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## Memorandum

To: Distribution

From: Paul Ferry, P.E. Revised 2/2/23 *MC*  
Highways Engineer

Date: March 16, 2009

Subject: Recycled Surfacing Options

The Department is making a concerted effort to make the best use of the existing pavement. The following guidelines should be reviewed on projects to determine if any of the applications are appropriate.

### Reconstruction Projects

The plant mix surface can be milled and reused as

- Traffic gravel
- Recycled asphalt pavement (RAP)
- A supplement to the base gravel
- Detour surfacing

Since the milling operation is not inherent to reconstruction projects, these uses of the existing pavement may not be cost effective in areas where aggregate is readily available

### Rehabilitation and Engineered Overlays

The existing pavement can be recycled through the use of the treatments described below.

- Cold-in-Place-Recycle (CIPR) combined with a new overlay. This treatment's performance is equivalent to a mill/fill overlay
- Recycled Asphalt Pavement (RAP). This treatment will depend on the availability of millings and the thickness of the designed overlay. The use of RAP in both the top and bottom lifts should also be evaluated.
- Pulverization. This treatment should always include either pulverization into the existing base course or the addition of virgin aggregate. The addition of cement to the pulverization should also be evaluated

### Pavement Preservation

The recycling options available for pavement preservation projects are limited to the following treatments that could be used in place of mill/fill projects:

- Recycled asphalt pavement (RAP). This treatment would have to be evaluated by the Surfacing Section to determine if RAP should be used in the top lift. The use of RAP would still result in excess millings
- Cold-in-Place Recycle (CIPR) with or without an overlay. This treatment is differentiated from a rehabilitation, because both the depth of the milling and the thickness of the overlay are limited)
  - ▶ A minimum 0.25 ft (75 mm) recycle depth
- A CIPR project without an overlay must meet the following criteria.
  - ▶ ADT < 2000
  - ▶ ESAL < 50
  - ▶ Project Length  $\geq$  5 Miles (8 km)

The Materials Bureau has noted that research is being conducted on the use of warm mix. However, the specifications and design criteria for its implementation will not be available until 2010.

The Materials Bureau also noted that Hot-in-Place Recycle is generally not cost effective due to energy costs. Taking the milled material to a hot plant and producing RAP is typically cheaper and results in a better road surface.

### **Excess Millings**

Although it is not always practical to use all of the cold millings on a project, our goal is to utilize them wherever it is cost effective to do so. In addition to RAP millings can be utilized for the following purposes:

- Base Course or digout backfill (needs to be mixed with crushed aggregate)
- Shoulder gravel
- Guardrail widening
- Traffic gravel
- Detour surfacing
- Additional gravel for CIPR as needed

If the millings can't be used on a project, refer to the priorities provided in memo on the use of cold millings dated March 10, 2009.

### **Implementation**

An assessment of the most cost-effective use of the existing pavement should be made for all projects that are not beyond the Scope of Work. The Project Design Manager needs to contact the Materials Bureau to determine if any of the recycle treatments are viable.

For projects that are beyond the Scope of Work in the design process, the Project Design Manager should review projects to determine if sufficient time is available to implement any changes in the designed surfacing section. If there is sufficient time to make changes, the PDM should coordinate with the Materials Bureau for the appropriate surfacing treatment.

- The recycling of pavement needs to be documented in the appropriate reports (PFR, SOW, or PIH of FPR if the recycling is added later in the design process. The number and thickness of plant mix lifts will need to be identified when RAP is

used. The sequencing of surfacing operations can be critical. The designer will need to coordinate with construction and Materials Bureau personnel.

If you have questions concerning this, please contact ~~the Highways Engineer me at 444-6244.~~

Pf.

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