TERM OF COMMISSION: March Session of the January Adjourned Term

PLACE OF MEETING: Roger B. Wilson Boone County Government Center Chambers

PRESENT WERE: Presiding Commissioner Dan Atwill
District I Commissioner Fred Parry
District II Commissioner Janet Thompson
Buyer Robert Wilson
Captain Gary German
County Counselor CJ Dykhouse
Director Community Services Joanne Nelson
Director Human Resources Jenna Redel
Director Road & Bridge Greg Edington
Road Maintenance Superintendent Bryan Boyce
Deputy County Clerk Michelle Thompson

The meeting was called to order at 1:30 p.m.

Auditor

1. **First Reading; Budget Amendment: To Cover Cost of Semi-Annual Association Assessments for Unit 1 & 2 of the Health Department Building**

Commissioner Thompson explained that this is for the two tenants at the City/County Health Department. Assessments are done to address funding needs and things of that nature every year. This year, the money that was in the sinking fund will be moved to replace siding instead.

There were no comments or questions from the Commission.

Commissioner Atwill stated this is a first reading and requested the Deputy County Clerk to schedule this item for a second reading at the next available commission meeting with appropriate order for approval.

Purchasing

2. **First & Second Reading; Bid Award: 05-04FEB20 – Underground LP Storage Tanks**

Robert Wilson read the following memo:

> 05-04FEB20 – Underground LP Storage Tanks opened on February 04, 2020.
> One (1) bid was received.
> Joint Communications recommends award by only bid to MFA Oil Company of Columbia, Missouri to purchase three (3) 1000-gallon Quality Steel underground LP storage tanks to be installed at the new Support Building.
>
> Cost of the purchase is $13,857.00 and will be paid from department 4103 – ECC Support Services Building, account 71231 – Owner Costs.

There were no comments or questions from the Commission.

Commissioner Thompson moved now on this day, the County Commission of the County of Boone does hereby award bid 05-04FEB20 – Underground LP Storage Tanks to MFA Oil Company of Columbia, Missouri.

Terms of the award are stipulated in the attached Purchase Agreement. It is further ordered the Presiding Commissioner is hereby authorized to sign said Purchase Agreement.

Commissioner Parry seconded the motion.

The motion carried 3 to 0. **Order #110-2020**

3. **First Reading; Bid Award: 07-18FEB20 – Above-ground Diesel Storage Tank**

Robert Wilson read the following memo:

> 07-18FEB20 – Above-ground Diesel Storage Tank opened on February 18, 2020. Three (3) bids were received.
>
> Joint Communications recommends award by lowest responsive bid to Neumayer Equipment Company of St Louis, Missouri to purchase one (1) 2000-gallon WE-MAC diesel storage tank to replace the existing 1,000-gallon storage tank at the ECC Building.
>
> Cost of the purchase is $14,931.40 and will be paid from department 4100 – ECC Facility Construction Project, account 71231 – Owner Costs.

There were no comments or questions from the Commission.

Commissioner Atwill stated this is a first reading and requested the Deputy County Clerk to schedule this item for a second reading at the next available commission meeting with appropriate order for approval.

4. **First Reading; Contract Amendment One: 59-31DEC19C – Mural for Bicentennial**

Robert Wilson read the following memo:

> Contract 59-31DEC19C - Mural for Bicentennial was approved by Commission for award to WildyWorld! LC of Columbia, Missouri on September 17, 2019. This amendment clarifies that Phase I & II were paid by Commissioner Janet Thompson and Phases III, IV and V will be paid by Boone County, Missouri.
>
> Phases I & II previously paid by Commissioner Thompson were $7,000. Phases

III, IV and V are a total of $8,300 and will be paid from department 1190 - non-departmental, account 84010 - receptions/meetings.

There were no comments or questions from the Commission.

Commissioner Atwill stated this is a first reading and requested the Deputy County Clerk to schedule this item for a second reading at the next available commission meeting with appropriate order for approval.

5. **First Reading; Cooperative Contract: 081419 – CDW – Technology Catalog Solutions**

Robert Wilson read the following memo:

The Information Technology Department requests permission to utilize the Sourcewell cooperative term and supply contract 081419-*CDW* to purchase Technology Catalog Solutions from CDW Government LLC of Vernon Hills, Illinois.

This is an Information Technology Term and Supply contract. Invoices will be paid from multiple departments, account 91300 – Machinery and Equipment.

There were no comments or questions from the Commission.

Commissioner Atwill stated this is a first reading and requested the Deputy County Clerk to schedule this item for a second reading at the next available commission meeting with appropriate order for approval.

6. **First Reading; Cooperative Contract: MoDOT Contract 60520CO0242 – Snow/Tow Plows and Parts**

Robert Wilson read the following memo:

> Road & Bridge requests permission to utilize the MoDOT Cooperative Contract 60520CO0242 Snow/Tow Plows and Parts to purchase two (2) Henderson RSP 10'x42" Snow Plows from Henderson Products, Inc.
>
> Cost of the purchase is $16,884.00 and will be paid from department 2040 – PW Maintenance Operations and account 92300 – Replacement Equipment.
>
> This is a replacement purchase and the 2020 budgeted amount was $16,500.00. Budgeted sale value is $500.00, yielding a net cost of $16,000.00.
>
> The contract price is $16,884.00 less the sale price of $500.00 yielding a net cost of $16,384.00
>
> The Purchasing department requests permission to dispose of the following surplus by sale: 2004 Henke 36R10 Snow Plow, fixed asset tag 14784 and 2010 Henke 36R10 Snow Plow, fixed asset tag 17507.

There were no comments or questions from the Commission.

Commissioner Atwill stated this is a first reading and requested the Deputy County Clerk to schedule this item for a second reading at the next available commission meeting with appropriate order for approval.

7. **First Reading; Purchase Agreement: 150-123120SS – Albert Monitoring Services**

Robert Wilson read the following memo:

> Attached for signature is sole source agreement # 150-123120SS - Albert Monitoring Services.
>
> This is an agreement to provide cybersecurity monitoring services. It provides a 24 x 7 x 365 watch and warning center that provides network monitoring, dissemination of cyber threat warnings and vulnerability identification and mitigation recommendations.
>
> The vendor is the Center for Internet Security, Inc. of East Greenbush, New York. This vendor has been approved by the United States Department of Homeland Security as the governmental ISAC (Multi-State Information Sharing and Analysis Center).
>
> Total amount of agreement is $17,100 and will be paid from departments 1170 - Information Technology, 2703 - Information Technology - BCJC/EM, accounts 91301 - Computer Hardware, 70100 - 911/EM Sales Tax Fund. $21,800 was budgeted.

Commissioner Parry asked if this was an annual subscription.

Wilson said yes.

There were no more comments or questions from the Commission.

Commissioner Atwill stated this is a first reading and requested the Deputy County Clerk to

schedule this item for a second reading at the next available commission meeting with appropriate order for approval.

Community Services

8. **First Reading; Service Agreement for Child Abuse Prevention Projects: Children's Trust Fund**

Joanne Nelson explained this was for the Children's Trust Fund and is the award for child abuse prevention projects in the amount of $50,000. The contract goes to July of 2020.

There were no comments or questions from the Commission.

Commissioner Atwill stated this is a first reading and requested the Deputy County Clerk to schedule this item for a second reading at the next available commission meeting with appropriate order for approval.

9. **First Reading; Shelter for Victims of Domestic Violence Agreement: True North of Columbia**

Joanne Nelson said this is for the purchase of shelter for victims of domestic violence. This is an annual contract with True North of Columbia, and it is in the amount of $23,000.

There were no comments or questions from the Commission.

Commissioner Atwill stated this is a first reading and requested the Deputy County Clerk to schedule this item for a second reading at the next available commission meeting with appropriate order for approval.

Sheriff's Department

10. **First & Second; Grant Application: 2019-2020 Missouri State Cyber Crimes Grant**

Gary German explained this is the application for the Missouri State Cyber Crimes Grant which will continue funding for two people for the program. This also includes the software and training for the software. Something new for the year is the network storage system.

There were no comments or questions from the Commission.

Commissioner Parry moved now on this day, the County Commission of the County of Boone does hereby approve the attached 2021 State Cyber Crimes Grant application from the Sheriff's Department.

It is further ordered the Presiding Commissioner is hereby authorized to sign said grant application.

Commissioner Thompson seconded the motion.

The motion carried 3 to 0. **Order #111-2020**

Human Resources

11. **First & Second Reading; Request to reactivate position 700, Lead Deputy Collector, and deactivate position 566 Accountant II for the Collector's Office**

Jenna Redel said this is a request to change the Accountant II position to a Lead Deputy Collector position. This change would bring about a $14,000 savings in the budget. If needed in the future, the Collector could opt to reactive the Accountant II position.

There were no comments or questions from the Commission.

Commissioner Thompson moved now on this day, the County Commission of the County of Boone does hereby approve the request to authorize the re-activation of position 700, Lead Deputy Collector, Range 27, as well as the de-activation of position 566, Accountant II, Range 41. If at a later date, the Boone County Collector determines that staffing needs are better met by a return to the Accountant II position, or some other reorganization, the Collector will make such a change during the annual budget process.

Commissioner Parry seconded the motion.

The motion carried 3 to 0. **Order #112-2020**

12. **First & Second Reading; Request to add a part-time temporary intern for the Prosecutor's Office**

Jenna Redel explained there is currently an un-paid intern position in the Prosecuting Attorney's Office and this order would allow them to do work that would call for pay and insure they get paid for that work.

There were no comments or questions from the Commission.

Commissioner Parry moved now on this day, the County Commission of the County of Boone does hereby approve the request to authorize hiring a temporary part-time Intern, Range 19 (Classification Code 901100) in the Prosecuting Attorney's Office, Department 1262. The position is to be budgeted at a maximum of 500 hours in 2020 and the County Commission does hereby authorize an appropriation of $6,000.00 for the salary of said position. If the Prosecutor's Office seeks to retain the position in 2021, it will make such a request for additional hours in the annual budget process.

Commissioner Thompson seconded the motion.

The motion carried 3 to 0. **Order #113-2020**

Resource Management

13. **Second Reading; 2020 Consultant Services Agreements with the following: (1st read 3-3-20)**
    - **Crockett Geotechnical-Testing Lab**
    - **Midwest Engineering Group, LLC**

Commissioner Thompson moved now on this day, the County Commission of the County of Boone does hereby approve the attached 2020 Annual Consultant Services Agreements for Professional Services with the following:

Crockett Geotechnical-Testing Lab
Midwest Engineering Group, LLC

Terms of the agreements are stipulated in the attached Agreements. It is further ordered the Presiding Commissioner is hereby authorized to sign said General Consultant Services Agreements.

Commissioner Parry seconded the motion.

The motion carried 3 to 0. **Order #114-2020**

Road & Bridge

14. **Surface Aggregate Test: Bonne Femme Church Road**

Greg Edington presented the Commission with a report on the surface aggregate test. That report is included at the end of these minutes.

Edington explained the testing started back in 2018. The road was divided into four 1,500

feet sections. They found that higher plasticity created less dust but did not seem to hold up very well and by the late fall, early winter, the road just fell apart.

Commissioner Parry asked if they learned much else during this test.

Edington explained that they did learn a lot. One thing they learned is that trying to adopt another region's way of doing their roads is not always a good idea with climate differences.

Bryan Boyce said that this type of testing also requires that no maintenance be done to the road while the testing is going on and that is really just impossible.

Commissioner Atwill thanked Edington and Boyce for their effort with this testing and said it appeared to him that the current mixture being used is better than the possible alternatives at this time and the roads are as good as the County can make them given the materials available.

Commission

15. **First Reading; Updated Indigent Cremation and Burial Policy**

CJ Dykhouse explained that the current indigent burial policy has not been changed in thirteen years and it had come to the attention of the Commission that the amount that was being reimbursed to the funeral homes was no longer correctly reflects the costs associated with the work being done. Parker-Millard Funeral Home did some work with some programs in the Kansas City area to work on getting a better reimbursement set up and this updated policy reflects that.

Commissioner Thompson thanked Dykhouse for working with Michele Hall and Parker-Millard to get the policy updated.

There were no more comments or questions from the Commission.

Commissioner Atwill stated this is a first reading and requested the Deputy County Clerk to schedule this item for a second reading at the next available commission meeting with appropriate order for approval.

16. **First & Second Reading; Approve Closed Session authorized per RSMo Sec 610.021 (1) at 2:30 pm on March 10, 2020**

Commissioner Parry moved now on this day, the County Commission of the County of Boone does hereby authorize a closed meeting on Tuesday, March 10, 2020 at 2:30 pm. The meeting will be held in Conference Room 338 of the Roger B. Wilson Boone County Government Center at 801 E. Walnut, Columbia, Missouri, as authorized by RSMo 610.021(1), to discuss legal actions, causes of action or litigation involving a public governmental body and any confidential or privileged communications between a public governmental body or its representatives and its attorneys.

Commissioner Thompson seconded the motion.

The motion carried 3 to 0. **Order #115-2020**

17. **Public Comment**

None

18. **Commission Reports**

None

The meeting adjourned at 1:59 p.m.

Attest:

Brianna L. Lennon
Clerk of the County Commission

Daniel K. Atwill
Presiding Commissioner

Fred J. Parry
District I Commissioner

Janet M. Thompson
District II Commissioner

Surface Aggregate Test: Bonne Femme Church Rd

Boone County Road and Bridge Dept.

June 2018 to June 2019

08/02/2018

Boone County Road and Bridge: Gravel Road Surface Aggregates Study

Purpose:

The purpose of this study is to determine what effects (if any) the plasticity index (PI) and percent of the aggregate passing a #200 sieve (PP200) of road surface aggregates have on the maintenance of loose aggregate roads in Boone County, Missouri. Specifially, how do these properties affect:

1. The road surface's resistance to wear from daily traffic,
2. The volatile dust emitted from the road surface by a single passenger vehicle, and
3. (Optional but curious) The road surface's resistance to various climatic and weather conditions.

Background Information:

.... (still working on it)....

Methods:

The study area consists of the first 1600 feet of the loose aggregate portion of Bonne Femme Church Rd in Boone County, Missouri, USA, which was divided into four segments ranging in length from 360 feet to 395 feet. Each segment received a different surface aggregate. Boone County Road and Bridge prepared the segments by first reshaping the crown of the road to 4%, applying two inches of 1" Type 5 Base aggregate, wetting and rolling the base aggregate to at least 90% compaction, and then repeating those steps for 2" of surface aggregate. "Resistance to wear" will be measured as changes in surface crown, ravelling, corrugation, rutting, potholing, and dust emmision. Measurement methods and subsequent ratings are based on those presented in Woll et al. 2008 Appendix B.

Corrugation: Every occurrence of corrugation will be measured and mapped as a polygon within each test segment. The depth of six consecutive troughs will be measured near the center of each washboard polygon. These depths will be averaged per test segment, and that value will be used to produce a rating.

Rutting: Every observed rut will be measured and mapped within each test segment. Three depth measurements will be taken at random locations within eachrut, and those depths will be averaged to produce a rating.

Ravelling: Ravelling will be measured at three locations per test segment – once in the center of the segment and 100 feet to either side of the center. Depth of accumulated surface aggregate will be measured at the inside and outside edges of each wheel path, and the average of these measurements used to produce a rating.

Potholing: Potholing will be measured by one of two methods, which will be determined on-site during the first measurement event. The first method is taken directly from Woll et al. 2008, where potholes will be counted and measured within predetermined 25-foot sections of road. For our study, these sections will be centered on the locations where ravelling measurements are taken. The second method

will involve counting, measuring, and mapping every pothole in each test segment. In both cases, an average pothole depth will be calculated per segment and used assign a rating to the segment.

Crown: Crown will be measured every third measurement event at locations where ravelling is also measured. Relative crown elevations will be measured at the road center, each road edge, and the bottom of each ditch using a laser surveyor's level from predetermined, fixed viewpoints. Percent crown will be calculated for each measurement location so that an average crown can be subsequently calculated per test segment.

Dust Emission: Dust emission will be measured using a Dustrck DRX mounted to the tailgate of a ½ ton pickup truck. Data will be collected every second as the vehicle travels at 25 mph. For each measurment event, beginning and ending points will be recorded using Collector for ArcGIS so that a line of travel can be drawn and data points from the Dustrack DRX fitted to and spaced evenly along said line.

Boone County Road and Bridge intends to measure the test segments once per month or as weather permits.

Rock ID	Rock Description	Size (in)	Vendor	Quarry	Formation	Ledges	P_#30	P_#200	PI	LL	PL		Dust Ratio	Soil Quality (PI/LL*100)	Dust * Quality
0	1" Commercial Base	0.75	Boone Quarries	Riggs	Burlington	1, 2, 3, 4, 5	35	20	6	21	15		0.57	28.57	16.33
1	Type 1 Base	1	Boone Quarries	Big Springs	Plattin	1	15	10	7	19	13		0.67	36.84	24.56
2	1" Surface	1	Boone Quarries	Boone East	Chouteau	8, 9	17	12	6	18	12		0.71	33.33	23.53
3	Cement Treated Type 5 Base	0.50	Capital Quarries	63 North			23	13.7	1	19	18		0.60	5.26	3.14
													from Faiz, 1972		from Dekoltz, 1940

Agg_Descr	Vendor	Quarry	PI	Passing_200
Big Springs Type 1 Base	Boone Quarries	Big Springs	7	10
Riggs Type 1 Base	Boone Quarries	Riggs	6	20
Boone East 1" Surface	Boone Quarries	Creasy Springs East	6	12
Capital Type 5 Base	Capital Quarries	63 North	1	13.7

Questions of Interest

1. What effects do the plasticity index and the percent of aggregate passing a #200 sieve have on:
   - The performance/durability/etc of a loose aggregate road surface; and
   - The volatile dust emitted from a loose aggregate road surface?

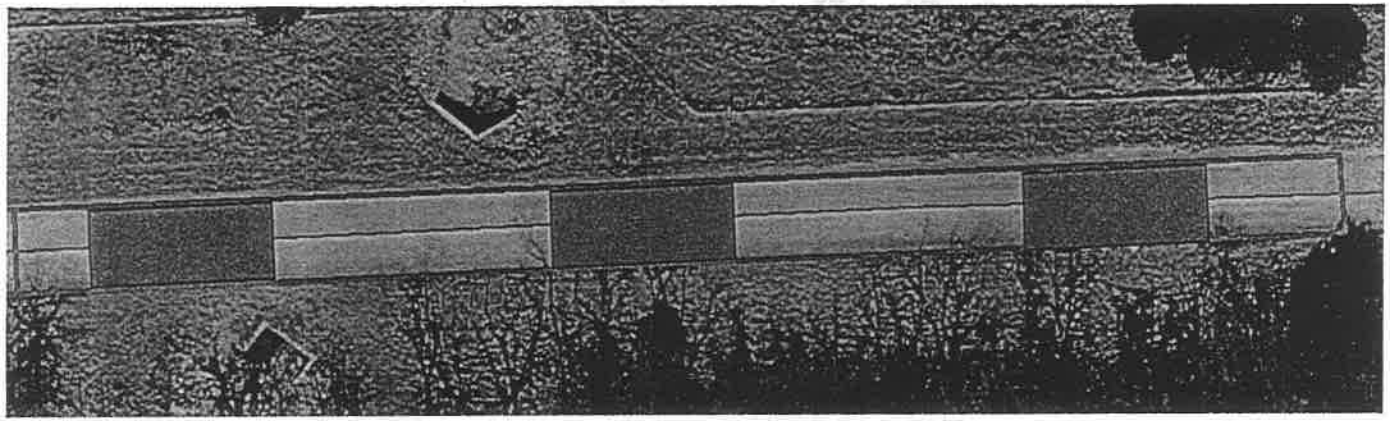
2. Do the variation in observed effects correlate with the variation of any known spatial variables?
   - Elevation changes, shade, etc

Study Area

- Average Daily Traffic: 125 vehicles
- Elevation and amount of shade varies
- Total Length: 1487 ft
  - Big Springs: 365 ft
  - Riggs: 392 ft
  - Boone East: 360 ft
  - Capital: 370 ft
- Total Area: 3,578.4 yd^2
  - Big Springs: 900.6 yd^2
  - Riggs: 1,007.4 yd^2
  - Boone East: 843.0 yd^2
  - Capital: 827.4 yd^2

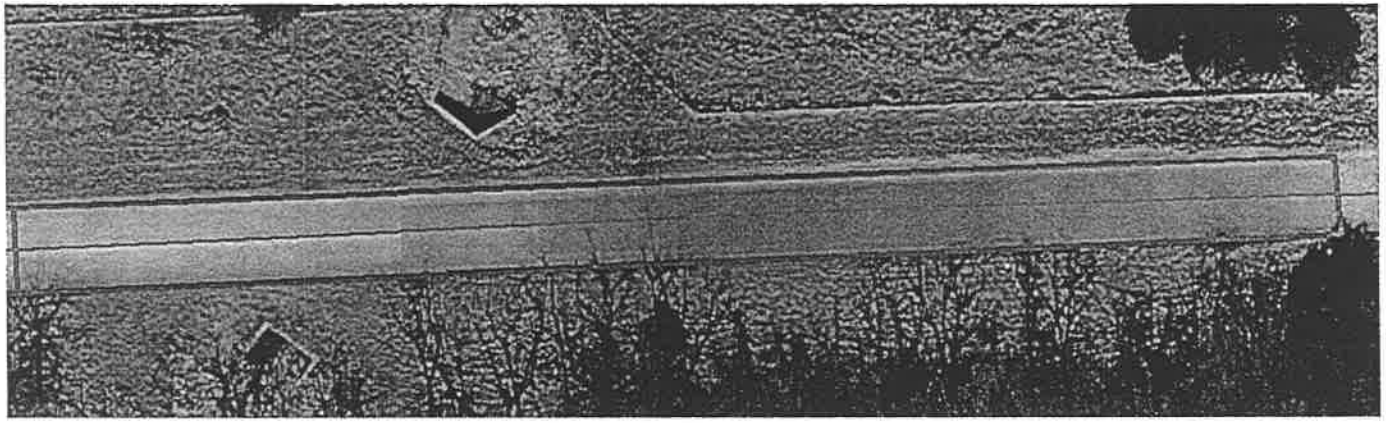
Objective Methods: Washboarding

from Woll et al. 2008



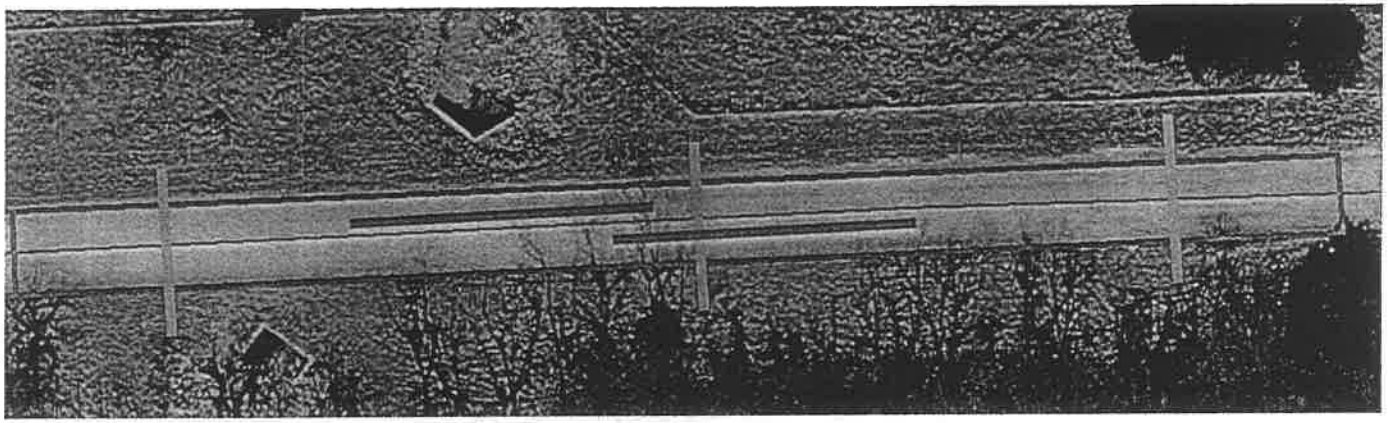
- Measure the number and depth of parallel troughs within a pre-determined 25-foot segment(s) of road
- Six trough depth measurements will be taken, distributed evenly among the wheel paths
- Average the trough measurements per test section to produce a rating

Objective Methods: Washboarding



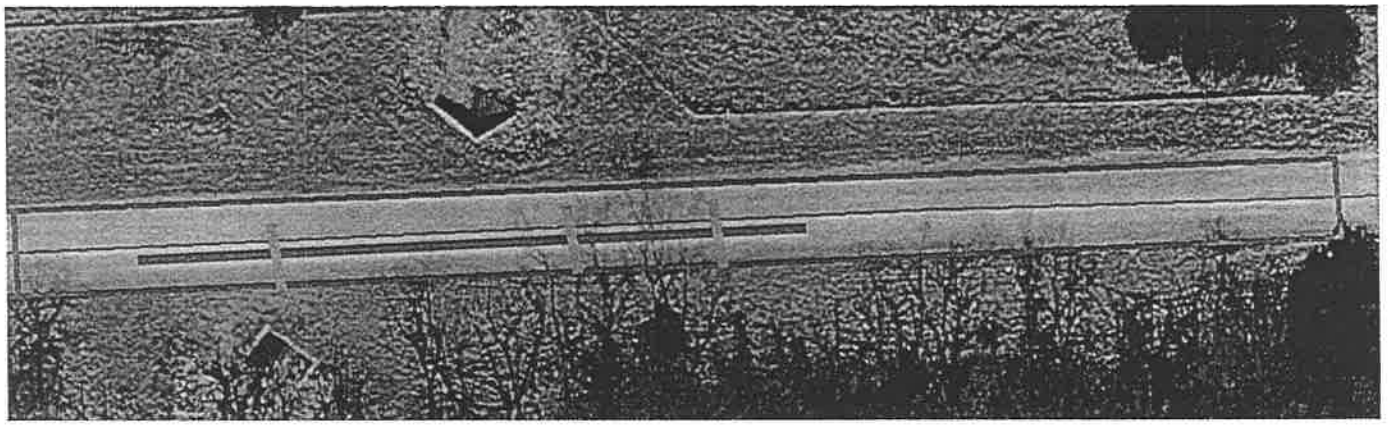
- Measure six parallel troughs, divided between wheel paths, for each observed washboard within a test segment
- Average the six measurements to produce a rating
- Map the extent of the washboard as a polygon

Objective Methods: Rutting from Woll et al. 2008



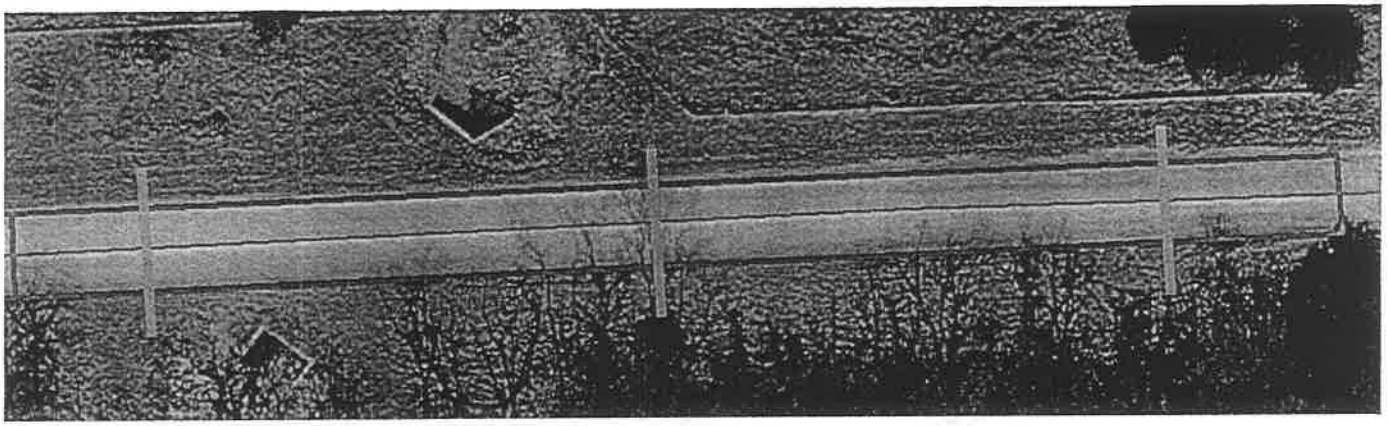
- Measure the depth of rutting with a straightedge and ruler at predetermined locations in the test section
- Average the measurements to produce a rating

Objective Methods: Rutting



- Measure the depth of rutting with a straightedge and ruler at >= 3 random locations along the rut
- Average the measurements to produce a rating
- Map the extent of the rutting as a line

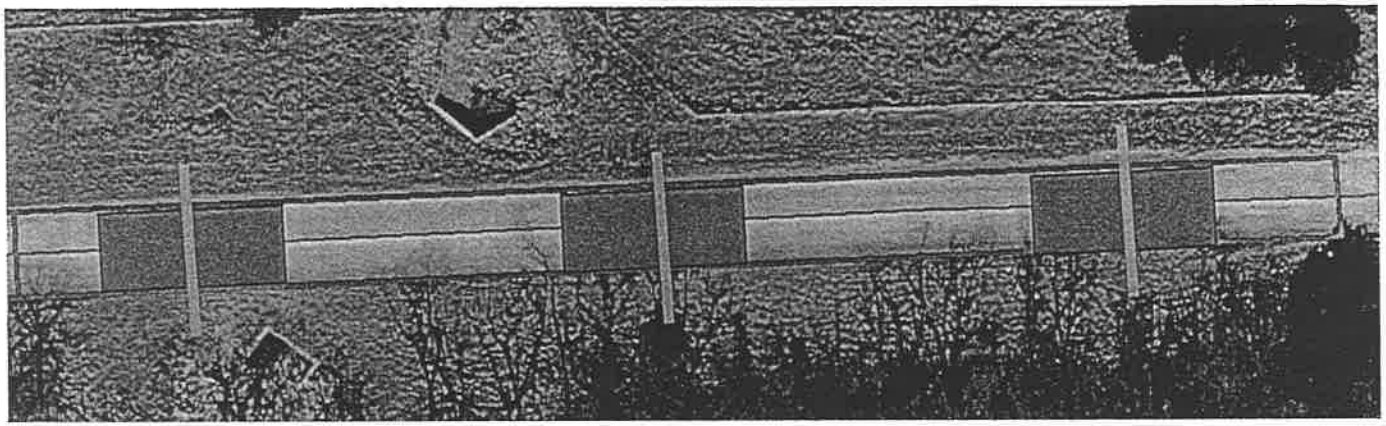
Objective Methods: Ravelling from Woll et al. 2008



- Measure the depth of material accumulated by scraping loose aggregate away until the packed road surface is exposed at predetermined locations
- If there are two wheel paths, measure outside and between them
- If there are three wheel path, only measure to the outside of them

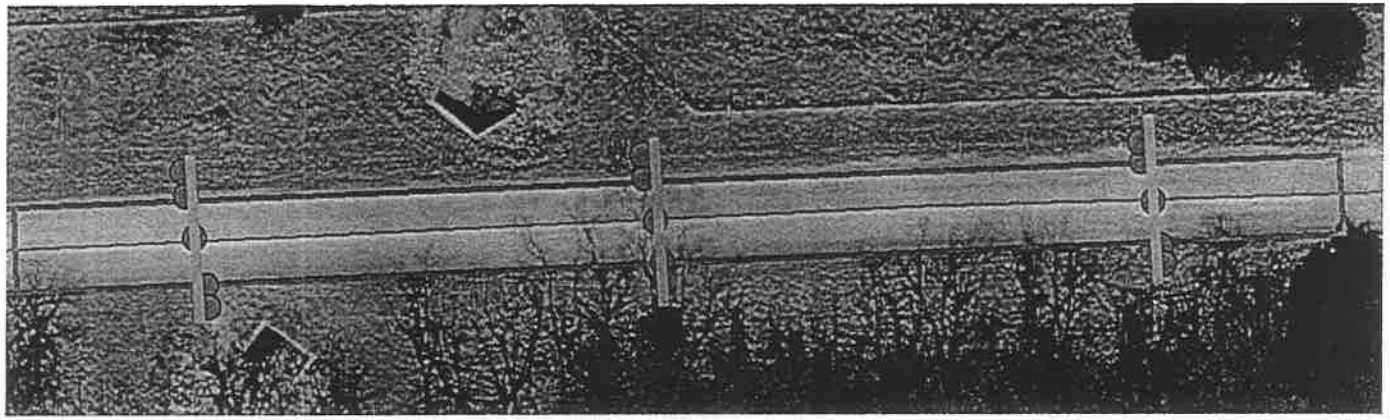
Objective Methods: Potholing

from Woll et al. 2008



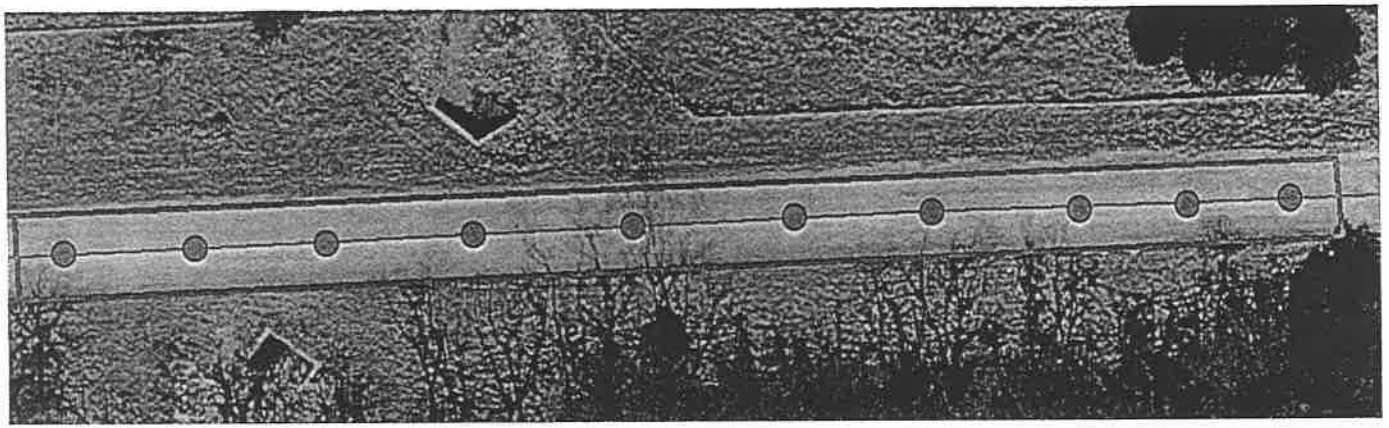
- Measure the number and depth of potholes within predetermined 25-foot segments within each test section
- Average the pothole depths for each 25-foot segment

Methods: Crown



- Measure the elevation of the road surface at its center and both edges at three locations per test segment
- Measure the elevation of the ditch on both sides of the road at three locations per test segment

Methods: Dust Emission



- Measure the volatile dust emitted from the road surface using a Dustrack DRX mounted to the tailgate of a ½ ton pickup truck travelling 25 mph
- Results in one measurement every 36.67 ft, or approximately 10 measurements per 375-foot segment

Analysis: Washboarding, Rutting, Potholes

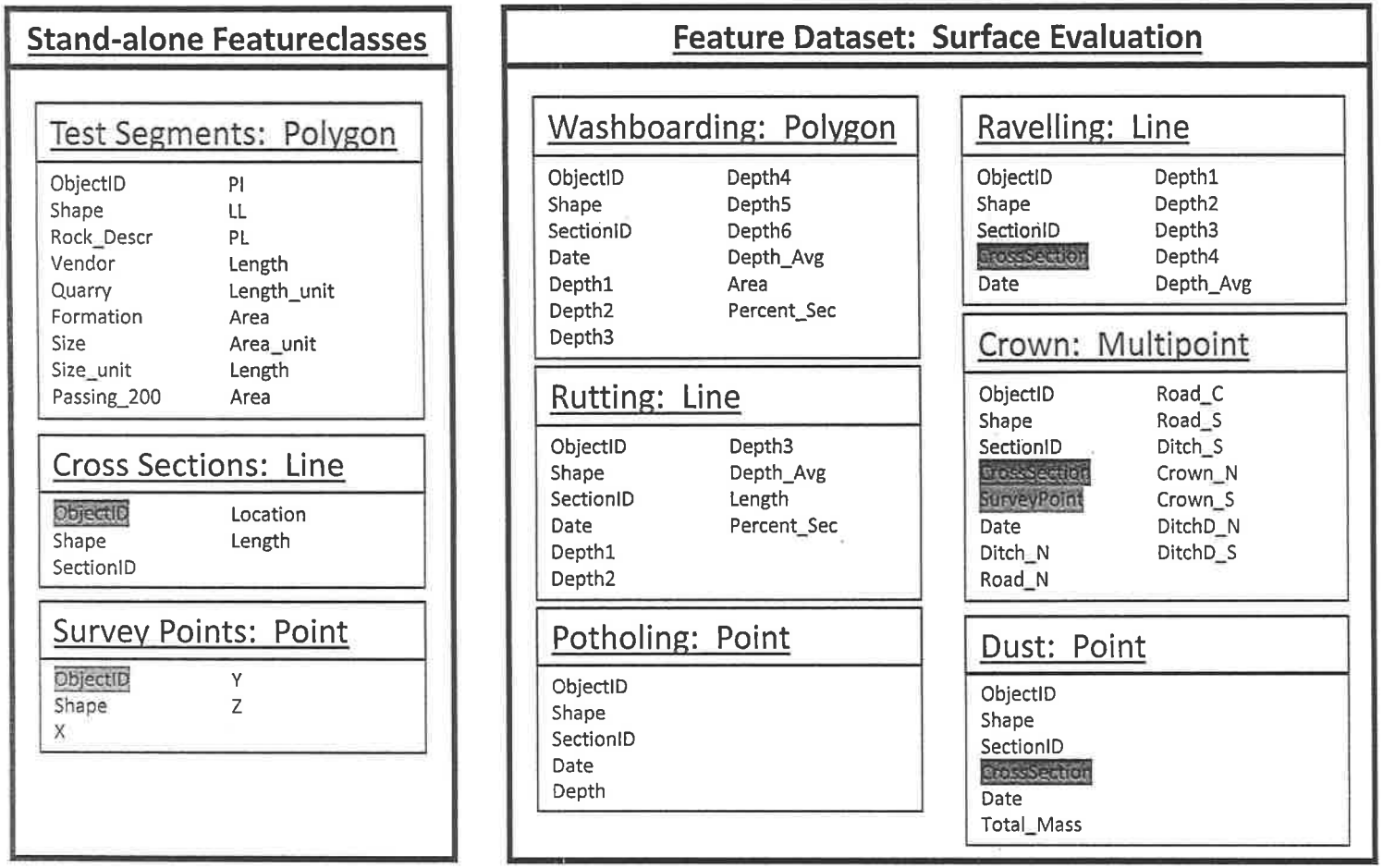
- For each measurement date, calculate the % of the segment affected using the rating as a severity factor
- Compare this calculation between rock types for each characteristic of interest
- Does the spatial variation observed with washboards correlate to other spatial variables?

Analysis: Ravelling

- Calculate the average per test segment of the total depth of accumulated gravel per measurement location
- Calculate the average per test segment of the change in depth of accumulated gravel between measurement dates per measurement location
- Compare this calculation between rock types for each characteristic of interest
- Does the spatial variation observed with washboards correlate to other spatial variables?

Analysis: Dust

- Calculate the average and total amount of volatile dust emitted per test segment
- Calculate the average and total amount of volatile dust emitted per measurement date for each test segment
- Compare this calculation between rock types for each characteristic of interest
- Does the spatial variation observed with washboards correlate to other spatial variables?


Stand-alone Featureclasses
Test Segments: Polygon
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Rock_Descr
Vendor
Quarry
Formation
Size
Size_unit
Passing_200
PI
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Length
Length_unit
Area
Area_unit
Length
Area
Cross Sections: Line
ObjectID
Shape
SectionID
Location
Length
Survey Points: Point
ObjectID
Shape
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Feature Dataset: Surface Evaluation
Washboarding: Polygon
ObjectID
Shape
SectionID
Date
Depth1
Depth2
Depth3
Depth4
Depth5
Depth6
Depth_Avg
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Percent_Sec
Rutting: Line
ObjectID
Shape
SectionID
Date
Depth1
Depth2
Depth3
Depth_Avg
Length
Percent_Sec
Potholing: Point
ObjectID
Shape
SectionID
Date
Depth
Ravelling: Line
ObjectID
Shape
SectionID
CrossSection
Date
Depth1
Depth2
Depth3
Depth4
Depth_Avg
Crown: Multipoint
ObjectID
Shape
SectionID
CrossSection
SurveyPoint
Date
Ditch_N
Road_N
Road_C
Road_S
Ditch_S
Crown_N
Crown_S
DitchD_N
DitchD_S
Dust: Point
ObjectID
Shape
SectionID
CrossSection
Date
Total_Mass

Run	ID	Date	Time	PM1	PM2.5	RESP	PM10	TOTAL
1	1	9/14/2018	13:08:39	0.01	0.011	0.012	0.012	0.012
1	2	9/14/2018	13:08:40	0.023	0.025	0.028	0.035	0.035
1	3	9/14/2018	13:08:41	0.042	0.045	0.053	0.086	0.086
1	4	9/14/2018	13:08:42	0.087	0.092	0.104	0.17	0.17
1	5	9/14/2018	13:08:43	0.094	0.106	0.137	0.253	0.253
1	6	9/14/2018	13:08:44	0.086	0.098	0.125	0.232	0.232
1	7	9/14/2018	13:08:45	0.06	0.068	0.086	0.169	0.169
1	8	9/14/2018	13:08:46	0.043	0.049	0.068	0.144	0.144
1	9	9/14/2018	13:08:47	0.03	0.034	0.05	0.084	0.084
1	10	9/14/2018	13:08:48	0.048	0.052	0.063	0.098	0.098
1	11	9/14/2018	13:08:49	0.079	0.085	0.102	0.175	0.175
1	12	9/14/2018	13:08:50	0.078	0.084	0.106	0.212	0.212
1	13	9/14/2018	13:08:51	0.087	0.095	0.12	0.195	0.195
1	14	9/14/2018	13:08:52	0.085	0.096	0.131	0.255	0.255
1	15	9/14/2018	13:08:53	0.039	0.046	0.066	0.154	0.154
1	16	9/14/2018	13:08:54	0.052	0.056	0.069	0.121	0.121
1	17	9/14/2018	13:08:55	0.037	0.042	0.054	0.1	0.1
1	18	9/14/2018	13:08:56	0.032	0.036	0.048	0.082	0.082
1	19	9/14/2018	13:08:57	0.023	0.026	0.037	0.065	0.065
1	20	9/14/2018	13:08:58	0.023	0.026	0.032	0.064	0.064
1	21	9/14/2018	13:08:59	0.051	0.054	0.061	0.105	0.105
1	22	9/14/2018	13:09:00	0.064	0.069	0.089	0.165	0.165
1	23	9/14/2018	13:09:01	0.151	0.158	0.186	0.283	0.283
1	24	9/14/2018	13:09:02	0.296	0.31	0.359	0.578	0.578
1	25	9/14/2018	13:09:03	0.062	0.076	0.12	0.283	0.283
1	26	9/14/2018	13:09:04	0.046	0.054	0.081	0.177	0.177
1	27	9/14/2018	13:09:05	0.027	0.032	0.048	0.097	0.097
1	28	9/14/2018	13:09:06	0.035	0.039	0.049	0.077	0.077
1	29	9/14/2018	13:09:07	0.036	0.041	0.058	0.102	0.102
1	30	9/14/2018	13:09:08	0.017	0.022	0.034	0.056	0.056
1	31	9/14/2018	13:09:09	0.027	0.03	0.038	0.048	0.048
1	32	9/14/2018	13:09:10	0.061	0.065	0.082	0.134	0.134
1	33	9/14/2018	13:09:11	0.091	0.096	0.119	0.201	0.201
1	34	9/14/2018	13:09:12	0.171	0.182	0.231	0.407	0.407
1	35	9/14/2018	13:09:13	0.059	0.071	0.117	0.316	0.316
1	36	9/14/2018	13:09:14	0.079	0.086	0.113	0.24	0.24
1	37	9/14/2018	13:09:15	0.09	0.099	0.137	0.31	0.31
1	38	9/14/2018	13:09:16	0.114	0.122	0.149	0.281	0.281
1	39	9/14/2018	13:09:17	0.387	0.398	0.442	0.646	0.646
1	40	9/14/2018	13:09:18	0.362	0.389	0.493	0.979	0.979
1	41	9/14/2018	13:09:19	0.086	0.106	0.18	0.496	0.496
1	42	9/14/2018	13:09:20	0.057	0.068	0.103	0.204	0.204
1	43	9/14/2018	13:09:21	0.075	0.083	0.112	0.19	0.191
1	44	9/14/2018	13:09:22	0.071	0.077	0.099	0.162	0.172
1	45	9/14/2018	13:09:23	0.082	0.088	0.11	0.199	0.204
1	46	9/14/2018	13:09:24	0.073	0.078	0.096	0.19	0.19
1	47	9/14/2018	13:09:25	0.103	0.109	0.133	0.255	0.255
1	48	9/14/2018	13:09:26	0.089	0.097	0.126	0.267	0.267
1	49	9/14/2018	13:09:27	0.054	0.06	0.085	0.221	0.221
1	50	9/14/2018	13:09:28	0.032	0.036	0.047	0.144	0.144
1	51	9/14/2018	13:09:29	0.045	0.048	0.055	0.113	0.113
1	52	9/14/2018	13:09:30	0.087	0.091	0.11	0.199	0.199
1	53	9/14/2018	13:09:31	0.072	0.077	0.099	0.225	0.225
1	54	9/14/2018	13:09:32	0.045	0.049	0.067	0.159	0.159
1	55	9/14/2018	13:09:33	0.044	0.046	0.063	0.142	0.143
1	56	9/14/2018	13:09:34	0.036	0.038	0.05	0.129	0.141
2	1	9/14/2018	13:15:47	0.004	0.004	0.004	0.006	0.006
2	2	9/14/2018	13:15:48	0.007	0.007	0.008	0.008	0.008
2	3	9/14/2018	13:15:49	0.009	0.009	0.01	0.013	0.013
2	4	9/14/2018	13:15:50	0.013	0.014	0.015	0.022	0.022
2	5	9/14/2018	13:15:51	0.045	0.047	0.052	0.062	0.062
2	6	9/14/2018	13:15:52	0.074	0.081	0.108	0.186	0.186
2	7	9/14/2018	13:15:53	0.016	0.022	0.043	0.14	0.14
2	8	9/14/2018	13:15:54	0.044	0.048	0.064	0.115	0.115
2	9	9/14/2018	13:15:55	0.03	0.034	0.05	0.104	0.104
2	10	9/14/2018	13:15:56	0.037	0.04	0.05	0.084	0.084
2	11	9/14/2018	13:15:57	0.039	0.043	0.056	0.092	0.092
2	12	9/14/2018	13:15:58	0.02	0.023	0.034	0.065	0.065
2	13	9/14/2018	13:15:59	0.018	0.021	0.027	0.043	0.043
2	14	9/14/2018	13:16:00	0.018	0.021	0.028	0.044	0.044
2	15	9/14/2018	13:16:01	0.015	0.017	0.023	0.032	0.032
2	16	9/14/2018	13:16:02	0.047	0.049	0.058	0.085	0.085
2	17	9/14/2018	13:16:03	0.032	0.036	0.049	0.117	0.117
2	18	9/14/2018	13:16:04	0.025	0.027	0.038	0.074	0.075

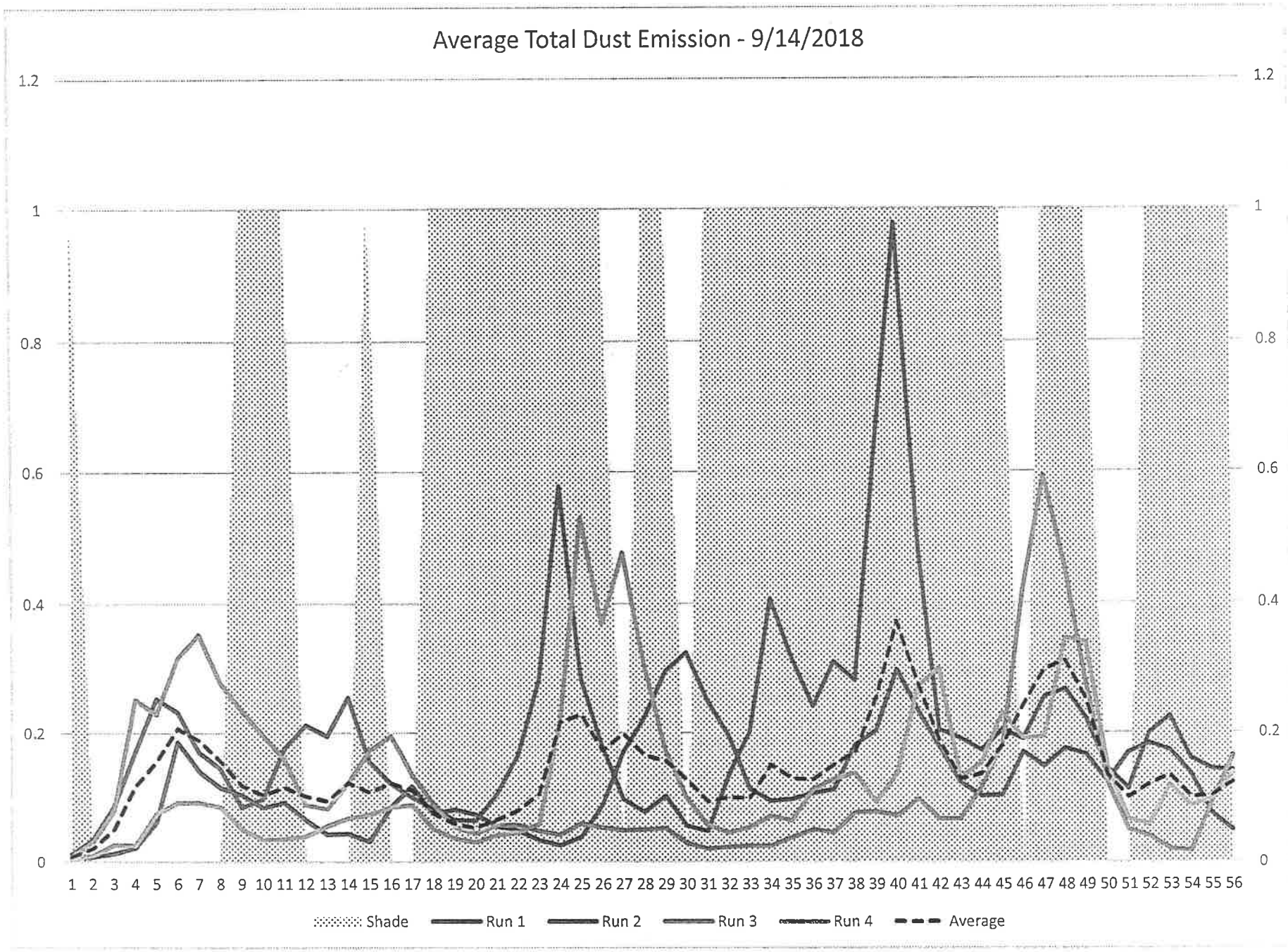
Section	ID	Average	Sum	Shade (Y/N)
1	1	0.00775	0.031	1
1	2	0.02125	0.085	0
1	3	0.05125	0.205	0
1	4	0.1175	0.47	0
1	5	0.15475	0.619	0
1	6	0.20675	0.827	0
1	7	0.1885	0.754	0
1	8	0.1555	0.622	0
1	9	0.11825	0.473	1
1	10	0.10325	0.413	1
1	11	0.11525	0.461	1
1	12	0.10125	0.405	0
1	13	0.094	0.376	0
1	14	0.12225	0.489	0
2	15	0.10775	0.431	1
2	16	0.1215	0.486	0
2	17	0.10975	0.439	0
2	18	0.0745	0.298	1
2	19	0.05925	0.237	1
2	20	0.053	0.212	1
2	21	0.065	0.26	1
2	22	0.07925	0.317	1
2	23	0.106	0.424	1
2	24	0.216	0.864	1
2	25	0.22825	0.913	1
2	26	0.1715	0.686	1
2	27	0.1985	0.794	0
2	28	0.164	0.656	1
3	29	0.15525	0.621	1
3	30	0.12725	0.509	0
3	31	0.0935	0.374	1
3	32	0.0995	0.398	1
3	33	0.09825	0.393	1
3	34	0.14925	0.597	1
3	35	0.12875	0.515	1
3	36	0.127	0.508	1
3	37	0.14875	0.595	1
3	38	0.1685	0.674	1
3	39	0.2545	1.018	1
3	40	0.371	1.484	1
3	41	0.2745	1.098	1
3	42	0.187	0.748	1
4	43	0.1275	0.51	1
4	44	0.13525	0.541	1
4	45	0.18	0.72	1
4	46	0.2425	0.97	0
4	47	0.29725	1.189	1
4	48	0.311	1.244	1
4	49	0.25	1	1
4	50	0.13425	0.537	0
4	51	0.0995	0.398	0
4	52	0.12	0.48	1
4	53	0.134	0.536	1
4	54	0.09975	0.399	1
4	55	0.102	0.408	1
4	56	0.12275	0.491	1

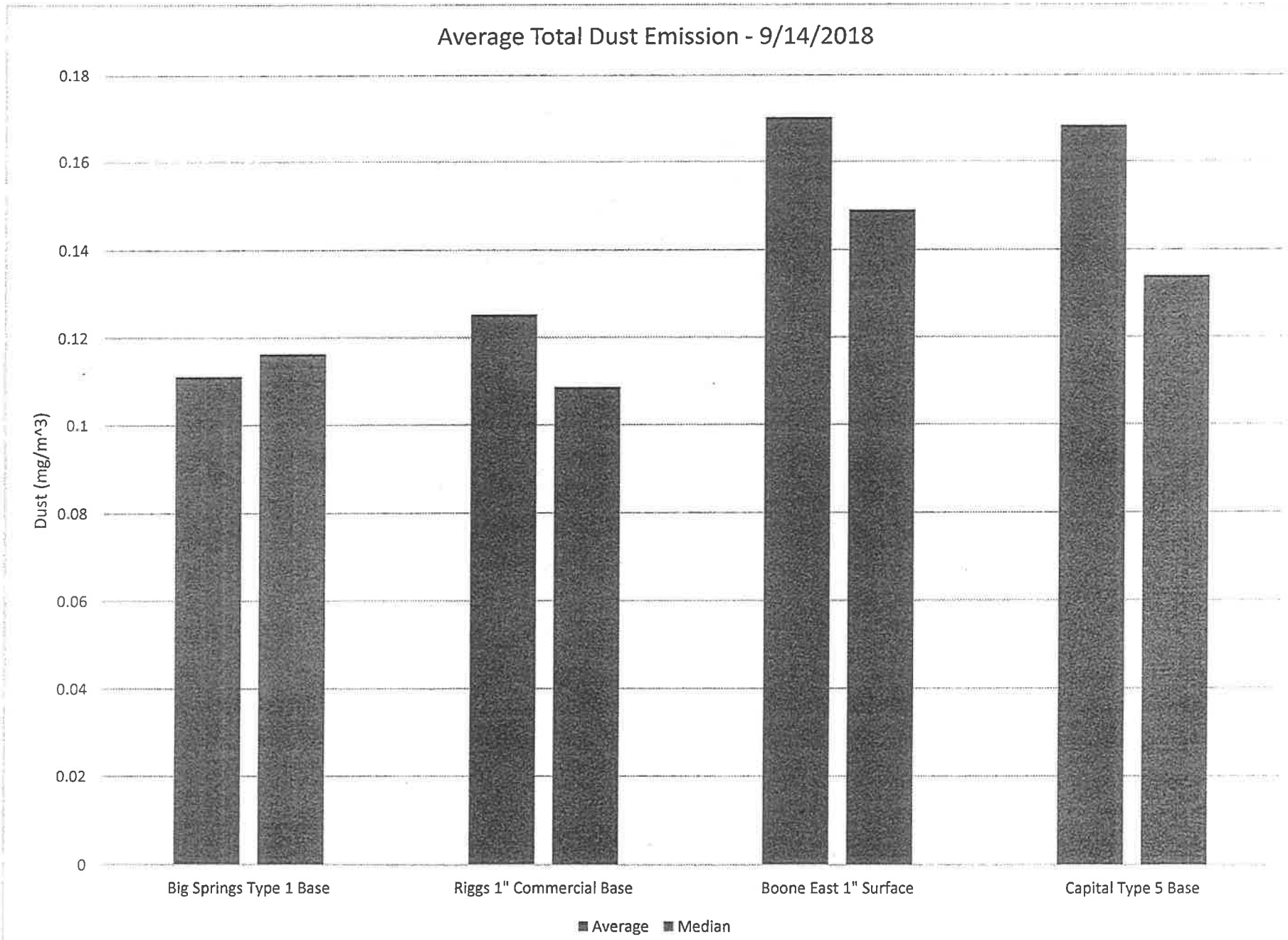
Section	Rock	Count(shade)	PI	LL	PL	PP_30	PP_200	Dust Quality	Dust * Quality	Average	Median
1	Big Springs Type 1 Base	4	7	19	13	15	10	36.84	24.56	0.11125	0.116375
2	Riggs 1" Commercial Base	11	6	21	15	35	20	28.57	16.33	0.125304	0.10875
3	Boone East 1" Surface	13	6	18	12	17	12	33.33	23.53	0.170214	0.149
4	Capital Type 5 Base	11	1	19	18	23	13.7	5.26	3.14	0.168268	0.134125

Shade	Average	Count
Yes	0.148826923	39
No	0.132132353	17

2	19	9/14/2018	13:16:05	0.035	0.037	0.046	0.07	0.081
2	20	9/14/2018	13:16:06	0.029	0.032	0.046	0.069	0.073
2	21	9/14/2018	13:16:07	0.027	0.031	0.042	0.056	0.056
2	22	9/14/2018	13:16:08	0.015	0.017	0.027	0.049	0.049
2	23	9/14/2018	13:16:09	0.011	0.013	0.017	0.034	0.034
2	24	9/14/2018	13:16:10	0.012	0.013	0.015	0.026	0.026
2	25	9/14/2018	13:16:11	0.02	0.021	0.023	0.039	0.039
2	26	9/14/2018	13:16:12	0.038	0.04	0.049	0.088	0.088
2	27	9/14/2018	13:16:13	0.076	0.08	0.098	0.17	0.17
2	28	9/14/2018	13:16:14	0.083	0.089	0.116	0.224	0.224
2	29	9/14/2018	13:16:15	0.128	0.139	0.175	0.296	0.296
2	30	9/14/2018	13:16:16	0.13	0.143	0.189	0.325	0.325
2	31	9/14/2018	13:16:17	0.085	0.093	0.125	0.249	0.249
2	32	9/14/2018	13:16:18	0.065	0.071	0.094	0.195	0.195
2	33	9/14/2018	13:16:19	0.038	0.042	0.059	0.113	0.113
2	34	9/14/2018	13:16:20	0.035	0.039	0.051	0.094	0.094
2	35	9/14/2018	13:16:21	0.037	0.041	0.054	0.097	0.097
2	36	9/14/2018	13:16:22	0.038	0.041	0.056	0.106	0.106
2	37	9/14/2018	13:16:23	0.056	0.059	0.073	0.112	0.112
2	38	9/14/2018	13:16:24	0.069	0.073	0.093	0.18	0.18
2	39	9/14/2018	13:16:25	0.091	0.095	0.114	0.203	0.203
2	40	9/14/2018	13:16:26	0.108	0.117	0.147	0.298	0.298
2	41	9/14/2018	13:16:27	0.071	0.079	0.106	0.234	0.234
2	42	9/14/2018	13:16:28	0.05	0.057	0.081	0.178	0.178
2	43	9/14/2018	13:16:29	0.04	0.045	0.06	0.123	0.123
2	44	9/14/2018	13:16:30	0.034	0.039	0.055	0.102	0.102
2	45	9/14/2018	13:16:31	0.053	0.058	0.071	0.103	0.103
2	46	9/14/2018	13:16:32	0.08	0.087	0.104	0.169	0.169
2	47	9/14/2018	13:16:33	0.064	0.072	0.091	0.147	0.147
2	48	9/14/2018	13:16:34	0.07	0.078	0.101	0.175	0.175
2	49	9/14/2018	13:16:35	0.043	0.049	0.074	0.165	0.165
2	50	9/14/2018	13:16:36	0.044	0.048	0.062	0.124	0.124
2	51	9/14/2018	13:16:37	0.062	0.066	0.077	0.168	0.168
2	52	9/14/2018	13:16:38	0.068	0.073	0.089	0.183	0.183
2	53	9/14/2018	13:16:39	0.07	0.074	0.094	0.172	0.172
2	54	9/14/2018	13:16:40	0.042	0.045	0.06	0.136	0.136
2	55	9/14/2018	13:16:41	0.013	0.015	0.022	0.075	0.075
2	56	9/14/2018	13:16:42	0.018	0.019	0.023	0.05	0.05
3	1	9/14/2018	13:22:54	0.008	0.008	0.009	0.009	0.009
3	2	9/14/2018	13:22:55	0.02	0.022	0.026	0.032	0.032
3	3	9/14/2018	13:22:56	0.049	0.052	0.061	0.079	0.079
3	4	9/14/2018	13:22:57	0.106	0.115	0.147	0.252	0.252
3	5	9/14/2018	13:22:58	0.07	0.08	0.114	0.229	0.229
3	6	9/14/2018	13:22:59	0.134	0.148	0.192	0.317	0.317
3	7	9/14/2018	13:23:00	0.125	0.141	0.188	0.353	0.353
3	8	9/14/2018	13:23:01	0.084	0.098	0.137	0.278	0.278
3	9	9/14/2018	13:23:02	0.081	0.095	0.131	0.234	0.234
3	10	9/14/2018	13:23:03	0.073	0.083	0.115	0.196	0.196
3	11	9/14/2018	13:23:04	0.063	0.071	0.099	0.158	0.158
3	12	9/14/2018	13:23:05	0.036	0.043	0.062	0.088	0.088
3	13	9/14/2018	13:23:06	0.039	0.043	0.061	0.082	0.082
3	14	9/14/2018	13:23:07	0.048	0.052	0.071	0.122	0.122
3	15	9/14/2018	13:23:08	0.076	0.082	0.101	0.172	0.172
3	16	9/14/2018	13:23:09	0.08	0.088	0.113	0.195	0.195
3	17	9/14/2018	13:23:10	0.035	0.041	0.058	0.124	0.134
3	18	9/14/2018	13:23:11	0.025	0.029	0.039	0.085	0.09
3	19	9/14/2018	13:23:12	0.017	0.02	0.027	0.054	0.054
3	20	9/14/2018	13:23:13	0.021	0.023	0.027	0.044	0.044
3	21	9/14/2018	13:23:14	0.025	0.027	0.031	0.057	0.057
3	22	9/14/2018	13:23:15	0.026	0.029	0.039	0.057	0.057
3	23	9/14/2018	13:23:16	0.018	0.021	0.03	0.048	0.048
3	24	9/14/2018	13:23:17	0.021	0.023	0.029	0.042	0.042
3	25	9/14/2018	13:23:18	0.028	0.032	0.041	0.06	0.06
3	26	9/14/2018	13:23:19	0.018	0.021	0.031	0.053	0.053
3	27	9/14/2018	13:23:20	0.018	0.021	0.029	0.049	0.049
3	28	9/14/2018	13:23:21	0.018	0.02	0.027	0.049	0.05
3	29	9/14/2018	13:23:22	0.022	0.024	0.03	0.042	0.052
3	30	9/14/2018	13:23:23	0.008	0.01	0.015	0.024	0.029
3	31	9/14/2018	13:23:24	0.012	0.013	0.015	0.02	0.02
3	32	9/14/2018	13:23:25	0.014	0.015	0.018	0.023	0.023
3	33	9/14/2018	13:23:26	0.014	0.016	0.021	0.025	0.025
3	34	9/14/2018	13:23:27	0.016	0.018	0.021	0.025	0.025
3	35	9/14/2018	13:23:28	0.023	0.026	0.031	0.038	0.038
3	36	9/14/2018	13:23:29	0.026	0.03	0.041	0.05	0.05
3	37	9/14/2018	13:23:30	0.021	0.024	0.032	0.045	0.045

3	38	9/14/2018	13:23:31	0.044	0.05	0.063	0.076	0.076
3	39	9/14/2018	13:23:32	0.03	0.038	0.056	0.077	0.077
3	40	9/14/2018	13:23:33	0.04	0.047	0.059	0.071	0.071
3	41	9/14/2018	13:23:34	0.051	0.06	0.079	0.097	0.097
3	42	9/14/2018	13:23:35	0.022	0.029	0.044	0.066	0.066
3	43	9/14/2018	13:23:36	0.038	0.043	0.054	0.066	0.066
3	44	9/14/2018	13:23:37	0.06	0.066	0.082	0.115	0.115
3	45	9/14/2018	13:23:38	0.088	0.094	0.115	0.182	0.182
3	46	9/14/2018	13:23:39	0.238	0.25	0.29	0.42	0.42
3	47	9/14/2018	13:23:40	0.282	0.297	0.351	0.593	0.593
3	48	9/14/2018	13:23:41	0.154	0.166	0.208	0.455	0.455
3	49	9/14/2018	13:23:42	0.105	0.113	0.14	0.273	0.273
3	50	9/14/2018	13:23:43	0.024	0.028	0.042	0.122	0.122
3	51	9/14/2018	13:23:44	0.01	0.011	0.017	0.05	0.05
3	52	9/14/2018	13:23:45	0.012	0.013	0.018	0.04	0.04
3	53	9/14/2018	13:23:46	0.007	0.007	0.01	0.02	0.02
3	54	9/14/2018	13:23:47	0.009	0.009	0.011	0.017	0.017
3	55	9/14/2018	13:23:48	0.077	0.078	0.08	0.092	0.092
3	56	9/14/2018	13:23:49	0.102	0.103	0.113	0.163	0.163
4	1	9/14/2018	13:31:17	0.004	0.004	0.004	0.004	0.004
4	2	9/14/2018	13:31:18	0.009	0.009	0.01	0.01	0.01
4	3	9/14/2018	13:31:19	0.017	0.018	0.022	0.027	0.027
4	4	9/14/2018	13:31:20	0.012	0.014	0.017	0.026	0.026
4	5	9/14/2018	13:31:21	0.046	0.049	0.057	0.075	0.075
4	6	9/14/2018	13:31:22	0.037	0.043	0.059	0.092	0.092
4	7	9/14/2018	13:31:23	0.041	0.047	0.062	0.092	0.092
4	8	9/14/2018	13:31:24	0.038	0.043	0.057	0.085	0.085
4	9	9/14/2018	13:31:25	0.024	0.027	0.036	0.051	0.051
4	10	9/14/2018	13:31:26	0.019	0.023	0.028	0.035	0.035
4	11	9/14/2018	13:31:27	0.02	0.024	0.03	0.036	0.036
4	12	9/14/2018	13:31:28	0.023	0.027	0.033	0.04	0.04
4	13	9/14/2018	13:31:29	0.028	0.033	0.04	0.056	0.056
4	14	9/14/2018	13:31:30	0.031	0.036	0.045	0.068	0.068
4	15	9/14/2018	13:31:31	0.034	0.039	0.05	0.073	0.073
4	16	9/14/2018	13:31:32	0.039	0.043	0.053	0.085	0.085
4	17	9/14/2018	13:31:33	0.038	0.043	0.056	0.088	0.088
4	18	9/14/2018	13:31:34	0.018	0.022	0.033	0.051	0.051
4	19	9/14/2018	13:31:35	0.017	0.02	0.027	0.037	0.037
4	20	9/14/2018	13:31:36	0.015	0.018	0.024	0.031	0.031
4	21	9/14/2018	13:31:37	0.02	0.022	0.027	0.042	0.042
4	22	9/14/2018	13:31:38	0.023	0.025	0.033	0.046	0.046
4	23	9/14/2018	13:31:39	0.032	0.035	0.044	0.059	0.059
4	24	9/14/2018	13:31:40	0.156	0.16	0.174	0.218	0.218
4	25	9/14/2018	13:31:41	0.291	0.309	0.369	0.531	0.531
4	26	9/14/2018	13:31:42	0.119	0.136	0.191	0.367	0.368
4	27	9/14/2018	13:31:43	0.202	0.225	0.287	0.468	0.478
4	28	9/14/2018	13:31:44	0.071	0.09	0.144	0.3	0.305
4	29	9/14/2018	13:31:45	0.048	0.058	0.088	0.162	0.171
4	30	9/14/2018	13:31:46	0.031	0.037	0.053	0.094	0.099
4	31	9/14/2018	13:31:47	0.019	0.023	0.031	0.057	0.057
4	32	9/14/2018	13:31:48	0.019	0.021	0.029	0.046	0.046
4	33	9/14/2018	13:31:49	0.028	0.03	0.038	0.054	0.054
4	34	9/14/2018	13:31:50	0.032	0.035	0.046	0.071	0.071
4	35	9/14/2018	13:31:51	0.032	0.035	0.045	0.064	0.064
4	36	9/14/2018	13:31:52	0.05	0.054	0.074	0.112	0.112
4	37	9/14/2018	13:31:53	0.06	0.064	0.083	0.128	0.128
4	38	9/14/2018	13:31:54	0.053	0.058	0.076	0.137	0.137
4	39	9/14/2018	13:31:55	0.034	0.038	0.051	0.092	0.092
4	40	9/14/2018	13:31:56	0.076	0.083	0.099	0.136	0.136
4	41	9/14/2018	13:31:57	0.143	0.159	0.199	0.271	0.271
4	42	9/14/2018	13:31:58	0.124	0.147	0.198	0.3	0.3
4	43	9/14/2018	13:31:59	0.041	0.054	0.08	0.13	0.13
4	44	9/14/2018	13:32:00	0.087	0.095	0.114	0.152	0.152
4	45	9/14/2018	13:32:01	0.103	0.117	0.146	0.231	0.231
4	46	9/14/2018	13:32:02	0.072	0.085	0.117	0.191	0.191
4	47	9/14/2018	13:32:03	0.087	0.098	0.13	0.194	0.194
4	48	9/14/2018	13:32:04	0.185	0.198	0.238	0.347	0.347
4	49	9/14/2018	13:32:05	0.134	0.146	0.184	0.341	0.341
4	50	9/14/2018	13:32:06	0.03	0.037	0.055	0.147	0.147
4	51	9/14/2018	13:32:07	0.019	0.021	0.028	0.067	0.067
4	52	9/14/2018	13:32:08	0.034	0.035	0.039	0.058	0.058
4	53	9/14/2018	13:32:09	0.054	0.058	0.069	0.119	0.119
4	54	9/14/2018	13:32:10	0.028	0.033	0.048	0.087	0.087
4	55	9/14/2018	13:32:11	0.055	0.058	0.071	0.098	0.098
4	56	9/14/2018	13:32:12	0.06	0.064	0.079	0.137	0.137

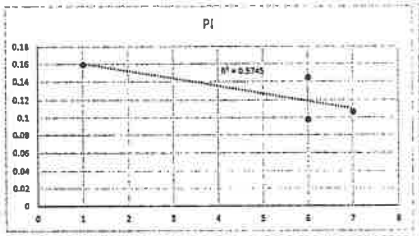

Average Total Dust Emission - 9/14/2018
1.2
1
0.8
0.6
0.4
0.2
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56
Shade
Run 1
Run 2
Run 3
Run 4
Average

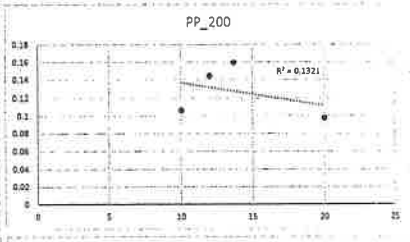

Average Total Dust Emission - 9/14/2018
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Dust (mg/m^3)
Big Springs Type 1 Base
Riggs 1" Commercial Base
Boone East 1" Surface
Capital Type 5 Base
Average
Median

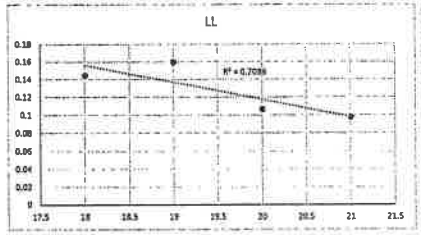
ID	Run	Prev_ID	SectionID	Date	Time	PM1	PM2.5	RESP	PM10	TOTAL
				MM/dd/yyyy	hh:mm:ss	mg/m^3	mg/m^3	mg/m^3	mg/m^3	mg/m^3
1	1	61	1	9/14/2018	13:08:37	0.006	0.006	0.009	0.012	0.012
2	1	62	1	9/14/2018	13:08:38	0.005	0.006	0.009	0.011	0.011
3	1	63	1	9/14/2018	13:08:39	0.01	0.011	0.012	0.012	0.012
4	1	64	1	9/14/2018	13:08:40	0.023	0.025	0.028	0.035	0.035
5	1	65	1	9/14/2018	13:08:41	0.042	0.045	0.053	0.086	0.086
6	1	66	1	9/14/2018	13:08:42	0.087	0.092	0.104	0.17	0.17
7	1	67	1	9/14/2018	13:08:43	0.094	0.106	0.137	0.253	0.253
8	1	68	1	9/14/2018	13:08:44	0.086	0.098	0.125	0.232	0.232
9	1	69	1	9/14/2018	13:08:45	0.06	0.068	0.086	0.169	0.169
10	1	70	1	9/14/2018	13:08:46	0.043	0.049	0.068	0.144	0.144
11	1	71	2	9/14/2018	13:08:47	0.03	0.034	0.05	0.084	0.084
12	1	72	2	9/14/2018	13:08:48	0.048	0.052	0.063	0.098	0.098
13	1	73	2	9/14/2018	13:08:49	0.079	0.085	0.102	0.175	0.175
14	1	74	2	9/14/2018	13:08:50	0.078	0.084	0.106	0.212	0.212
15	1	75	2	9/14/2018	13:08:51	0.087	0.095	0.12	0.195	0.195
16	1	76	2	9/14/2018	13:08:52	0.085	0.096	0.131	0.255	0.255
17	1	77	2	9/14/2018	13:08:53	0.039	0.046	0.066	0.154	0.154
18	1	78	2	9/14/2018	13:08:54	0.052	0.056	0.069	0.121	0.121
19	1	79	2	9/14/2018	13:08:55	0.037	0.042	0.054	0.1	0.1
20	1	80	2	9/14/2018	13:08:56	0.032	0.036	0.048	0.082	0.082
21	1	81	3	9/14/2018	13:08:57	0.023	0.026	0.037	0.065	0.065
22	1	82	3	9/14/2018	13:08:58	0.023	0.026	0.032	0.064	0.064
23	1	83	3	9/14/2018	13:08:59	0.051	0.054	0.061	0.105	0.105
24	1	84	3	9/14/2018	13:09:00	0.064	0.069	0.089	0.165	0.165
25	1	85	3	9/14/2018	13:09:01	0.151	0.158	0.186	0.283	0.283
26	1	86	3	9/14/2018	13:09:02	0.296	0.31	0.359	0.578	0.578
27	1	87	3	9/14/2018	13:09:03	0.062	0.076	0.12	0.283	0.283
28	1	88	3	9/14/2018	13:09:04	0.046	0.054	0.081	0.177	0.177
29	1	89	3	9/14/2018	13:09:05	0.027	0.032	0.048	0.097	0.097
30	1	90	3	9/14/2018	13:09:06	0.035	0.039	0.049	0.077	0.077
31	1	91	3	9/14/2018	13:09:07	0.036	0.041	0.058	0.102	0.102
32	1	92	4	9/14/2018	13:09:08	0.017	0.022	0.034	0.056	0.056
33	1	93	4	9/14/2018	13:09:09	0.027	0.03	0.038	0.048	0.048
34	1	94	4	9/14/2018	13:09:10	0.061	0.065	0.082	0.134	0.134
35	1	95	4	9/14/2018	13:09:11	0.091	0.096	0.119	0.201	0.201
36	1	96	4	9/14/2018	13:09:12	0.171	0.182	0.231	0.407	0.407
37	1	97	4	9/14/2018	13:09:13	0.059	0.071	0.117	0.316	0.316
38	1	98	4	9/14/2018	13:09:14	0.079	0.086	0.113	0.24	0.24
39	1	99	4	9/14/2018	13:09:15	0.09	0.099	0.137	0.31	0.31
40	1	100	4	9/14/2018	13:09:16	0.114	0.122	0.149	0.281	0.281
41	1	101	4	9/14/2018	13:09:17	0.387	0.398	0.442	0.646	0.646
42	1	102	4	9/14/2018	13:09:18	0.362	0.389	0.493	0.979	0.979
1	2	49	1	9/14/2018	13:15:47	0.004	0.004	0.004	0.006	0.006
2	2	50	1	9/14/2018	13:15:48	0.007	0.007	0.008	0.008	0.008
3	2	51	1	9/14/2018	13:15:49	0.009	0.009	0.01	0.013	0.013
4	2	52	1	9/14/2018	13:15:50	0.013	0.014	0.015	0.022	0.022
5	2	53	1	9/14/2018	13:15:51	0.045	0.047	0.052	0.062	0.062
6	2	54	1	9/14/2018	13:15:52	0.074	0.081	0.108	0.186	0.186
7	2	55	1	9/14/2018	13:15:53	0.016	0.022	0.043	0.14	0.14
8	2	56	1	9/14/2018	13:15:54	0.044	0.048	0.064	0.115	0.115
9	2	57	1	9/14/2018	13:15:55	0.03	0.034	0.05	0.104	0.104
10	2	58	1	9/14/2018	13:15:56	0.037	0.04	0.05	0.084	0.084
11	2	59	2	9/14/2018	13:15:57	0.039	0.043	0.056	0.092	0.092
12	2	60	2	9/14/2018	13:15:58	0.02	0.023	0.034	0.065	0.065
13	2	61	2	9/14/2018	13:15:59	0.018	0.021	0.027	0.043	0.043
14	2	62	2	9/14/2018	13:16:00	0.018	0.021	0.028	0.044	0.044
15	2	63	2	9/14/2018	13:16:01	0.015	0.017	0.023	0.032	0.032
16	2	64	2	9/14/2018	13:16:02	0.047	0.049	0.058	0.085	0.085
17	2	65	2	9/14/2018	13:16:03	0.032	0.036	0.049	0.117	0.117
18	2	66	2	9/14/2018	13:16:04	0.025	0.027	0.038	0.074	0.075
19	2	67	2	9/14/2018	13:16:05	0.035	0.037	0.046	0.07	0.081
20	2	68	2	9/14/2018	13:16:06	0.029	0.032	0.046	0.069	0.073
21	2	69	3	9/14/2018	13:16:07	0.027	0.031	0.042	0.056	0.056
22	2	70	3	9/14/2018	13:16:08	0.015	0.017	0.027	0.049	0.049
23	2	71	3	9/14/2018	13:16:09	0.011	0.013	0.017	0.034	0.034
24	2	72	3	9/14/2018	13:16:10	0.012	0.013	0.015	0.026	0.026
25	2	73	3	9/14/2018	13:16:11	0.02	0.021	0.023	0.039	0.039
26	2	74	3	9/14/2018	13:16:12	0.038	0.04	0.049	0.088	0.088
27	2	75	3	9/14/2018	13:16:13	0.076	0.08	0.098	0.17	0.17
28	2	76	3	9/14/2018	13:16:14	0.083	0.089	0.116	0.224	0.224
29	2	77	3	9/14/2018	13:16:15	0.128	0.139	0.175	0.296	0.296
30	2	78	3	9/14/2018	13:16:16	0.13	0.143	0.189	0.325	0.325
31	2	79	3	9/14/2018	13:16:17	0.085	0.093	0.125	0.249	0.249
32	2	80	4	9/14/2018	13:16:18	0.065	0.071	0.094	0.195	0.195

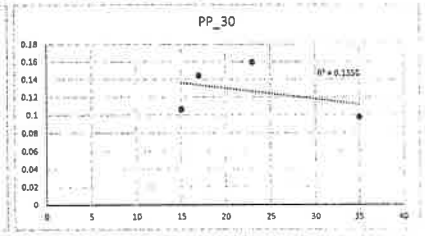
SectionID	ID	Date	TOTAL	Shade
1	1	9/14/2018	0.00775	
1	2	9/14/2018	0.01525	
1	3	9/14/2018	0.027	
1	4	9/14/2018	0.07975	
1	5	9/14/2018	0.101	
1	6	9/14/2018	0.17475	
1	7	9/14/2018	0.20525	
1	8	9/14/2018	0.17925	
1	9	9/14/2018	0.14975	
1	10	9/14/2018	0.12725	
2	11	9/14/2018	0.09625	
2	12	9/14/2018	0.0715	
2	13	9/14/2018	0.084	
2	14	9/14/2018	0.1045	
2	15	9/14/2018	0.11375	
2	16	9/14/2018	0.15075	
2	17	9/14/2018	0.1195	
2	18	9/14/2018	0.09275	
2	19	9/14/2018	0.08075	
2	20	9/14/2018	0.0625	
3	21	9/14/2018	0.05375	
3	22	9/14/2018	0.05025	
3	23	9/14/2018	0.05725	
3	24	9/14/2018	0.06975	
3	25	9/14/2018	0.11025	
3	26	9/14/2018	0.23425	
3	27	9/14/2018	0.25825	
3	28	9/14/2018	0.20475	
3	29	9/14/2018	0.23075	
3	30	9/14/2018	0.184	
3	31	9/14/2018	0.1355	
4	32	9/14/2018	0.09325	
4	33	9/14/2018	0.06075	
4	34	9/14/2018	0.07475	
4	35	9/14/2018	0.0975	
4	36	9/14/2018	0.1585	
4	37	9/14/2018	0.13425	
4	38	9/14/2018	0.152	
4	39	9/14/2018	0.1795	
4	40	9/14/2018	0.19675	
4	41	9/14/2018	0.26725	
4	42	9/14/2018	0.33975	

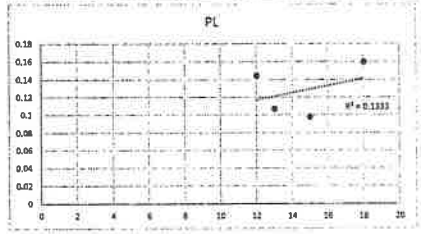
Section	Rock	PI	LL	PL	PP_30	PP_200	Dust Quality (I	Dust * Quality (I	Average	Median
1	Big Springs Type 1 Base	7	20	13	15	10	35	23.33	0.1067	0.114125
2	Riggs 1" Commercial Base	6	21	15	35	20	28.57	16.33	0.097625	0.0945
3	Boone East 1" Surface	6	18	12	17	12	33.33	23.53	0.144432	0.1355
4	Capital Type 5 Base	1	19	18	23	13.7	5.26	3.14	0.159477	0.152

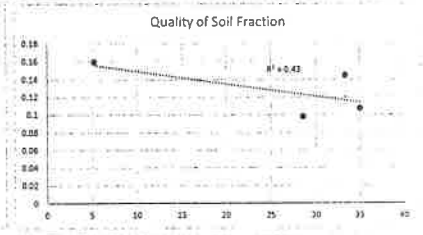


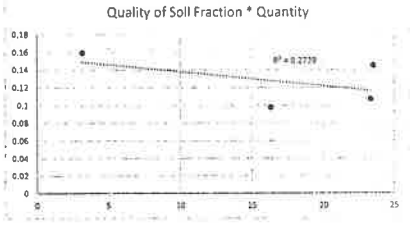






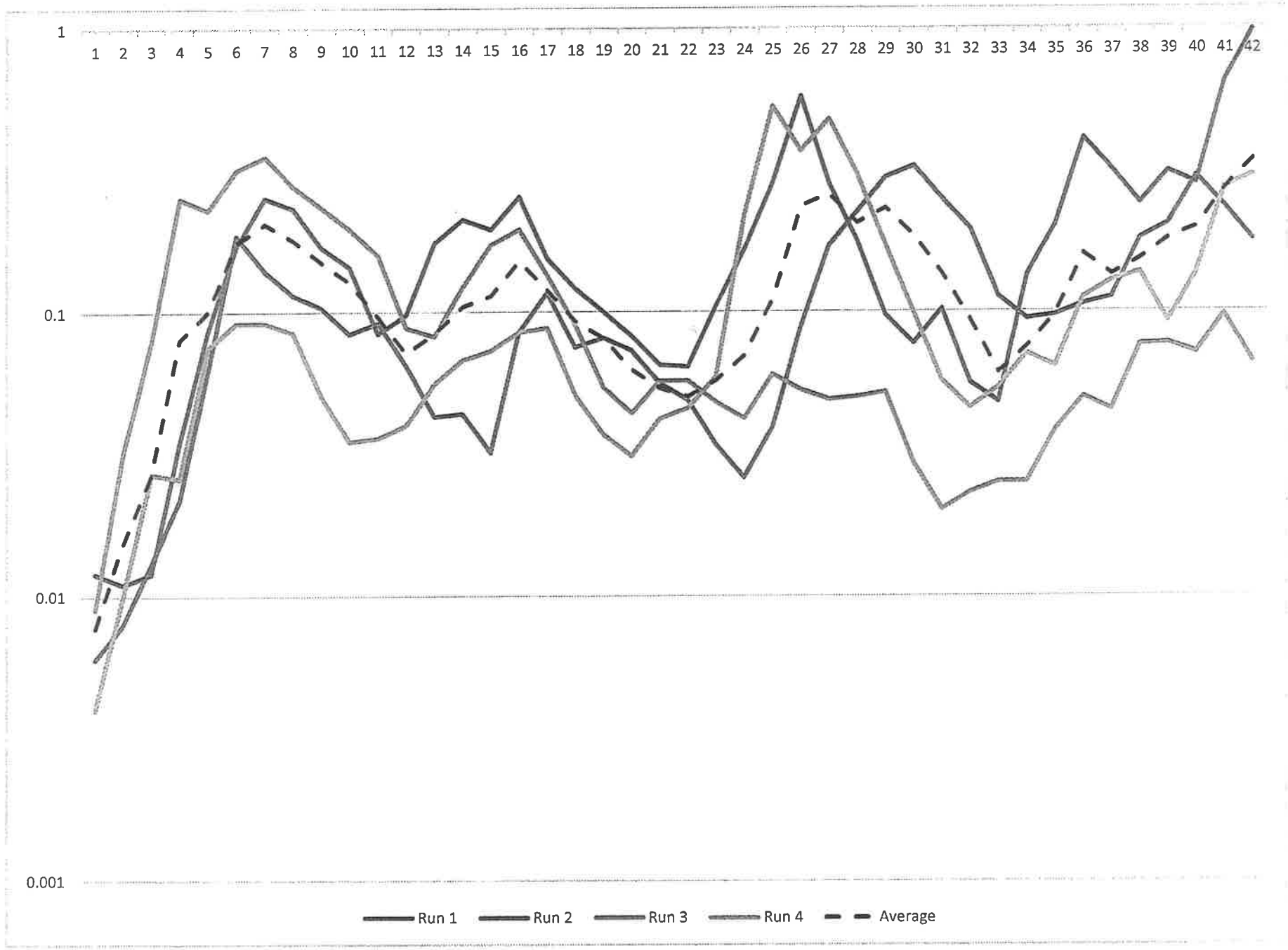


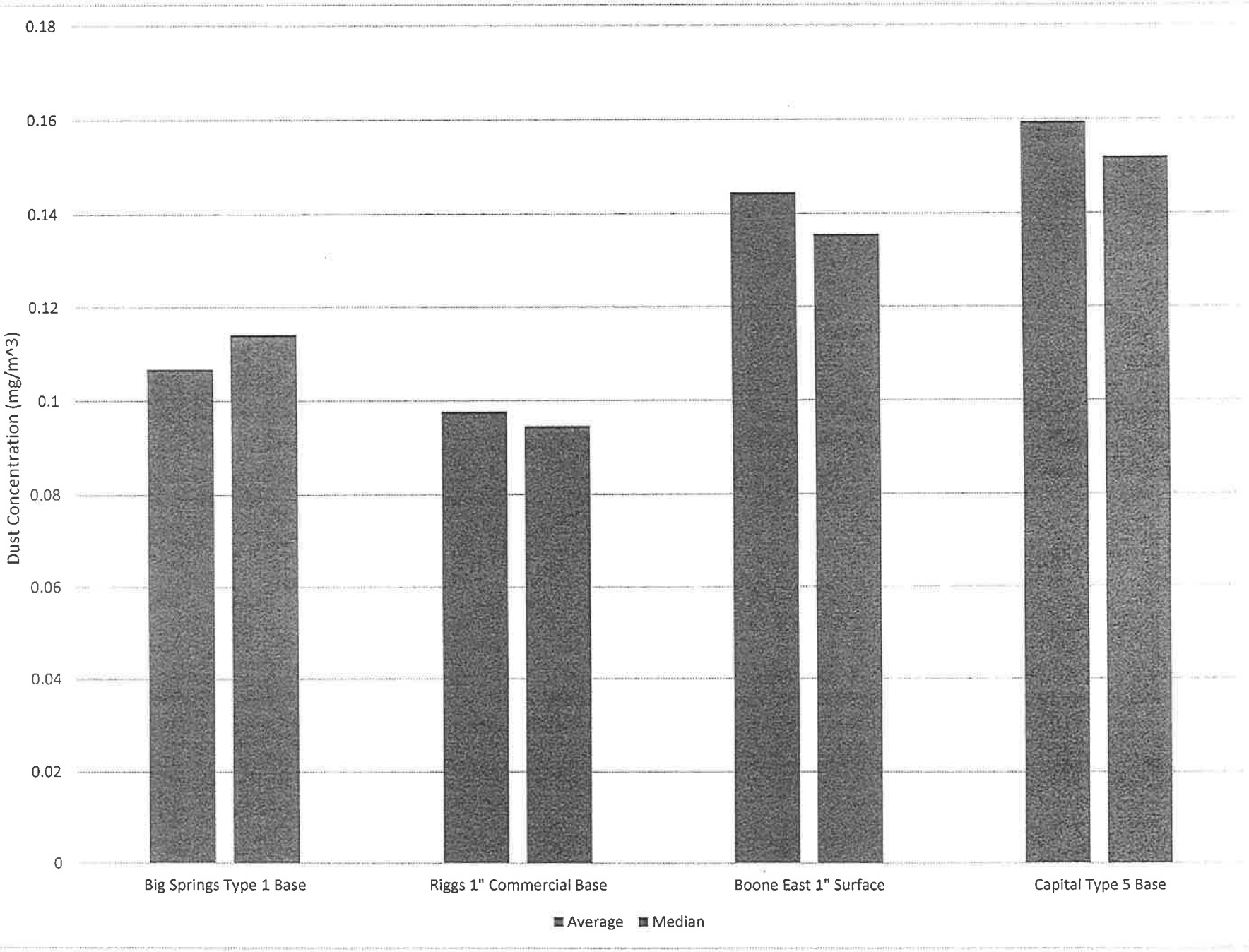




33	2	81	4	9/14/2018	13:16:19	0.038	0.042	0.059	0.113	0.113
34	2	82	4	9/14/2018	13:16:20	0.035	0.039	0.051	0.094	0.094
35	2	83	4	9/14/2018	13:16:21	0.037	0.041	0.054	0.097	0.097
36	2	84	4	9/14/2018	13:16:22	0.038	0.041	0.056	0.106	0.106
37	2	85	4	9/14/2018	13:16:23	0.056	0.059	0.073	0.112	0.112
38	2	86	4	9/14/2018	13:16:24	0.069	0.073	0.093	0.18	0.18
39	2	87	4	9/14/2018	13:16:25	0.091	0.095	0.114	0.203	0.203
40	2	88	4	9/14/2018	13:16:26	0.108	0.117	0.147	0.298	0.298
41	2	89	4	9/14/2018	13:16:27	0.071	0.079	0.106	0.234	0.234
42	2	90	4	9/14/2018	13:16:28	0.05	0.057	0.081	0.178	0.178
1	3	59	1	9/14/2018	13:22:54	0.008	0.008	0.009	0.009	0.009
2	3	60	1	9/14/2018	13:22:55	0.02	0.022	0.026	0.032	0.032
3	3	61	1	9/14/2018	13:22:56	0.049	0.052	0.061	0.079	0.079
4	3	62	1	9/14/2018	13:22:57	0.106	0.115	0.147	0.252	0.252
5	3	63	1	9/14/2018	13:22:58	0.07	0.08	0.114	0.229	0.229
6	3	64	1	9/14/2018	13:22:59	0.134	0.148	0.192	0.317	0.317
7	3	65	1	9/14/2018	13:23:00	0.125	0.141	0.188	0.353	0.353
8	3	66	1	9/14/2018	13:23:01	0.084	0.098	0.137	0.278	0.278
9	3	67	1	9/14/2018	13:23:02	0.081	0.095	0.131	0.234	0.234
10	3	68	1	9/14/2018	13:23:03	0.073	0.083	0.115	0.196	0.196
11	3	69	2	9/14/2018	13:23:04	0.063	0.071	0.099	0.158	0.158
12	3	70	2	9/14/2018	13:23:05	0.036	0.043	0.062	0.088	0.088
13	3	71	2	9/14/2018	13:23:06	0.039	0.043	0.061	0.082	0.082
14	3	72	2	9/14/2018	13:23:07	0.048	0.052	0.071	0.122	0.122
15	3	73	2	9/14/2018	13:23:08	0.076	0.082	0.101	0.172	0.172
16	3	74	2	9/14/2018	13:23:09	0.08	0.088	0.113	0.195	0.195
17	3	75	2	9/14/2018	13:23:10	0.035	0.041	0.058	0.124	0.134
18	3	76	2	9/14/2018	13:23:11	0.025	0.029	0.039	0.085	0.09
19	3	77	2	9/14/2018	13:23:12	0.017	0.02	0.027	0.054	0.054
20	3	78	2	9/14/2018	13:23:13	0.021	0.023	0.027	0.044	0.044
21	3	79	3	9/14/2018	13:23:14	0.025	0.027	0.031	0.057	0.057
22	3	80	3	9/14/2018	13:23:15	0.026	0.029	0.039	0.057	0.057
23	3	81	3	9/14/2018	13:23:16	0.018	0.021	0.03	0.048	0.048
24	3	82	3	9/14/2018	13:23:17	0.021	0.023	0.029	0.042	0.042
25	3	83	3	9/14/2018	13:23:18	0.028	0.032	0.041	0.06	0.06
26	3	84	3	9/14/2018	13:23:19	0.018	0.021	0.031	0.053	0.053
27	3	85	3	9/14/2018	13:23:20	0.018	0.021	0.029	0.049	0.049
28	3	86	3	9/14/2018	13:23:21	0.018	0.02	0.027	0.049	0.05
29	3	87	3	9/14/2018	13:23:22	0.022	0.024	0.03	0.042	0.052
30	3	88	3	9/14/2018	13:23:23	0.008	0.01	0.015	0.024	0.029
31	3	89	3	9/14/2018	13:23:24	0.012	0.013	0.015	0.02	0.02
32	3	90	4	9/14/2018	13:23:25	0.014	0.015	0.018	0.023	0.023
33	3	91	4	9/14/2018	13:23:26	0.014	0.016	0.021	0.025	0.025
34	3	92	4	9/14/2018	13:23:27	0.016	0.018	0.021	0.025	0.025
35	3	93	4	9/14/2018	13:23:28	0.023	0.026	0.031	0.038	0.038
36	3	94	4	9/14/2018	13:23:29	0.026	0.03	0.041	0.05	0.05
37	3	95	4	9/14/2018	13:23:30	0.021	0.024	0.032	0.045	0.045
38	3	96	4	9/14/2018	13:23:31	0.044	0.05	0.063	0.076	0.076
39	3	97	4	9/14/2018	13:23:32	0.03	0.038	0.056	0.077	0.077
40	3	98	4	9/14/2018	13:23:33	0.04	0.047	0.059	0.071	0.071
41	3	99	4	9/14/2018	13:23:34	0.051	0.06	0.079	0.097	0.097
42	3	100	4	9/14/2018	13:23:35	0.022	0.029	0.044	0.066	0.066
1	4	68	1	9/14/2018	13:31:17	0.004	0.004	0.004	0.004	0.004
2	4	69	1	9/14/2018	13:31:18	0.009	0.009	0.01	0.01	0.01
3	4	70	1	9/14/2018	13:31:19	0.017	0.018	0.022	0.027	0.027
4	4	71	1	9/14/2018	13:31:20	0.012	0.014	0.017	0.026	0.026
5	4	72	1	9/14/2018	13:31:21	0.046	0.049	0.057	0.075	0.075
6	4	73	1	9/14/2018	13:31:22	0.037	0.043	0.059	0.092	0.092
7	4	74	1	9/14/2018	13:31:23	0.041	0.047	0.062	0.092	0.092
8	4	75	1	9/14/2018	13:31:24	0.038	0.043	0.057	0.085	0.085
9	4	76	2	9/14/2018	13:31:25	0.024	0.027	0.036	0.051	0.051
10	4	77	2	9/14/2018	13:31:26	0.019	0.023	0.028	0.035	0.035
11	4	78	2	9/14/2018	13:31:27	0.02	0.024	0.03	0.036	0.036
12	4	79	2	9/14/2018	13:31:28	0.023	0.027	0.033	0.04	0.04
13	4	80	2	9/14/2018	13:31:29	0.028	0.033	0.04	0.056	0.056
14	4	81	2	9/14/2018	13:31:30	0.031	0.036	0.045	0.068	0.068
15	4	82	2	9/14/2018	13:31:31	0.034	0.039	0.05	0.073	0.073
16	4	83	2	9/14/2018	13:31:32	0.039	0.043	0.053	0.085	0.085
17	4	84	2	9/14/2018	13:31:33	0.038	0.043	0.056	0.088	0.088
18	4	85	2	9/14/2018	13:31:34	0.018	0.022	0.033	0.051	0.051
19	4	86	3	9/14/2018	13:31:35	0.017	0.02	0.027	0.037	0.037
20	4	87	3	9/14/2018	13:31:36	0.015	0.018	0.024	0.031	0.031
21	4	88	3	9/14/2018	13:31:37	0.02	0.022	0.027	0.042	0.042
22	4	89	3	9/14/2018	13:31:38	0.023	0.025	0.033	0.046	0.046
23	4	90	3	9/14/2018	13:31:39	0.032	0.035	0.044	0.059	0.059
24	4	91	3	9/14/2018	13:31:40	0.156	0.16	0.174	0.218	0.218

25	4	92	3	9/14/2018	13:31:41	0.291	0.309	0.369	0.531	0.531
26	4	93	3	9/14/2018	13:31:42	0.119	0.136	0.191	0.367	0.368
27	4	94	3	9/14/2018	13:31:43	0.202	0.225	0.287	0.468	0.478
28	4	95	3	9/14/2018	13:31:44	0.071	0.09	0.144	0.3	0.305
29	4	96	3	9/14/2018	13:31:45	0.048	0.058	0.088	0.161	0.171
30	4	97	4	9/14/2018	13:31:46	0.031	0.037	0.053	0.094	0.099
31	4	98	4	9/14/2018	13:31:47	0.019	0.023	0.031	0.057	0.057
32	4	99	4	9/14/2018	13:31:48	0.019	0.021	0.029	0.046	0.046
33	4	100	4	9/14/2018	13:31:49	0.028	0.03	0.038	0.054	0.054
34	4	101	4	9/14/2018	13:31:50	0.032	0.035	0.046	0.071	0.071
35	4	102	4	9/14/2018	13:31:51	0.032	0.035	0.045	0.064	0.064
36	4	103	4	9/14/2018	13:31:52	0.05	0.054	0.074	0.112	0.112
37	4	104	4	9/14/2018	13:31:53	0.06	0.064	0.083	0.128	0.128
38	4	105	4	9/14/2018	13:31:54	0.053	0.058	0.076	0.137	0.137
39	4	106	4	9/14/2018	13:31:55	0.034	0.038	0.051	0.092	0.092
40	4	107	4	9/14/2018	13:31:56	0.076	0.083	0.099	0.136	0.136
41	4	108	4	9/14/2018	13:31:57	0.143	0.159	0.199	0.271	0.271
42	4	109	4	9/14/2018	13:31:58	0.124	0.147	0.198	0.3	0.3


1
0.1
0.01
0.001
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42
Run 1
Run 2
Run 3
Run 4
Average


0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Dust Concentration (mg/m^3)
Big Springs Type 1 Base
Riggs 1" Commercial Base
Boone East 1" Surface
Capital Type 5 Base
Average
Median

North Shoulder	North Tire Track	Road Center	South Tire Track	South Shoulder	Lathe	
59.25		52.5		53.375	45.675	20.49
52.625	51.75	48	48	48.375	23.875	20.86
81.125	79.625	74.875	75.25	77	58.25	18.42
132.25	131.75	126.5	126.875	126.75	102.75	18.01
151.75	150.75	145.25	144.75	144	137.25	19.1
153	154	150.25	151	150.5	151.75	19.98
86.375	85.25	84	86	87	82	20.63
81.5	80.75	79	81.75	82.625	72.75	20.43
121	120.5	118.375	120.5	122	121.75	21.72
156	154.75	152.625	154.625	155	151.5	22.16
160.375	159.375	156.625	159	159.5	153	21.94
137	136.625	133	134	134.5	128	23.05

North Shoulder	North Tire Track	Road Center	South Tire Track	South Shoulder	Lathe
4.9375		4.375		4.447916667	3.80625
4.385416667	4.3125	4	4	4.03125	1.98958333
6.760416667	6.635416667	6.239583333	6.270833333	6.416666667	4.85416667
11.02083333	10.97916667	10.54166667	10.57291667	10.5625	8.5625
12.64583333	12.5625	12.10416667	12.0625	12	11.4375
12.75	12.83333333	12.52083333	12.58333333	12.54166667	12.6458333
7.197916667	7.104166667	7	7.166666667	7.25	6.83333333
6.791666667	6.729166667	6.583333333	6.8125	6.885416667	6.0625
10.08333333	10.04166667	9.864583333	10.04166667	10.16666667	10.1458333
13	12.89583333	12.71875	12.88541667	12.91666667	12.625
13.36458333	13.28125	13.05208333	13.25	13.29166667	12.75
11.41666667	11.38541667	11.08333333	11.16666667	11.20833333	10.6666667

North Shoulder	North Tire Track	Road Center	South Tire Track	South Shoulder
-2.7%		0.0%		-0.4%
-1.8%	-1.5%	0.0%	0.0%	-0.1%
-2.8%	-2.1%	0.0%	-0.2%	-1.0%
-2.7%	-2.4%	0.0%	-0.2%	-0.1%
-2.8%	-2.4%	0.0%	0.2%	0.5%
-1.1%	-1.6%	0.0%	-0.3%	-0.1%
-1.0%	-0.5%	0.0%	-0.8%	-1.2%
-1.0%	-0.7%	0.0%	-1.1%	-1.5%
-1.0%	-0.8%	0.0%	-0.8%	-1.4%
-1.3%	-0.8%	0.0%	-0.8%	-0.9%
-1.4%	-1.0%	0.0%	-0.9%	-1.1%
-1.4%	-1.3%	0.0%	-0.4%	-0.5%

Section	North Shoulder	North Tire Track	Road Center	South Tire Track	South Shoulder
1	-2.5%	-1.8%	0.0%	-0.1%	-0.5%
2	-2.2%	-2.1%	0.0%	-0.1%	0.1%
3	-1.0%	-0.7%	0.0%	-0.9%	-1.4%
4	-1.4%	-1.1%	0.0%	-0.7%	-0.8%

Bonne Femme Church Road (Surface Aggregate Test)

Summary:

The experimental test was terminated early (within one year) due to frequency of maintenance. Blading the road and additional rock was a necessity due to rutting and slick conditions (during the spring thaws). The areas with a higher plasticity rock performed the worst structurally, necessitating maintenance.

Observations:

The areas with higher plasticity qualities (Big Springs Type 1 base, Riggs Type 1 base, and Capital Type 5 base) all exhibited more than anticipated rutting and surface imperfections (greater occurrence of washboarding and potholes) along with slick conditions during the winter weather. The material from Boone East (1" Surface) performed the best in resisting rutting but also exhibited milder forms of surface imperfections than the other materials and produced more dust (according to data from the 3 tests that were performed).

Noted deficiencies in the experimental section:

1. Experimental areas included in the study were too short and experienced material mixing with other experimental sections when maintaining the surface.
2. Adding material from the different quarries proved to be difficult due to proximity to the quarry, availability of the same material, and the need for immediate repairs that needed to be performed due to poor conditions of the road surface.
3. There was a lack of a control section to compare current maintenance of gravel roads to the experimental sections.

Further questions to be explored:

Do base rock and surface rock compaction along with the addition of water (to achieve optimum compaction) produce a surface that exhibit less surface imperfections and reduce dust? If so, is there a process to replicate for a greater quantity of gravel roads with limited resources?