AGENDA MEMORANDUM
Action Item for the City Council Meeting of October 27, 2020

DATE: September 30, 2020

TO: Peter Zanoni, City Manager

FROM: Richard Martinez, Director of Public Works
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Resolution Amending City Council Policy 28 – Award Guidelines for Arterial and Collector Streets with Concrete or Asphalt Pavement

CAPTION:

Resolution amending City Council Policy 28 that outlines the guidelines for awarding arterial and collector street construction contracts using concrete pavement or asphalt pavement.

SUMMARY:

This resolution amends City Council Policy 28 which outlines the guidelines for awarding arterial and collector street construction contracts using concrete pavement (PCC) or asphalt pavement (HMAC). This policy must be updated annually. The policy updates include an emphasis on including the evaluation of the geotechnical soil conditions and recommending the removal of the residential streets from this policy.

BACKGROUND AND FINDINGS:

Prior to Bond 2008 the City would typically design arterial road reconstruction projects with HMAC pavement. With Bond 2008, the City began to bid some of the arterial streets with both HMAC and PCC pavement designs, resulting in multiple bid awards for the PCC pavement alternative.

In 2013, the City upgraded the pavement design standards to a 30-year design life using the Association of State Highway Transportation Officials Guide for Design of Pavement Structures. The change in design criteria, combined with market forces, created an environment where PCC became much more competitive with HMAC. In 2016, the City began designing and bidding all arterial Bond projects with both HMAC and PCC pavement alternatives.

In 2016, the practice was to design both HMAC and PCC using a 30-year design life and award the bid to the lower cost pavement alternative. Bidding projects utilizing both PCC and HMAC designs enhanced competition among contractors and reduced costs. Several projects received lower bids for the PCC pavement alternative.

In early 2017, at council request, Engineering Services staff performed a life cycle cost analysis comparing a proposed maintenance plan with the City's existing HMAC maintenance plan. The results of that cost analysis validated the belief that PCC offered reduced maintenance costs over HMAC. The analysis indicated that the City should be willing to pay an additional $100,000 per lane mile for PCC pavement based on maintenance savings. Staff adopted a policy recommending award of the PCC alternative if it was within $100,000 per lane mile of the HMAC alternative. That policy was communicated to City Council in a memo dated June 2, 2017 and was applied to all bids.

In April 2019, an updated memo addressed a question raised at the September 18, 2018 City Council meeting during discussions about the Rodd Field Road Improvement Project award. That project was bid with both HMAC and PCC pavement alternatives. The HMAC alternative was awarded; however, council had a question as to whether the $100,000 per lane mile adequately reflected the value of maintenance savings from PCC pavement. This policy was last updated on July 16, 2019 as a result.

Freese and Nichols, Inc. was tasked with re-evaluating the life cycle cost analysis between HMAC and PCC pavements and providing a letter report with recommendations resulting in three cost range options for bid award recommendations. Upon the review of the recommendations, Engineering Services concluded the analysis warranted increasing the previous cost per lane mile from $100,000 to $125,000 .

For the FY 2021 policy update, Public Works contracted with Roadway Asset Services (RAS) to re-evaluate the life cycle cost analysis between HMAC and PCC pavements. RAS has the required experience for evaluating pavement networks and general performance. Scott Gordon, Principal Engineer and President, has over 30 years of experience in pavement evaluation, including providing similar services for 4 out of the 5 major cities in Texas.

This policy update includes an emphasis on the evaluation of existing geotechnical soil conditions. Public Works proposes incorporating geotechnical testing in the design phase of the project to determine the plasticity index (PI) of the existing soil. The plasticity index is the size of the range of water contents where the soil exhibits plastic properties. As indicated in the recommendations from RAS, soils with a PI greater than 30 are characterized as an expansive soil. The expansiveness of clay soils will have a major impact on the performance of pavement structures. Pavements on clays soils must be designed with an additional stabilized layer, which should be accounted for in the initial design and capital expenses. Expansive soils will also require more frequent maintenance due to the higher percentage of cracking and differential movement anticipated and, in some cases, with different types of maintenance. HMAC pavements will likely require additional mill and overlay activities to correct differential movement and PCC pavements will likely require grinding and additional panel replacements due to the differential movements.

To determine an updated life cycle cost analysis, RAS has used maintenance actives,

assigned costs to the activities, applied discount and inflation rates using a 40- year analysis timeline. The details of this life cycle cost analysis can be found in Attachment A.

The results from the RAS cost analysis indicated that the City should not use concrete pavement for arterial and collector streets on soils with a PI greater than 30. If the PI is less than 30 then this policy will be used to determine the selection of asphalt or concrete. Therefore, if the initial construction bid is within $128,000 per lane mile between HMAC and PCC, then PCC should be chosen. If the difference in initial construction bid is greater than $128,000, then HMAC should be chosen. With a minimal differential in price, Public Works recommends utilizing the existing $125,000 per lane mile for construction bids on arterial and collector roadway projects. An additional item for consideration in the selection of pavement surfaces should be the adjacent pavement types. In areas of PCC, prioritization should be given to PCC, similarly on areas with HMAC. For example, if a proposed project is adjacent to an existing PCC section, additional consideration will be given to PCC as the pavement selection for continuity.

Additionally, this policy update reinforces previous recommendations of the elimination of residential streets from the evaluation of PCC. This is due to the general location of utilities in residential areas and lower traffic loads on residential streets. Typically, utilities are in the street. Street cuts needed to repair utility lines would result in costly repairs. At this time, it is not deemed financially advantageous to bid residential streets in PCC.

Below is a summary of the recommendations from Public Works:

1. When the project contains a majority subgrade with a PI greater than 30 or deemed as a moderate to highly expansive soil by the design Geotechnical Engineer, the City should recommend HMAC.
2. When the cost difference of PCC is below **$125,000/lane mile**, the City should recommend PCC.
3. For residential projects, the City should recommend HMAC.
4. Other criteria to consider is if the adjacent pavement section is PCC, consideration should be given to providing a uniform surface type, at the discretion of the City Public Works staff.

ALTERNATIVES:

Do not approve this policy update and defer to the existing policy.

FISCAL IMPACT:
N/A

RECOMMENDATION:

Staff recommends approval of this policy update.

LIST OF SUPPORTING DOCUMENTS:

Presentation
Roadway Asset Services, LLC (RAS) Letter Report