

**March 2012**

## **Rejuvenation vs. Re-Paving our Drum Point Subdivision Roads**

Rejuvenation will extend the life of a road surface from 15 years to almost 30 years. Since the roads were paved/repaved in 2002 and Rejuvenation applied in 2007, they are due to be rejuvenated now. To fail to do so means that Drum Point will be faced with the necessity of re-paving 15.3 miles of roads in 5 – 8 years at a cost of **\$3,635,280**. Compare this with **\$188,000** for Rejuvenation. Can we wait? No. Rejuvenation must be applied before road surfaces show significant deterioration from aging.

The Rejuvenation process is cost effective for extending the life of roads if applied in a timely manner to well-paved roads. Rejuvenation must be applied before the effects of aging are visible. It can be applied three or more years after the road surface is laid down; and the surface should show only small loss of surface aggregate and hairline cracks with alligatoring on less than 10% of the surface.

Good stewardship of roads calls for maintenance of asphalt road surfaces. Rejuvenation has been evaluated and used by the states, Federal government, US Navy, and the Army Corps of Engineers. Fifty years of use shows that Rejuvenation is a proven method to extend pavement life at a low cost (J. Brownridge)<sup>1</sup> In 1973, the US Navy, in a multi-year study, compared use of Rejuvenation at China Lake, California<sup>2</sup> with untreated test sections at each site. The study report said that field test and laboratory results “show conclusively that [Rejuvenation] does prolong the life of asphalt concrete pavements.”

### **How does Rejuvenation work?**

A road surface consists of aggregate in a petroleum/asphalt binder. As asphalt ages, the petroleum elements of the binder oxidize and the asphalt loses its elastic properties and becomes brittle; whereupon the road surface cracks, allowing freeze-thaw cycles to destroy the road.

Rejuvenation reverses the aging process by adding back the petroleum fractions needed for elasticity of the binder. In contrast to sealing processes, Rejuvenation is formulated so that the essential petroleum fractions work their way down below the surface of the road and renew the binder.

### **Why is Rejuvenation cost effective?**

It is cheaper to obtain, and transport Rejuvenation chemicals, which are only a fraction of the binder, than to coat the road with 2” of combined aggregate and asphalt/petroleum binder. Further, the application process for Rejuvenation is simpler and cheaper than that for a road resurfacing operation.

## Drum Point Roads and Current Costs

Drum Point has 15.3 miles of roads. A normal road surface in a semi-rural environment such as the Drum Point Subdivision can be expected to last for about 15 years in usable condition (Calvert County Dept. of Public Works).

Rejuvenation of our 15.3 miles of roads would cost about \$2.30 per linear foot of road (or \$12,287 per mile) for a total cost of \$188,000 (contractor estimate).

We estimate that re-paving our 15.3 miles of roads with a 2" layer of asphalt/aggregate mix would cost at least \$45.00 per linear foot of road (or \$237,600 per mile) for a total cost of \$3,635,280 (Great Mills Trading Post). This is for repaving only, and does not bring the roads up to County standard.

### Cost Comparison

Comparing the cost of Rejuvenation with that of re-paving, the break-even point is 9 ¼ months, i.e., Rejuvenation pays for itself if it extends the life of the road surface by 9 ¼ months or more.

Experience has shown that Rejuvenation, appropriately used, adds 3 to 5 years of life to a pavement. (see for example, Cocoa Beach Florida<sup>3</sup>, which plans to extend the life of its roads from 15 years to 30 years with application of Rejuvenation every 5 years before re-paving). So let's look at the mathematics:

- If Rejuvenation adds 1 year of life to the road surface, it saves  $(1/15) \times \$45 = \$3.00$ /linear foot (which is already past the break-even point).
- If it adds 3 years of life to the road surface, it saves  $(3/15) \times \$45 = \$9$ /linear foot.
- If it adds 5 years of life to the road surface, it saves  $(5/15) \times \$45 = \$15$ /linear foot.

So, one application of Rejuvenation, at a cost of \$2.30 per linear foot can be expected to save between \$9 and \$15 per linear foot of road and prolong the life of the road surface by 3 to 5 years.

Another way to look at it is to ask "how much it would cost to add a full 15 years of usable life to the road?" Apply Rejuvenation 4 times in the course of 15 years at a total cost of \$9.28/linear foot. Compare this with the cost of resurfacing the road for \$45/linear foot.

### Cost of Road Re-Paving

If road life at Drum Point is 15 years, to replace 1 mile/year of our 15.3 miles of roads will cost about \$237,600/year ( $\$3,635,280/15$ ). Therefore, when the road surfaces wear out due to aging asphalt, DPPOA must be able to budget **\$237,600/year** for 15 years for a total of **\$3,635,280** in addition to its other ongoing operations and maintenance expenses for roads (i.e. swale refurbishment, storm water control, etc.).

<sup>1</sup>J. Brownridge, The Role of an Asphalt Rejuvenator in Pavement Preservation: Use and need for Asphalt Rejuvenation, #47, First International Conference on Pavement Preservation.

<sup>2</sup>Value Engineering, Report on Reclamite Usage, Naval Weapons Center, China Lake, California, Navy Facilities Engineering Command – Western Division, San Bruno, Ca., 94066, 1973

<sup>3</sup>B. Torres, Citywide Asphalt Roadway Rejuvenation Project, Oct. 22, 2009 (Cocoa Beach Florida)