

Use of Recycled Asphalt Shingles (RAS) in Asphalt Pavement — Workshop & Field Demonstrations June 15, 2015



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City of Columbus RAS Project Scope

- OEPA Special Assistance Grant (SPAG) Opportunity for a RAS Project.
- The grant application was a collaboration with various Sections and Divisions within DPS with the lead taken by the In-House Design Section.
- Much research and collaboration with asphalt/RAS industry experts (Cliff, Larry and Jerry/John Lambert) was also performed to assure data and quantity estimates were accurately computed and represented in the application.
- Grant Application review (Cover, Executive Summary, Project Details: etc.).

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RAS OEPA SPECIAL ASSISTANCE GRANT APPLICATION

- As with RAP back in the day, the asphalt industry has an increasing opportunity to use RAS to reduce solid waste volume in our landfills and produce a better (stiffer) asphalt mix.
- ODOT has accepted RAS use as referenced in their Construction Materials and Specifications (CMS) General Asphalt specification (401.04)
- The City of Columbus embraced the opportunity to use RAS to see if we observe a reduction in surface rutting and cracking as claimed; if so, then we would likely specify more RAS pavements in the future.

COC RAS PILOT — WHY NOW?

- The City of Columbus used the ODOT RAS specification for the most part.
- Since resurfacing mills and fills the surface course we held to the ODOT spec. only allowing manufactured asphalt shingle waste only in the spec.
- RAS was specified in the mix for Heavy Traffic PG70-22M (Georgesville Road); Medium Traffic PG70-22M (Weber Road), and Medium Traffic PG64-22 (select residential streets)
- ITEM 448 ASPHALT CONCRETE SURFACE COURSE (HEAVY TRAFFIC) PG70-22M, RAS, AS PER PLAN (Binder varies as represented above)

COC RAS SPECIFICATION

- AT THE LOCATIONS SPECIFIED, USE CITY OF COLUMBUS CMS 448 MIX PRODUCED WITH RECLAIMED ASPHALT SHINGLES (RAS) MANUFACTURING WASTE ONLY AT NOT LESS THAN 4% AND UP TO 5.0% RAS PER DRY WEIGHT OF MIX AND PER ODOT 401.04; TABLE 401.04-1. RAP MAY BE USED WITH THE RAS PER ODOT 401.04 WITH A TOTAL RECLAIMED PRODUCT NOT MORE THAN 20%. ENSURE MANUFACTURING WASTE RAS COMES FROM APPROVED ODOT QPL SOURCES. IT SHALL BE UNDERSTOOD THAT THE RAS AND RAP 448 ASPHALT CONCRETE MATERIALS USED AT THE SPECIFIED LOCATIONS FOLLOW ODOT 401.04 FOR THE RAS AND RAP ADIMIXTURES ONLY.
- Total RAS asphalt for this project estimated at 3,500-Tons

COC RAS SPECIFICATION

- A review of the streets being resurfaced in Resurfacing 2015 P-1 was performed;
- Recommendation was made for RAS streets to maximize the widest range of traffic types; Discussion with Division leadership occurred and the roads/streets selected represent that traffic range (next slide) to make performance observations
- We did not want to set up a Pilot RAS project for failure; so we looked for a good mix of Arterial, Collector, and Residential streets to use the RAS mix and observe performance where rutting has been observed and traffic conditions vary.

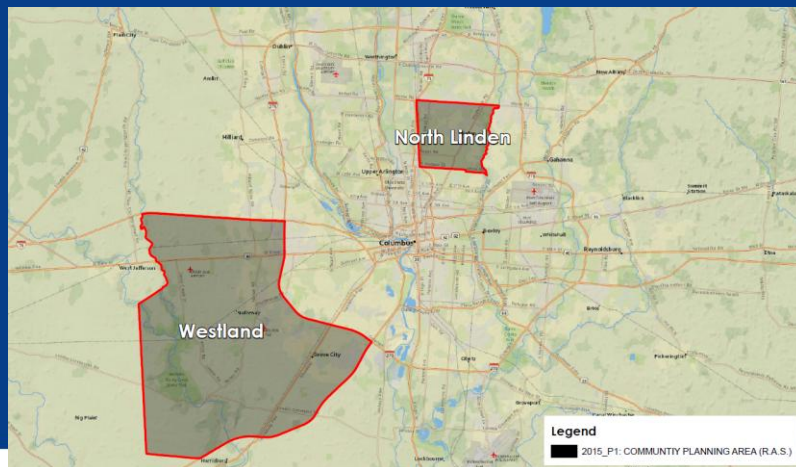
STREETS SELECTED & WHY

- Arterial Streets (heavy truck and bus use)
- Collector Streets (routine bus use)
- Residential Streets (light traffic)

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STREETS SELECTED & WHY

RAS Asphalt Project Areas



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STREETS SELECTED & WHY

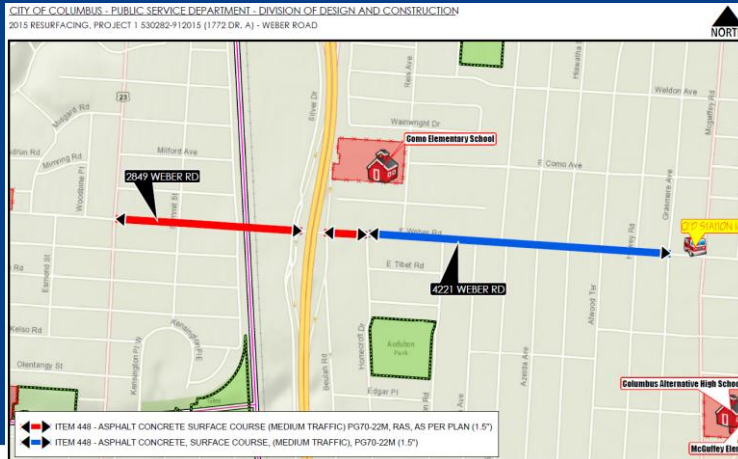
RAS Asphalt Project Areas



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STREETS SELECTED & WHY

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STREETS SELECTED & WHY

- Pursuant to developed City of Columbus testing criteria for this RAS pilot project; the proposed testing protocol included in the OEPA SPAG application:
- *Visual observations and measurements will be made annually by the Construction Testing lab for rutting and cracking resistance on selected streets by observing over time; rutting and cracking are first observed and then documenting the rate of increase to rutting and cracking thereafter. The documented test is to observe a measurable reduction in rutting and cracking on the selected streets as compared with adjacent conventional asphalt placed on the project (where cracking will be measured by the frequency of cracks and width of the crack in a given area and the rate at which the cracks get larger and/or cracking frequency increases; the rutting will be measured with a straight edge for depth and the change in depth over time from year to year). It is expected that the RAS performance measurements will occur over a 5-Year period with gathered performance data serving as a basis for a formal RAS asphalt performance report at the end of the testing period.*

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POST CONSTRUCTION TESTING AND MONITORING PROTOCOL (specifications)

- Reduced rutting and deformation on heavy traffic areas;
- Reduced cracking on all streets where RAS asphalt is used throughout the project
- Resulting in improved life cycle costs (maintenance and resurfacing frequency); and,
- Improved sustainability through increased recycling and reduction in natural resource consumption and waste diversion from landfills

COC PERFORMANCE EXPECTATIONS

- About 140 tons of asphalt shingles diverted from Ohio landfills
- Should performance expectations be positive; likely other local agencies using City of Columbus Construction Materials and Specifications will follow the lead resulting in reduced resurfacing life cycle costs and more asphalt shingles being diverted from landfills.
- Expectation is that future RAS utilizing more tear off shingles (surface course) will have an even greater positive environmental benefit (tear offs have a greater percentage of asphalt content by volume than manufactured waste).

ENVIRONMENTAL BENEFITS

Q & A

PRESENTED BY:

Richard A Miller, Jr., P.E.
In House Design Manager
Division of Design and
Construction
50 West Gay Street
Columbus, Ohio 43215
614.645.3977
ramiller@columbus.gov



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