Porous Asphalt Parking Lot
Sand Run Metro Park

2400 Sand Run Parkway, Akron, Ohio

Paul D. Wilkerson, PE, CPESC

Metro Parks Mission

The Mission of Metro Parks, Serving Summit County is to acquire, conserve, and manage natural resources and to provide the public with safe, outdoor recreation and educational opportunities through a system of regional natural area parks.

Sustainability Policy

- Energy conservation
- Biodiesel and ethanol
- Local supply, recycling
- Pollution prevention practices
- Sustainability in capital and major maintenance projects

MS4 under NPDES Phase II stormwater permit

Hold ourselves and our projects to a higher standard

Ranger Office: Green Building!

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Pervious paver parking lot

Local supply - Belden Brick

Recycled concrete base

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Pervious paver parking lot

Local supply - Belden Brick

Recycled concrete base

ZERO DISCHARGE!

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Sand Run Jogging Trail

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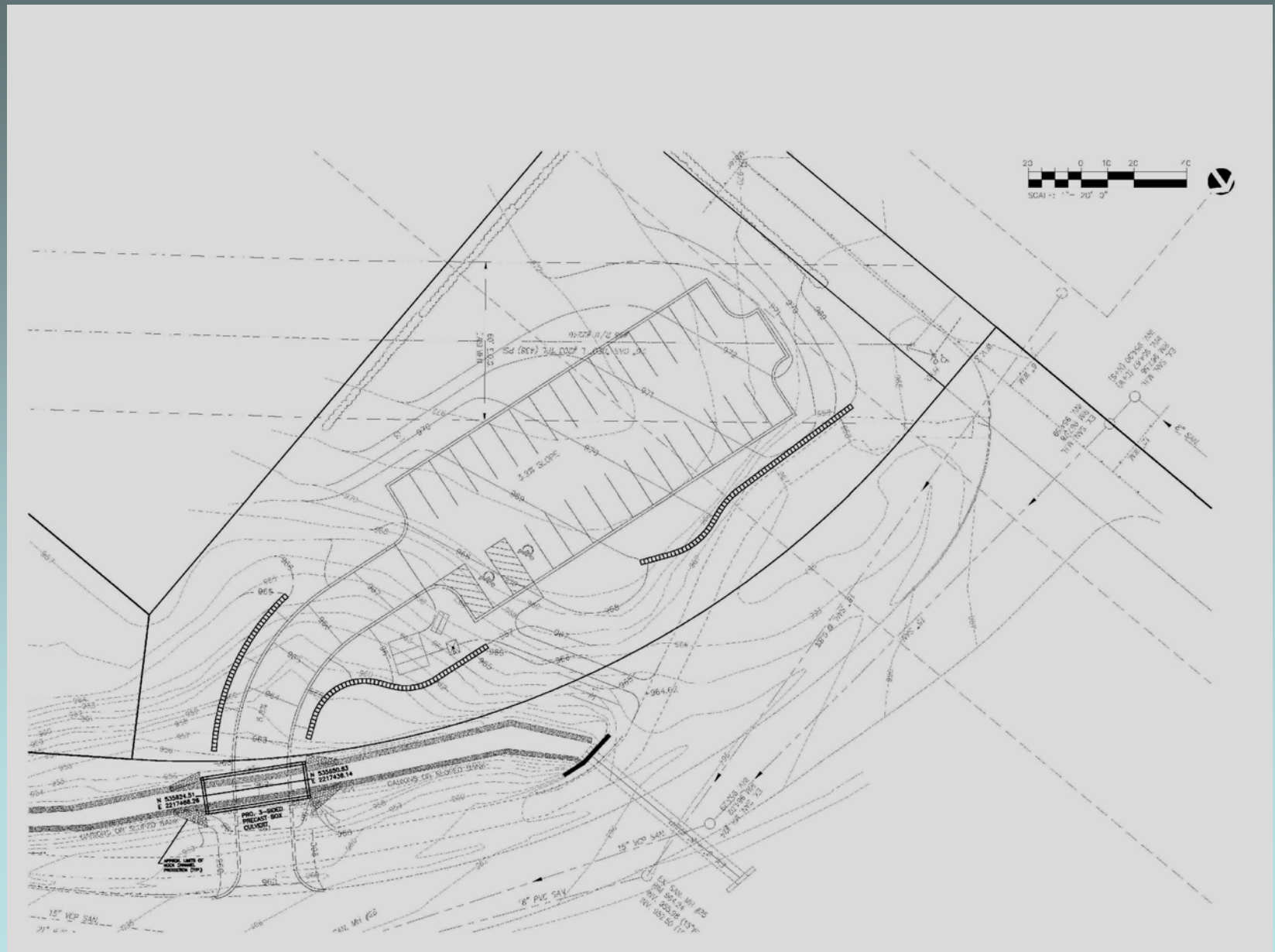

Hydrologic Design – storage volume required

- Store/infiltrate volume of 2-yr storm with FS=2
- Consider porous pavement as impervious for runoff calculations
- Need redundant drainage such as edge drain to capture & direct runoff to storage

Site Design - recommended

- Soil borings/field test infiltration rate
- Level, sandy site generally ideal
- Wells within half mile?
- Design subgrade and surface slope between 1% and 4%

Site Design – our site

- No borings, and soil not like soil at adjacent site
- Not level, silt loam
- Subgrade and surface slope between 3% and 5%
- No wells to worry about

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Site Design – our site

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Site Design – our site

Site Design – our site

Porous Asphalt section

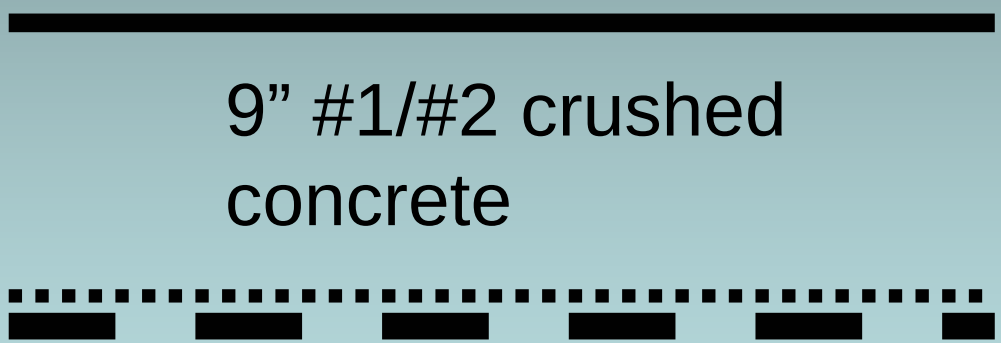
Uncompacted subgrade

Porous Asphalt section

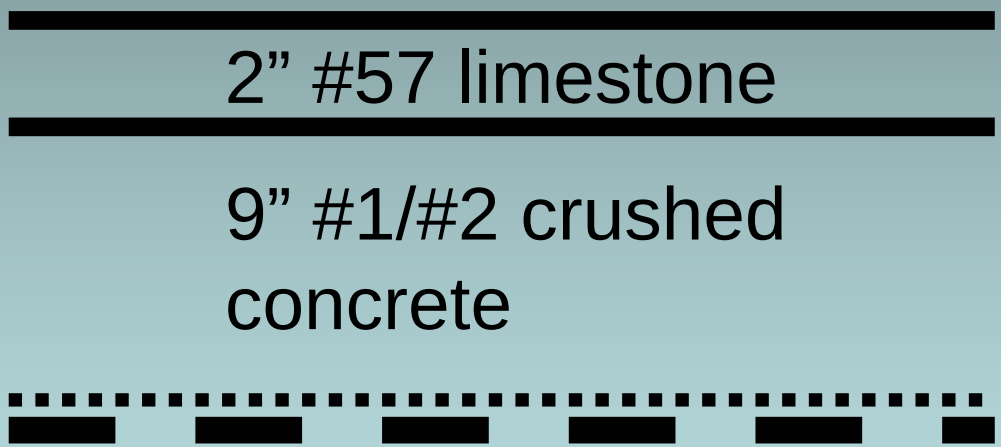
BX1100 geogrid

Uncompacted subgrade

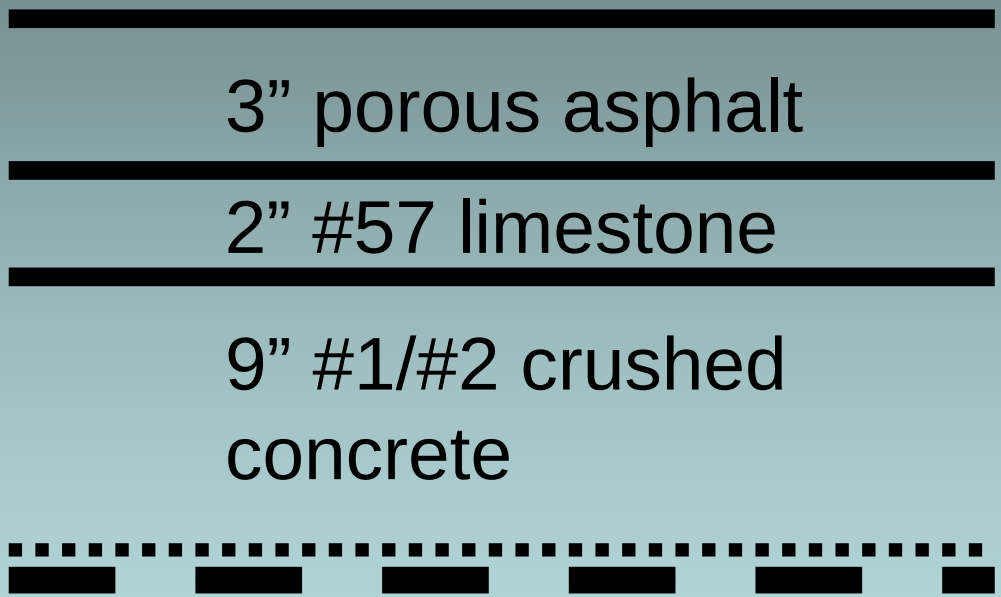
Porous Asphalt section



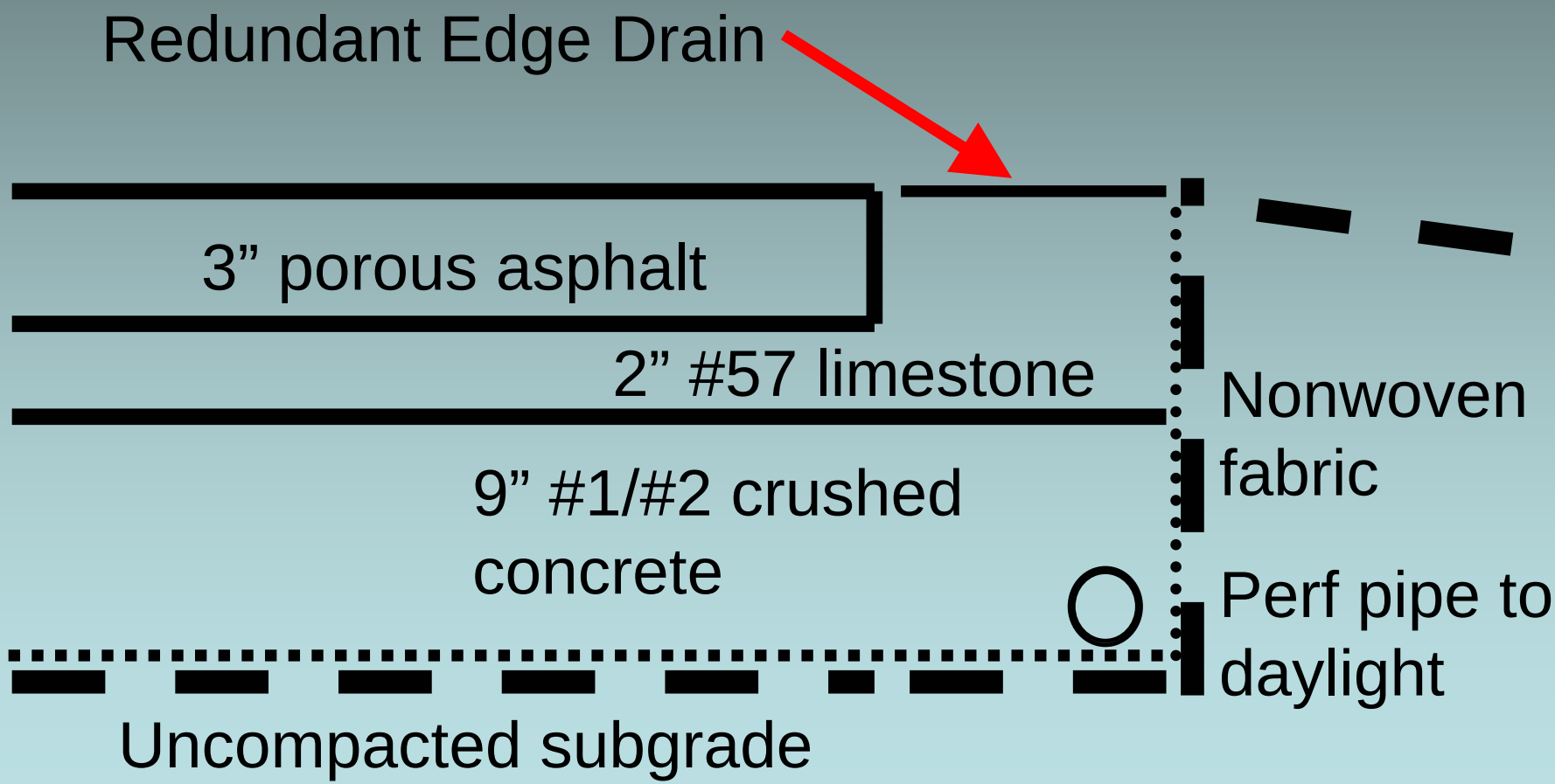
Porous Asphalt section



Porous Asphalt section



Porous Asphalt section



Mix Design

Air voids >18%

Draindown<0.3%

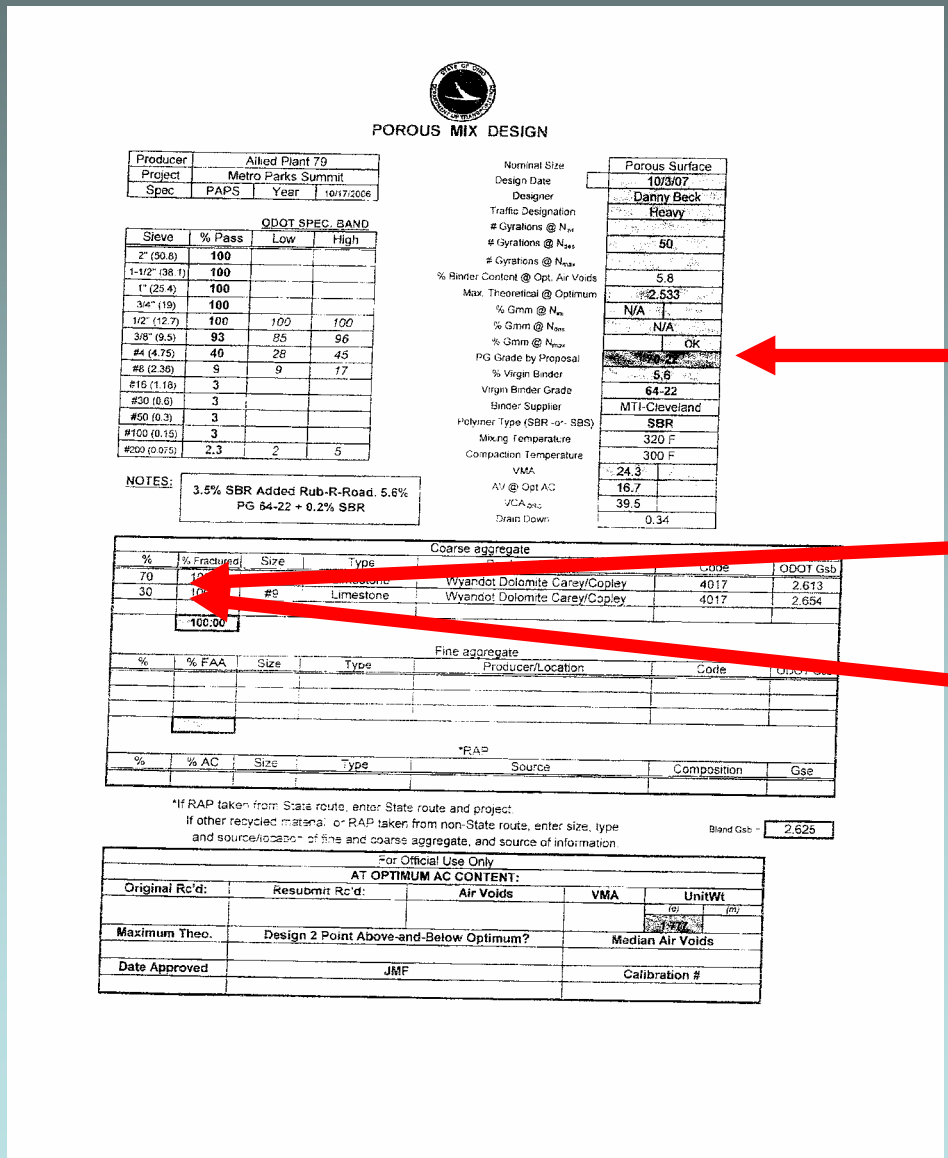
AC 5.75% - 6.0%

Polymer or rubber additive 5.5%-12%

See ODOT Porous Asphalt Surface Course

Mix Design

Allied Materials



POROUS MIX DESIGN

Producer	Allied Plant 79
Project	Metro Parks Summit
Spec	PAPS / Year 10/17/2006

Sieve	% Pass	ODOT SPEC. BAND Low	High
2" (50.8)	100		
1-1/2" (38.1)	100		
1" (25.4)	100		
3/4" (19)	100		
1/2" (12.7)	100	100	100
3/8" (9.5)	93	85	96
#4 (4.75)	40	28	45
#8 (2.36)	9	9	17
#16 (1.18)	3		
#30 (0.6)	3		
#50 (0.3)	3		
#100 (0.15)	3		
#200 (0.075)	2.3	2	5

Nominal Size	Porous Surface
Design Date	10/3/07
Designer	Danny Beck
Traffic Designation	Heavy
# Gyrations @ N_{ini}	
# Gyrations @ N_{des}	50
# Gyrations @ N_{max}	
% Binder Content @ Opt. Air Voids	5.8
Max. Theoretical @ Optimum	2.533
% Gmm @ N_{ini}	N/A
% Gmm @ N_{des}	N/A
% Gmm @ N_{max}	OK
PG Grade by Proposal	[redacted]
% Virgin Binder	5.6
Virgin Binder Grade	64-22
Binder Supplier	MTI-Cleveland
Polymer Type (SBR -or- SBS)	SBR
Mixing Temperature	320 F
Compaction Temperature	300 F
VMA	24.3
AV @ Opt AC	16.7
VCA$_{DRC}$	39.5
Drain Down	0.34

NOTES: 3.5% SBR Added Rub-R-Road. 5.6% PG 64-22 + 0.2% SBR

Coarse aggregate

%	% Fractured	Size	Type	Producer/Location	Code	ODOT Gsb
70	100	#8	Limestone	Wyandot Dolomite Carey/Copley	4017	2.613
30	100	#9	Limestone	Wyandot Dolomite Carey/Copley	4017	2.654
	100.00					

Fine aggregate

%	% FAA	Size	Type	Producer/Location	Code	ODOT Gsb

*RAP

%	% AC	Size	Type	Source	Composition	Gse

*If RAP taken from State route, enter State route and project. If other recycled material or RAP taken from non-State route, enter size, type and source/location of fine and coarse aggregate, and source of information.

Blend Gsb = 2.625

For Official Use Only

AT OPTIMUM AC CONTENT:

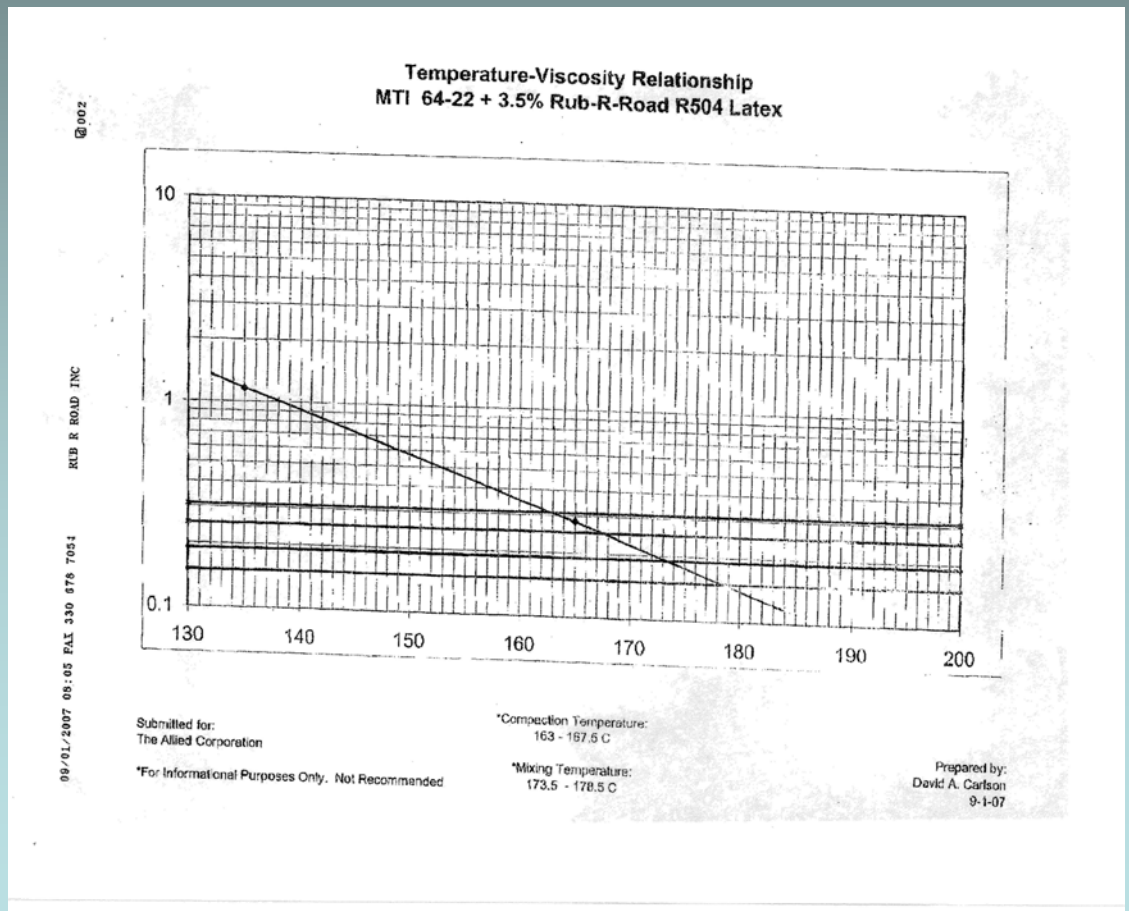
Original Rc'd:	Resubmit Rc'd:	Air Voids	VMA	UnitWt (e)	(m)
				[redacted]	
Maximum Theo.	Design 2 Point Above-and-Below Optimum?		Median Air Voids		
Date Approved	JMF		Calibration #		

64-22 binder

70% #8 limestone

30% #9 limestone

Mix Design



Rub-R-Road
R504 latex

Final PG 76-22

Keeps it stiffer in hot weather

Placement & Compaction

Karvo Paving
Akron

Light roller, 1-2 pass at 300° target

Keep trucks off!

Placement & Compaction

Prevent wash from adjacent areas

Project sequence to build porous parking last

#57 limestone

304 base

Placement & Compaction

Prevent wash from adjacent areas

Project sequence to build porous parking last

Perf. Pipe outfall →

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1,320 sy

$39,000 for grid, base,and asphalt

$30/sy

No curb

Edge drain

No curb

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Stinky toilet

Edge drain

No curb

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Stinky toilet

Edge drain

No curb

Surface damage

Maintenance

KEEP IT CLEAN!

Prevent soil wash from adjacent areas

Only salt for de-icing (75% less salt in UNHSC study!)

Maintenance

Careful plowing

Vacuum sweep 1 – 2 times annually

NO SEAL COAT!

LESSONS LEARNED

- Test soil – know infiltration rate & expectations for project
- Design for relatively level subgrade - <4%
- Subgrade sound but not compacted – keep trucks off subgrade – spread stone base on the way in
- Plan for overflow from base

LESSONS LEARNED

- Shear strength not quite like “regular” asphalt

RESOURCES

- ODNR Rainwater and Land Development Manual
- National Asphalt Pavement Association
- Center for Watershed Protection
- US EPA
- www.rub-r-road.com
- Jeff Gunderson, *Pervious Pavements,* Stormwater, September 2008

Thank you!
Questions?