PBOT ATSPM Update

PORTAL Users Group Meeting
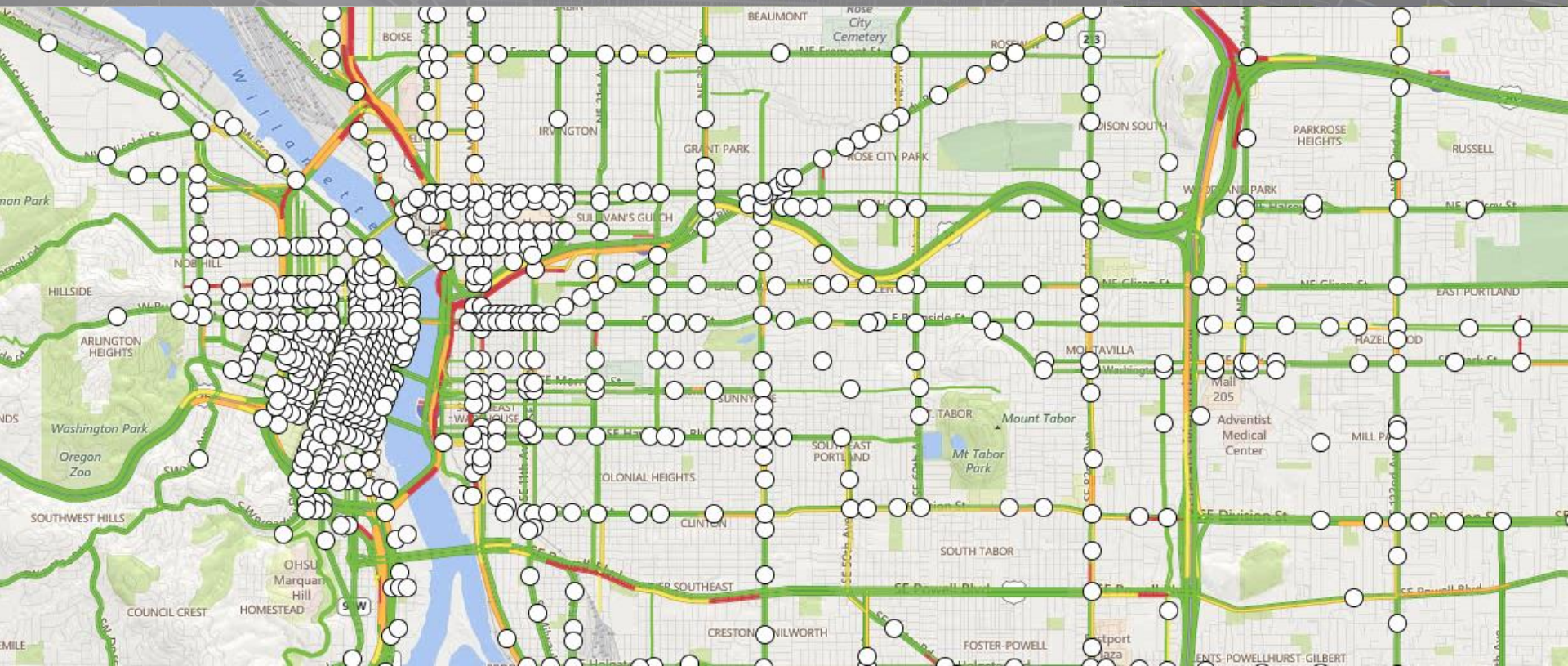
March 18, 2020
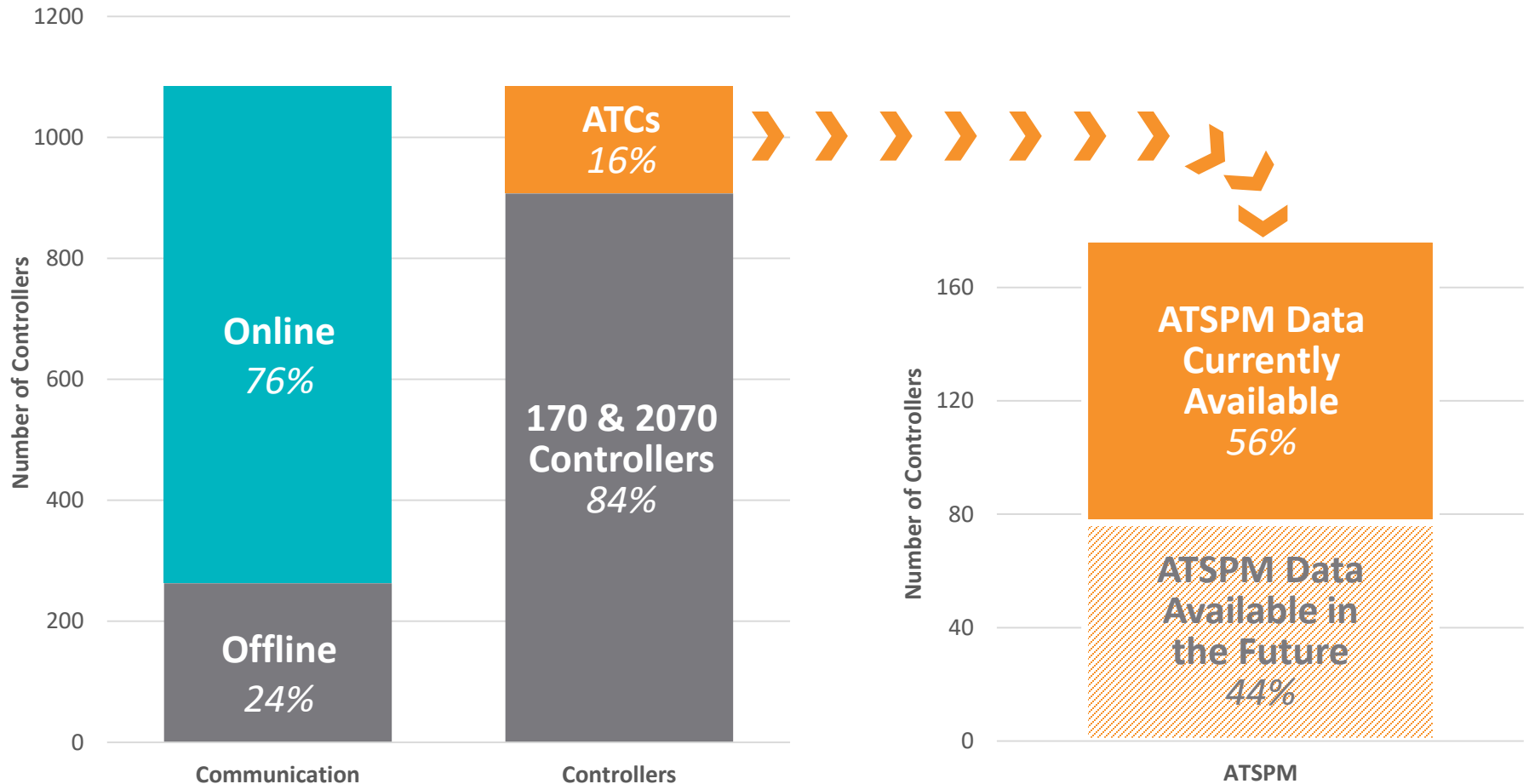
Alison Tanaka | alison.tanaka@portlandoregon.gov

Building a Foundation

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Existing Equipment

Chart — Existing Equipment:

Communication (Number of Controllers, axis 0–1200): Online 76%, Offline 24%

Controllers (Number of Controllers): ATCs 16%, 170 & 2070 Controllers 84%

ATSPM (Number of Controllers, axis 0–160): ATSPM Data Currently Available 56%, ATSPM Data Available in the Future 44%

Current ATSPM Data

100

Signals Reporting ATSPMs

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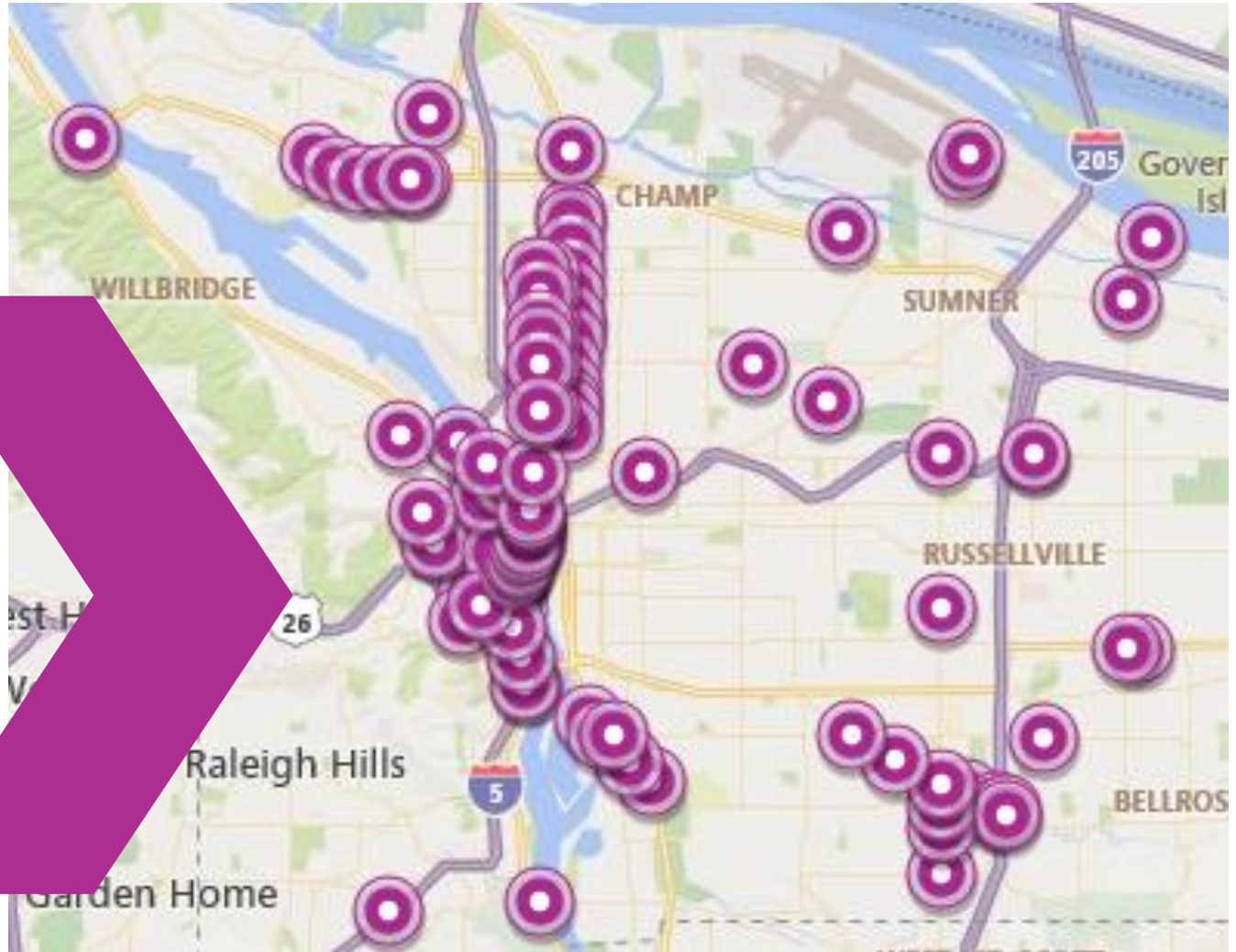
Planning for the Future

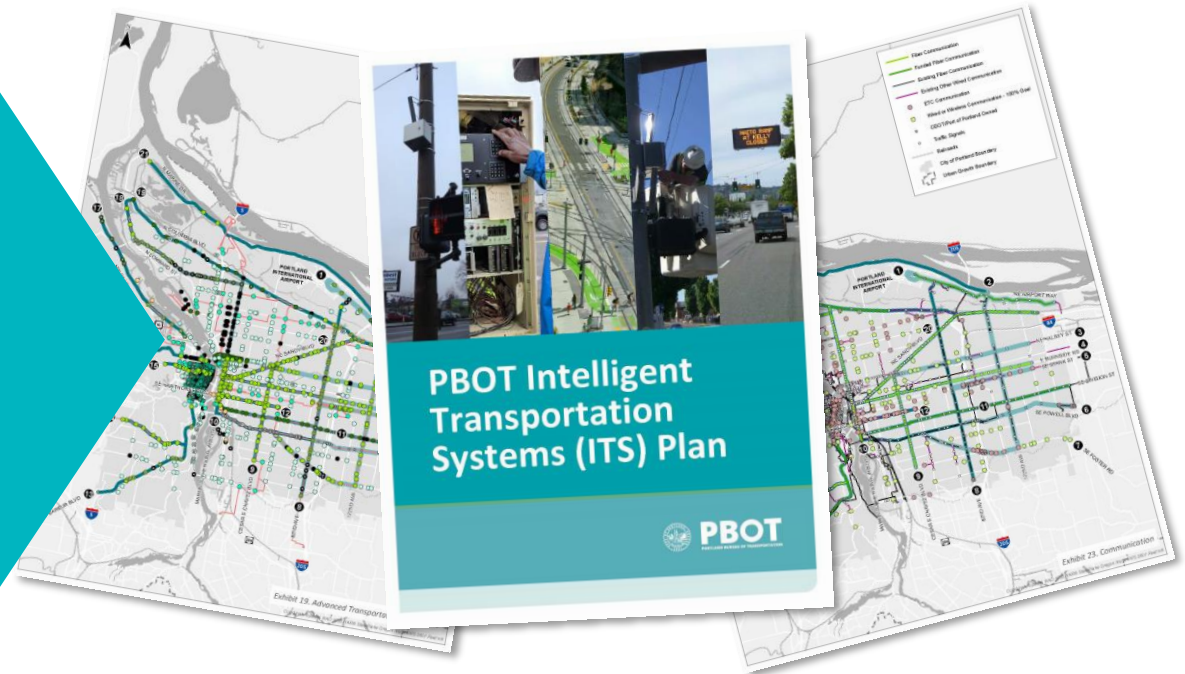**GOAL 1**

100%

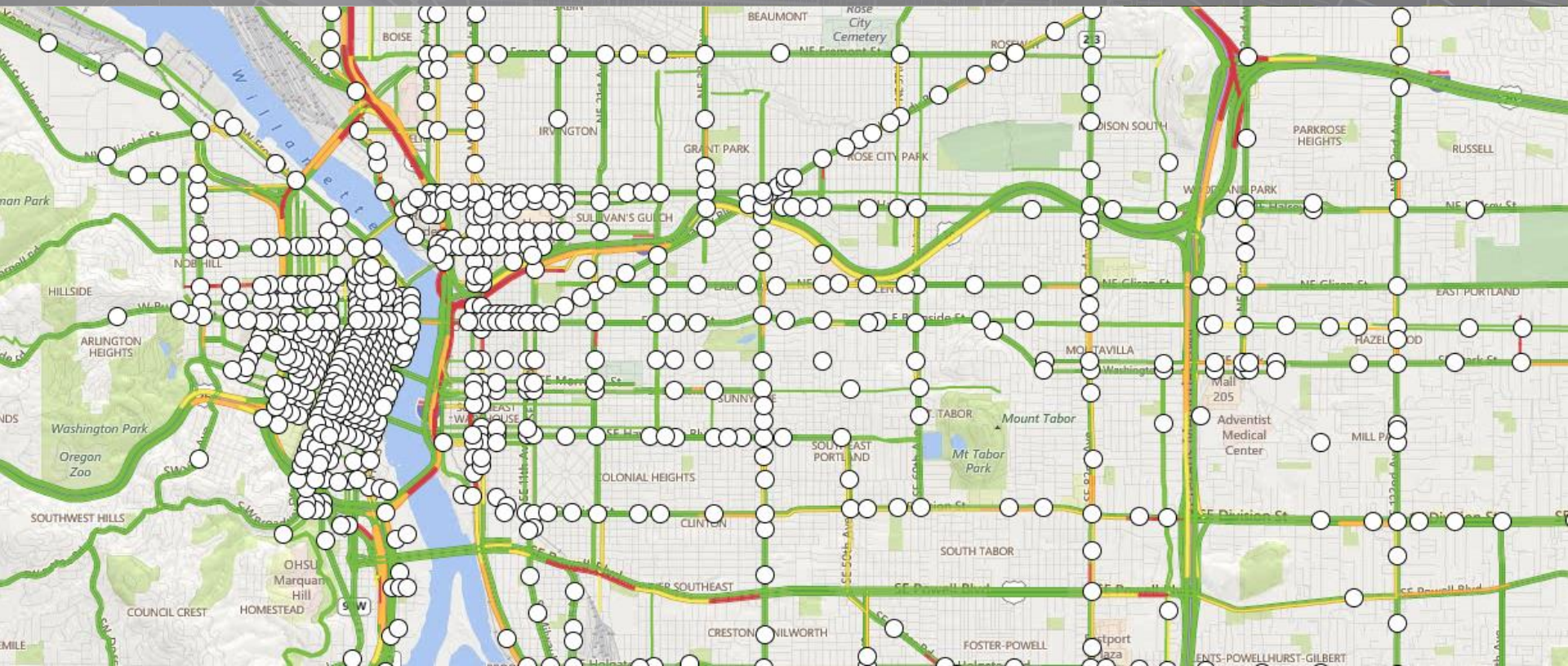Connected Traffic Signals

GOAL 2

100%

Advanced Transportation Controllers

PBOT is Developing Plans and Applying for Grants to Reach Goals

PBOT Intelligent Transportation Systems (ITS) Plan

PBOT

Standardization

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Types of Detection

Operations Detection

1. Stop Bar Presence

2. Stop Bar Presence (Right-Turn)

3. Stop Bar Extend

4. Advance Extend (Car)

5. Advance Extend (Truck/Bus)

ATSPM Detection

6. Stop Bar Count

7. Yellow/Red Actuation

8. Advance Count

Loops

9. Bike Loops

10. Vehicle Loops

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Draft Detector Layout

ATSPM Event Codes

Intelight Developed Additional Enumerations

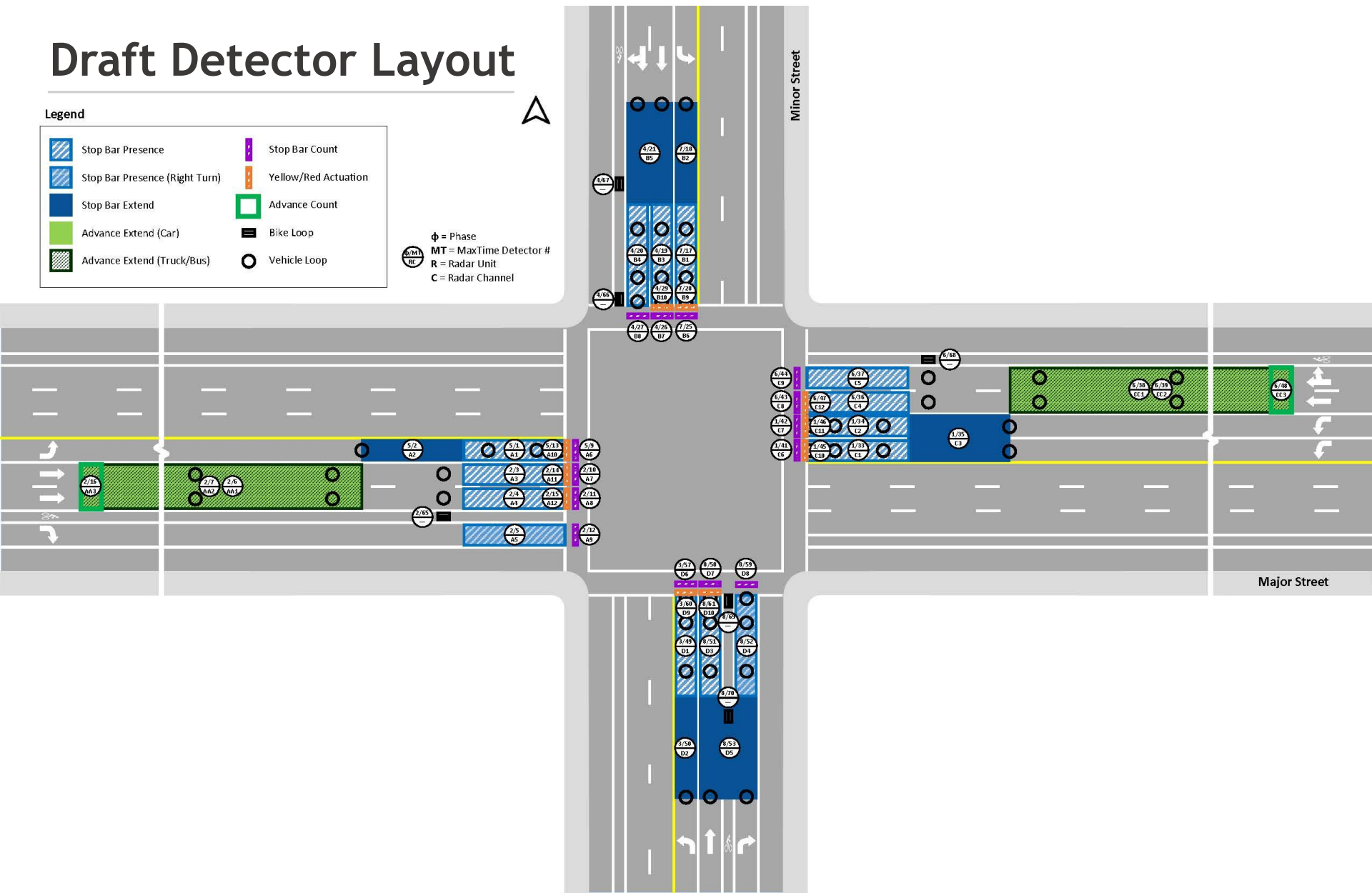| 305	Recorded Split 6	Actual Split Time in Seconds (0-255)
306	Recorded Split 7	Actual Split Time in Seconds (0-255)
307	Recorded Split 8	Actual Split Time in Seconds (0-255)
308	Recorded Split 9	Actual Split Time in Seconds (0-255)
309	Recorded Split 10	Actual Split Time in Seconds (0-255)
310	Recorded Split 11	Actual Split Time in Seconds (0-255)
	Recorded Split 12	Actual Split Time in Seconds (0-255)
	Recorded Split 13	Actual Split Time in Seconds (0-255)
	Recorded Split 14	Actual Split Time in Seconds (0-255)
	Recorded Split 15	Actual Split Time in Seconds (0-255)
	Recorded Split 16	Actual Split Time in Seconds (0-255)
	Actual Cycle Length	Actual Cycle Time in Seconds
317	Actual Natural Cycle Length	Actual Natural Cycle Time in Seconds
318	Actual Cycle Offset	Actual Cycle Offset in Seconds
319	Seq Change Request	Sequence changed requested
320	Master Cycle Zero	Master Cycle Zero point
321	Coord - Oversize Ped	Oversized ped served in coord
322	TSP Delay Time	Tracks the time from TSP arrival to when TSP phase service begins.

PBOT Submitted a Ticket for Supplemental Detection Enumerations

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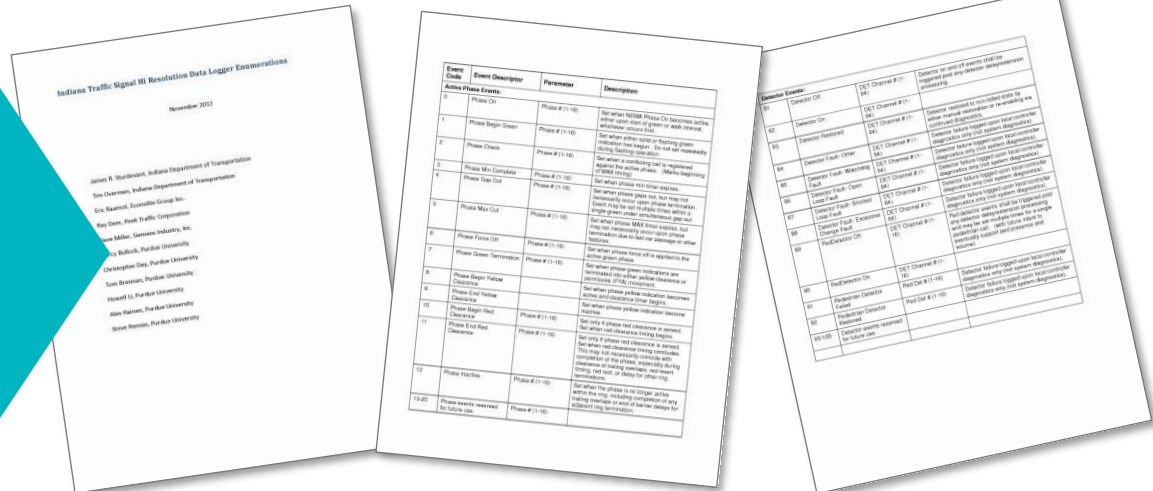
Radar and MaxTime Assignments

Radar Unit Assignments

Click Unit	Click Input	Radar Unit	Description	BIU
Unit 1	1	A	Phase 2/5 Matrix	9
	2	AA	Phase 2 Advance	
	3	B	Phase 4/7 Matrix	10
	4	BB	Phase 4 Advance	
Unit 2	1	C	Phase 1/6 Matrix	11
	2	CC	Phase 6 Advance	
	3	D	Phase 3/8 Matrix	12
	4	DD	Phase 8 Advance	

MaxTime Assignments

BIU	φ	MaxTime Detector #	Description
9	2/5	1-8	Operations
		9-16	ATSPM
10	4/7	17-24	Operations
		25-32	ATSPM
11	1/6	33-40	Operations
		41-48	ATSPM
12	3/8	49-56	Operations
		57-64	ATSPM
N/A	All	65-128	Loops

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Numbering and Labels

Description	BIU	BIU Detector Channel / MaxTime Detector #	Phase	Location/Size	Direction/Lane	Type	Radar Unit	Radar Channel
Phase 2/5 Operations	9	1	5	0-50	EBL	Stop Bar Presence	A	1
	9	2	5	50-100	EBL	Stop Bar Extend	A	2
	9	3	2	0-50	EBT IL	Stop Bar Presence	A	3
	9	4	2	0-50	EBT OL	Stop Bar Presence	A	4
	9	5	2	0-50	EBR	Stop Bar Presence	A	5
	9	6	2	100-400	EBT	Advance Extend Car	AA	1
	9	7	2	100-400	EBT	Advance Extend Truck	AA	2
	9	8						
Phase 2/5 ATSPM	9	9	5	Small Zone	EBL	Stop Bar Count	A	6
	9	10	2	Small Zone	EBT IL	Stop Bar Count	A	7
	9	11	2	Small Zone	EBT OL	Stop Bar Count	A	8
	9	12	2	Small Zone	EBR	Stop Bar Count	A	9
	9	13	5	Small Zone	EBL	Yellow/Red Actuation	A	10
	9	14	2	Small Zone	EBT IL	Yellow/Red Actuation	A	11
	9	15	2	Small Zone	EBT OL	Yellow/Red Actuation	A	12
	9	16	2	390-400	EBT	Advance Count	AA	3

Planning for Big Data

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Data Storage

Hot Storage

- New PBOT Server
- 2,000 traffic signals
- 13 months of data

Cold Storage

- Portland Urban Data Lake (PUDL)
- PORTAL

	A	B	C
61989	2/29/20 13:35:18	0	6
61990	2/29/20 13:35:18	11	4
61991	2/29/20 13:35:18	12	4
61992	2/29/20 13:35:18	1	2
61993	2/29/20 13:35:18	11	8
61994	2/29/20 13:35:18	12	8
61995	2/29/20 13:35:18	1	6
61996	2/29/20 13:35:18	21	2
61997	2/29/20 13:35:18	21	6
61998	2/29/20 13:35:18	150	3
61999	2/29/20 13:35:18	2	2
62000	2/29/20 13:35:18	2	6
62001	2/29/20 13:35:18	46	3
62002	2/29/20 13:35:18	48	3
62003	2/29/20 13:35:24	2	2
62004	2/29/20 13:35:24	2	6
62005	2/29/20 13:35:24	22	2
62006	2/29/20 13:35:28	3	2
62007	2/29/20 13:35:28	3	6
62008	2/29/20 13:35:33	22	6
62009	2/29/20 13:35:41	7	2
62010	2/29/20 13:35:41	8	2
62011	2/29/20 13:35:41	6	2
62012	2/29/20 13:35:41	7	6
62013	2/29/20 13:35:41	8	6
62014	2/29/20 13:35:41	6	6
62015	2/29/20 13:35:41	23	2
62016	2/29/20 13:35:41	23	6
62017	2/29/20 13:35:41	150	5

Raw Data is Currently Available in CSV Format

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UDOT Source Code Updates

Version 4.0.1
March 2017

- Improved Preemption Details chart
- Watchdog Configuration
- User Configuration
- Signal Configuration Report
- Permissive phase charts for Purdue Split Failure and YRA
- FAQ editor
- TMC data table
- Chart axis interval responds to range
- Technician user role

Version 4.2
January 2019

- New Aggregate Data reports (15-minute summary archive database and report)
- Signal versioning (detection programmed for specific time periods)
- Export data feature
- Improved Route Configuration
- Bug fixes

Version 4.2.2
September 2019

- New Timing and Actuations chart
- Updated Pedestrian Delay report
- Intelight pull request that is more tolerant of slower network and DB servers
- Support for Econolite EOS controllers
- Repaired Aggregate Data
- Bug fixes

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Source Code Version 4.2.3

Version 4.2.3
January 2020

- New GDOT Left Turn Gap Analysis Metric
- New Web API
- Changed the options on Timing And Actuations, to include time before and after the display for the system to look for events
- Bug fixes

Updating the Source Code to Version 4.2.3

Example Applications

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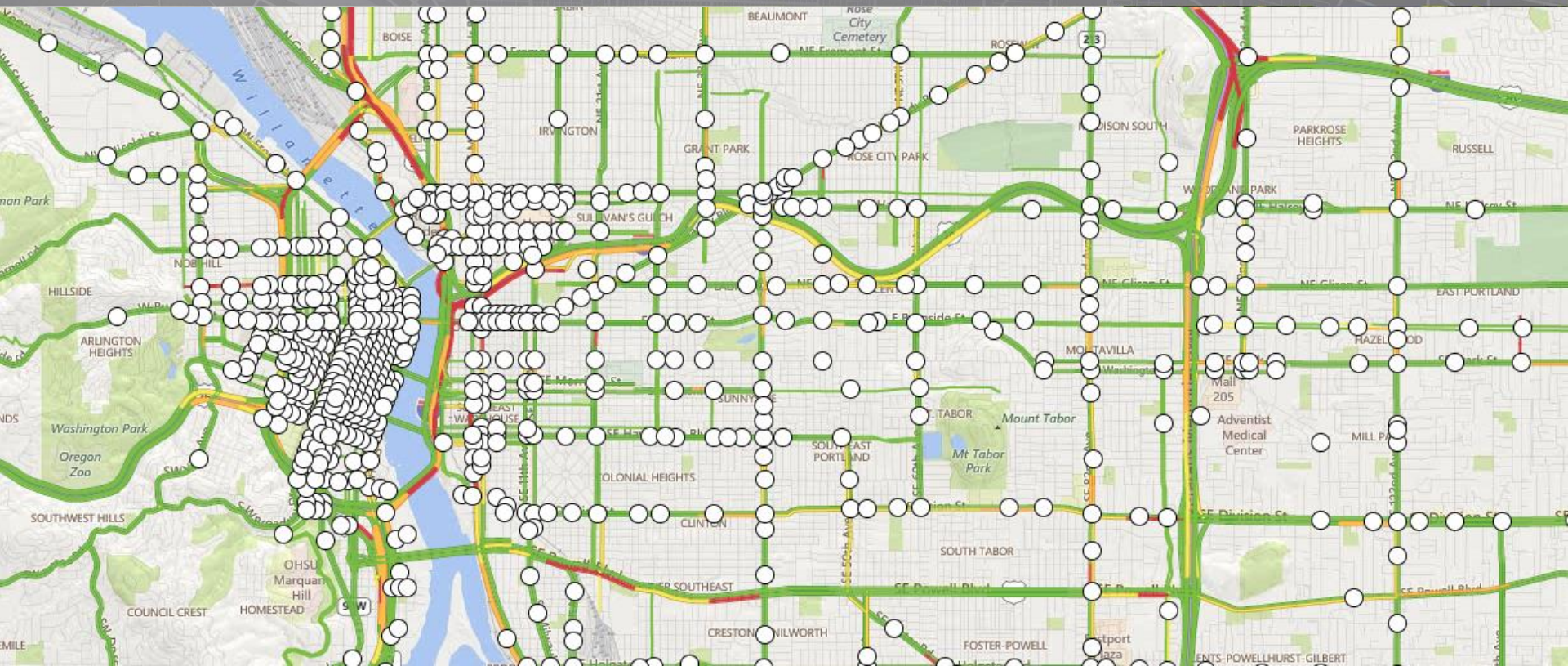
SE 122nd Ave / SE Division St

Identified a failing detector driving up the dynamic max

Division @ 122ndSIG#4161 Phase 4
Friday, January 24, 2020 12:00 AM - Friday, January 24, 2020 11:59 PM
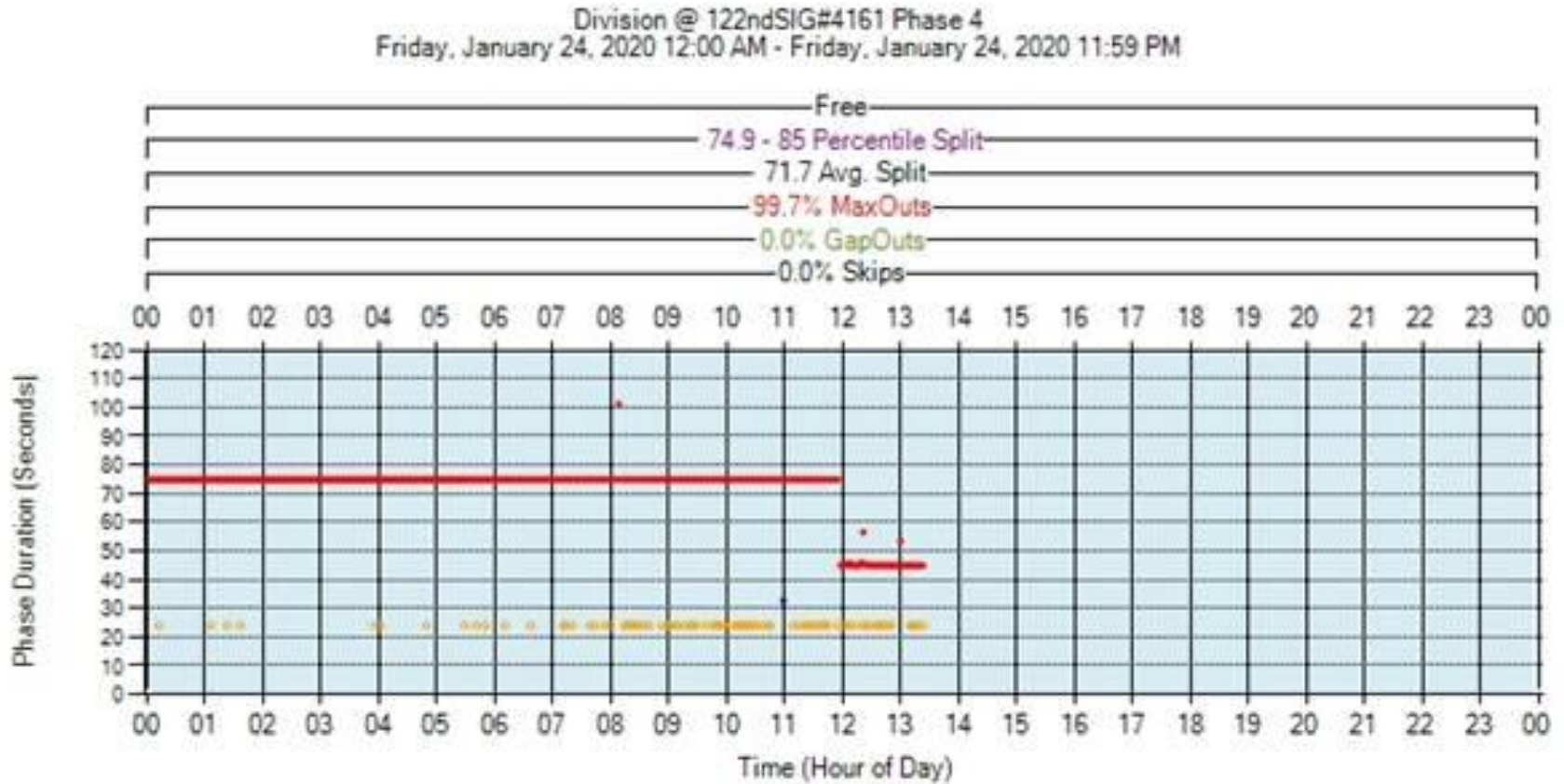
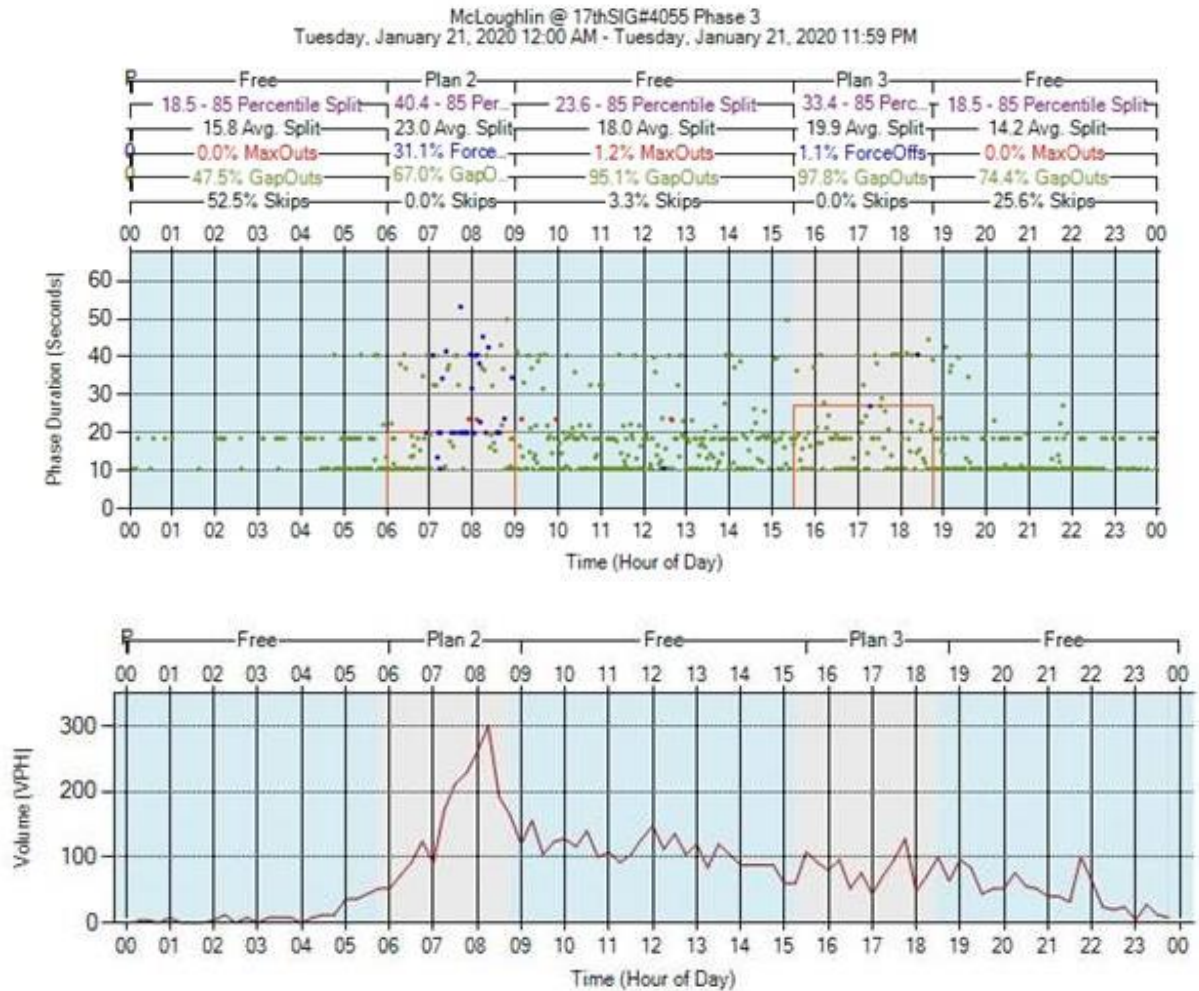# NE 122nd Ave / NE Marine Dr

Tracked the number of times a bike phase was served twice during a cycle
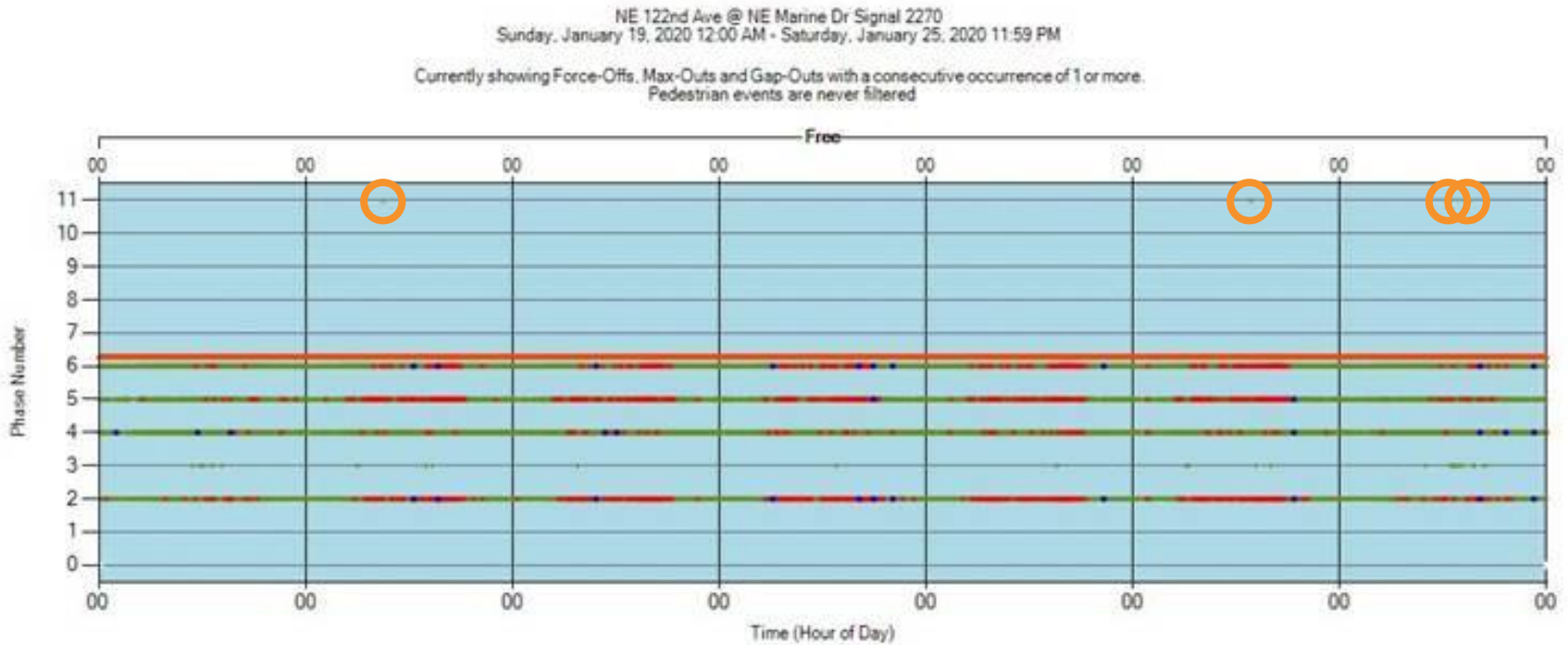
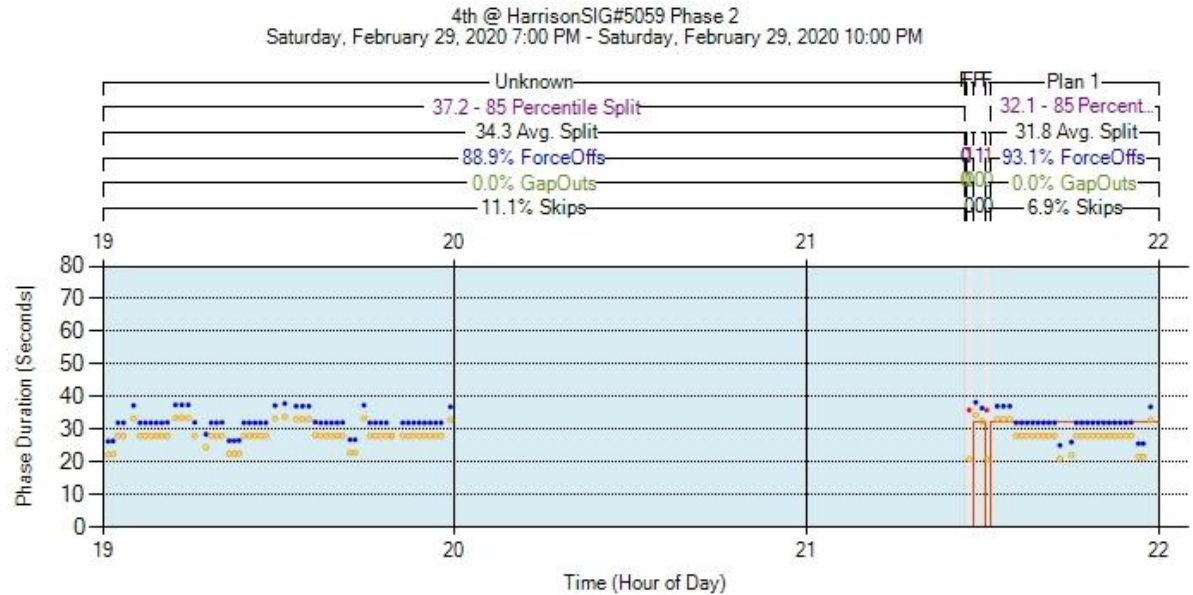# SE 17th Ave / SE McLoughlin Blvd

Confirmed the number of cycles when a left-turn phase was skipped (compared to volumes and split failures)


McLoughlin @ 17thSIG#4055 Phase 3
Tuesday, January 21, 2020 12:00 AM - Tuesday, January 21, 2020 11:59 PM

SW 4th Ave / SW Harrison St

Identified a stuck streetcar check-in causing constant preempt

4th @ HarrisonSIG#5059 Phase 2
Saturday, February 29, 2020 7:00 PM - Saturday, February 29, 2020 10:00 PM

2/29/20 19:58:39	176	4	Special Function Output on
2/29/20 19:58:43	177	4	Special Function Output off
2/29/20 19:59:56	176	1	Special Function Output on
2/29/20 20:00:57	176	1	Special Function Output on
2/29/20 20:01:00	177	1	Special Function Output off
2/29/20 20:01:05	176	2	Special Function Output on
2/29/20 20:01:14	177	2	Special Function Output off
2/29/20 20:01:51	176	3	Special Function Output on
2/29/20 20:01:56	177	3	Special Function Output off
2/29/20 20:02:09	176	4	Special Function Output on

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Next Steps
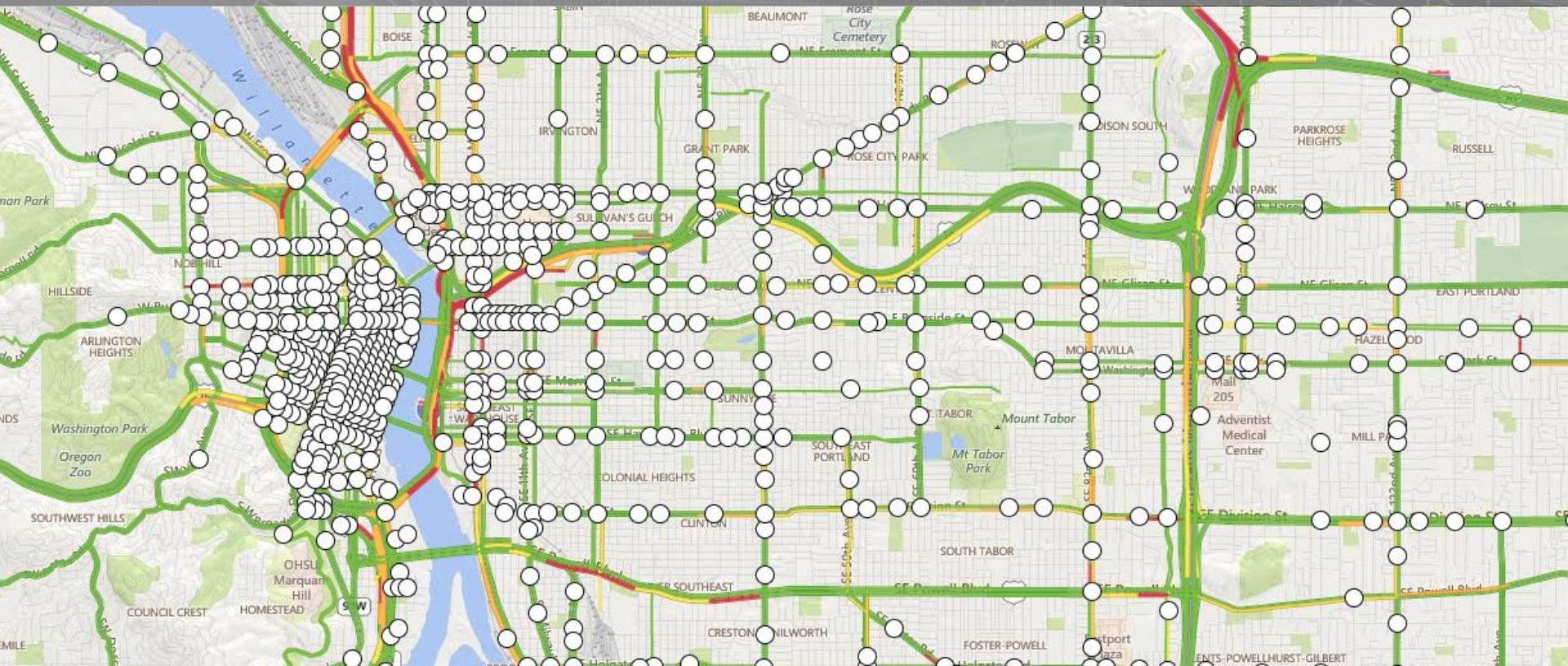
What's Next?

- Collect data from all ATCs
- Program existing detection
- Test new detection standard at three test intersections
- Test speed data collection
- Document detection standard in design guides
- Program alerts/alarms for daily use
- Research multimodal and transit signal priority metrics
- Train staff on use of ATSPMs