DGLVR Workgroup

2/2/23

Proposed Driving Surface Aggregate Specification Changes

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For technical assistance, call: 814-865-5355

PennState zoom

Background

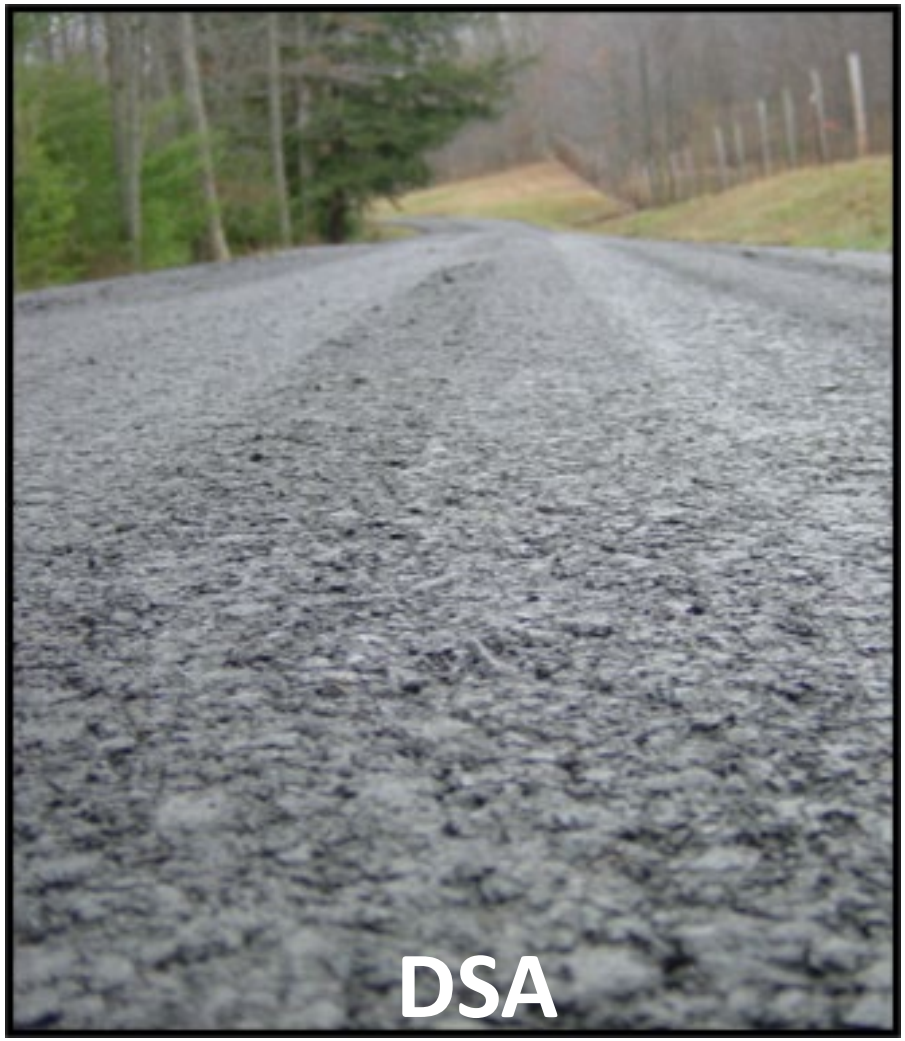
- **DSA is only approved unbound surface aggregate for use with DGLVR funds**

- **Specification is designed for maximum compaction density.**
  - **Resist erosion**
  - **Lengthen maintenance cycles**
  - **Less sediment runoff**

- **Other common aggregates**
  - **PennDOT 2A: “cleaner”, minimal fines designed for drainage**
  - **PennDOT 2RC: very wide spec that can contain dirt and organics**

DGLVR

DSA Specification Changes



	2”	1.5”	¾”	¼”	1/16”	“fines”
DSA		100	65-97	30-65	15-30	10-15*
2A	100		52-100	24-50	10-30	0-10

DSA developed in 2000, modified over the years

Recent History

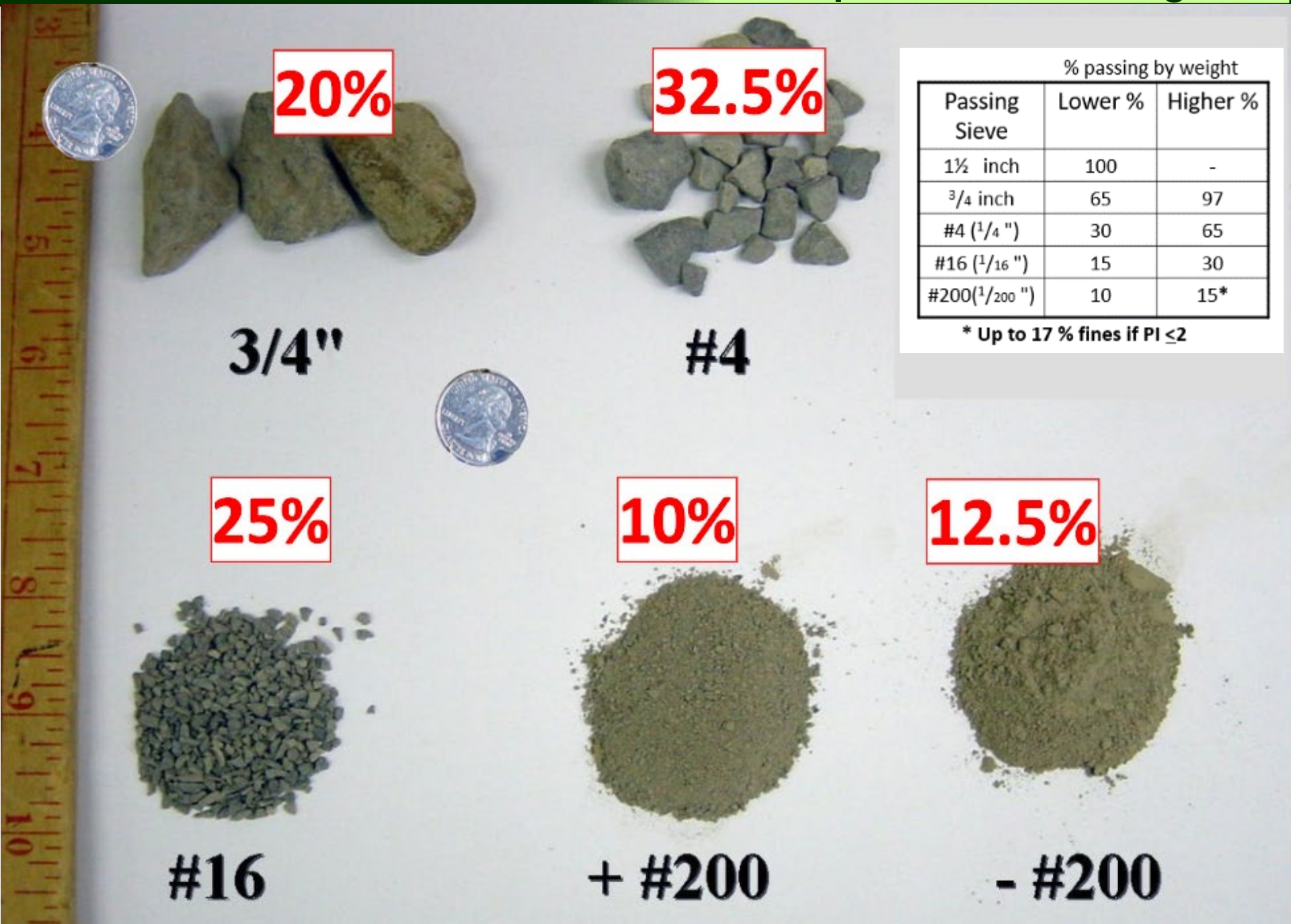
- **20015-18:** implemented Plasticity index to limit clay content
- **2019:** Increased max fine content for non-plastic aggregate
- **2022:** reduced paver requirement to jobs over 500 tons

Current Driving Surface Aggregate Specification

% passing by weight

Passing Sieve	Lower %	Higher %
1½ inch	100	-
3/4 inch	65	97
#4 (1/4 ")	30	65
#16 (1/16 ")	15	30
#200(1/200 ")	10	15*

*** Up to 17 % fines if PI ≤2**



% passing by weight

Passing Sieve	Lower %	Higher %
1½ inch	100	-
¾ inch	65	97
#4 (¼ ")	30	65
#16 (1/16 ")	15	30
#200(1/200 ")	10	15*

* Up to 17 % fines if PI ≤2

Proposed Driving Surface Aggregate Change

Proposing to increase #200 sieve to 11%

% passing by weight

Passing Sieve	Lower %	Higher %
1½ inch	100	-
3/4 inch	65	97
#4 (1/4 ")	30	65
#16 (1/16 ")	15	30
#200(1/200 ")	~~10~~ 11	15*

*** Up to 17 % fines if PI ≤2**

Question:

Why are we proposing the change to 11%?

Answer:

- In **2020** we tested 52 DSA piles
  - **15 failed**
- **20%** of samples had #200 sieves that were ≤11%
- **17%** of samples has #200 sieves that were <11%

- In **2021** we tested 60 DSA piles
  - **5 failed**
- **23%** of samples had #200 sieves that were ≤11%
- **19%** of samples has #200 sieves that were <11%

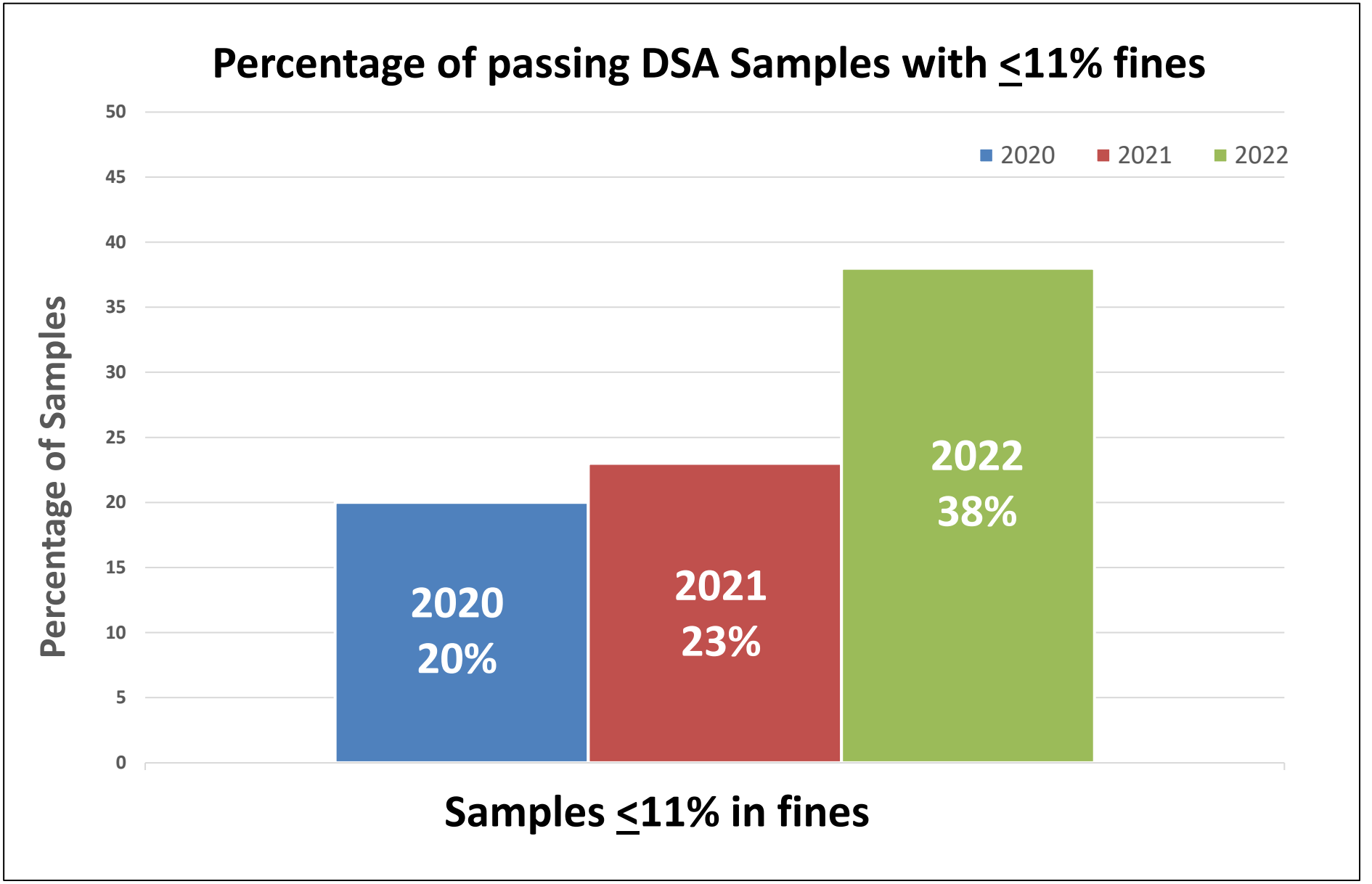
Question:

Why are we proposing the change to 11%?

Answer:

- In **2022** we tested 47 DSA piles
  - **7 failed**
- **38%** of samples had #200 sieves that were ≤11%
- **33%** of samples has #200 sieves that were <11%

Number of samples with low #200 results almost doubled in 2022!


Percentage of passing DSA Samples with ≤11% fines
Percentage of Samples
50
45
40
35
30
25
20
15
10
5
0
2020
2021
2022
2020
20%
2021
23%
2022
38%
Samples ≤11% in fines

Why are projects with #200 sieves <11% an issue?

- Most DSA issues in 2022 that were material-related (not placement) were due to low fines (10-11%).
- Raveling during and immediately after placement
- Grading and re-compaction required soon after new placement
- Multiple projects required remediation immediately after placement
  - Time & Money…
- We can’t reject material that meets spec, even 10.0%.

- Most DSA issues in 2022 that were material-related (not placement) were due to low fine content (10-11%).
- We can't reject material that meets spec, even 10.0%.


Road #1:
10.4% #200 Sieve
Immediately after placement & compaction


Take a closer look…


• Lack of fines
• Loose aggregate


Road #1:
10.4% #200 Sieve
Immediately after placement & compaction
• Lack of fines
• Loose aggregate


Road #2:
Low Moisture & Fines
Immediately after placement & compaction


Road #2:
Low Moisture & Fines
Immediately after placement & compaction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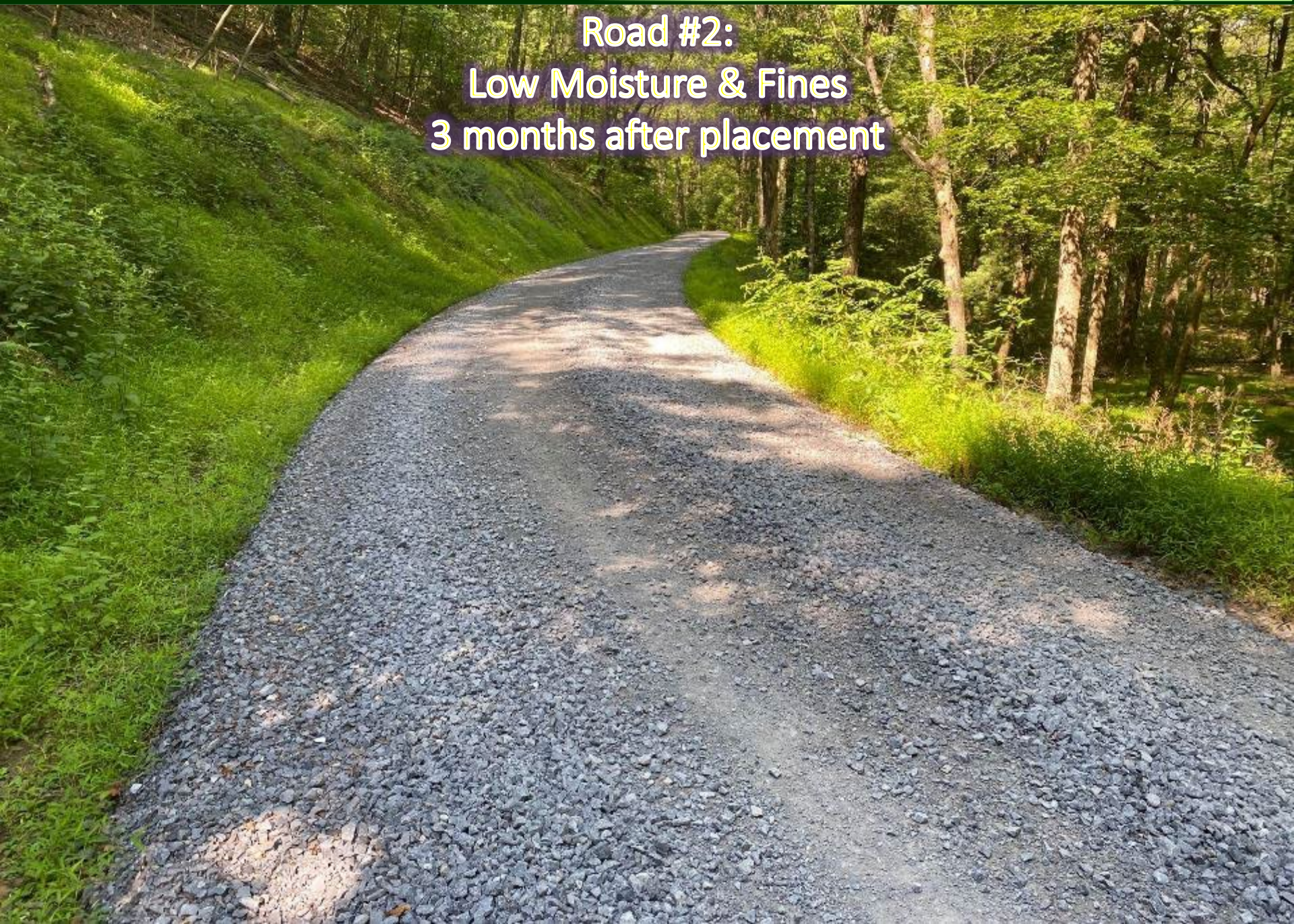
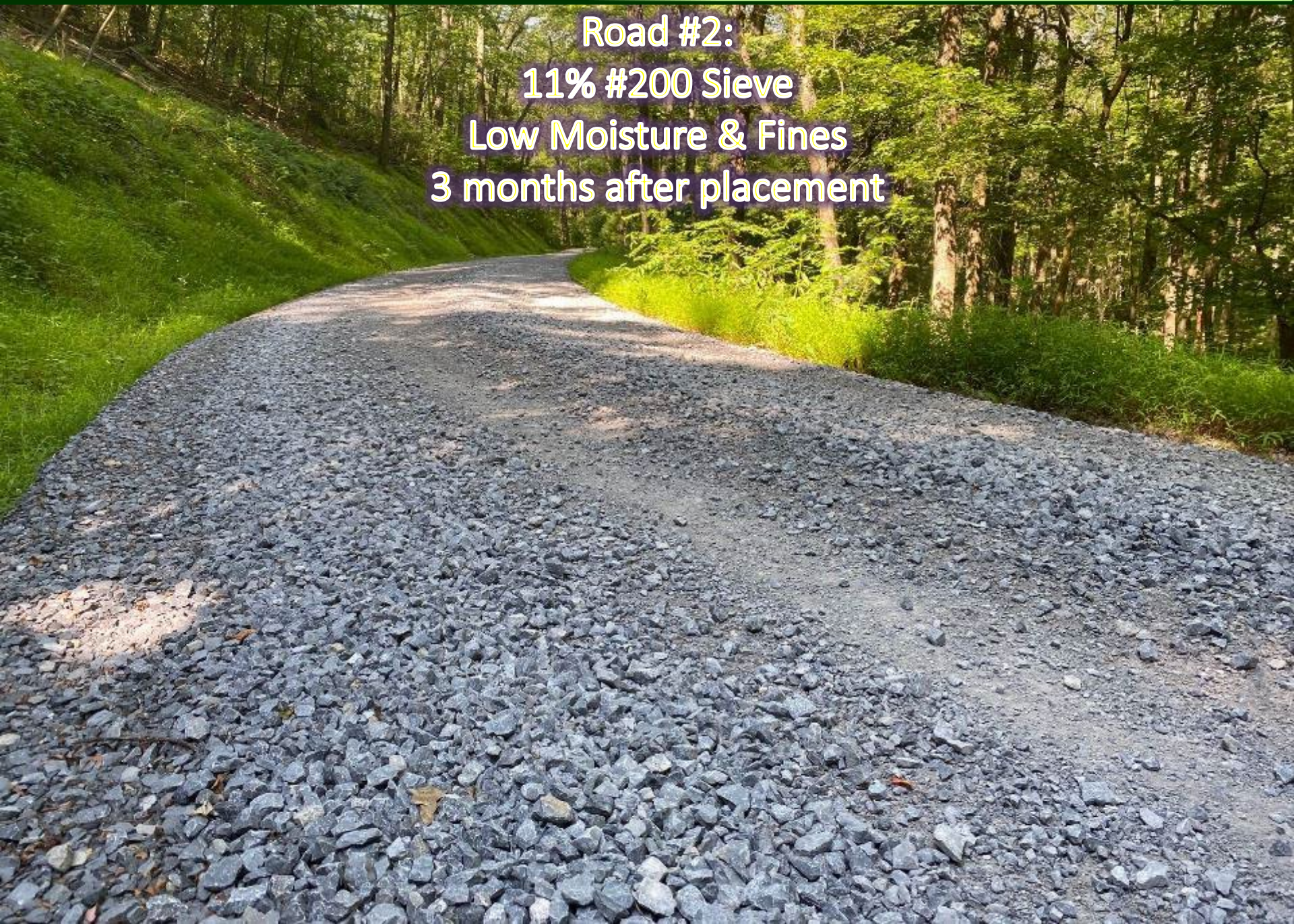

Road #2:
Low Moisture & Fines
3 months after placement


Road #2:
11% #200 Sieve
Low Moisture & Fines
3 months after placement

Proposed 2023 Driving Surface Aggregate Specification

Proposing to increase #200 sieve to 11%

% passing by weight

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#200(1/200 ")	11	15*

*** Up to 17 % fines if PI ≤2**

Other DSA Specifications

DCNR Currently has their own DSA specification

PennDOT currently has their own DSA specification

The three specs do not all match!

Why? Changes were made to the SCC spec that were never reflected in other specs.

DCNR Bureau of Forestry

- Match SCC specification
  - Increase #200 sieve to 11%
  - Change LA Abrasion to 40%
  - Minus #200 composition word change - *"Lime kiln dust and cement kiln dust may be added to DSA to account for up to 50% of the fines passing the #200 sieve".*

PennDOT

- Meeting with PennDOT to update spec to match SCC specification.

Goal is to have the DSA specification be the same for all 3 entities!

Next Steps?

- Thoughts / Questions from CDs?
- Talking with PA Aggregate & Concrete Association in February for supplier input.
- Take proposed change to SCC for approval
- If approved, determine acceptable date for implementation.

DSA Notification Form

- Make sure you are using the most recent form!
  - Dated 7/2022
- Please fill in the cost of the DSA
  - Used to track $/ton

Version 7/2022

Date Submitted:_____

PA Dirt, Gravel, and Low-Volume Road Maintenance Program

Driving Surface Aggregate (DSA) Purchase Notification Form

This form is for Conservation Districts to provide notice to the PSU Center for Dirt and Gravel Road Studies (CDGRS) of upcoming DSA placement projects. The top portion of this form is to be completed and returned to dirtandgravel@psu.edu or fax: 814-863-6787.

CONTACTS	Entity	Person	Phone	E-mail
Cons. District:				
Grant Recipient:				
Quarry				
Placement Cont.:				

PLACEMENT DETAILS

Tons DSA to be placed: _____ tons Estimated Placement Date:_____

Est. Total DSA Costs: $ _____

Placement Method: Motor-paver Other: _____