

Memorandum

Department of Public Works



TO: Michael O. Geisel, P.E.
City Administrator

FROM: James A. Eckrich, P.E. *JAE*
Public Works Dir. / City Engineer

DATE: August 10, 2023

RE: Nooning Tree Court – Case Study

Nooning Tree Court is a residential street in the City of Chesterfield located within the Nooning Tree Addition Subdivision. The street is approximately 1,500 feet long and was constructed around 2002. It has an overall pavement condition rating of 7.8.



I am bringing this street to your attention because the City's Street Maintenance Division of the Public Works Department recently completed some isolated asphalt joint repairs on this street. This resulted in a number of complaints to the City related to the appearance of the street. Three photos of the patched areas are shown on the next page.



These asphalt joint repairs are very well done and, if allowed to remain, would extend the life of Nooning Tree Court. Additionally, they ensure that the street remains safe and passable. Unfortunately, their appearance is unacceptable to many City residents. Accordingly, the City's policy for a number of years has been to incorporate these streets into the concrete slab replacement program. That has been done in this case, and these slabs are scheduled for replacement later this year.

You will recall that earlier this year I presented a Concrete Pavement Report (Report) to the Planning and Public Works Committee. That Report provided a comprehensive analysis of the City's network of 184 miles of public streets. The Report demonstrates the importance of maintenance work and extending the life of concrete streets, with an expected life of 30 years. When the City prematurely replaces slabs for the sake of appearance, as will occur on Nooning Tree Court, these slabs never reach their intended life. It is my opinion that that is not the best use of limited resources within the Capital Projects Fund.

Before delving further into this topic, it is important to note that there are maintenance techniques which are acceptable to City residents. Most residents will accept concrete Partial Depth Repair (PDR) as it creates an appearance similar (although not identical to) the original concrete. PDR is an effective maintenance treatment that has been used throughout the City to address joint deterioration. While the limits of PDR treatment are similar to asphalt joint repair it is roughly three times more labor-intensive and can be considered as a "permanent repair." **Unfortunately, PDR is NOT effective on all concrete deterioration.** The concrete on Nooning Tree Court is beginning to fail, most likely due to an alkali silica reaction (ASR) or an alkali carbonate reaction (ACR) within the concrete. These types of reactions manifest themselves by the fine lines within the concrete shown below.



If the City were to attempt to address joints / slabs like this via PDR the old concrete would “pull away” from the new concrete repairs, creating more joint deterioration. Instead, we use asphalt because it has flexible properties which can retard the impacts of the concrete “pulling away” from the joint repair. This creates a safe and passable joint for a longer period of time – at a cheaper price.

The Engineering Staff and Street Division Staff are frequently searching for a joint repair material that has the properties of asphalt with the appearance of concrete. Unfortunately, we have yet to find such a material. The materials that we have tried, on streets such as Clover Ridge and Chesterfield Industrial Drive, have not held up well and required premature replacement. If such a material can be found it will be a real game changer for us, allowing appropriate repairs to extend the life of the concrete. But until that occurs the City has to make a choice regarding its streets.

The asphalt repairs completed by the Street Maintenance Division were accomplished at a total cost of \$11,300 for 375 lineal feet of asphalt joint repairs. This cost includes labor (in-house), material (asphalt), and trucks / equipment. The cost we will spend later this year to replace these slabs is estimated at \$88,000. Not only is this substantially higher, but it begins a process whereby in five to ten years, when the rest of this street is replaced, the new slabs will be left to remain. These slabs will be beaten up / stressed during construction and never last as long as the new slabs, initiating an endless cycle on a street that now mostly looks like this:



Additionally, the other slabs on Nooning Tree Court, which are at an earlier stage of ACR / ASR, will also need to be replaced. If the street were allowed to progress through its intended life we would be able to make additional asphalt repairs. Instead, this street will likely need to be programmed for replacement, sooner than necessary, to avoid additional asphalt repairs.

In conclusion, I am bringing this street to your attention because it is an excellent example of the dilemma we face when addressing a street that has significant isolated deficiencies but is in overall fair / good condition. Ideally these deficiencies would be addressed in asphalt and the street would be allowed to progress through its design life. Once the useful life has been reached and conditions warrant replacement, the street would be programmed for replacement. Instead, we are currently removing and replacing slabs with asphalt repairs due to aesthetics.

Action Recommended

This matter should be forwarded to the Planning and Public Works Committee of City Council. At that meeting I will provide a presentation of this case study for informational purposes and affirmation of our current process. Should PPW prefer an alternate course of action in the future, it should instruct Staff accordingly. Regardless of what action occurs, the City's Engineering Staff and Street Maintenance Staff will continue to search for an effective repair material that functions like asphalt with the appearance of concrete.

Agree and please forward to PPW for review and affirmation.

 2023-8-14