Bituminous PWT
(Percent Within Tolerance)

Steven L. Koser, P.E.
Pennsylvania Department of Transportation

Gary L. Hoffman, P.E.
Pennsylvania Asphalt Pavement Association

Adam M. Ostinowsky, E.I.T.
Urban Engineers, Inc.

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Quality

- PWT is a continuation of the Department's goal of increased quality.
- Joint effort between the Department, FHWA and Industry
- 2016 was "A year to learn"
- Future of PWT

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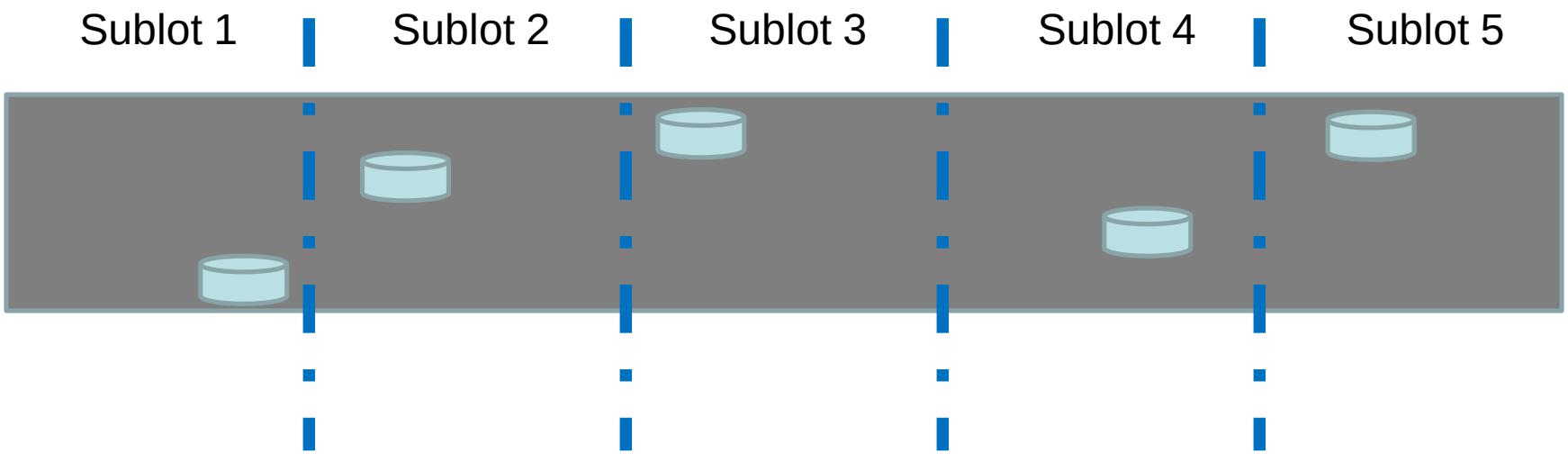
Typical 2,500 ton Lot



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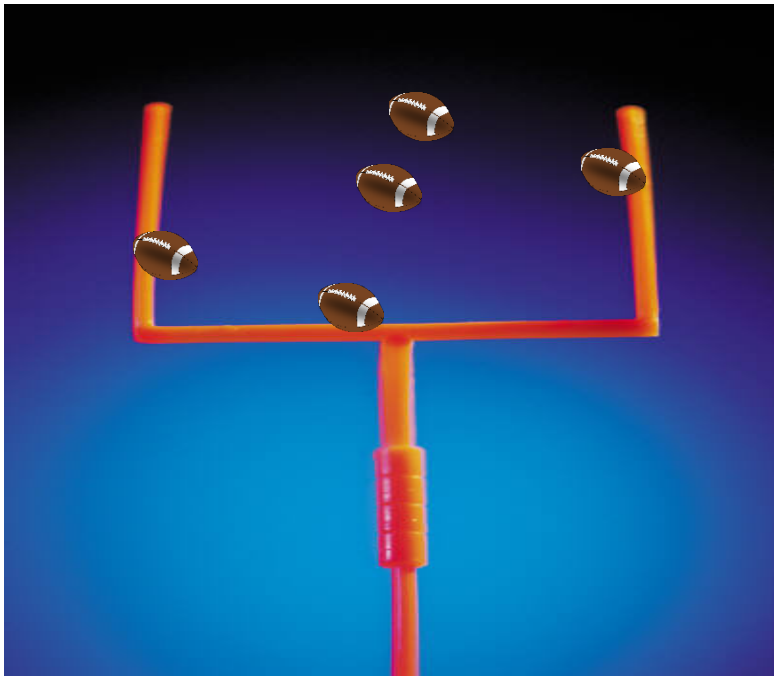
Spec Limits and Goal Posts are Similar



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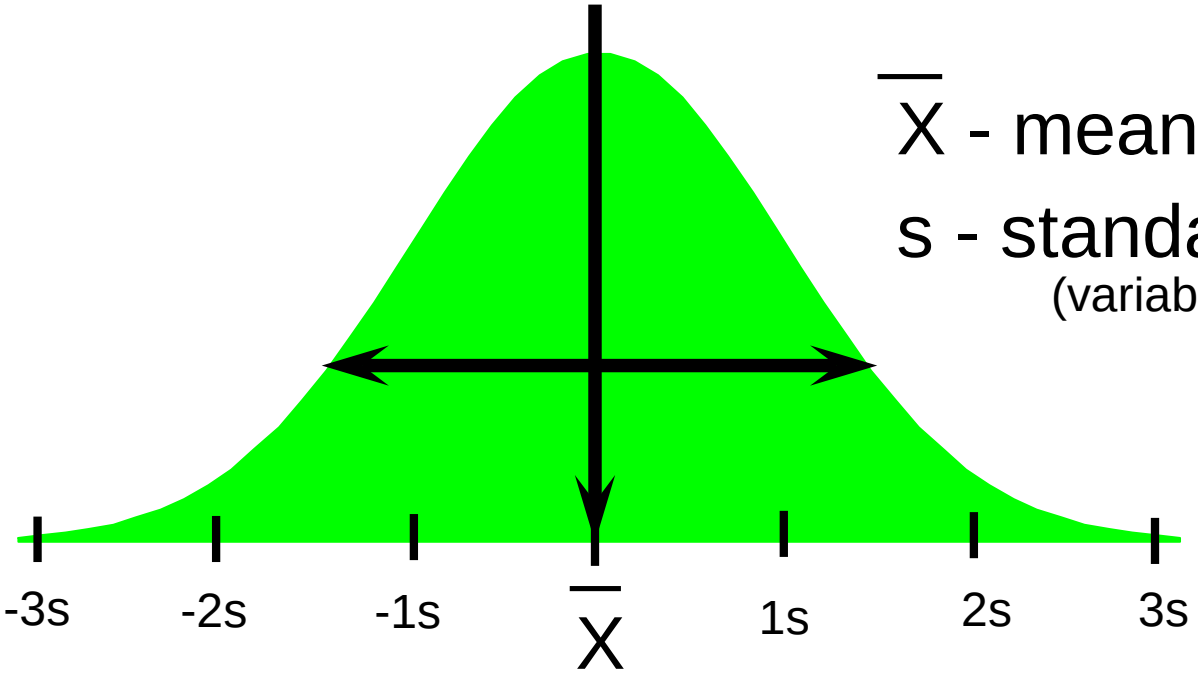
AASHT0 R-10

"Percent within limits is the percentage of the lot falling between upper and lower specification limits. May refer to either the population value or the sample estimate of the population value."

Quality Measure: Percent Within Tolerance (PWT)

- Efficiently captures mean and standard deviation in one quality measure



$\overline{X}$ - mean

s - standard deviation
(variability or dispersion)

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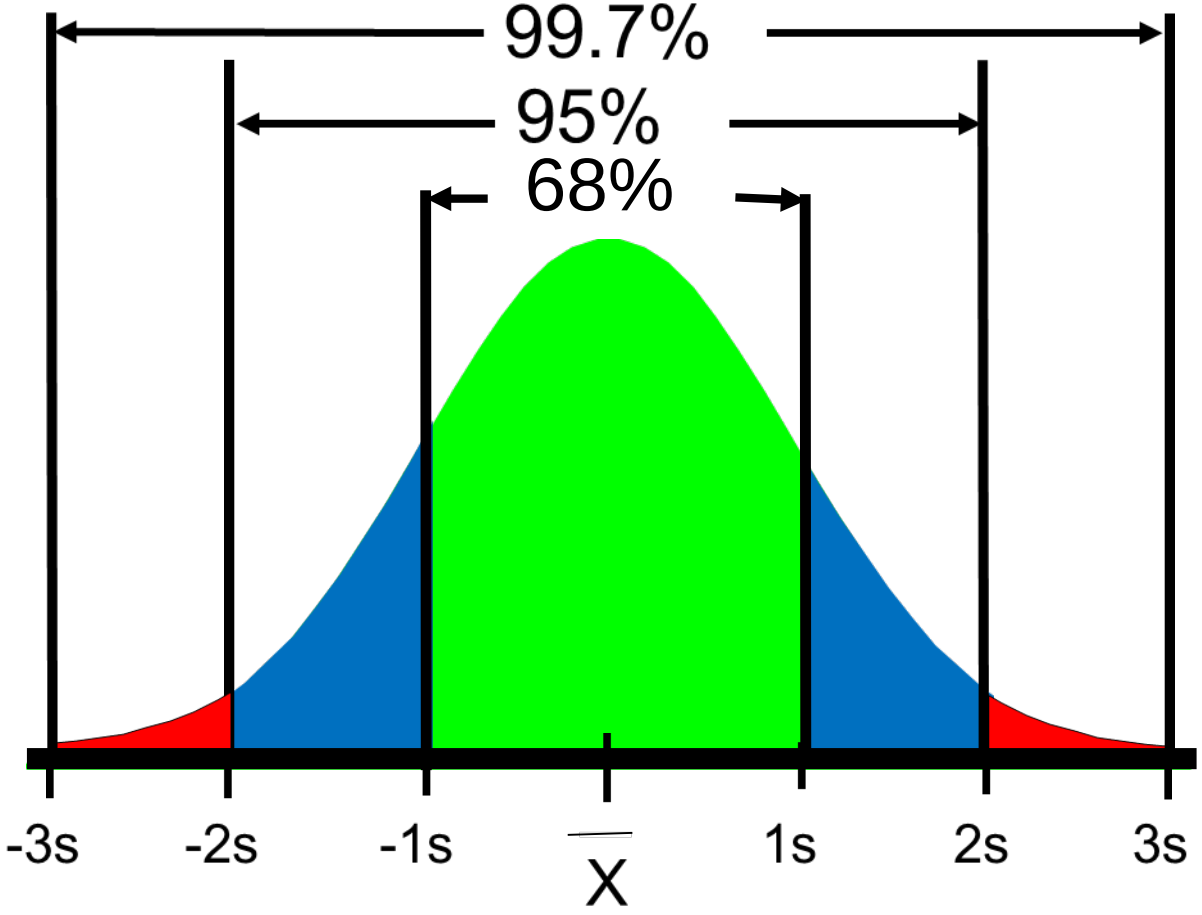
Standard Deviation



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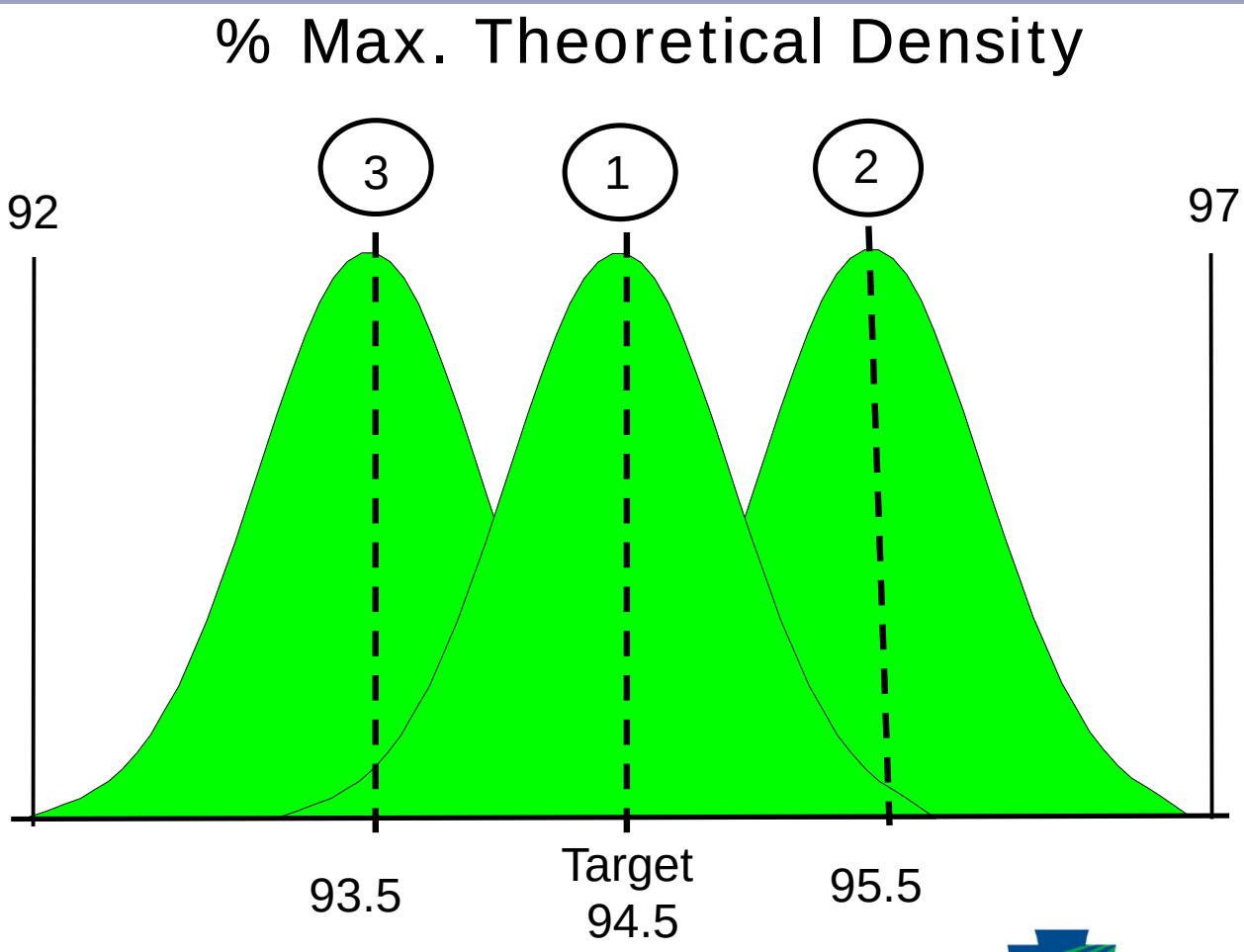
Standard Deviation



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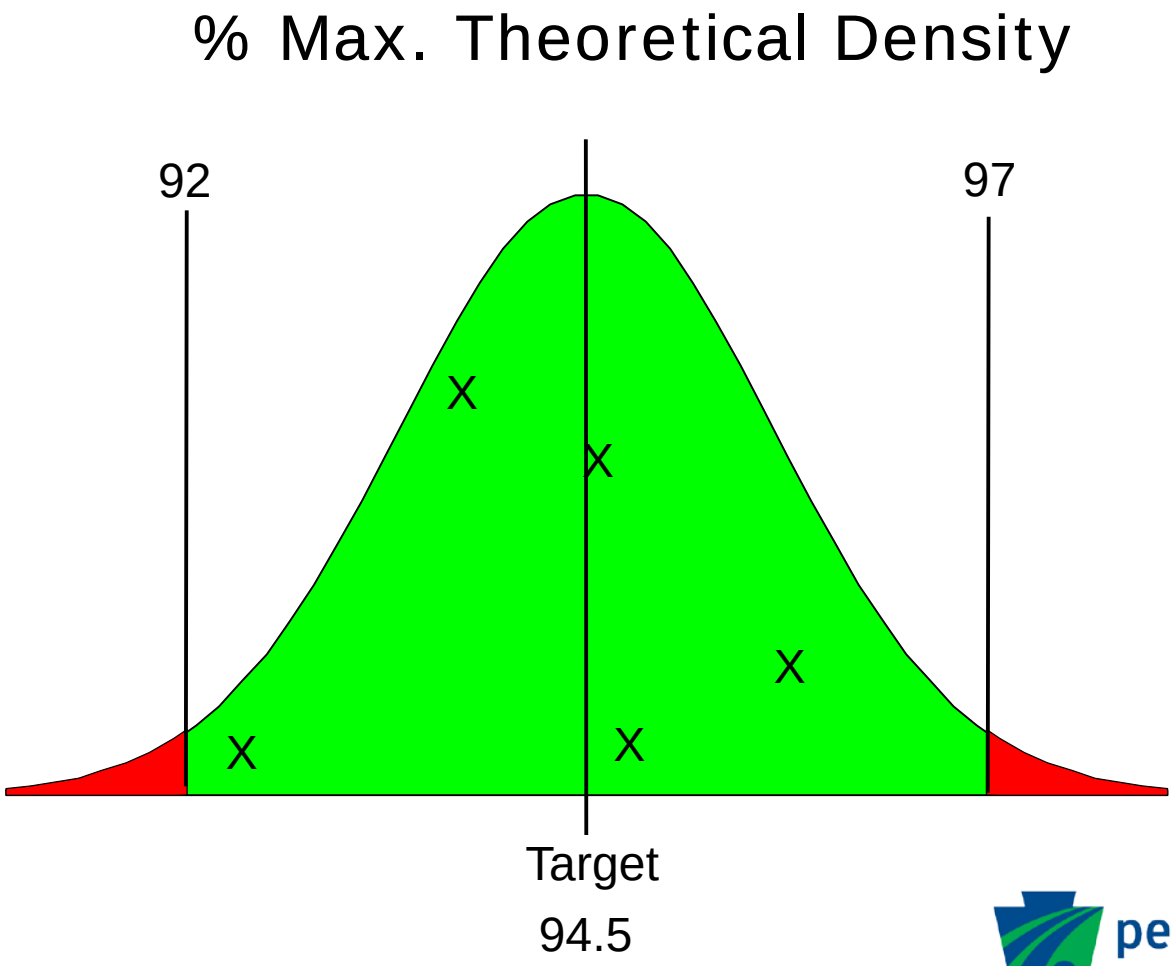
Standard Deviation



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What Does PWT Drive?

- Tighter adherence to producing job mix formula
- Tighter adherence to field density spec. requirements

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Advantages of PWT

- Well suited for low bids to achieve quality
- Contractors = **bonuses** for tighter adherence to targets
- Contractors = **reduced payments** for loose adherence to targets
- Moves focus to targets (NOT minimums/maximums)

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What's different with PWT spec?

- Adds **bonus** structure (maximum 4%)
- Adds **mix gradation** (PCS) as part of payment
- Modifies current "goal posts" approach for 100% payment (good or no good)
- Results in fewer 100% payments and spreads these out (bonus and penalty)

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Payment Equation Changes

- **Current** specification (50% mix, 50% density)
  - 25% asphalt content
  - 25% #200 sieve
  - 50% field density

- **PWT** specification (50% mix, 50% density)
  - 30% asphalt content
  - 10% #200 sieve
  - **10% primary control sieve**
  - 50% field density

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Common to All PWT Specs

- **Defective lots** can be left in place at 70% pay by DE (previously 50% pay)

- **Allows contractor to terminate lot**
  - Allows contractor to limit risk when early QC results indicate an issue
  - Must stop paving
  - 90% maximum pay
  - Must R&R if defective by test results

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Where can PWT be applied?

- Applicable to all bituminous paving items of Sections 309, 311, 316, 409, 410, and 411

- NOT applicable to items such as Stone Matrix Asphalt (SMA), crumb rubber modified asphalt binder, gap-graded asphalt rubber mixtures, FJ-1 Wearing Courses, asphalt warranty pavements, etc.

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Current Status

- **Two (2) methods in use:**

1. **PWT-LTS (Laboratory Testing Section)**
   - Acceptance at LTS
   - Gmm Verification included on Federally Funded and NHS Projects

2. **PWT-HOLA (Hands On Local Acceptance)**
   - Department Acceptance, Contractor Lab
   - Department Option to Witness Only
   - Gmm Verification included on Federally Funded and NHS Projects.(Conducted at Local Lab)

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PWT-LTS

- **Very similar** to **current process**

- Allows a **contractor option** to **expedite sample delivery** to Harrisburg
  - Inspection staff secures samples
  - Secure samples given to contractor
  - Contractor delivers to LTS at his cost
  - LTS verifies security prior to testing
  - 2-3 Standard Work Day Goal at LTS

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PWT-HOLA

- HMA/WMA Material **samples collected** as usual
- **Acceptance testing** performed at:
  - Proficient producers lab
  - or another mutually acceptable lab
- **No LTS acceptance testing** (except for dispute resolution situation)

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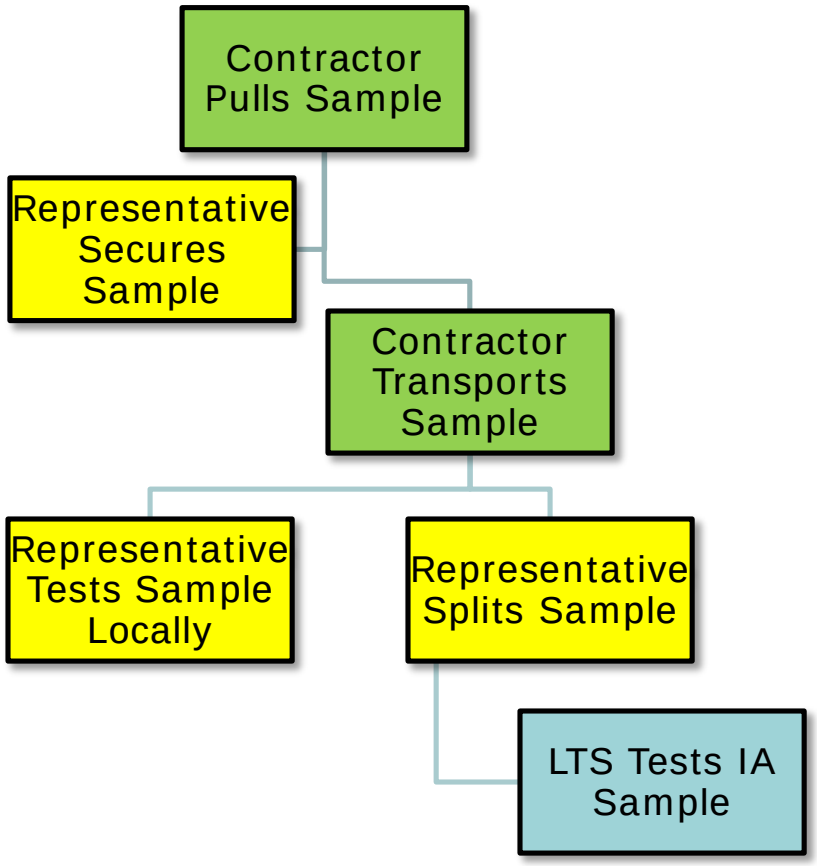
Mixture Sample Collection



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Contractor's Lab Assessment

- Local acceptance lab will need on-site proficiency assessment by re:source (formerly AMRL)
- Every 2 years (from assessment date)
- Assessment on the equipment to be used for acceptance

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Contract Adjustments

- Adjustments entered into ECMS
- “PWT-LTS” or “PWT-HOLA” Adjustment Types
- Attach eCAMMS Report

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2016 PWT Summary

158 PWT Projects Let in 2016

District	Total Active Project	SSP included in Advertisement		SSP Used on Project	
		LTS	HOLA	LTS	HOLA
1-0	9	9	0	6	3
2-0	3	2	1	2	1
3-0	8	7	1	7	1
4-0	3	3	0	3	0
5-0	5	5	0	5	0
6-0	1	1	0	0	1
8-0	25	23	1	24	1
9-0	12	5	7	6	6
10-0	6	5	1	4	2
11-0	7	6	1	2	5
12-0	7	7	0	7	0
Total	**86**	73	12	**66**	**20**

Industry Breakdown of Active Projects		
Prime Contractors (ea.)	Suppliers (Plants) (ea.)	Paving Contractors (ea.)
32	**57**	**31**

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2016 PWT Summary
(As of January 6, 2017)

		Overall Lot Payment Averages			Pay Factor Averages			
	Lots	Average Lot Payment	Average Lot Payment (Cores)	Average Lot Payment (Other)	Asphalt Content	#200 Sieve	Primary Control Sieve	Density (Cores/Optimum Rolling/Non-Movement)
Total	452	1.01	1.02	1.01	101.27	101.12	100.25	101.60
PWT-HOLA	121	1.02	1.02	1.01	102.26	101.98	101.03	101.68
PWT-LTS	331	1.01	1.01	1.00	100.89	100.80	99.95	101.58

	Average Density Pay Factor (Cores Only)					
	Total		HOLA		LTS	
	Lots	Pay Factor	Lots	Pay Factor	Lots	Pay Factor
Total	355	102.03	88	102.26	267	101.96
BPN 1	2	103.00	0	N/A	2	103.00
BPN 2	139	101.82	38	100.82	101	101.92
BPN 3	168	102.21	34	103.24	134	101.95
BPN 4	46	102.60	16	103.61	30	102.06

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2016 PWT Summary
(As of January 6, 2017)

	PWT	Sec. 409	PWT-HOLA	PWT-LTS
Bonus Pay Lots	336	N/A	101	235
100% Pay Lots	30	420	8	22
Reduced Pay Lots	80	21	12	68
Defective Lots	6	11	0	6
Terminated Lots	0	N/A	0	0
Total	452		121	331

District	Incentives	Reductions	Δ
1	$163,333.05	-$55,637.69	$107,695.36
2	$46,908.89	-$18,866.20	$28,042.69
3	$66,837.57	-$18,450.16	$48,387.41
4	$83,430.09	$0.00	$83,430.09
5	$88,680.57	-$20,140.30	$68,540.27
6	$0.00	$0.00	$0.00
8	$213,800.95	-$244,046.31	-$30,245.36
9	$104,490.10	-$45,848.47	$58,641.63
10	$156,313.92	-$4,871.88	$151,442.04
11	$144,013.41	-$20,736.51	$123,276.90
12	$100,296.68	-$26,007.13	$74,289.55
Total	$1,168,105.23	-$454,604.65	$713,500.58

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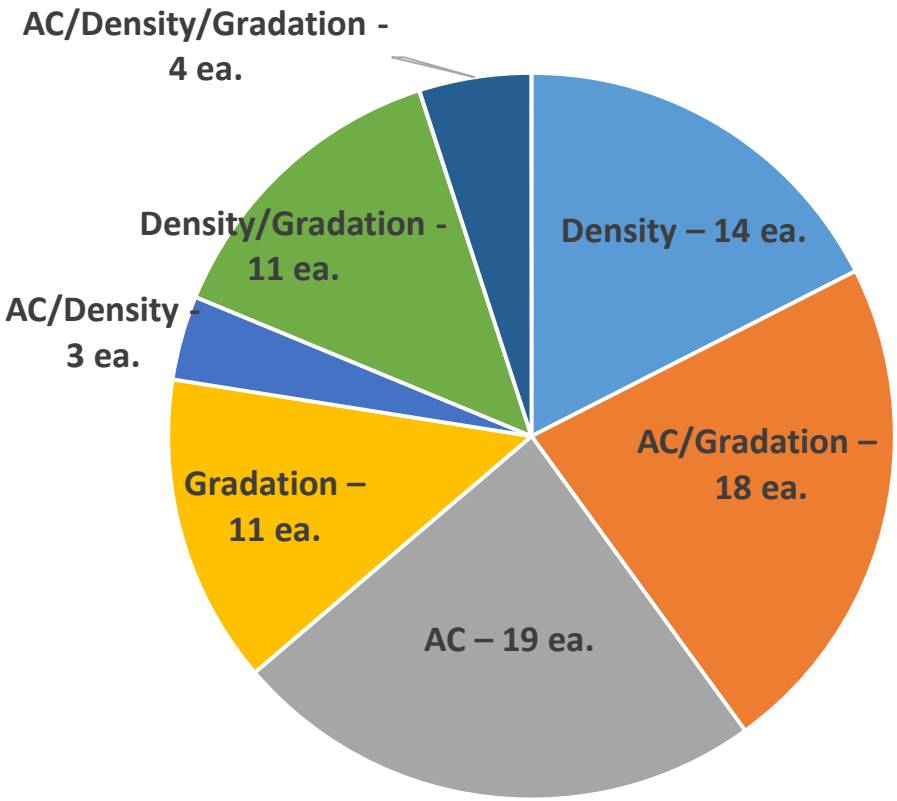
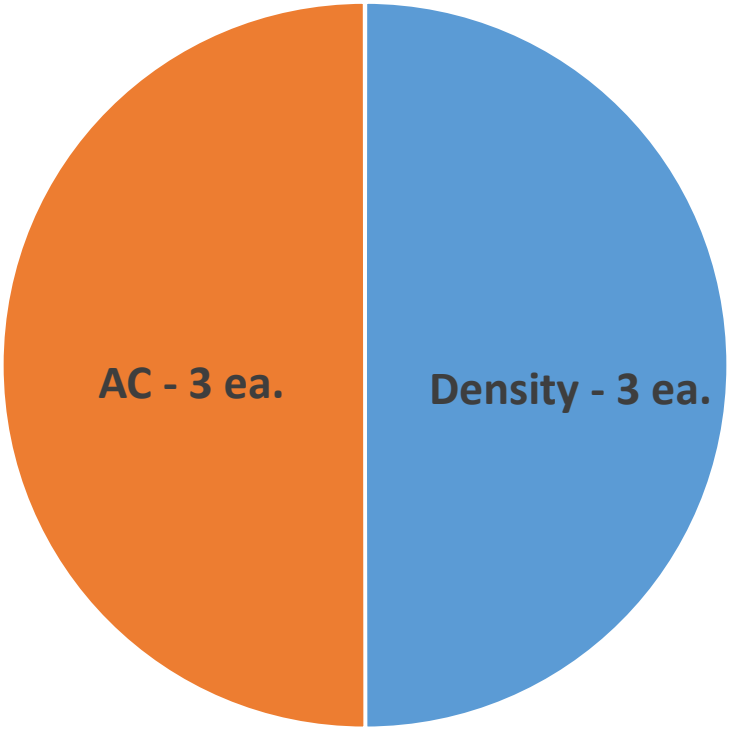
2016 PWT Summary
(As of January 6, 2017)

80 Reduced Pay Lots



6 Defective Lots



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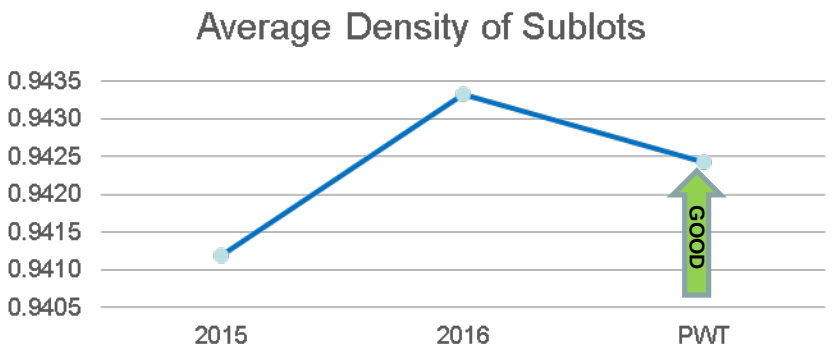
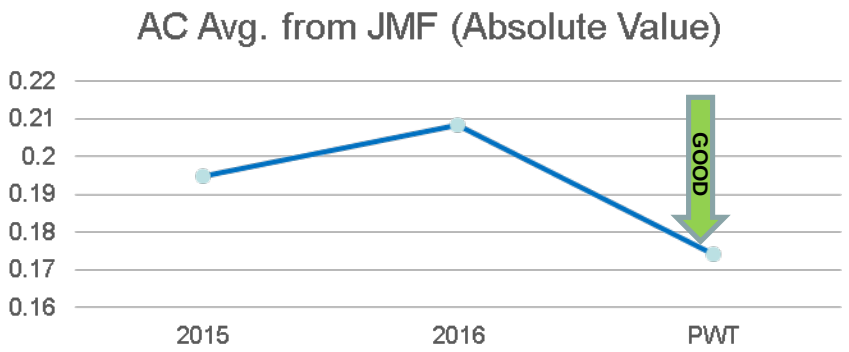
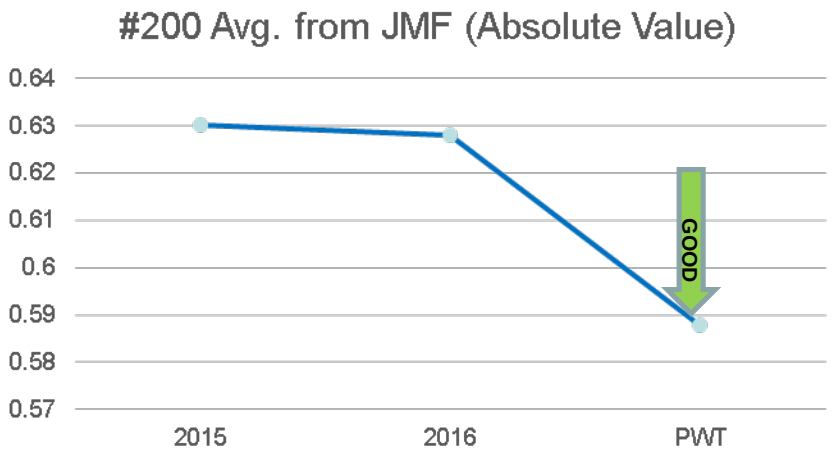
2016 PWT Summary

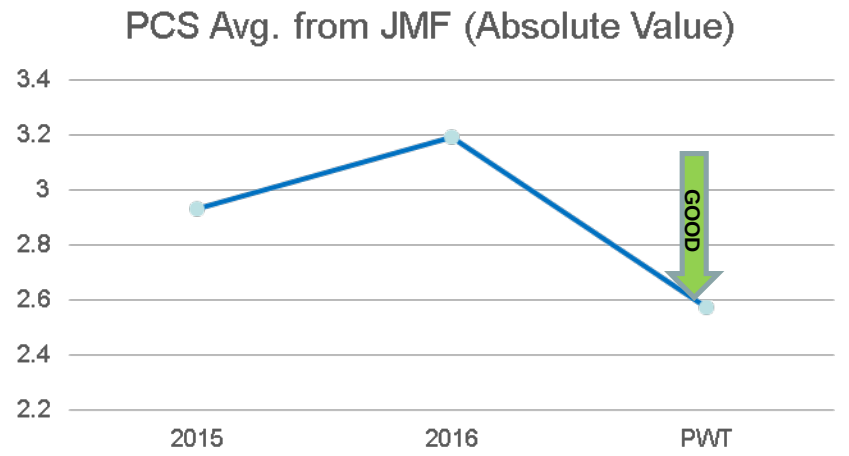
(Data from January 1, 2015 – November 23, 2016)

(Sublot Acceptance Test Results for 9.5mm, 12.5mm, 19mm & 25mm Mixes, excludes SMA)









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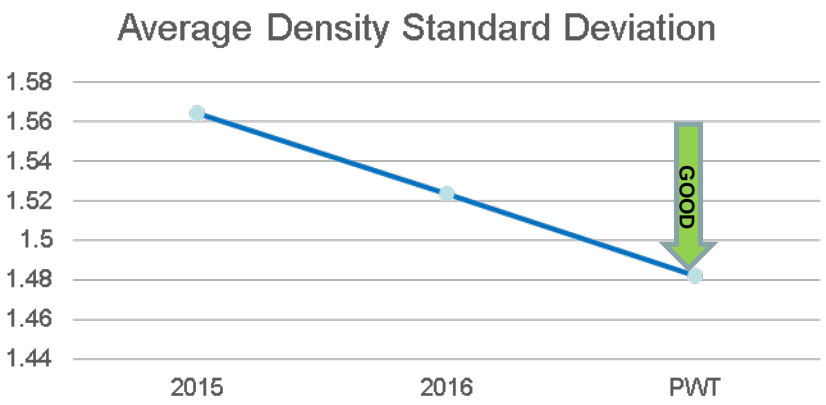
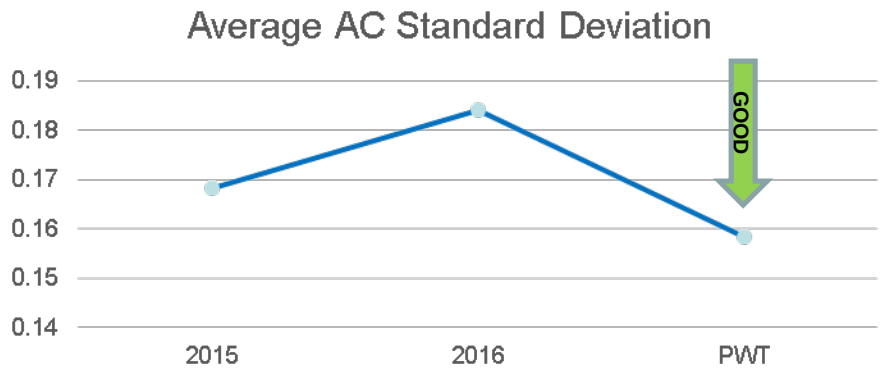
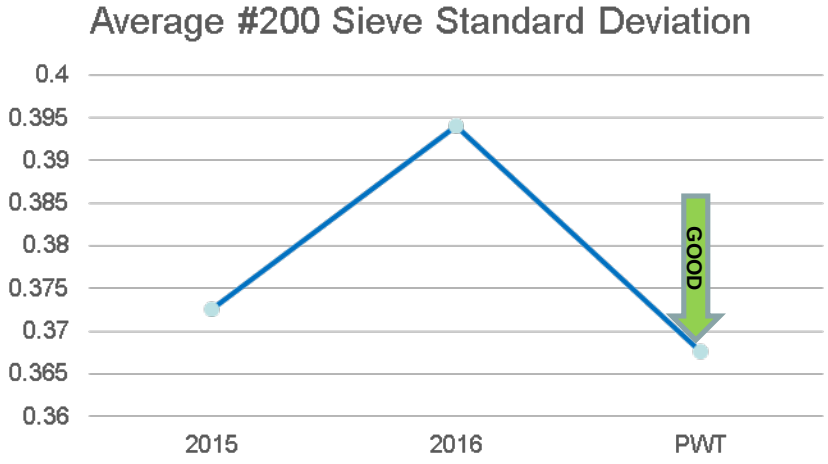
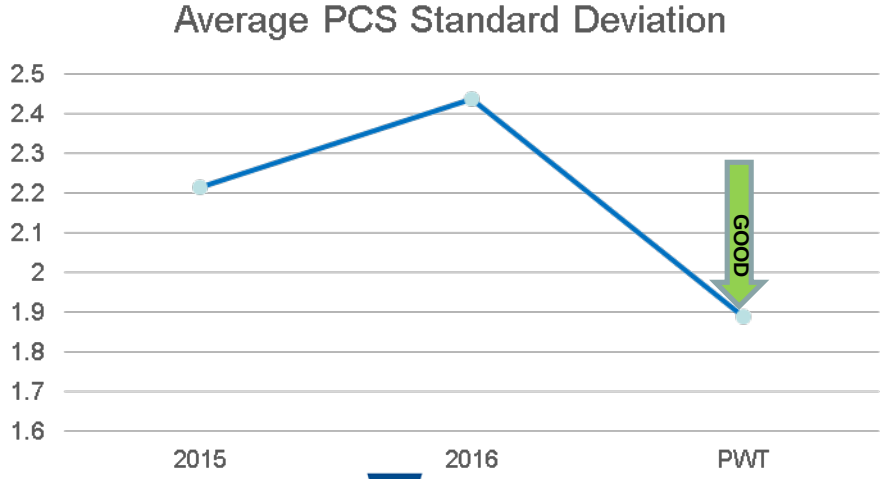
2016 PWT Summary
(Data from January 1, 2015 – November 23, 2016)

(Lot Acceptance Test Results for 9.5mm, 12.5mm, 19mm & 25mm Mixes, excludes SMA)









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2016 After Action Review
Lessons Learned: Sustain and/or Improve

→→→What should we sustain that we are doing right?

- **Standard Special Provisions**
- **Use Guidelines**
- **eCAMMS**

→→→What should we improve that we can do better?

- **Standard Special Provisions**
- **Use Guidelines**
- **eCAMMS**

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2016 After Action Review
Lessons Learned: Sustain

- Standard Special Provisions
  - No Changes to Upper and Lower Spec. Limits
  - No Changes to Payment Formula
  - Retain DISTRICT Option to Witness Only on PWT-HOLA (100% State / Non-NHS)
- Use Guidelines
  - Retain Contractor Request to Re-evaluate Non-RPS Items in Accordance with Section 409 ($PF_D < 100$)
- eCAMMS
  - Bonus and Reduced Pay Lots reported as “P”

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2016 After Action Review
Lessons Learned: Improve

- Standard Special Provisions
  - Updating AMRL to re:source
  - Clarifying Laboratory Assessment Period (24 months from Assessment Date)
  - PWT to PWL (not anticipated for 2017)
- Use Guidelines
  - Appropriate use of Density Acceptance by Cores (ref. Section 409)
  - Contract Item for Bonus/Reductions (PDA)
- eCAMMS
  - Multiple Ignition Oven Calibration Factors (PWT-HOLA)

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2017 Construction Season

- 100% Use of PWT on Paving Projects
- Revised SSPs
- Revised Use Guidelines
- Field Users Guide
- Continued monitoring of all PWT Projects
- 2017 AAR

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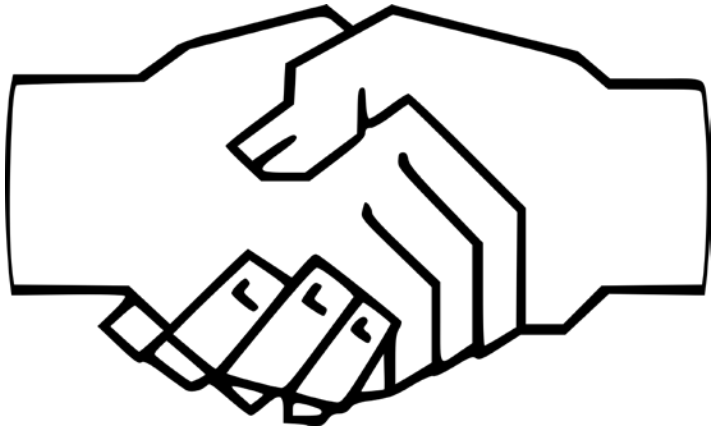
Questions?



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