

MEMO: Deep Cut vs Muddy Creek

DATE: October 30, 2014

TO: **Ryan Heiar, City Administrator**
City of North Liberty
3 Quail Creek Circle
North Liberty, IA 52317

RE: **East Growth Area Water & Sanitary Sewer Extensions**
Sanitary Sewer Alternatives Analysis – Deep Cut vs. Muddy Creek
FOX P.N. 2489-13A.470

Dear Ryan,

In March of this year, FOX Engineering analyzed two main alternatives for the routing of sanitary trunk sewer east of the wastewater treatment plant (WWTP) and west of North Liberty Rd to find the best means of conveying wastewater for the SE Growth Area Water and Sanitary Sewer Extensions Project. This memo provides a summary of the alternatives that were analyzed as well as how FOX came to the conclusion that the “Muddy Creek” option was best for the city of North Liberty.

The two routes that were analyzed are referred to as “Muddy Creek” and “Deep Cut.” See the attached “Alternatives Analysis Figure” for a depiction of the routings of each alternative. Plan and Profile sheets are attached for each alternative.

In general, the Muddy Creek sanitary sewer alternative follows Muddy Creek from the WWTP east to the east line of the Barbara Beaumont property where the sanitary sewer traverses northerly and easterly. The Deep Cut sanitary sewer alternative follows the toe of slope of a large mound located east of the WWTP, then continues east along the future Forevergreen Road right of way (ROW) to the “Naples Avenue” easement where the sanitary sewer continues northerly and easterly.

Please note that the sanitary sewer sizes listed in this memo reference the original 24-inch diameter sanitary sewer. The sanitary sewer size has been increased to 30-inch to account for additional flows from the City of Coralville.

The two alternatives had several features that were evaluated as we determined the best route for this project. Below is a listing of the pros and cons of each alternative:

Muddy Creek Alternative \$1,743,100

Pros:

- Least cost option. Savings of \$1,497,100.
- Easier to maintain since sewer is at normal depth (15-ft average).
- Future sanitary connections are easier due to normal sewer depth.
- Least land disturbance area during construction.
- Does not disturb existing row crop areas.
- Route provides for a larger sanitary service area.

Cons:

- Requires the most tree removal area during construction (5.7 acres). Additional trees may need to be replanted after construction.
- Challenging to access manholes for future maintenance along grass path.
- Easement negotiations with three property owners.
- Most amount of pipe length. Additional 1,270-ft of 24-inch pipe.
- Prairie grasses are disturbed due to construction and will require replanting. The planting of prairie grasses is difficult to establish and could take years of maintenance.
- Establishing disturbed areas with grass after construction will be challenging.

Deep Cut Alternative \$3,240,200

Pros:

- Very little tree removals are required.
- Easy to access sanitary sewer manholes along future Forevergreen Road ROW.
- Easement negotiations with one property owner.
- Least amount of pipe length. Saving of 1,270-ft of 24-inch pipe.
- Very little grass to establish after construction due to row crop land.

Cons:

- Highest project cost. Addition of \$1,497,100.
- Depth of sewer is greater than 50-ft in several locations. This depth is extremely uncommon since the average sewer depth is 15-ft. Future maintenance and/or repairs to the deep-cut sanitary sewer would be extremely cost prohibitive and problematic due to the amount of excavation area required. The future Forevergreen Road would need to be removed & replaced thus effecting traffic for an extended period of time.
- Future sanitary sewer connections would be impractical and extremely cost prohibitive.
- Most land disturbance area during construction.
- Most disturbance to existing row crop areas.
- Route has a smaller sanitary sewer service area.

- Potential settlement issues that could affect the pavement life (settlement) for Forevergreen Road.

As per the pros/cons summary above, the City selected the Muddy Creek Alternative. This alternative is the least cost, is normal sewer depth for future maintenance, provides for future sanitary sewer connections, disturbs the least amount of ground area, disturbs no row crop areas, and the route provides the largest sanitary sewer service area.

The amount of land disturbed, the potential for settlement under the future Forevergreen Road and the fact that the over 50-feet of depth of the sewer makes future connections and repairs nearly impossible for the Deep Cut Alternative. These factors along with the additional cost of nearly \$1,500,000 make the Deep Cut Alternative an inferior route when compared to the Muddy Creek alternative.

If you have questions about anything regarding the East Growth Area Water & Sanitary Sewer Extensions Project, we ask that you give John Gade a call at FOX Engineering (515-233-0000) to discuss.

FOX Engineering Associates, Inc.



John Gade, P.E.