City of Fayetteville
North Carolina
PUBLIC SERVICES

INTEROFFICE MEMORANDUM - UPDATED

TO:	DOUG HEWETT, ICMA-CM, CITY MANAGER
	KRISTOFF BAUER, ICMA-CM, DEPUTY CITY MANAGER
FROM:	GISELLE RODRIGUEZ. PE, CITY ENGINEER
SUBJECT:	SHAWCROFT ROAD PERMANENT REPAIR PROJECT
DATE:	12/20/2017
CC:	ROB STONE, PE, PUBLIC SERVICES DIRECTOR
	JOHN LARCH, PE, ASSISTANT CITY ENGINEER

As you are aware, the Shawcroft Road permanent repair project has been delayed due to a request from the Golf Course owners for the City to consider a bridge rather than a culvert at the creek crossing to avoid a high hazard classification of their dam. At the community meeting the City presented 3 design alternatives and agreed to work with their Consultant through the Hazard Classification study to determine the potential impact of the design alternatives previously presented.

After coordinating with their Consultant for 9 months, a draft analysis report was received. The analysis indicated *"based on our dam breach modeling, all three of the above listed stream crossing alternatives result in significant overtopping of Shawcroft Road. The cored-slab bridge results in the least amount of overtopping; however, the overtopping is still significant and will most likely cause Wooded Lake Dam to be classified as High Hazard by NC Dam Safety… Therefore, all three of the design alternatives for Shawcroft Road being considered by the City will not prevent the dam from being classified as High Hazard by NC Dam Safety…It is appropriate to note that Ramsey Street overtops in both the 100-year and 1/3-PMP design storms regardless of whether or not there is a failure of the dam".*

It was also indicated in the report that if the City's design alternative involving the cored-slab bridge was modified by raising the roadway sag by 1.2 feet, raising the bridge deck by 1.0 foot, and increasing the bridge span by 12 feet, overtopping of Shawcroft Road will be prevented which provides a very reasonable possibility that Wooded Lake Dam could be classified as exempt by NC Dam Safety. This opinion is conditioned to additional survey to be collected by the Consultant and final determination of the hazard classification by NC Dam Safety. The design modifications requested will result on a higher cost, impact to existing properties, longer timeline and extensive permitting.

Exempting Wooded Lake Dam from the Dam Safety regulations removes a level of oversight and robustness from the system, which exists to preserve the safety of the community.

The analysis provided offers no support for further delaying this project by selecting a bridge. There is no design criteria to support a bridge and furthermore, a bridge will cause further delays in the schedule. Additionally, the FEMA time limit for completion of permanent repair projects is 18-months. Selecting a bridge could jeopardize the ability of the City to meet this timeline and obtain our reimbursement funding. FEMA has also indicated previously that cost of bridge is not likely to be reimbursed.

Staff held a meeting with NC Dam Safety to discuss this case and explore the potential for the hazard classification and no confirmation was received as it is open to interpretation and judgement when presented by the Consultant, a step that hasn't taken place yet.

The City would certainly want to assist the private dam owners if possible, however no information has been provided to show that a bridge would provide any upstream benefits.

Please find attached a side-by-side comparison of the design alternatives including the design modifications requested by the Consultant.

Based on the facts gathered to date and the analysis attached, I recommend that we move forward with the culvert design as recommended by our Engineer. If you would like to discuss further we would be happy to do so. It is our intent to provide direction to our Engineer by ***January 2, 2018*** if at all possible.

Advise if you need further information or a copy of the reports.

Shawcroft Roadway Repair - Design Alternatives

Factors	Concrete Culvert	Arch Bridge - Natural Bottom	Cored Slab Bridge	Cored Slab Bridge 2 (per Golf Course owner request)
Size	8'x18' Box (1' bury)	7' rise x 20' span	28' span w H-pile foundations	40' span w H-pile foundations
Storm event	25-yr	25-yr	25-yr & Matthew (275-yr)	25-yr, Matthew (275-yr), upstream dam breach
Footprint along stream	50 ft	50 ft	Shorter footprint -Road width (due to vertical walls)	Shorter footprint -Road width (due to vertical walls)
Permitting	Typical (State, Army Corps & Local)	Typical (State, Army Corps & Local)	Typical (State, Army Corps & Local)	State, Army Corps, Local, FEMA compliance (CLOMR/LOMR), temporary guard house relocation
Utilities	Shallow cover requires re-routing of existing utilities; aerial waterline	Shallow cover requires re-routing of existing utilities; aerial waterline	Requires re-routing of existing utilities; aerial waterline	Requires re-routing of existing utilities; aerial waterline
Road work (grade)	Match existing	Match existing	Match existing	Raise road grade, temporary guard house relocation
Design Time	3 months	3 months	6 -8 months	At least 12 months **
Geotechnical Explorations	Completed	Completed	Additional data needed: 6 weeks (included in design time)	Additional data needed: 6 weeks (included in design time)
Construction / Production Time	Production time: 6 weeks Construction duration: 6 mo.	Production time: 6 weeks Construction duration: 6 mo.	Production time: 8 weeks Construction duration: 8 mo.	Production time: 8 weeks Construction duration: 10 mo.
Maintenance	Debris removal, periodic structural inspection, reduced scour risk	Debris removal, periodic structural inspection	Maintenance of asphalt on bridge surface, scour /abutment stability, seal deck joints and concrete, debris removal	Maintenance of asphalt on bridge surface, scour /abutment stability, seal deck joints and concrete, debris removal
Inspection requirements	City Standard	City Standard & maybe National (by NCDOT)	National Bridge Inspection standards (by NCDOT)	National Bridge Inspection standards (by NCDOT)
Scour performance	Preferred			
Foundation Type	Concrete Culvert buried with stone bedding	Undercut 4', backfill with stone	H-Pile supporting end bents on imported backfill	H-Pile supporting end bents on imported backfill
Cold weather driving risk	Low	Low	High	High
Cost	**$ 830,000**	**$ 880,000**	**$ 1,080,000**	**$ 1,340,000**
Staff Recommendation	Recommended option between culvert vs. bridge due to lower cost, better performance, lower maintenance and inspection.	Recommended option between the bridges due to lower cost, better scour performance, lower cold weather driving risk, faster construction and lower maintenance/inspection.		

Notes:

1. We are using standard NCDOT sizes.
2. Given the characteristics of this location, anything other than a culvert would be a-typical.

** Project availability for construction will depend on FEMA permit approval. This permit is required due to the impact to floodway/floodplain elevations. This is not associated with the funding.

Legend:

Low risk
Medium Risk
High Risk

Date : 12/20/2017 GRV