
5134 - SR-193 (700 S) & I-15 NB (Clearfield) - Phase: 2 (Has Unusually Low Counts.)
7061 - Bangerter Hwy (SR-154) & 4100 South - Phase: 1 (Has Unusually Low Counts.)
7061 - Bangerter Hwy (SR-154) & 4100 South - Phase: 7 (Has Unusually Low Counts.)
7361 - Bangerter Hwy (SR-154) & 13400 South - Phase: 1 (Has Unusually Low Counts.)

--The following signals have stuck ped detectors:
1023 - South Temple & 200 West - Phase: 2 (Stuck Ped)
1023 - South Temple & 200 West - Phase: 4 (Stuck Ped)
1023 - South Temple & 200 West - Phase: 6 (Stuck Ped)
1023 - South Temple & 200 West - Phase: 8 (Stuck Ped)
4511 - 4100 South & 3200 West - Phase: 4 (Stuck Ped)
6009 - Main (Lehi) & I-15 SPUI - Phase: 6 (Stuck Ped)
7826 - 9800 S (Little Cottonwood Rd) & Wasatch Blvd (3500 E) - Phase: 4 (Stuck Ped)

Alert Evaluation

1 No ATSPM data

- Check communication to signal
- Check controller clock
- Check IP address in SPM configuration
- Check VIOT = NO & DB State = All Saved (Econolite MM 9-3-1 SpFn*3)
- Try enabling Upload Current
- Create a WO to cold start the controller

2 Too many max outs

- Check for recalls
- Check for constant call on a detector channel
- Consider whether a bandaid is necessary

3 Too many force offs

- Should the signal be in coordination?
- Is a non-coordinated phase maxing out?
- Skip only 2-6 pairs and dummy phases

4 Too many ped calls

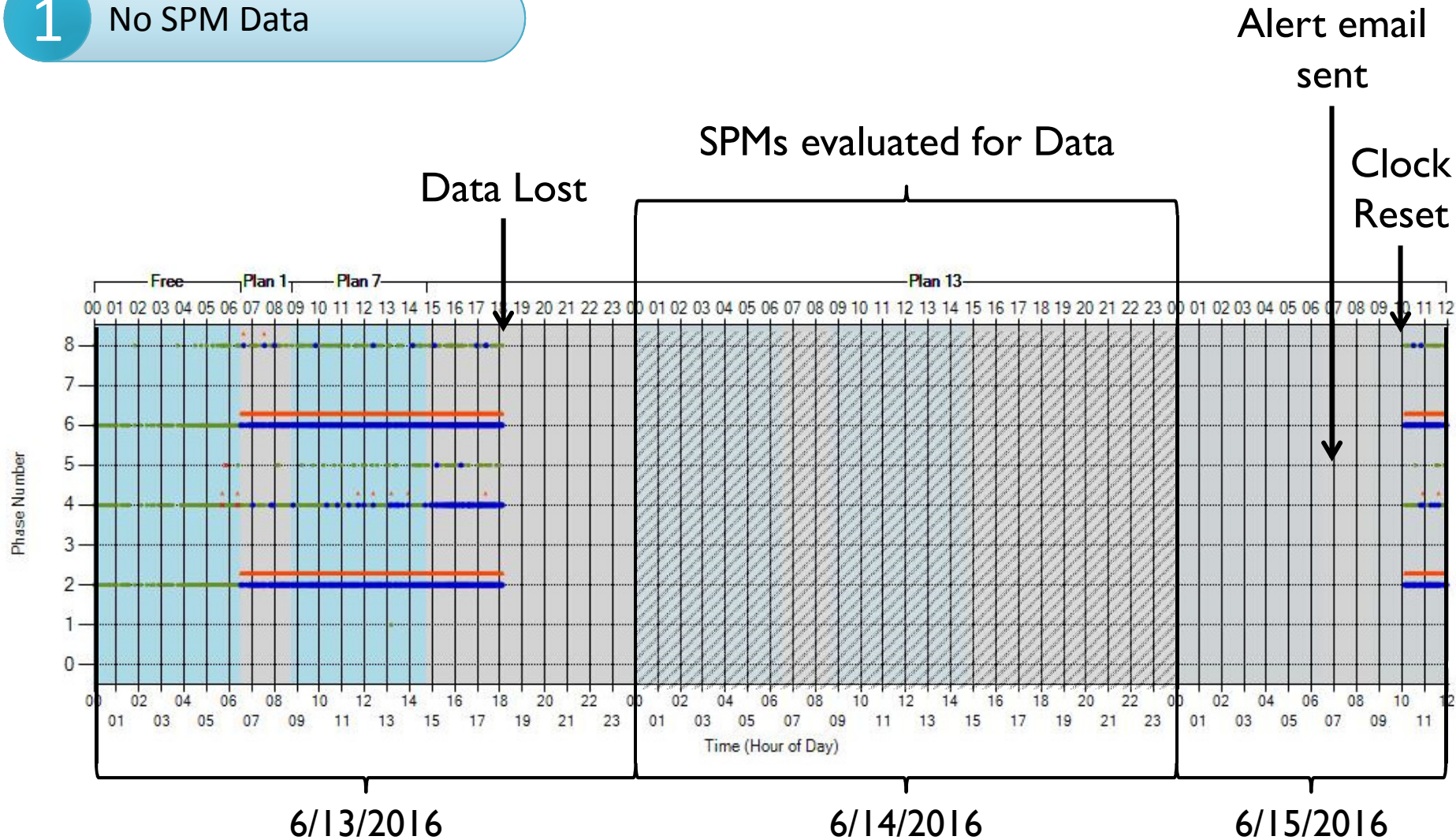
- Check for recalls
- Check for constant call on a detector channel

5 Low PCD detector count

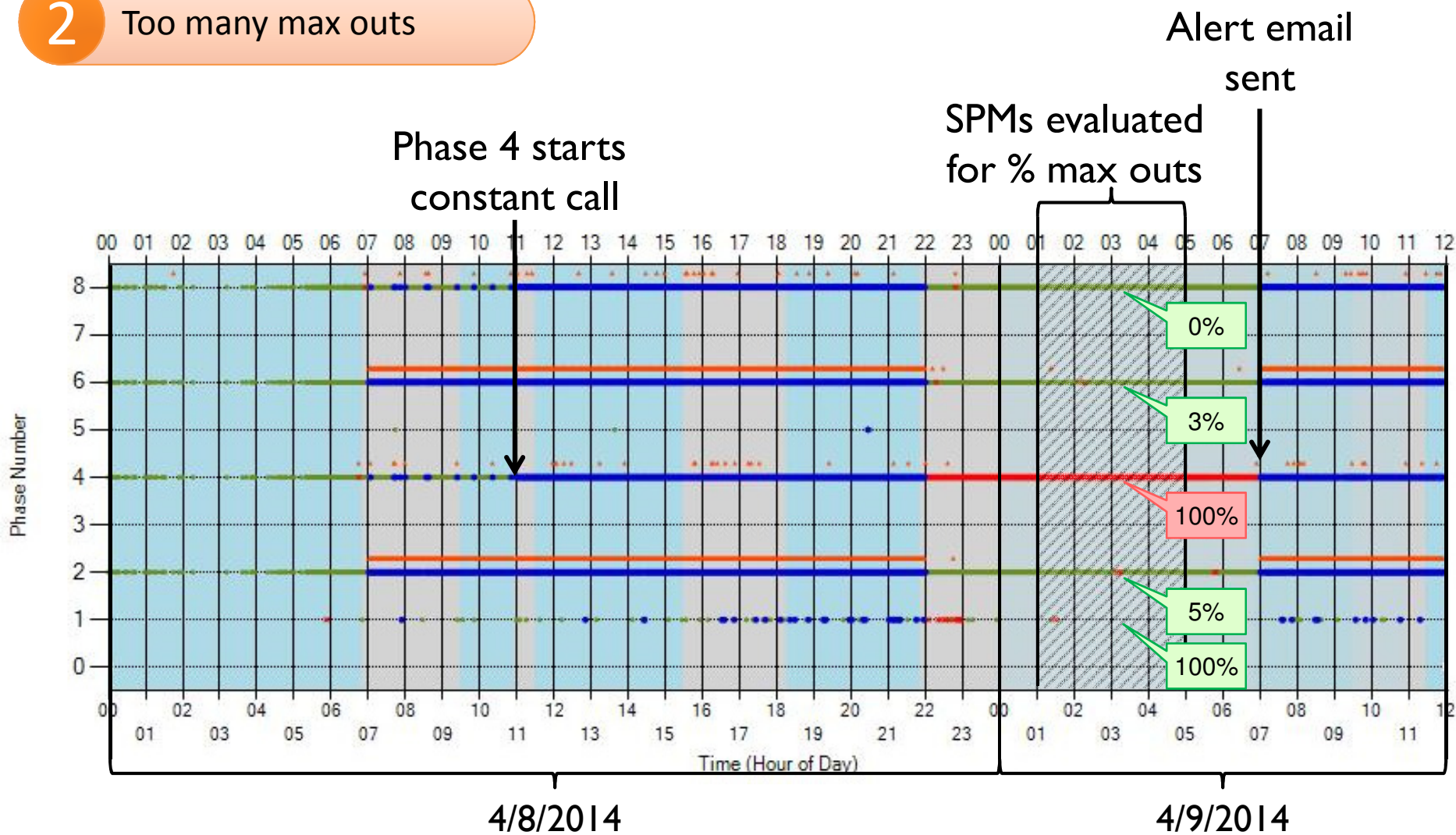
- Note: Evaluate the VOLUME on the PCD charts, not the phase data*
- Is count channel configured correctly in SPM Config Tool?
- Is ECPI Log enabled for count channel?
- Is the detector working?
- Is the detector communicating to the controller?
- Try resetting the sensor and VERIFY with Upload Current

1 No SPM Data

No SPM Data



2 Too many max outs



- Gap out
- Pedestrian activation (shown above phase line)
- Max out
- Force off
- Skip

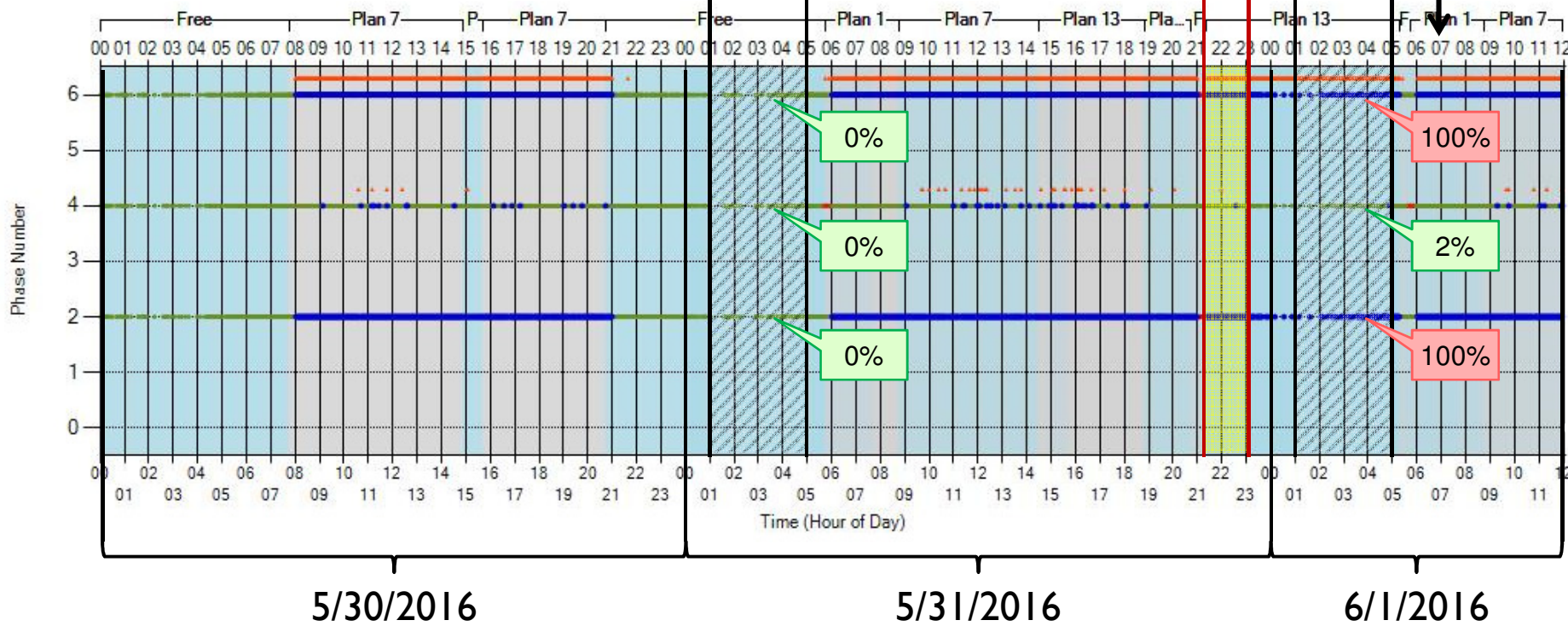
Metric: Purdue Phase Termination
Detection Requirements: None

3 Too many force offs

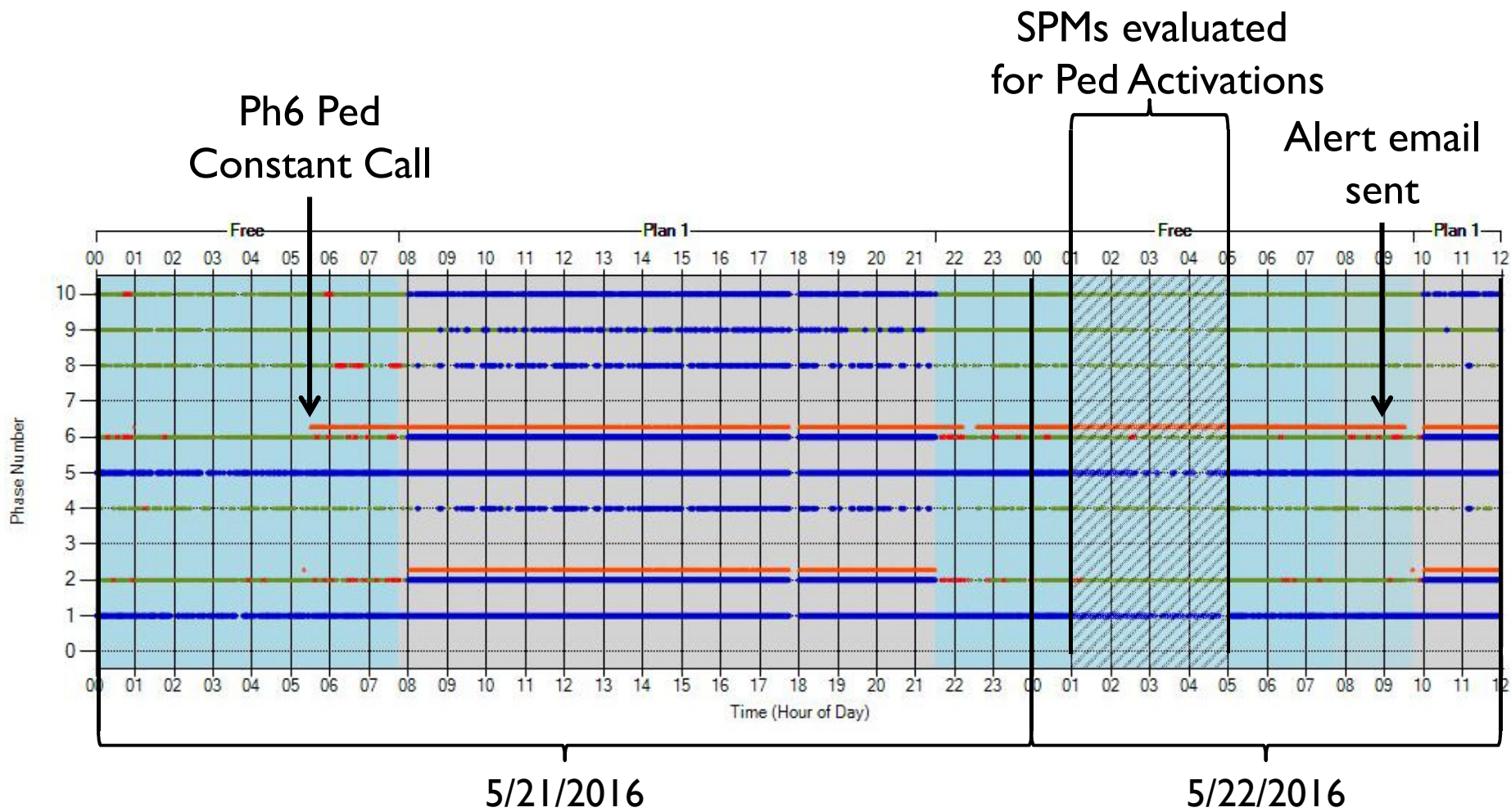
Phases evaluated for % Force Offs

Alert email sent

Incident Plans Scheduled

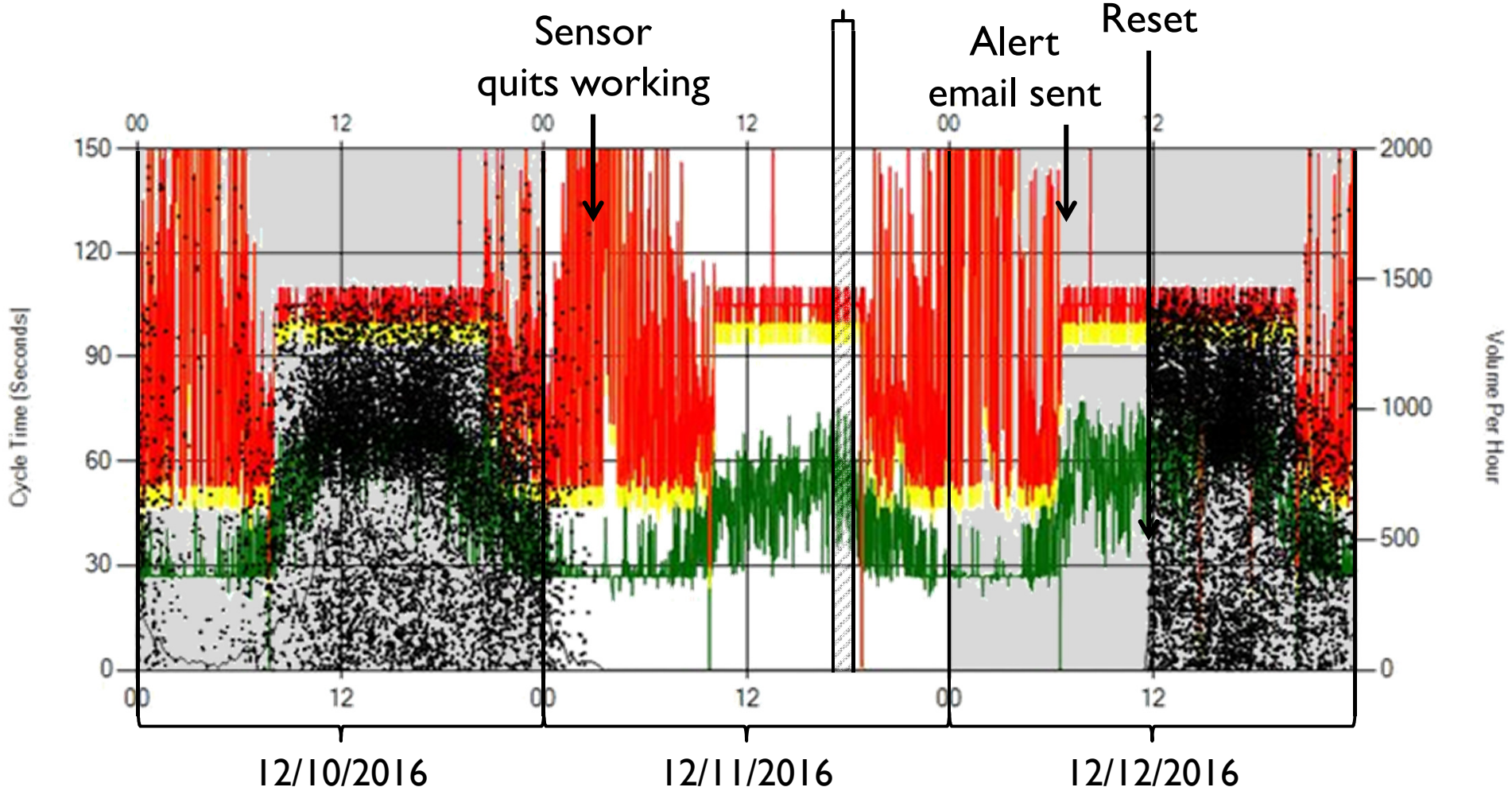


4 Too many ped calls



5 Low PCD detector count

SPMs evaluated for
 PCD Detector Volume

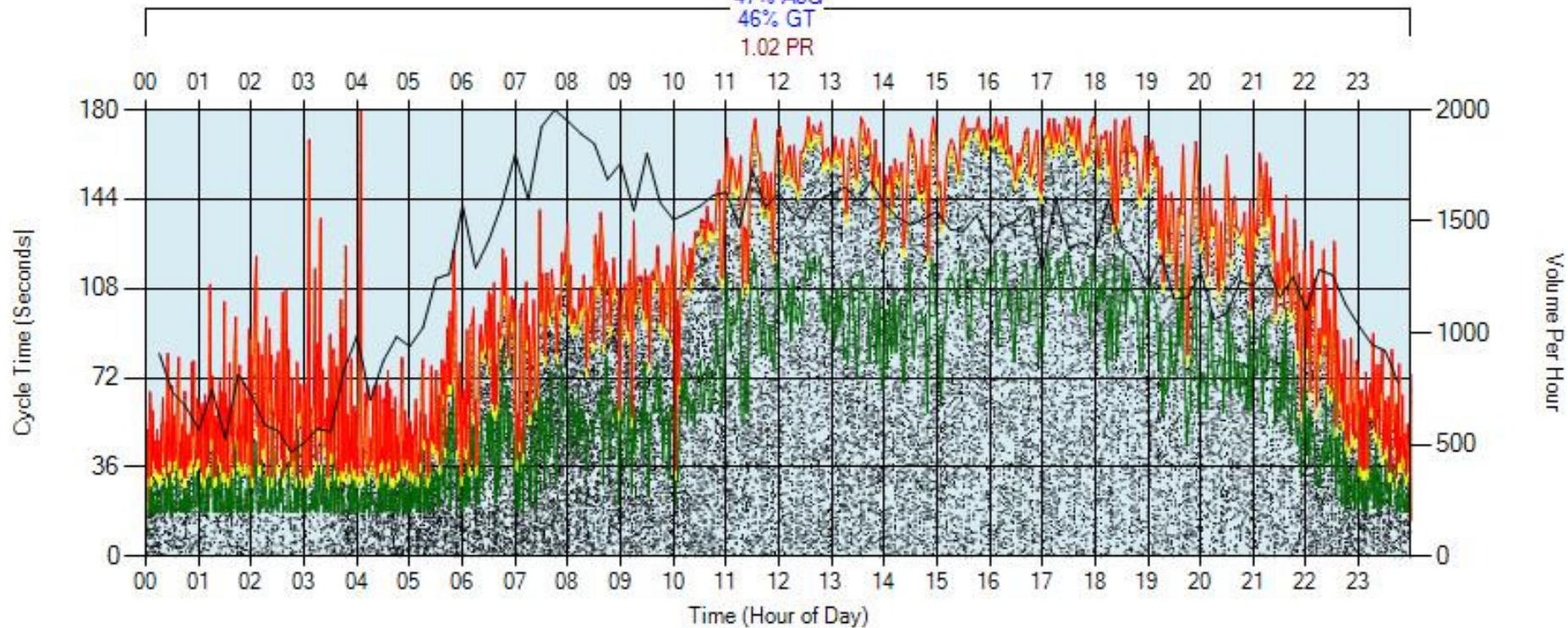


6 High PCD detector count

Washington 12th Signal 5030 Phase: 6 Southbound
 Thursday, August 04, 2016 12:00 AM - Thursday, August 04, 2016 11:59 PM

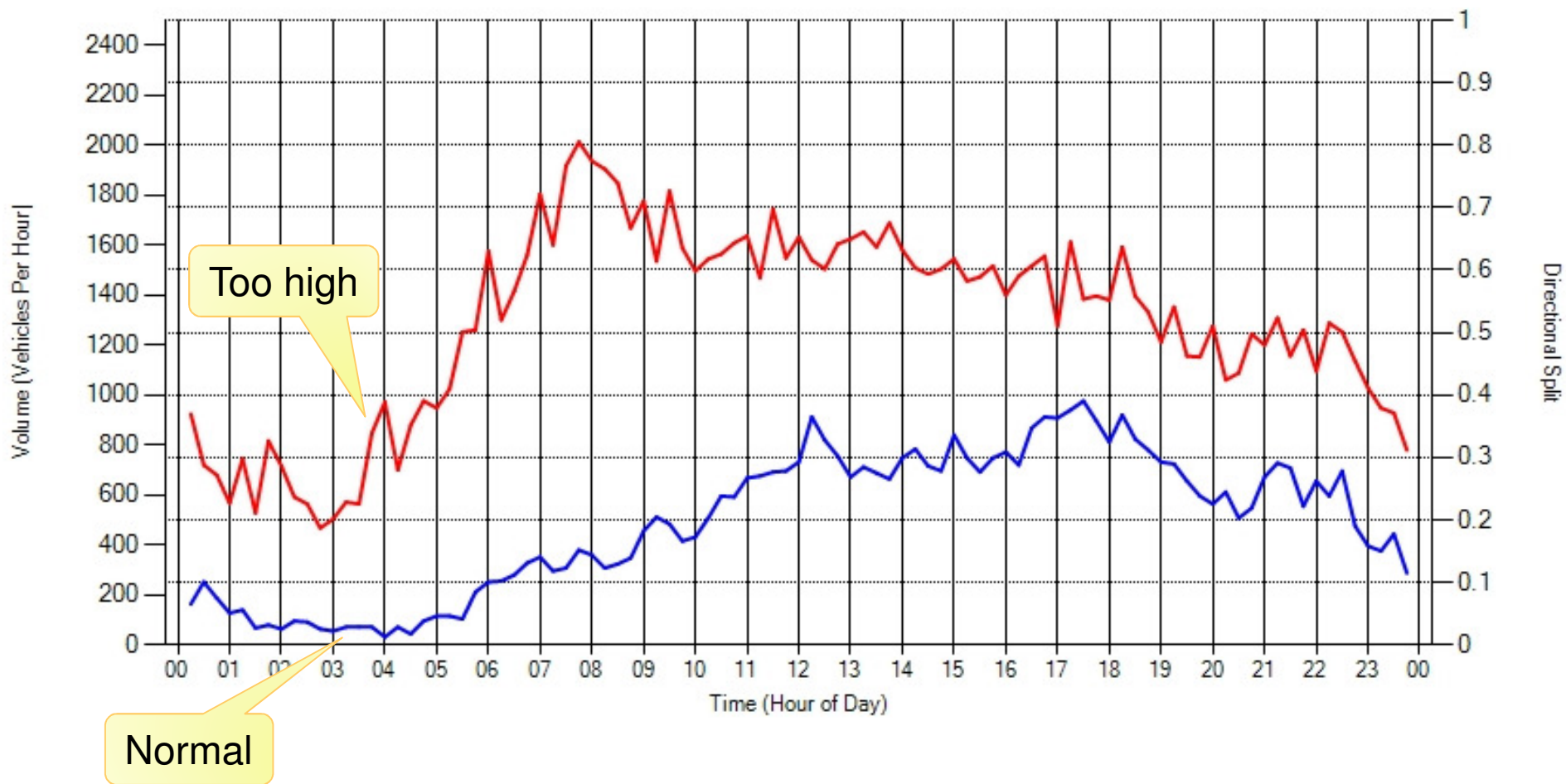
47% AoG

Free
 47% AoG
 46% GT
 1.02 PR



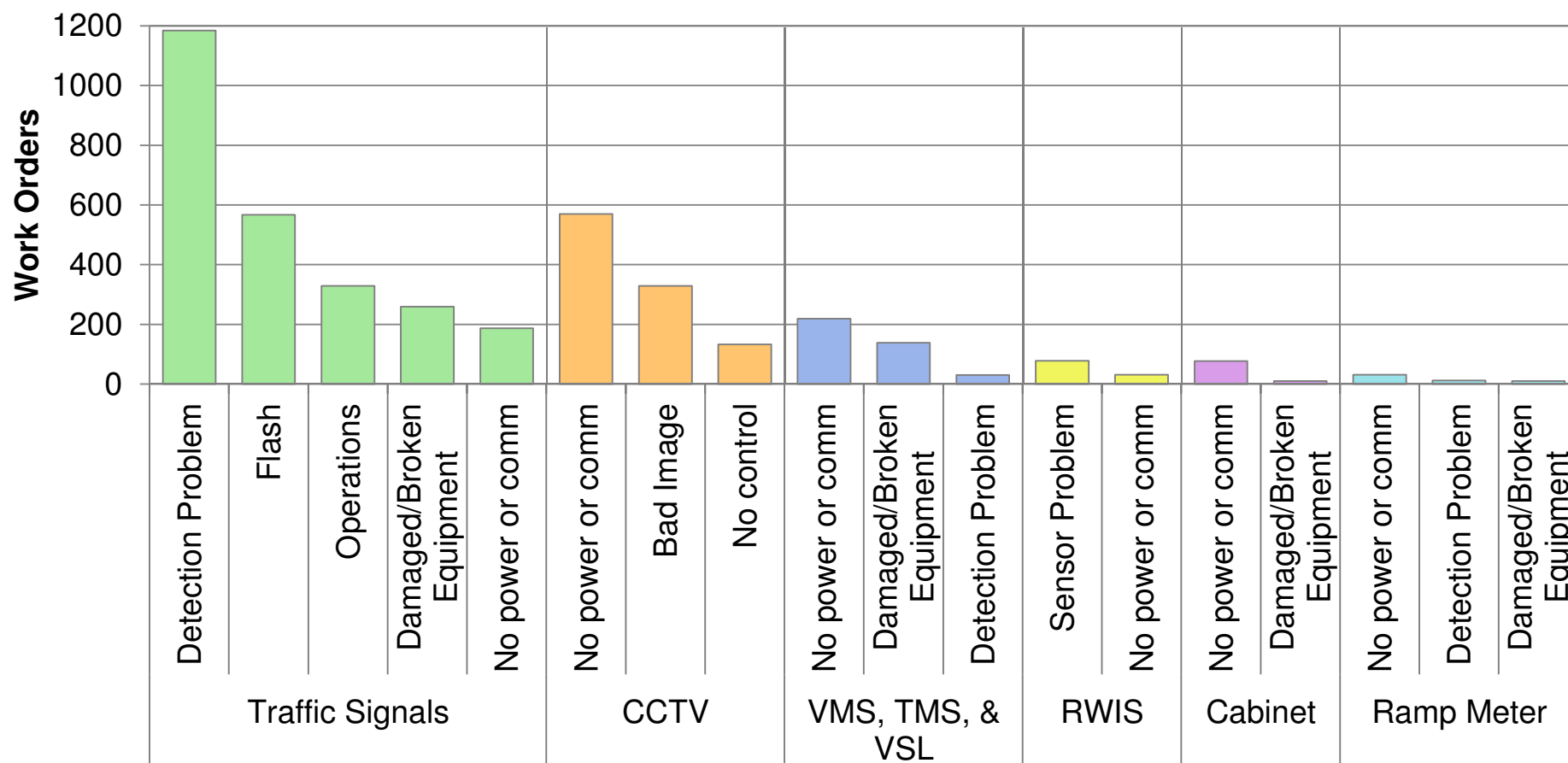
6 High PCD detector count

Volume report for Washington 12th on the Northbound and Southbound approaches.
 8/4/2016 12:00:00 AM - 8/4/2016 11:59:00 PM - Using Advanced Detection



Work Orders

Work Orders for ATMS Equipment
July 2015 to July 2016





LOG ACTION TAKEN

UDOT Automated Traffic Signal Performance Measures

Jamie Mackey, P.E, PTOE

UDOT Statewide Signal Engineer

Log Action

Name

Date

Signal

Agency

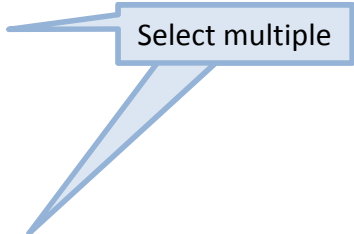
Actions

- Actuated Coord. All-Red Interval
- Coord On/Off Modeling
- Cycle Length Traffic Study
- Detector Issue Yellow Interval
- Offset Force Off Type
- Sequence Split Adjustment
- Time Of Day Manual Command
- Other

MetricTypes

- Purdue Phase Termination Approach Volume
- Split Monitor Approach Delay
- Pedestrian Delay Arrivals On Red
- Preemption Details Approach Speed
- Turning Movement Counts Yellow and Red Actuations
- Purdue Coordination Diagram Purdue Split Failure

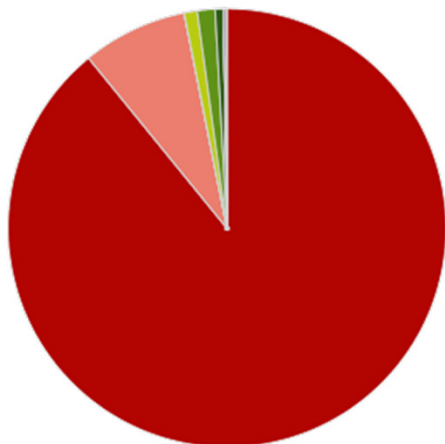
Comment



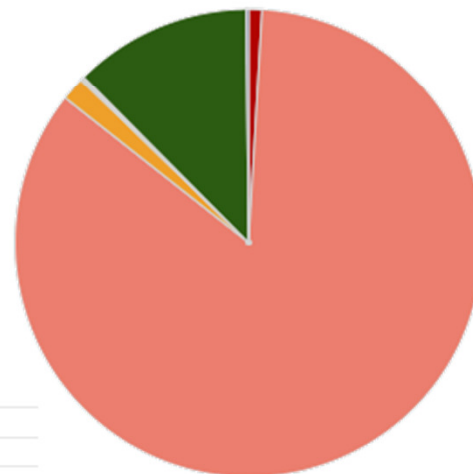
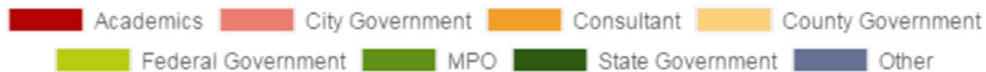
Create

Review Action and Metric Use

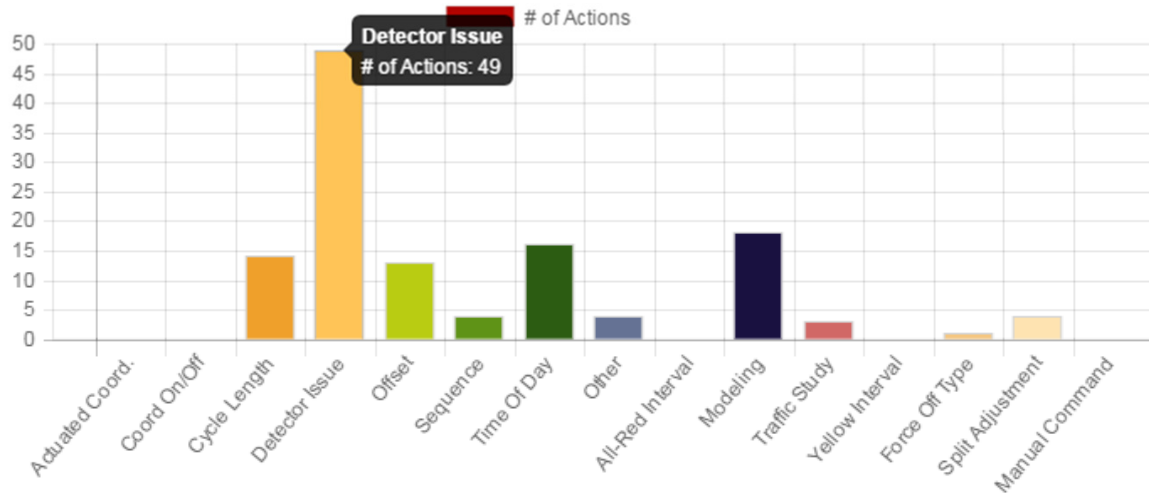
Chart Usage



Agency Usage



Split Monitor



Review Metric Use

