

Storm Sewer Separation Project 2009

Created by the City Engineering Department



Hydrodynamic Separators were installed to clean the storm water as it passes through. Because of this the City was able to receive a lower interest rate on the loan due to the "green" that the separators incorporate.



The Hydrodynamic separators were different sizes therefore larger pieces of equipment were utilized to install. This is a separator being prepped to be installed within the ground.



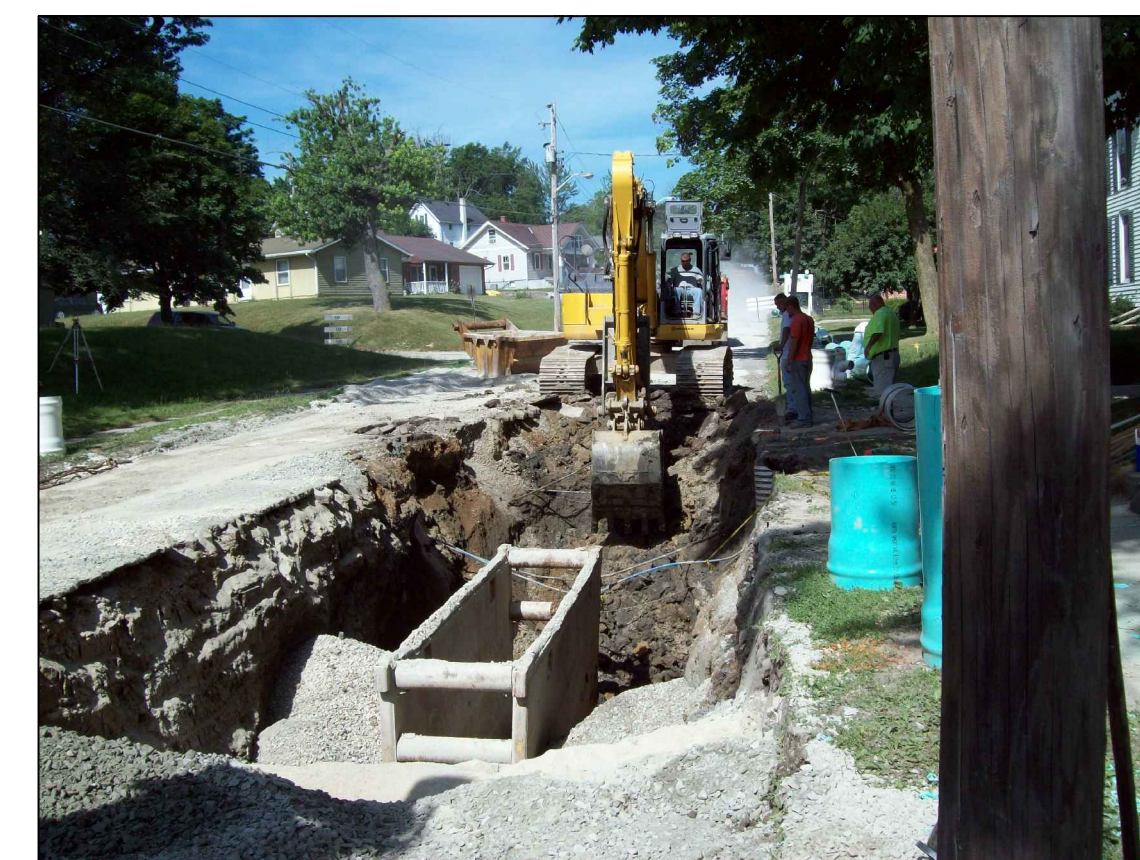
Many different types of pipe material is used depending on applications and locations. Here the center pipe is Reinforced Concrete Pipe. At the lower part of the picture you can see HDPE pipe in green. HDPE is an acronym for high-density polyethylene which is basically plastic.



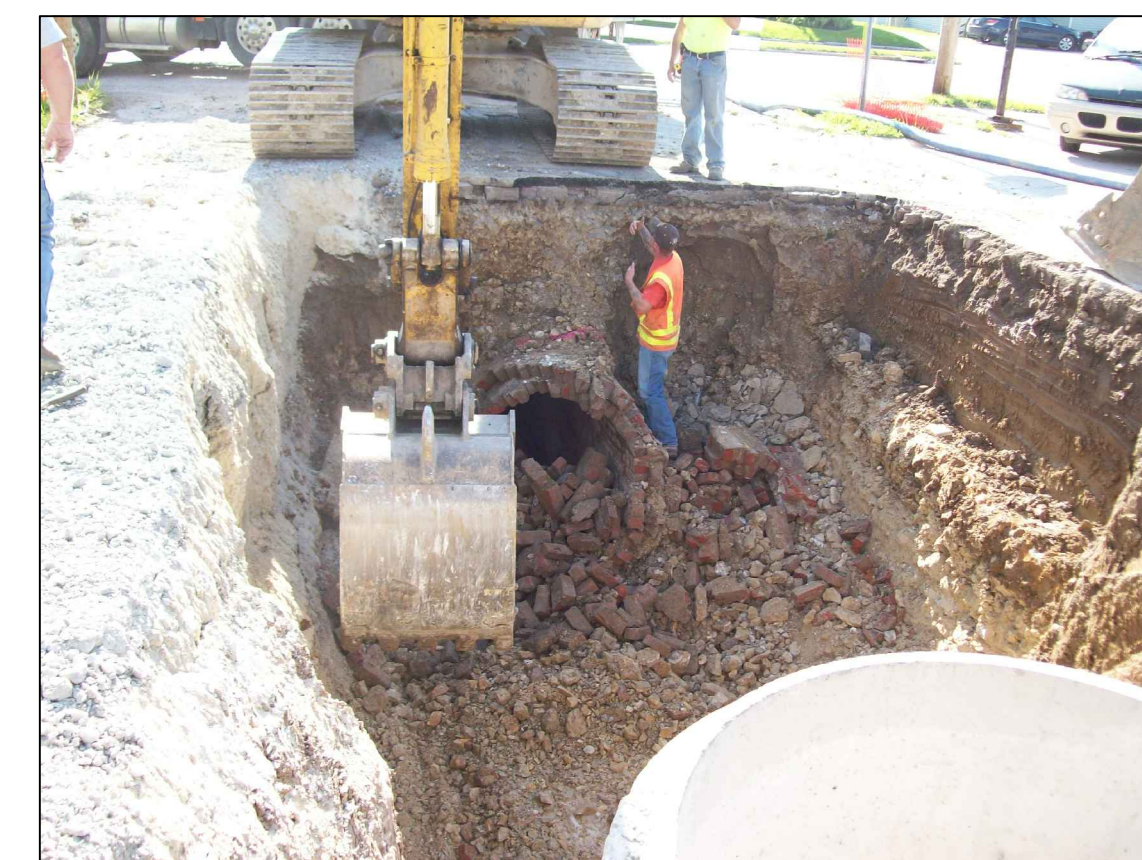
Due to water main conflicts, some water mains had to be rerouted. Per 10 State Standards all sewer mains must have a 10 foot horizontal separation from water mains. Other utilities were also encountered such as gas and electric lines. These conflicts were dealt with during the construction of the sewer.



This is main line sewer being installed on Warren Street. Most phases the City installed new sanitary sewer, however in phase 1 the City installed new storm sewer. The decision for what type of pipe is installed depends on many factors including existing pipe size, depth, and condition.



This sewer being installed along Division Street is approximately 20 feet deep. Due to depth pipe installation is drastically slow and safety measures, like you see within this picture (trench boxes), have to be maintained to protect workers in the trench from cave-ins.



Lot of the existing sewers were constructed by placing multiple layers of brick in a arched manner. These sewers are predicted to be 100+ years old and show age. Just a note: Most sewers installed today have a useful life of 50 years. Using that scale these brick sewers should have been replaced twice between the time they were installed and today.



Brick sewers are extremely strong if all bricks remain intact, however if one brick is removed the integrity of the sewer comes into question so special care is used to ensure preservation of brick sewers that are not planned on being replaced.



This is a storm sewer being installed. This type of material is HDPE Dual Wall pipe. It is normally installed for storm water applications. This particular picture is of a connection between two pipes via a manhole structure. Structures are placed at all bends or 400 foot intervals to allow maintenance crews an access to clean the pipes out when needed.



Throughout the job limestone was expected and encountered. There are many means of digging through limestone including blasting, hammering, grinding, and using rock teeth on an excavator. Depending on the hardness of the rock the grinder you see above was utilized within this job. To give an estimate it costs about \$150 a cubic yard to grind out the rock.



This is the finished product. All streets that are tore up within this separation project are intended to be repaved after the construction is done. The useful life of pavement is expected to be anywhere from 10 - 20 years depending on traffic. We expected some of these streets however have not been paved for well over 30 years.



As mandated by the United States Government, whenever the City repaves a street it MUST replace all handicap ramps at each intersection and bring them up to current ADA standards. Current ADA standards call for Detectable Warning Devices which are the yellow or red plates that you see within the sidewalk. These are to signal people that they are at the street.