

# Alaska Department of Transportation & Public Facilities

## Advantages Gained with Dielectric Imaging

Rich Giessel

March 2021

Our mission is to *Keep Alaska Moving* through service and infrastructure.

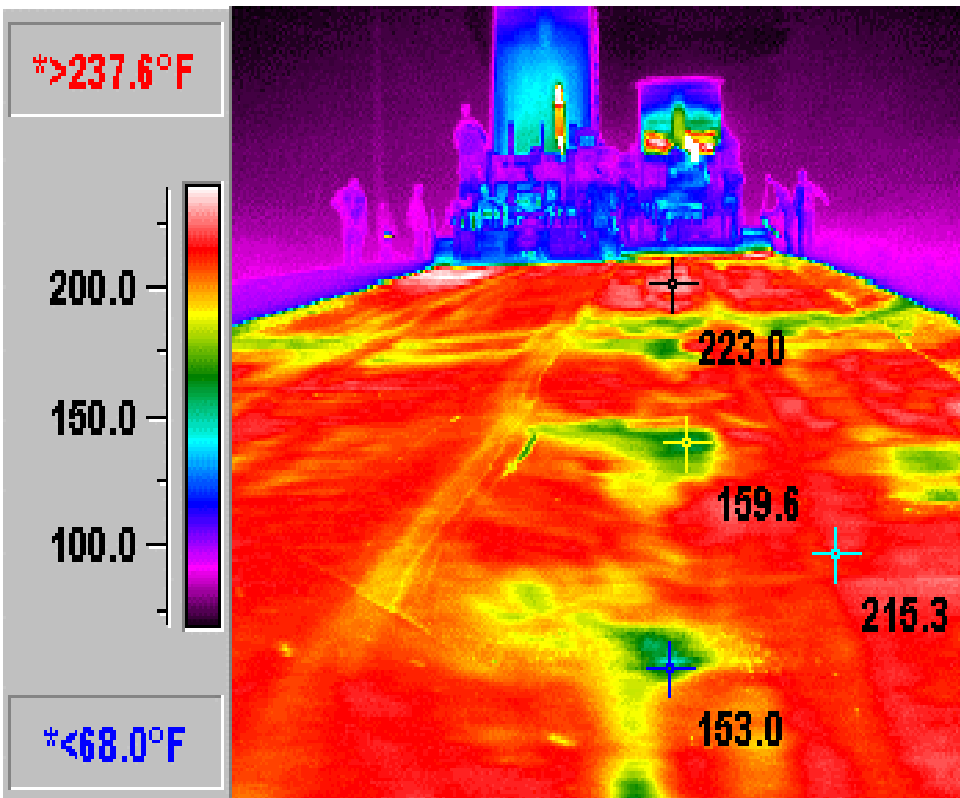


# **1. Continuous Full Coverage (CFC)**

## **Why use DPS testing technology?**

**40,000 >> 1**

# Cold Spots - Infrared vs B&W Photo



1.5 Years Later

# #1 DPS Advantage = Full Coverage

“The primary problem is not so much to determine the average conditions, as it is to make reasonably certain that possibly the most unfavorable conditions are known...”

Donald M. Burmister (1948)

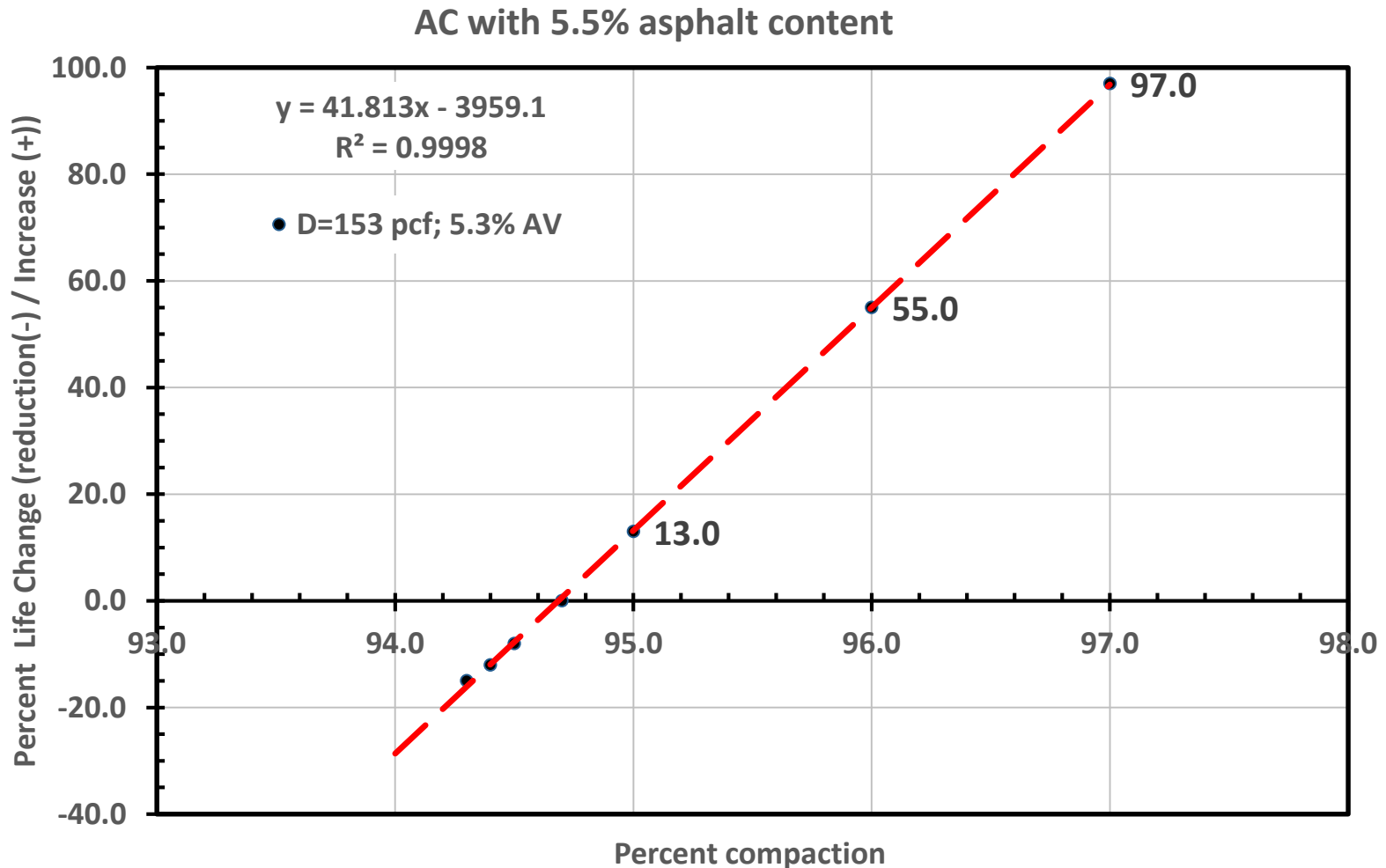


## #2 DPS Advantage

- DPS Accurately measures compaction **Uniformity**

# #3 Advantage = Higher Mat Compaction

Increasing Compaction **1.3%** (from 94.7 to 96.0) Increases Fatigue Life by **55%**





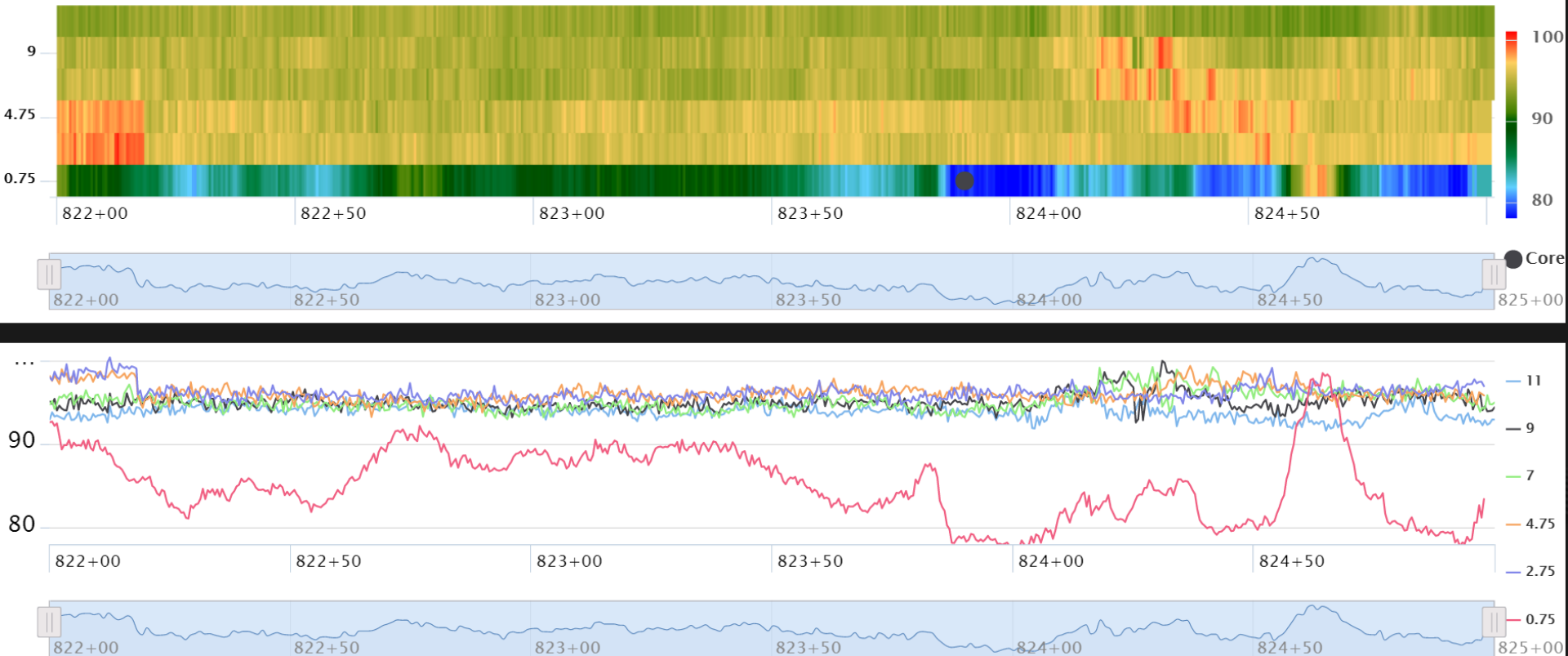
# Higher Mat Compaction and...

## Defect mapping



# #3 DPS Advantage = CFC on Mat

## Low Density Adjacent Rumble Strip



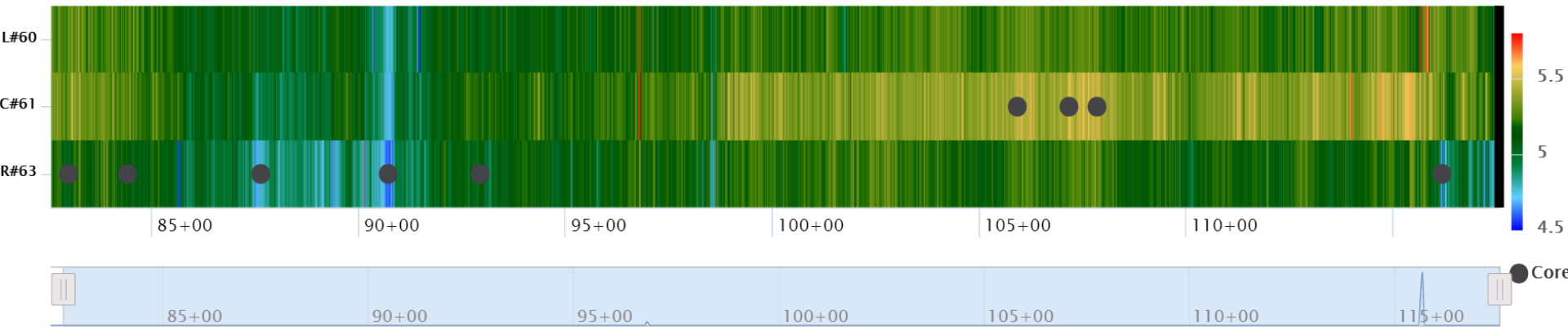


# When to use Continuous-Full-Coverage Mat Compaction Mapping?

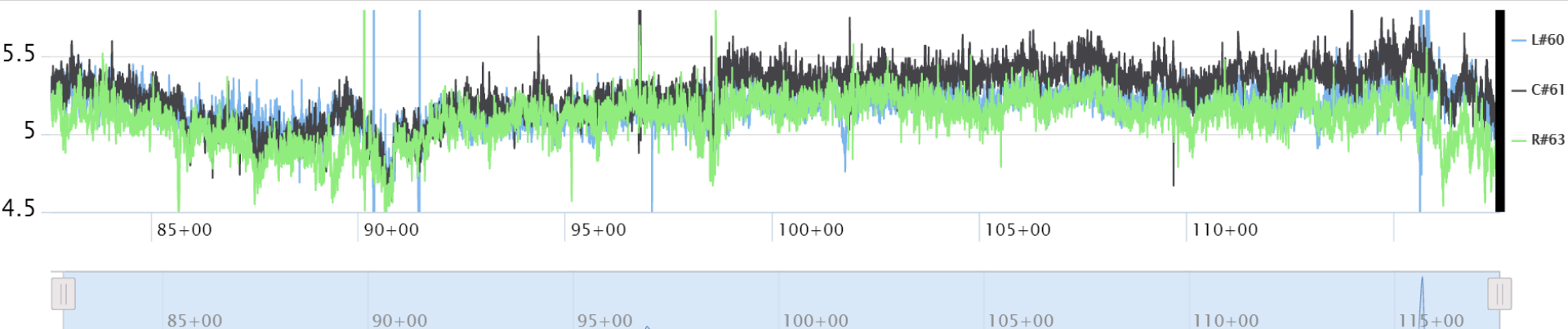


# Forensic Testing – 9 Months Later

Heatmap + Histogram



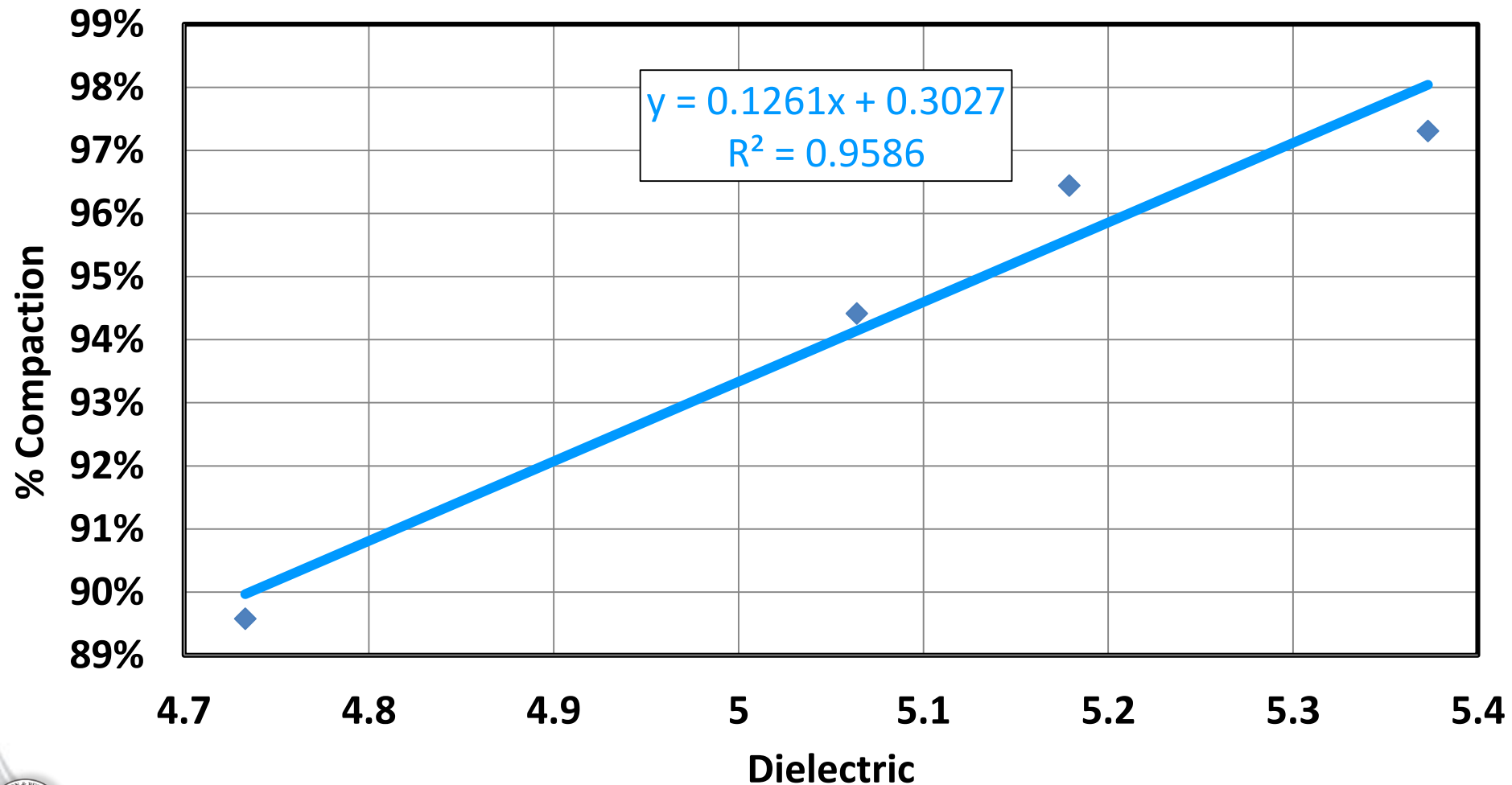
Heatmap + Linechart



Linechart + Histogram

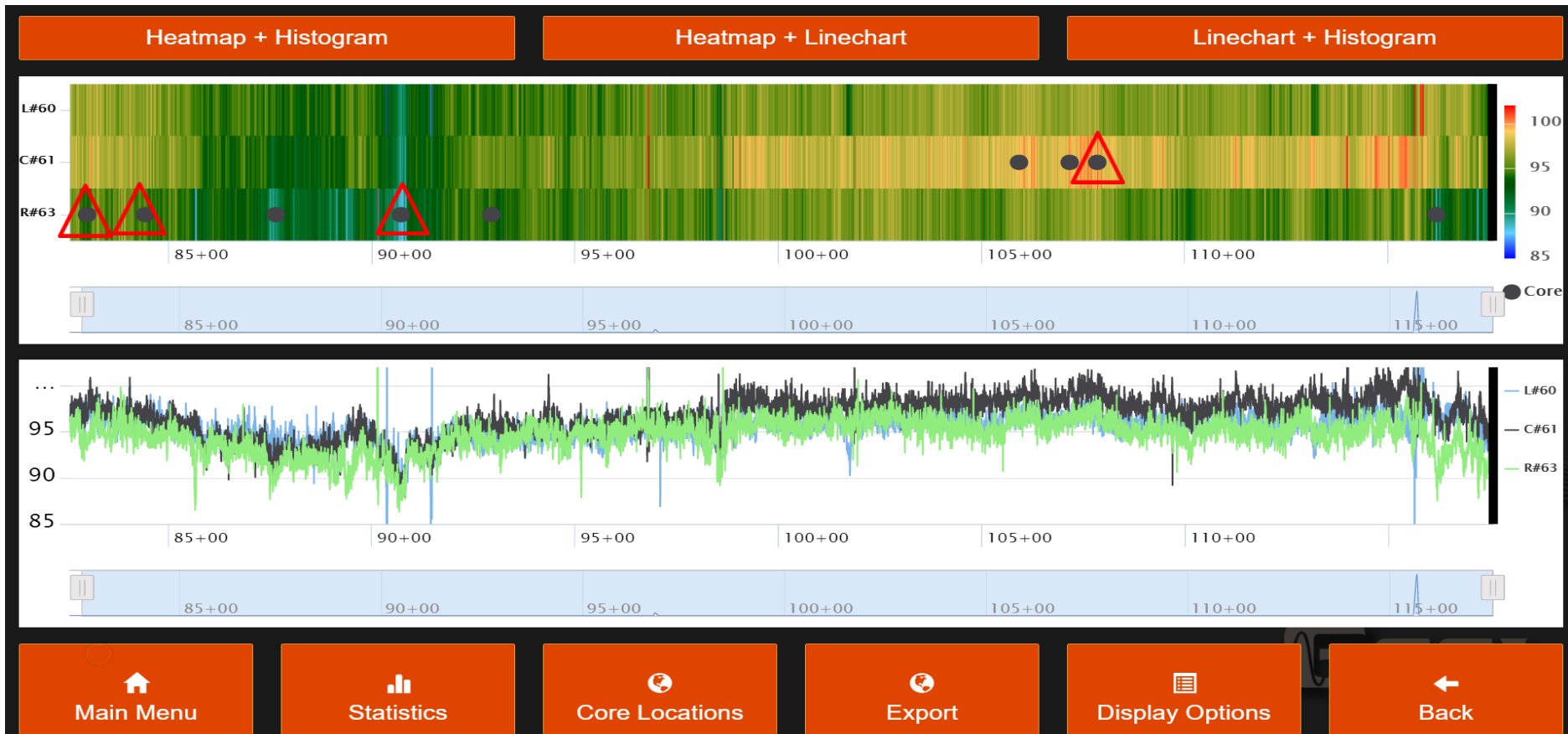
# Forensic Calibration

## Mainline Dielectric vs % Compaction-T 331



# Forensic Testing – 9 Months Later

- Fritz Cove % Compaction





# Compaction Coverage Across Bridge

## ~1500' of Lane 1





# Area Defects on Bridge

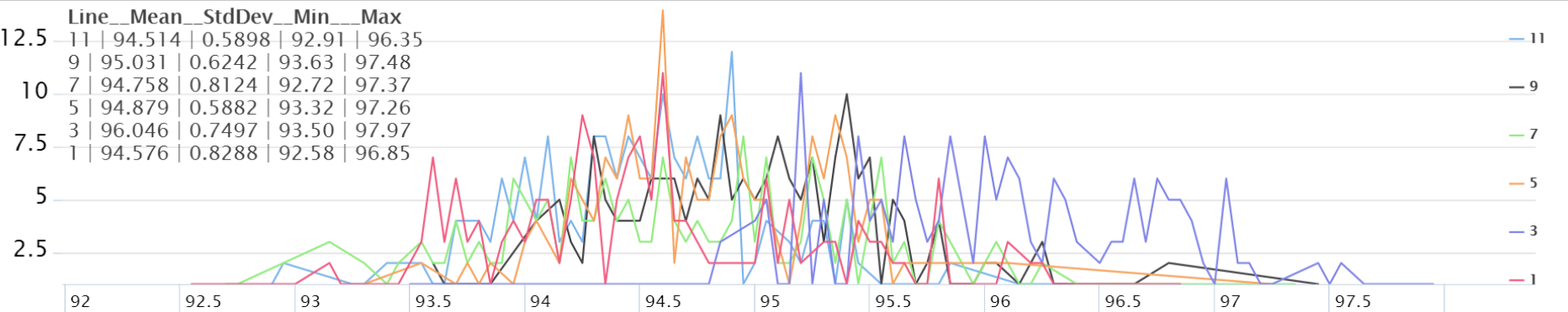
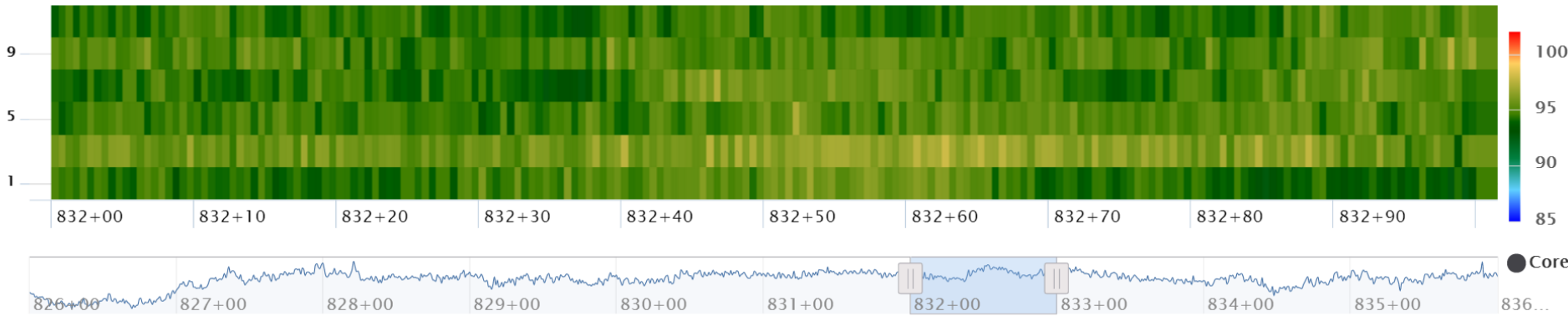


# Good Compaction - Station 832

Heatmap + Histogram

Heatmap + Linechart

Linechart + Histogram



  
Main Menu

  
Statistics

  
Core Locations

  
Export

  
Display Options

  
Back



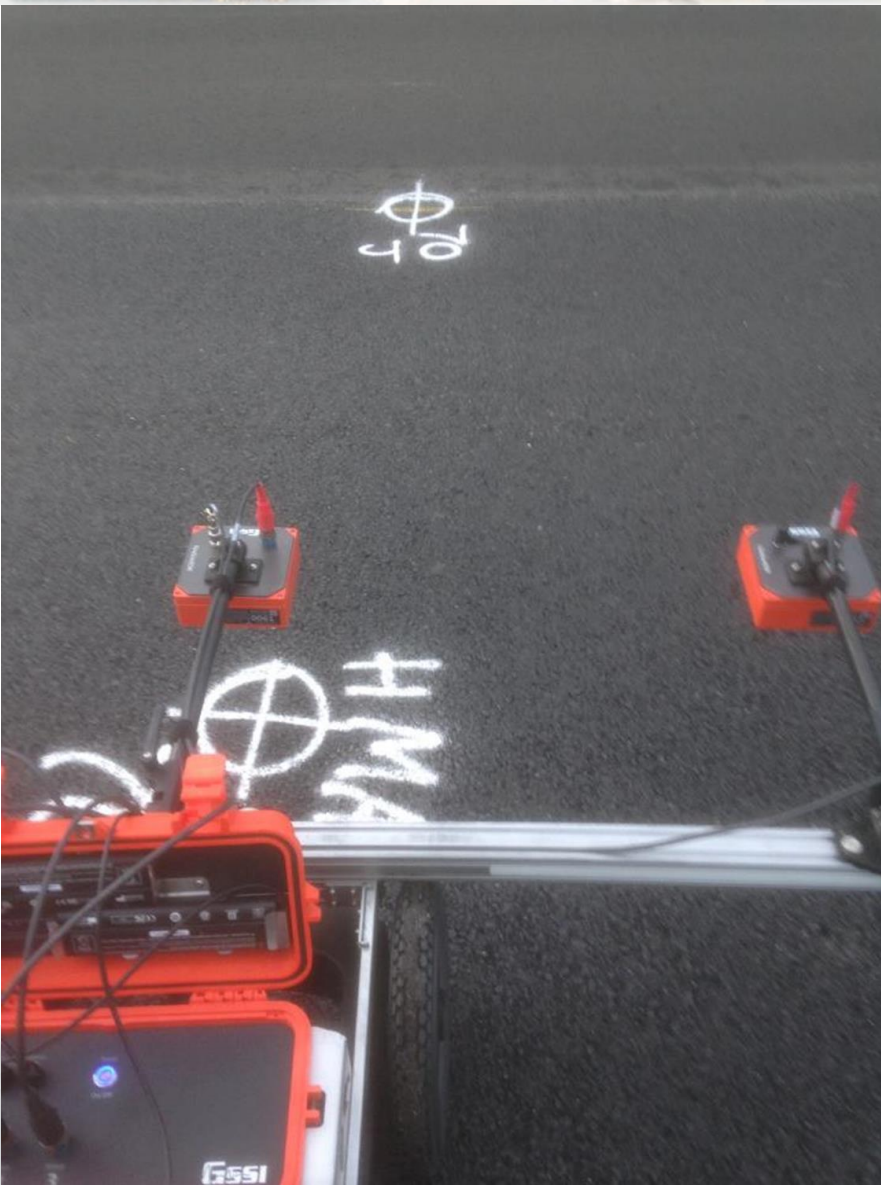
# Tabulation of Mat Defects

## Area Defect Locations:

Starting Station	Start Distance (ft)	Ending Station	End Distance (ft)	Start Offset (ft)	End Offset (ft)	Defect Area (ft <sup>2</sup> )
1196	27.25	1196	29.25	8	12	8
1196	65.25	1197	8.25	8	12	172
1197	8.75	1197	11.75	6	12	18
1197	13.25	1197	22.25	8	12	36
1208	12.25	1208	17.25	12	10	10
1217	73.25	1217	79.75	12	10	13
1218	29.25	1218	31.25	2	6	8
1218	0.75	1218	4.75	6	12	24
1218	31.25	1218	41.75	6	12	63
1218	4.75	1218	6.75	8	12	8
1218	7.25	1218	9.75	8	12	10
1218	10.25	1218	15.75	8	12	22

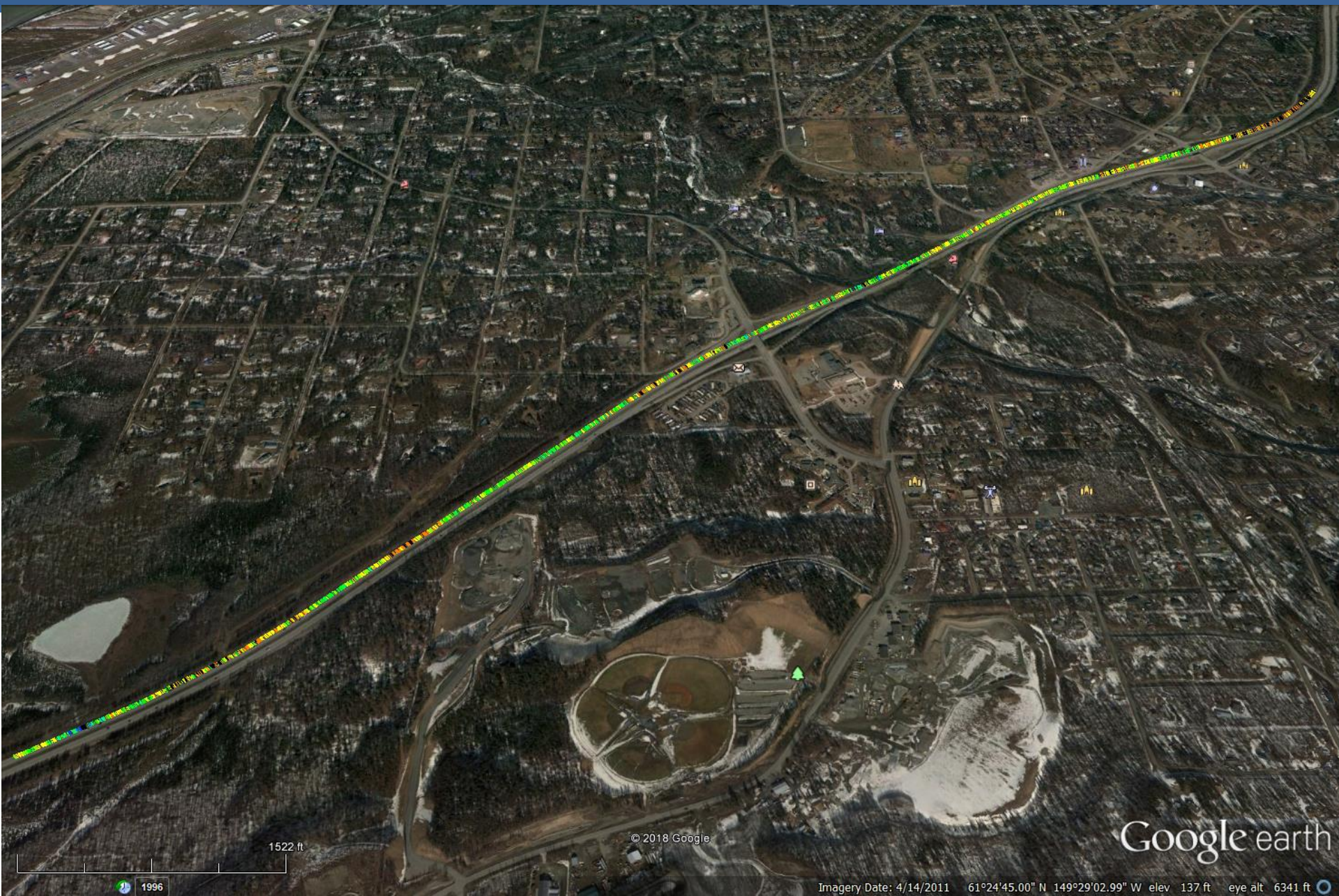
**78** = Number of Defects in this Segment:

# #4 DPS Advantage = Better Joints






# 14,000' of Dielectric Joint Data







Continuous-full-coverage (CFC) Mapping Gives...

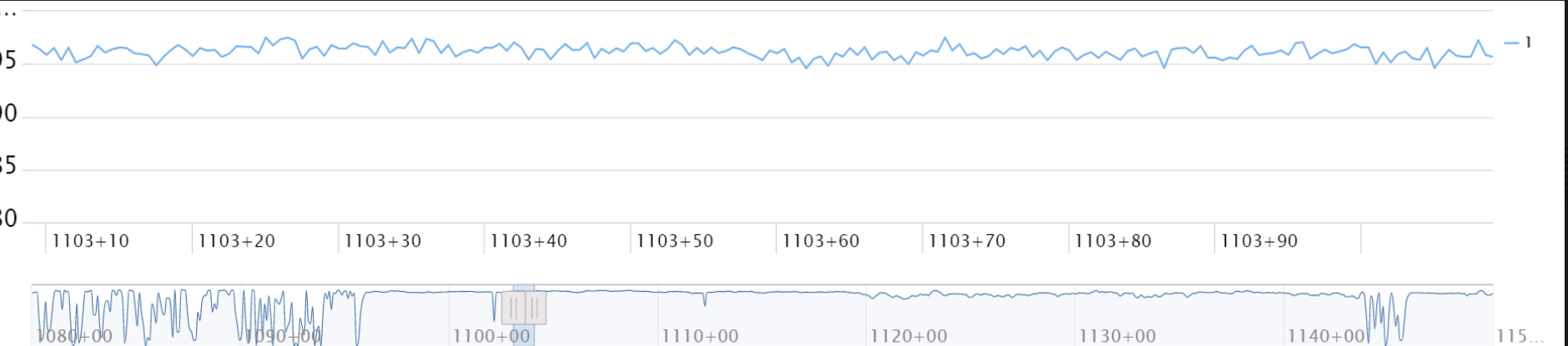
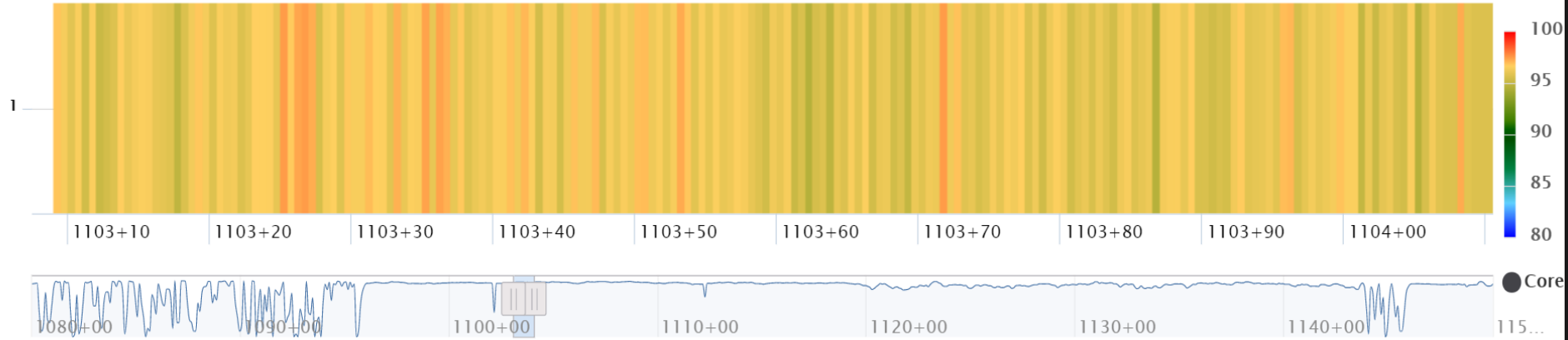
**One test every 6" along a joint**

# Sta. 1103, 96% Joint Compaction

Heatmap + Histogram

Heatmap + Linechart

Linechart + Histogram



  
Main Menu


  
Statistics

  
Core Locations

  
Export

  
Display Options

  
Back



CFC Data Provides...

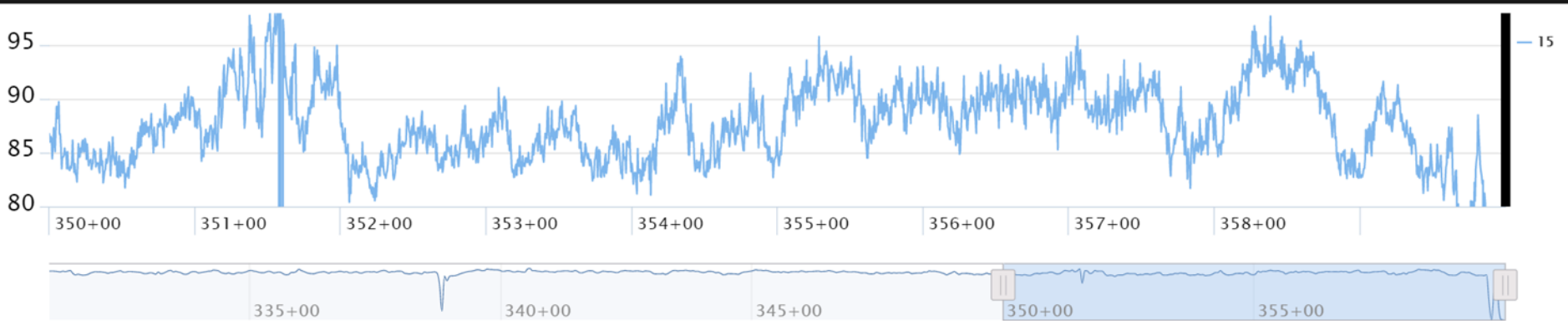
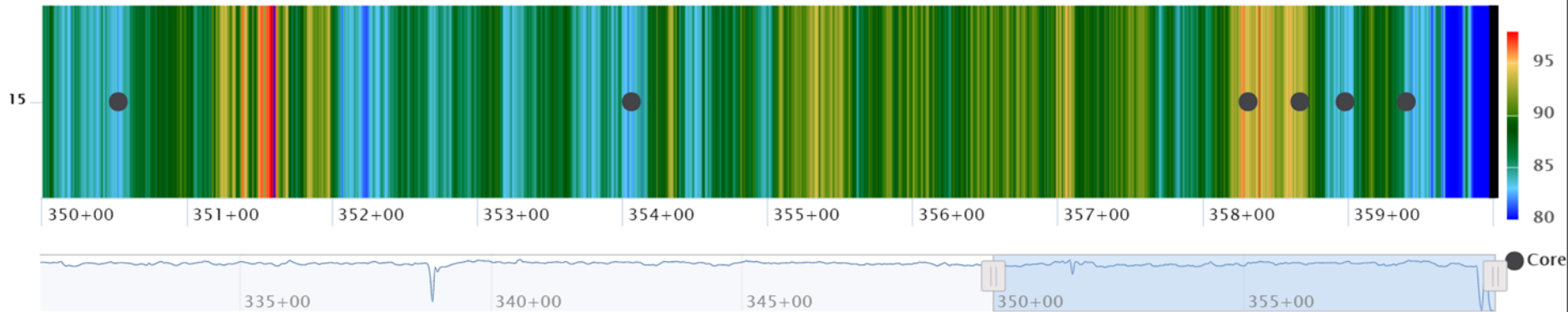
# 100% Longitudinal joint analysis

# 10 Stations of Joint Data

Heatmap + Histogram

Heatmap + Linechart

Linechart + Histogram



  
Main Menu

  
Statistics

  
Core Locations

  
Export


  
Display Options

  
Back



# Mapping Joint Defects to KML






CFC Data Provides...

# Tabulation of Joint Defects

# Tabulation of Joint Defects

## Linear Defect Locations:

Starting Station	Start Distance (ft)	Ending Station	End Distance (ft)	*Lateral Offset (ft)	Defect Length (ft)
1119	80.25	1119	91.25	1	11
1119	93.75	1120	52.25	1	58.5
1120	97.25	1122	53.25	1	156
1122	54.75	1122	59.75	1	5
1122	61.25	1122	65.75	1	4.5
1122	66.25	1122	70.75	1	4.5
1122	71.25	1122	84.25	1	13
1122	89.75	1123	1.25	1	11.5
1123	59.75	1123	90.25	1	30.5
1123	99.75	1124	3.75	1	4



# **#5 DPS Advantage = Improved Safety**

**Safety – No staff drilling cores**



# Safety – DPS mounted to SUV





Questions?

Rich Giessel

Alaska DOT&PF

[richard.giessel@Alaska.gov](mailto:richard.giessel@Alaska.gov)

(907) 269-6244