



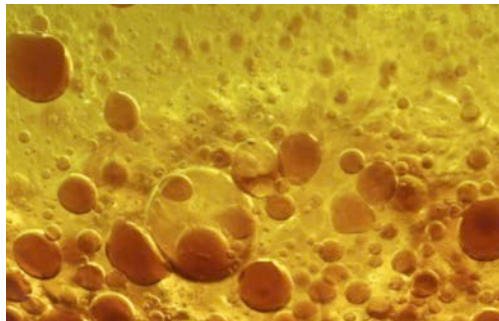
Axys[®] and Onyx[®] Mastic Surface Treatment Technologies

Almaty 16/08/2018

AXYS[®] & ONYX[®] MASTIC SURFACE TREATMENTS

DEFINITION

“ A composite material containing asphalt, polymers, particulate reinforcing materials (clays, etc.), surfactants and emulsifiers, and synthetic aggregate that is used in pavement preservation applications.”



Mastic Surface Treatment Technologies



Mastic Surface Treatment Technologies

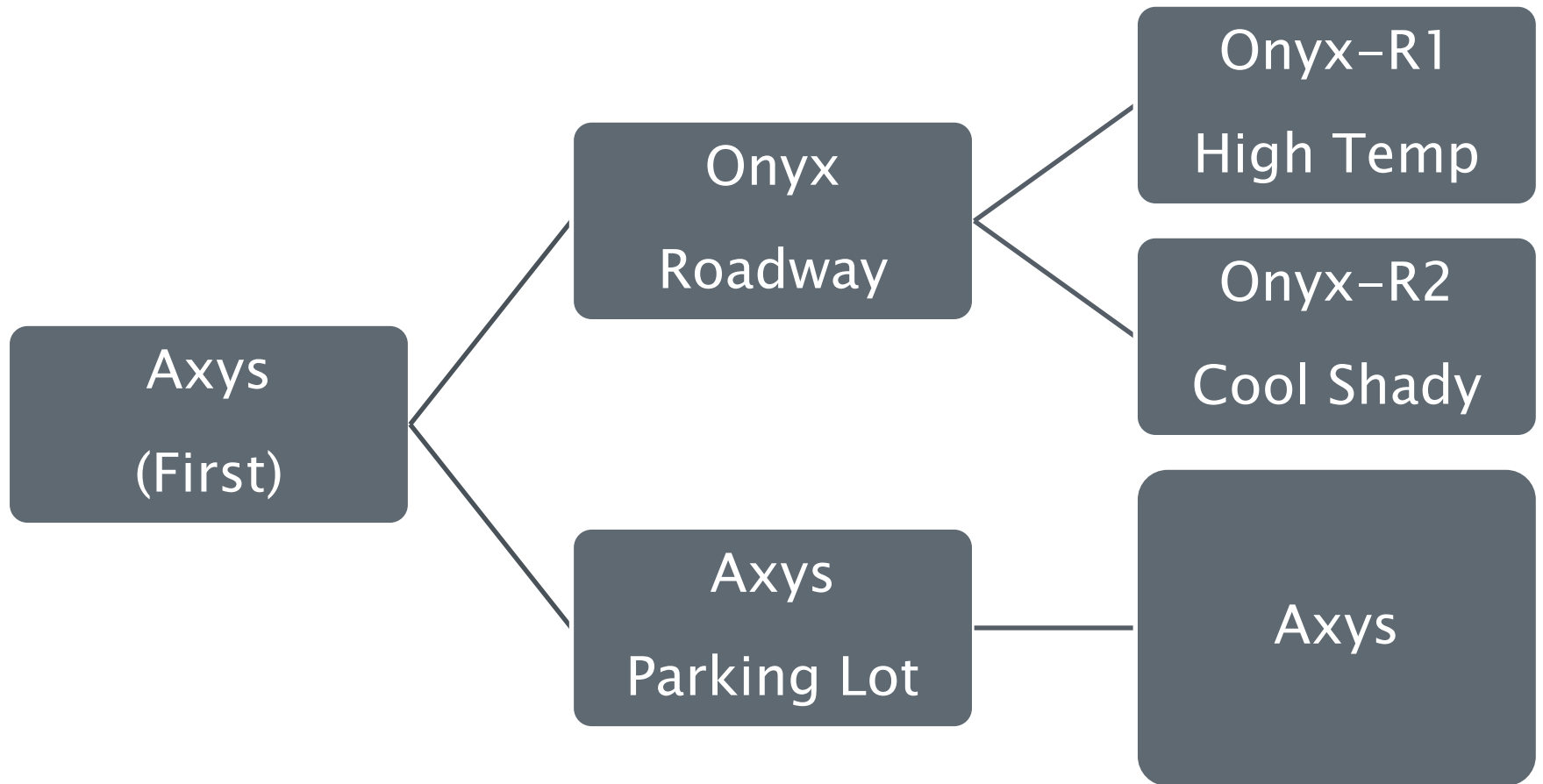


Mastic Surface Treatment Technologies



April 2016

Mastic Sealer Technology Product Developmental Tree



Onyx Mastic Sealer Product Line

Name	Typical Use	Differentiation
Onyx-R1	Roadways, shoulders - Used where pavement temperatures exceed 35° C immediately after application	Contains significant amount of high friction aggregate, best applied with spray truck
Onyx-R2	Roadways, shoulders - Cool , cloudy weather and areas where pavement temperature is usually lower than 35° C after application	Contains significant amount of high friction aggregate , best applied with spray truck. Manufactured with cool weather performance additive

Mastic Surface Treatment Manufacture

- Central Plant
- Mix system on load cells
 - Aggregate
 - Mineral Fines
 - Polymer
 - Asphalt Emulsion
 - Water
 - Testing on mix performed at plant



Mastic Surface Treatment Manufacture

Mastic is produced as complete mix and shipped ready to use

Aggregate remains suspended in the mastic with mixing for a few minutes every day.



Mastic Surface Treatment Transport and Application

Applicator trucks have ability to re-mix mastic to assure consistent proportions of materials



Application

0,60 to 0,7 liter per
Square yard per pass

Typically two
Applications

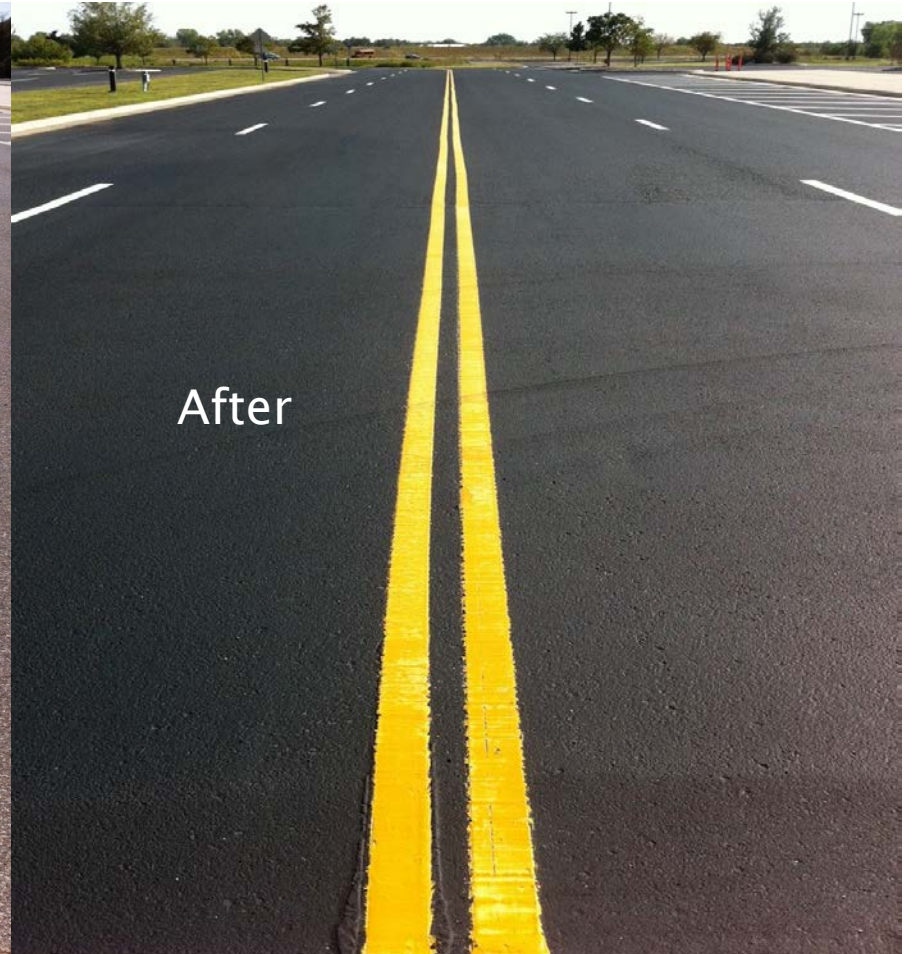


Mastic Surface Treatment

Large bore nozzles are used to allow the aggregate containing mastic to be sprayed



ONYX[®] | MASTIC SURFACE TREATMENT



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➔ ONYX is a cross between a Slurry Seal/Micro-Surfacing & a Fog Seal.



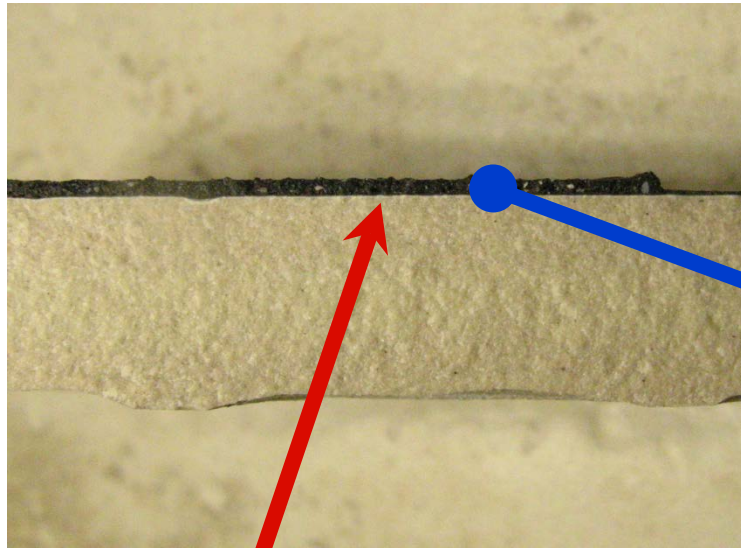
1,2-1,4 litre/Sqm.

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Benefits

- **Cost Effective:** Low cost allows agencies to cover more km of roads
- **Minimal User Delay:** Traffic can be returned quickly. Good weather, second coat in 15-30 min...**Quick Return to Traffic**
- **Friction:** Aggregate type and quantity provides frictional characteristics
- **Durability:** 2-4+ year life (**Depends on Existing Pavement & Traffic**); Excellent Wet Track Abrasion Test results
- **Appearance:** Aesthetically pleasing, black color; **No loose aggregate**
- **Safety:** fine sized sand wont harm wind shields or aircraft engines
- **Consistency:** Central Plant produced product means consistent results

Asphalt Mastic Cross Section



Mastic cured
seal layer
on pavement

Rough “micro texture” surface

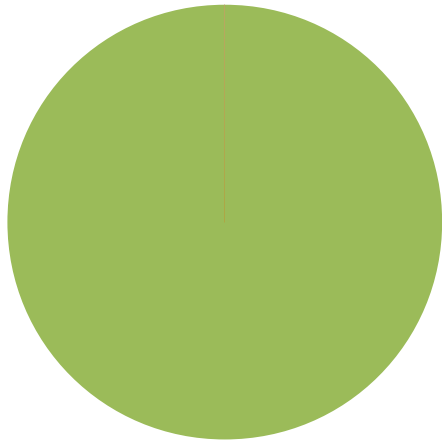


Aggregate, fines,
asphalt, polymer, voids
evenly distributed
through matrix

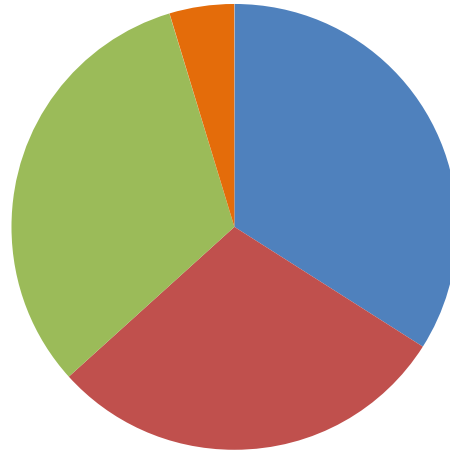
Magnified ~20 X

Composition Comparison of Asphalt Based Pavement Preservation Treatments

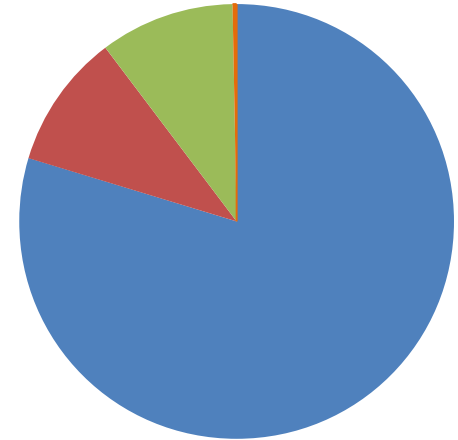
Fog Seal



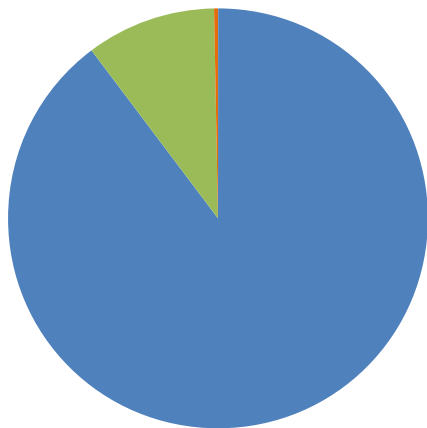
Mastic Sealer



Slurry Seal

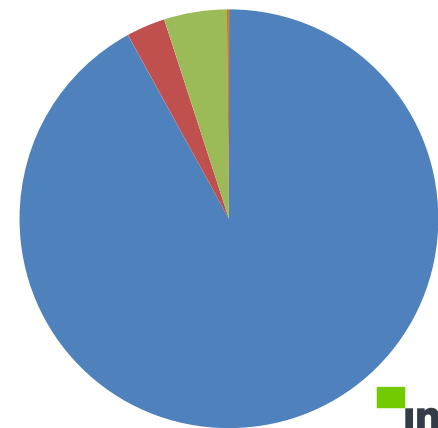


Chip Seal



■ Aggregate ■ Fines
■ Asphalt ■ Polymer

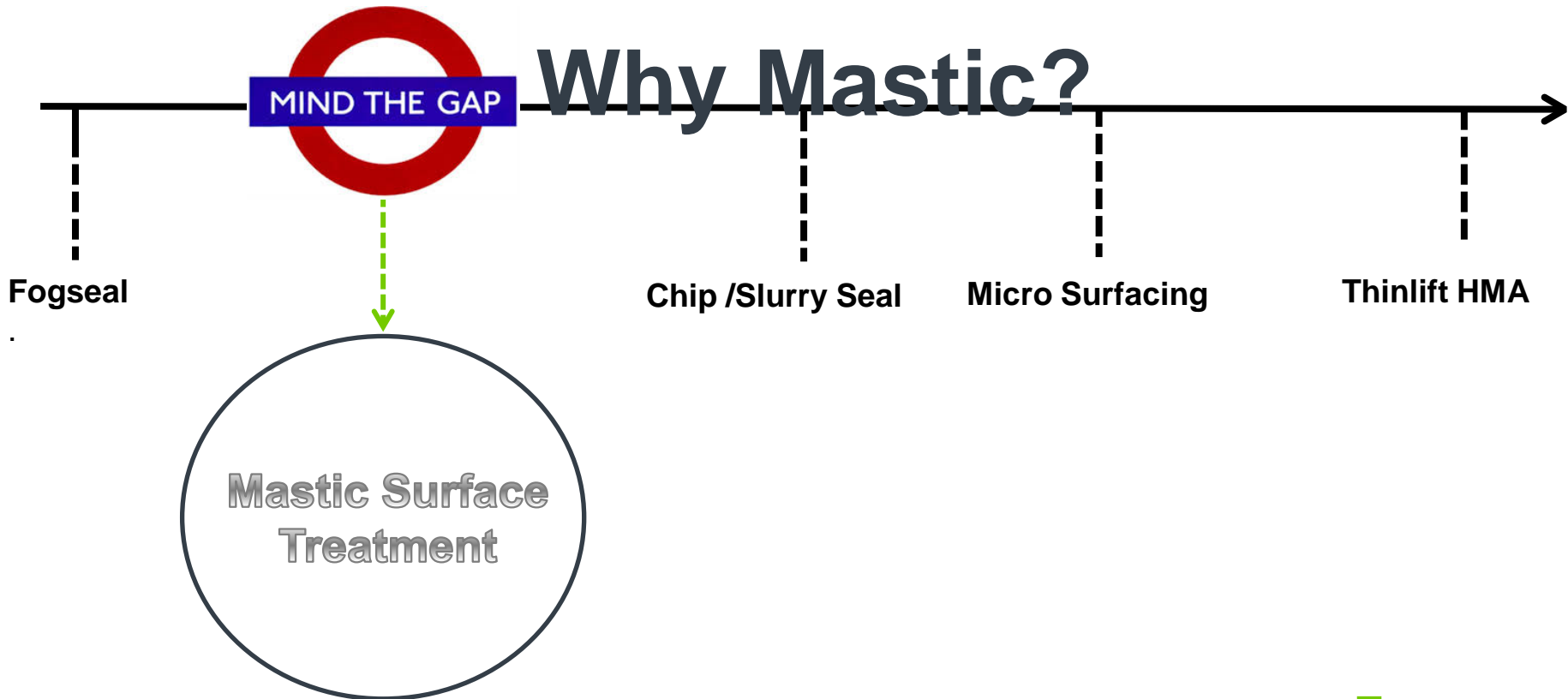
Hot Mix



MASTIC SURFACE TREATMENTS

Lower Cost

Higher Cost



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Performance



Onyx Mastic Surface Treatment

Product Attributes

Attribute	Test	Unit of Measure	Comments
Friction	DFT	U_f	Impact on Friction
Durability	Wet Track Abrasion Test (WTAT)	g/m^2	Is it tough
Permeability	NCAT Permeameter	Coefficient	Resist Water
Release to Traffic/Cure	Dry Time Test	Minutes	How fast to open to traffic
Color	Munsell Neutral Scale	Number	Is it Black
Tackiness	Zapon	Seconds	Will it get tacky in high heat

Mastic Surface Treatment

Specifications

Emulsion & Aggregate:

2.1 EMULSIFIED ASPHALT

- A. Use emulsified asphalt, grades CSS-1, or CSS-1h, in accordance with Table 1

Table 1 – Emulsified Asphalt			
Criterion	Standard	Min	Max
Viscosity, Saybolt Furol at 77°F, seconds	T-59 / D244	15	100
Particle Charge Test In case of inconclusive particle charge, material having a maximum pH value of 6.0 will be acceptable as a CSS type	T-59 / D244	Positive	
Sieve %	T-59	0	0.1
Residue by Distillation, percent	T-59	57	--
Penetration at 77° F, 100 g, 5 seconds (Test on Residue from Distillation)	T-49 / D-5	15	150

Mastic Surface Treatment

Specifications

Aggregate:

Table 2 - Aggregate			
Physical Properties (a)			
Criterion	Standard	Min	Max
Water Absorption, percent	T 84	--	4
Micro-Deval, percent	(b) D 7428	--	20
Gradation (c)			
Sieve	Standard	Master Grading Band Limits Percent Passing	Target Tolerance
No. 8	C136	100	
No. 16	C136	80 – 100	
No. 30	C136	75 – 100	+/- 5
No. 60	C136	50 – 85	+/- 5
No. 100	C136	40 – 65	+/- 5
No. 200	C117	25 – 65	+/- 5
a) Perform physical property tests on aggregates that are received before blending into sealer. b) Micro Deval on aggregate larger than #60 sieve U.S c) Includes all mineral components			

Mastic Surface Treatment

Specifications

Performance Tests (Mix Design):

2.4 MIX DESIGN

Table 3			
Asphalt Mastic – Mix Design			
Test	Standard	Min	Max
Wet-Track Abrasion Loss (3 day soak), g/m ² (a)	ISSA TB 100 D3910	--	80
Asphalt content by Ignition Method, percent	AASHTO T 308	30	--
Dynamic Friction Test Number @ 20 kph (ratio) (b)	E 1911	0.90	--

NOTES

(a) Use the modified method to account for realistic application depth and fine emulsion mixture.

(b) Establish base friction value using prepared laboratory compacted slab of approved mix as surface to be tested. The Dynamic Friction Test (DFT) number ratio should indicate that after application of the mastic seal, the surface retains required minimum percentage DFT number of the original pavement surface.

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EXAMPLES

Sedgwick County, KS

- Goal: Add 30 miles to PM program
- Insufficient funding to achieve goal.
- Diverted thin-lift overlay program \$\$ to ONYX to achieve goal.

Options:

\$56,320 per mile for thin-lift (\$4/yd²)

\$16,896 per mile for ONYX (\$1.20/yd²)

\$39,424 per mile savings allowed them to impact more of their pavement network

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ONYX Sedgwick County



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College Station, TX



- City of College Station contracted out crack seal contract, but results left residents dissatisfied, with the “graffiti” look to the pavement.

- City decided to use ONYX as a pavement preservation measure, with the hope of adding a more aesthetically pleasing look to the roadways.

- With a small budget to work with, the City of College Station saw value in utilizing ONYX over conventional pavement preservation alternatives.

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- City of College Station was pleased with the overall results of using ONYX, and has budgeted more work for 2016

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Summary: Mastic Surface treatments are providing agencies a tool that allows them to make their budget go farther, while making their roadways last longer.



Thank You



April 2016