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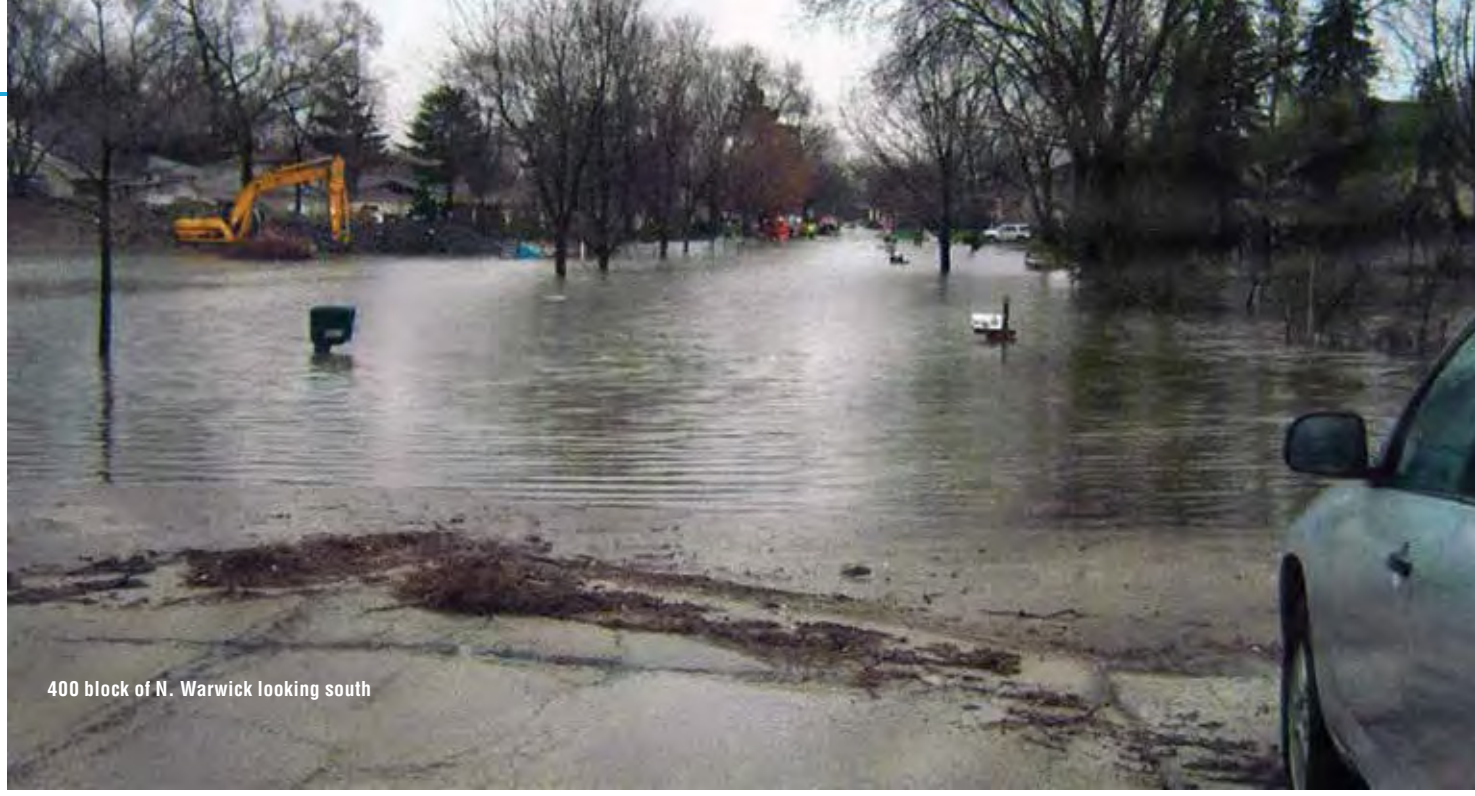
See our special PWX section on pages 27-62



400 block of N. Warwick looking south

Warwick Avenue Stormwater Improvement Project

The Village of Westmont Storm System

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Initial Conditions

During the larger rainstorms spanning over many years the Village of Westmont experienced some flooding conditions and inadequate drainage characteristics throughout the Village. The Storm Event that was "the straw that broke the camel's back" occurred on April 18, 2013. The April 18 event consisted of approximately 7" of rain in a 24-hour period, or roughly a 50-year storm. The storm infrastructure for the Village of Westmont had several locations that did not handle this storm as expected by Village leaders and residents. To be fair, numerous neighboring communities experienced similar flooding conditions as were experienced by the Village of Westmont.

Discussions and meetings were initiated shortly after the storm by residents and Village leaders. Actions were then taken by the Joint Committee to ensure that the required and pending stormwater improvements would not lose momentum. These actions included the following:

- The Village created a 12-member Community Stormwater Management Committee.
- Civil engineers were assigned by the Village Board in March 2014 to complete a Stormwater Feasibility Study and prepare a Draft Stormwater Utility Ordinance.
- A Citizens Stakeholder Group was developed to present their community concerns and recommendations.

Of prime concern to both Village leaders and residents is that a number of residences were now taking on stormwater in the homes during large events. Previously there had been little history of homes taking on stormwater during large rain events. This trend was not acceptable to all involved.

The situation of increased local private flooding can be attributed to several reasons, which include the following:

- Increased urban development.
- Aging stormwater removal infrastructure.
- Recent weather patterns which seemed to bring larger storms than what were accustomed to.

The civil engineers' Stormwater Feasibility Study Report was completed and recommended that the Village pursue approximately $30 million in stormwater infrastructure improvements. Upon receiving these results and recommendations, the Village then moved forward and worked closely with residents and community leaders to identify potential funding mechanisms to begin the Village of Westmont Stormwater Improvement Program.

The Village then scheduled a referendum vote on April 7, 2015 for the community to move forward and finance the Stormwater Improvement Program. Ultimately, what the Village leaders and residents agreed to be incorporated in this Referendum was a new half-cent sales tax. The proposed sales tax most importantly was dedicated to the Stormwater Improvement Program. The sales tax was appealing because it would encompass the residents as well as the involved non-residents to help fund the improvement program.

The referendum passed and the Stormwater Improvement Program became a reality. The tax was projected to realize $800,000 to $1 million per year for stormwater infrastructure improvements.

The North Warwick Avenue Drainage Area

Project funding had now been secured. Wasting no time, Village engineers initiated the Phase1/Phase 2 Engineering on North Warwick Avenue in August 2015. North Warwick Avenue was the top prioritized corridor from the Stormwater Feasibility Report. During the April 18 storm the North Warwick Avenue Corridor experienced home flooding, street flooding and general neighborhood flooding for several days before the floodwaters finally receded (see photo on p.121).

The engineers' concept is to work to incrementally reduce the stormwater load which passes through the sensitive North Warwick Avenue Corridor. It is planned that by removing and reducing the contributory areas into the depression areas of the North Warwick Avenue Corridor, this will dramatically reduce the volume of stormwater flowing into the depression areas on North Warwick Avenue.

The first project to be constructed will be to install a new storm sewer extending the existing 36" RCP located on Warwick Avenue south of the Chicago Avenue and Naperville Road intersections. This storm sewer will be extended north of the Naperville Road intersection to the high point of the natural topographic contours.

It was clear to the engineers from the beginning that the success of the Warwick Avenue Storm Sewer Construction Project would completely depend on the successful crossing of the Chicago Avenue and Naperville Road intersections.

Chicago Avenue is a well-traveled east-west arterial roadway. The ADT approaches 20,000. Chicago Avenue was an old state highway. It was then reconstructed in 2005 as part of a Jurisdictional Transfer Agreement to the Village of Westmont. The reconstructed Chicago Avenue cross-section is a 30-foot edge-to-edge full depth concrete pavement with B:6-24 concrete curb and gutter.

Village leaders wanted to maintain the integrity of the concrete pavement and to minimize effects on traffic during construction. Therefore, the conceptualized construction process was to auger the new storm sewer under Chicago Avenue.

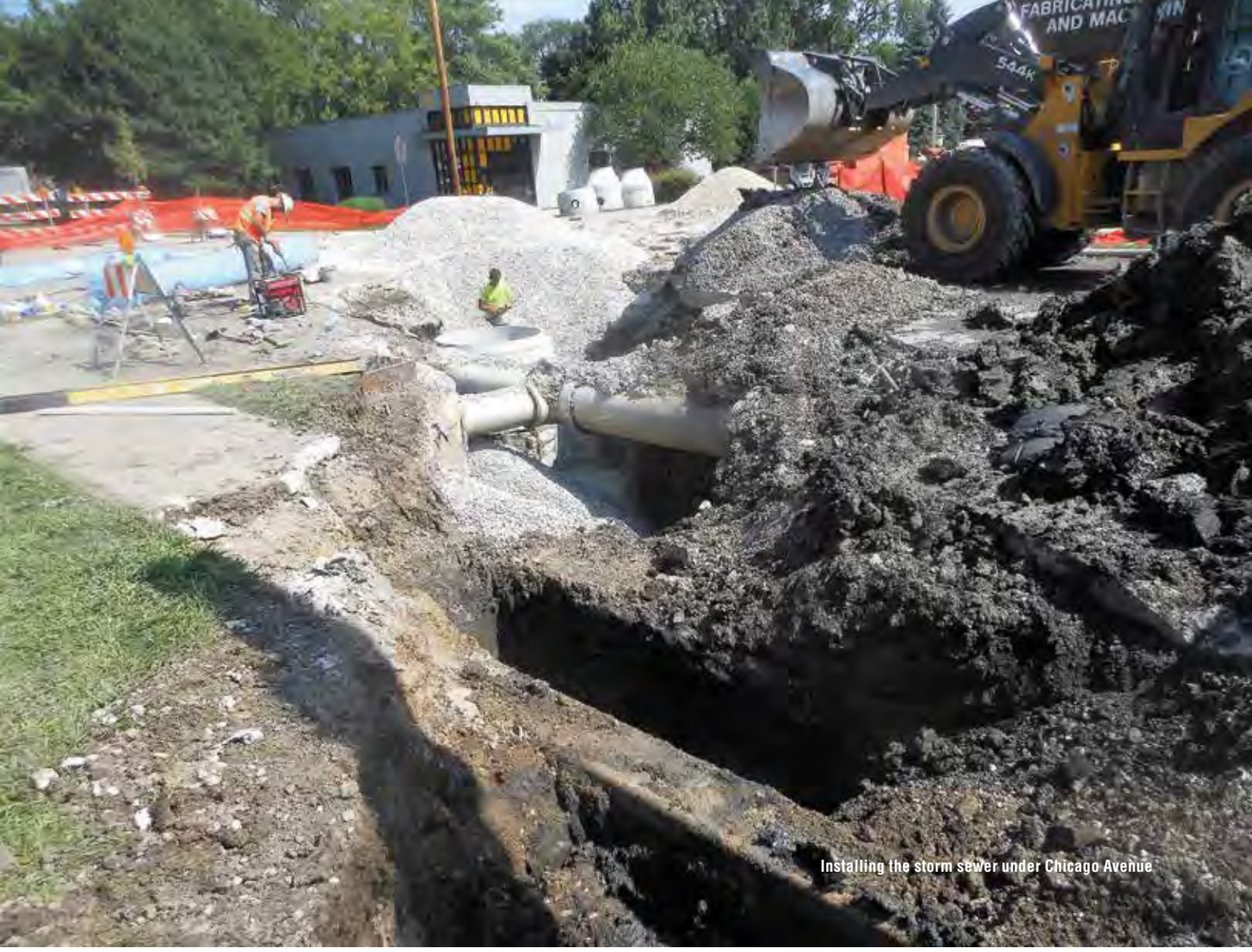
The Engineering Study/Design Process discovered that utilities located in the Chicago Avenue right-of-way included the following:

- Commonwealth Edison has a major utility duct travelling under and near the north edge of pavement.
- NICOR has a high-pressure gas main travelling under and near the south edge of pavement.
- The Village has a 12" water main travelling under and near the south edge of pavement.
- The FCWRD has an 8" sanitary sewer travelling under and near the south edge of pavement.
- T-Mobile, AT&T, XO Communication and ZAYO Communication have various fiber optic cables under and near the north edge of pavement.

It was becoming apparent that crossing through these utilities would be a complex undertaking.

The Engineering Study/Design Phase was completed in January 2017. The Warwick Avenue Storm Sewer Improvement Project was designed to provide the following:

- New 36" to 24" diameter RCCP storm sewer from Norfolk Street to Melrose Avenue.
- New local storm sewer improvements to connect to the new RCCP storm sewer.
- Relocated sanitary sewers, as required to facilitate the construction of the new storm sewer system.
- Relocated water mains, as required to facilitate the construction of the new storm sewer system.
- Rehabilitation and resurfacing of Warwick Avenue.
- New driveway aprons, new sidewalks and reconfigured parkways, as required.
- A 48" diameter steel casing will be augured and jacked under Chicago Avenue, to house the 36" RCCP.



Installing the storm sewer under Chicago Avenue

- Chicago Avenue will remain open to traffic at all times throughout the project duration.
- Construction began in 2017.

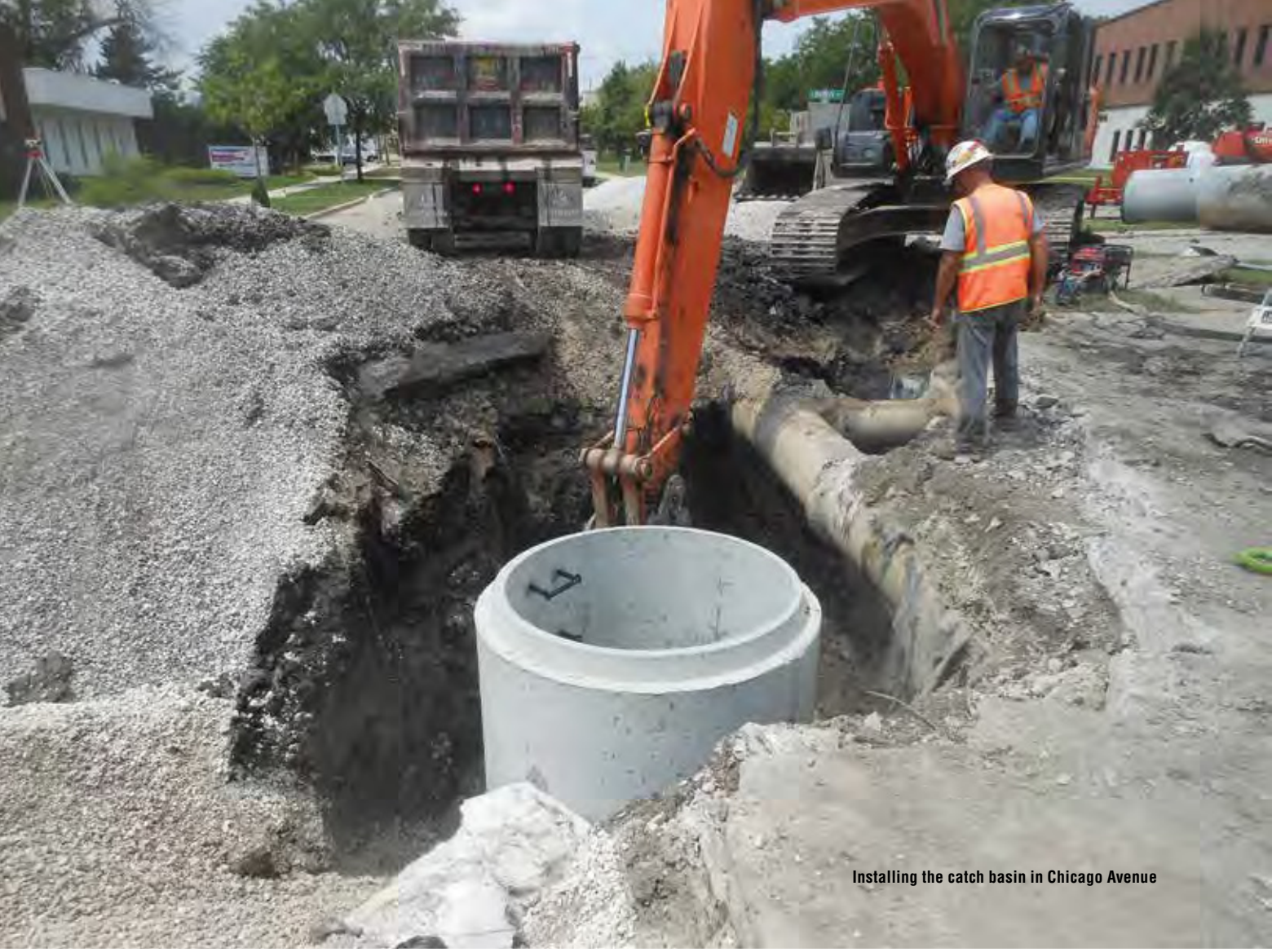
Construction Phase

Engineers completed the design plans and contract documents to construct the 36" diameter storm sewer under Warwick Avenue from Norfolk Street to Melrose Avenue and crossing under Chicago Avenue, over 3,000 lineal feet. Bids were opened on April 18, 2017 and 11 contractors submitted bids. Elanar Construction Company was awarded the contract with a low bid of $950,000. Construction was to begin immediately in May and to be completed by November 2017.

Stepping back, during the design phase it became apparent that the project corridor and the proposed storm sewer alignment was home to numerous utility crossings. The design maintained the invert of the proposed 36" RCP at approximately 11' deep to stay below the utilities. The utility companies responded politely to design engineers' requests for information, but they know that few municipalities actually build 36" storm sewers today. When the plan was complete and advertised, the engineers then received numerous communications and updates from the utility companies.

The advertised design plan was to auger the 36" RCP under Chicago Avenue. As the communications from the utility companies increased during April, it became more apparent that the utility companies were not confident of the exact location of their infrastructure. It was becoming clear that the project success would hinge on sneaking the proposed 36" RCP through the existing utilities. And, anyone who has installed pipe knows that it is really not possible to "sneak" a 36" RCP anywhere.

The pre-construction meeting was conducted on April 25. At that meeting, because of the recent communications from utilities, the contractor was requested to prepare a change order to install the pipe under Chicago Avenue by conventional trench and fill method, as opposed to the trenchless auger method. Chicago Avenue would be closed during installation of the storm sewer and again during construction of the new Chicago Avenue concrete pavement. Construction began on June 5, and the utility interferences were addressed as follows:



Installing the catch basin in Chicago Avenue

- T-Mobile and Zayo Communication relocated their fiber lines on the north side of Chicago Avenue in June.
- The contractor relocated various 8" sanitary sewers owned by FCWRD.
- AT&T relocated its fiber line located in the alley during July.
- The contractor was shut down for one week in July, while NICOR was forced to cut and cap its 4" high pressure main located on the south side of Chicago Avenue.
- The contractor relocated 12" water mains owned by the Village of Westmont.
- Field design change was required in July to avoid a COM ED duct bank located on the north side of Chicago Avenue, which was larger and deeper than anticipated by all.

    o To address this issue in more detail, this was the most concerning chapter of the project. The record drawings show the COM ED duct bank to be two feet deep and two feet thick. However, when we encountered this duct bank it was actually four feet deep and over four feet thick cast-in-place concrete duct bank. We were stuck! The Village engineers immediately came to the site to ascertain the situation. After a 30-minute conference it was decided to remove two sections of installed 36" RCP back to the centerline of Chicago Avenue. Elanar would modify and install a catch basin already on the project site. At this point we would begin to install the 20" diameter C905 pipe. We were then able to just fit this pipe under the COM ED duct bank. We were on our way again.

- AT&T relocated its fiber line on North Warwick in August.
- NICOR reestablished its 4" high pressure gas main on the south side of Chicago Avenue in September.

Completion of the new storm sewer was completed in September and correctly installed. Then, local drainage improvements were made, sidewalks were built, Chicago

Avenue was reconstructed, and Warwick Avenue was paved and landscaped. Final Inspection and Project Acceptance was conducted on November 9!

Lessons Learned

- **Owner**:
  - Infrastructure improvements are not possible until funding is secured.
  - Keeping the residents adjacent to the construction project continuously informed to the project status and progress will foster a community partnership.
- **Engineer**:
  - Engineers perceive a 36" RCP as a 36" diameter storm sewer. Underground contractors perceive a 36" RCP as a 48" diameter heavy pipe. During a construction project through a developed corridor, it benefits all parties to have these perceptions as closely aligned as possible.
  - Most utility companies have a pretty good understanding of where their underground utility infrastructure is located in the X and Y directions. And, most utility companies have a rather vague understanding of where their underground utility infrastructure is located in the Z direction.
  - A big problem today in successfully completing an underground improvement project is abandoned utilities. Not only are the abandoned utilities left underground to be dealt with by future construction projects, but they are also removed from all updated utility atlases. Sometimes, the only person who can provide the necessary insight pertaining to the abandoned utility is the engineer or technician with decades of local experience.
- **Contractor**:
  - A project team with a shared common goal can overcome almost any major conflict.
  - Working on a complicated project behind a closed road condition will exponentially increase work efficiencies and project safety.
  - When installing a new pipe through a maze of existing utilities, utilizing a thin-walled pipe will dramatically increase the chances for project success.

Conclusion: Project Safety

To conclude, and most importantly, there were no accidents during this construction project. During the Warwick Avenue Storm Sewer Installation Project there were no injuries to construction workers, local citizens, travelers passing through, or pedestrians. Further, there were no reported accidents or lost work time due to accidents. This construction project was a complicated project with constant inherent danger.

This successful project safety performance is partially due to the fact that the owner and the contractor and the engineer constantly stressed the following:

- Daily discussions pertaining to project safety.
- Constant attention paid to onlookers, pedestrians and traffic.
- Always work at a steady and safe pace.
- Always watch where you are walking.
- Always pay attention to the current situation.
- Never daydream.

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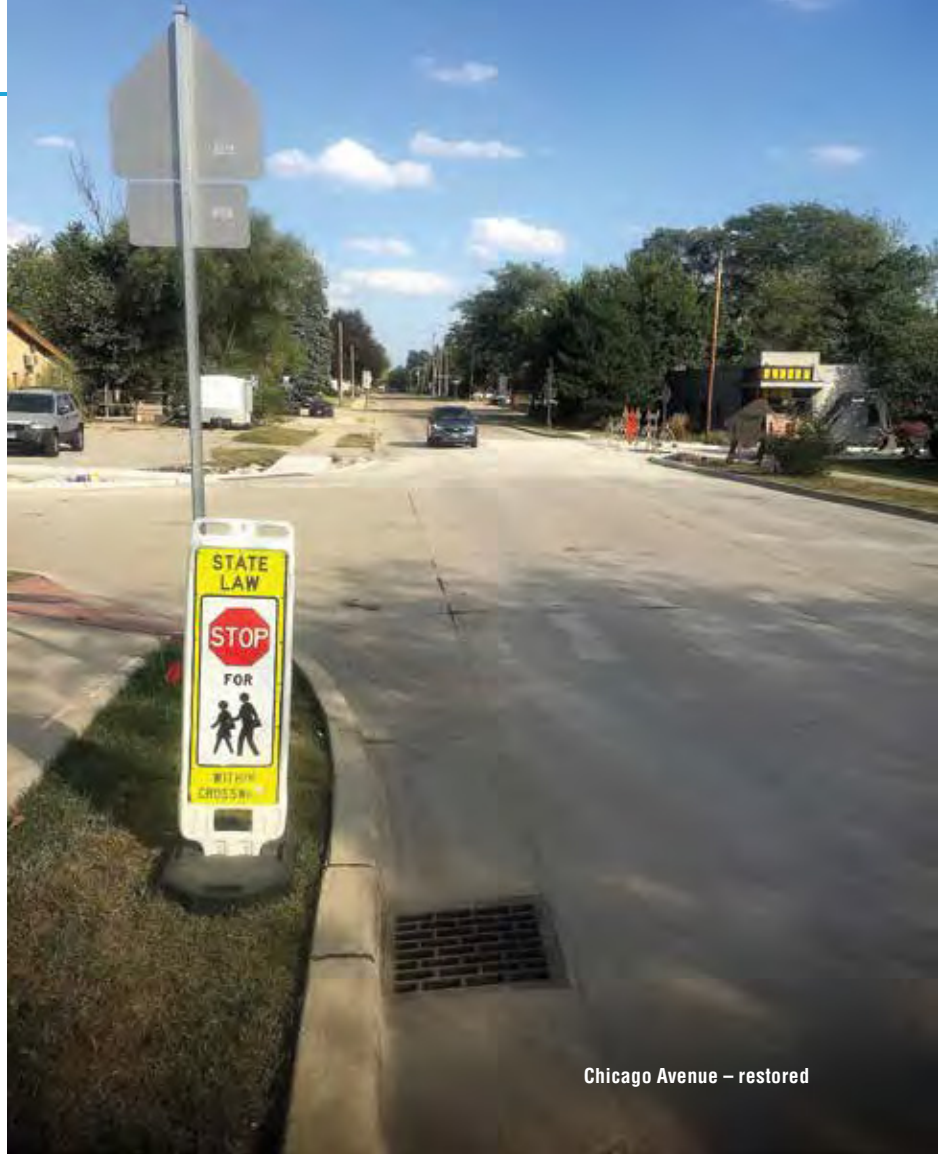

Chicago Avenue – restored