

Telephone: (262) 521-5272 • Fax: (262) 521-5265 • E-mail: contactus@waukesha-water.com

MEMORANDUM

Date: June 20, 2017

To: Dan Duchniak, P.E.

From: Chris Walter, P.E.

Re: Ratification of Additional Water Main Work on Meadowbrook Drive, as part of the City portion of the Waukesha West Bypass Project (M00502)

As previously stated in the memo dated June 6, 2017, Waukesha Water Utility has moved forward with the lowering of water main on Meadowbrook Road, between Joanne Drive and Woodridge Lane. We are now seeking ratification. D.F. Tomasini has been contracted to complete the work, and to date, we have completed installation of the main line work, with only chlorination, testing, and connection of water services remaining.

<u>Background</u>

The water main was installed by WWU in 1993. Through discussions with Water Utility staff, City Engineering staff, and limited construction records, I believe that most of the water main was installed with sufficient "cover" of 4 to 6 feet over the top of the pipe at that time. There is some speculation that the terrace area over the water main was lowered somewhat since 1993, which would have decreased the amount of cover over the water main.

One of the problems we face, is that the depth of existing or even newly installed water main is not regularly recorded. Within the last few years, we have begun to document depth of valves during our annual valve survey work and inspection reports for new main. However, the data or knowledge of exact depths of any given water main in our system is largely unknown. With approximately 330 miles of water main in our system, this is a daunting problem to fix.

Identifying the Problem

In review of the proposed West Bypass plans in this area, there is essentially no change between the existing and proposed centerline of the roadway. However, due to the widening of the proposed road, and the varying cross section of the road, the exact proposed cover over our existing main was again undetermined. It was not until roadway grading operations that water main was accidently exposed (but not damaged) and we took immediate action to investigate depths by means of hand digging and/or hydro-excavation to determine the depths and limits of our newly found "shallow" water main. Hydro-excavation is the method of shooting a highpowered stream of water into the ground, which creates a hole. At the same time, a large suction hose pulls the water and earth mix up into a large tank. This continues until we have reached the pipe. This allows us to physically measure depth. The water jets do not risk damage to the water main (or other utilities) as would a backhoe or even hand shovel.

I would also like to address the following questions posed by one of the Commissioners:

"When we discuss this item and act upon it, I would like to know if without the bypass, the main level would have been acceptable; if the work with the county and their consultant never explored the effect of the road grade changes on utilities. This area is within the district I served and there were many meetings and discussions about lanes, grades, utilities. I find this surprising at the least after all the tedious work and discussion that occurred.

In other words, what process or entity should have "caught" this? How do we insure that we learn from this? While some of the area is in the town, the next phase is down Meadowbrook near Madison. It will also have major grade changes. Can the impact of these be projected now and examined for possible issues?"

Without the bypass project, the existing water main would have continued to function without any risk of freezing, as there is a constant large volume of water that travels in the pipe to empty and fill the Meadowbrook Water Tower, and as stated, most of it has 4 to 6 feet of cover. The City, County, or State, which hosts a project such as this, places all responsibility on the "utility" contractors such as gas, electric, cable, fiber optics, etc. to move their respective utility if they will be in conflict with the project. In this case, water is treated no differently – as just another utility, and we must assume responsibility to the location of our facilities, including the cost to relocate them. Thus, the only answer as to which entity should have caught this, is Waukesha Water Utility. That being said, it is not feasible to determine the depth of all 3,000 feet of our main within the project limits (City portion only). I did review the plans thoroughly for conflicts with regards to where our existing main crosses new storm sewer, or cover is reduced significantly within the roadway. In this case, the reduction in cover was outside of the roadway, and outside of our regular review process.

In hindsight, I should have had our crews or an outside contractor perform hydro excavation at various locations (during design) to identify this issue more clearly. Hydro-excavation is the only practical way to identify depth, and then compare this with the proposed plan elevations. However, there is a cost associated with this effort, and the machine owned by the utility is smaller in scale, and not meant for performing large scale, frequent investigation work.

In the Future

In the future, we need to perform more "spot checks" to pothole ahead of time the areas of concern. Unfortunately, even catching this situation ahead of time, would not eliminate the need to perform the relocation work. Due to the road widening, the existing water main would have been fairly close behind the new curb and likely within a filled gravel area, which transmits frost much more quickly than normal soil. It also would have had proposed cover of less than 2 feet in some areas.

Please note that in general, we work together with the City on projects to reconstruct the roadway and the water main at the same time, which eliminates this problem. This case on Meadowbrook is a perfect example of a unique situation where there is a roadway project, but we did not have any "planned" associated water main work, other than offsets due to storm sewer conflicts. The extensive grading work for the new road created this problem. We will make sure we are more diligent in preventing these situations in the future and minimizing impacts ahead of time.

The enclosed exhibits should provide some further clarification as to development of the issue. I look forward to our discussion at the meeting on Thursday.

Recommended Motion: Move to approve and ratify the water main lowering work within the City's portion of the Waukesha West Bypass Project on Meadowbrook Road in an amount not to exceed \$250,000.



MEADOWBROOK ROAD (BYPASS) CROSS SECTION - CROSS SLOPES VARY



TYPICAL FINISHED SECTION

MEADOWBROOK RD STA 342+31.74 TO STA 370+02.43 LT/370+13.95 RT

* CROSS SLOPE VARIES - SEE PAVING GRADE SHEETS

