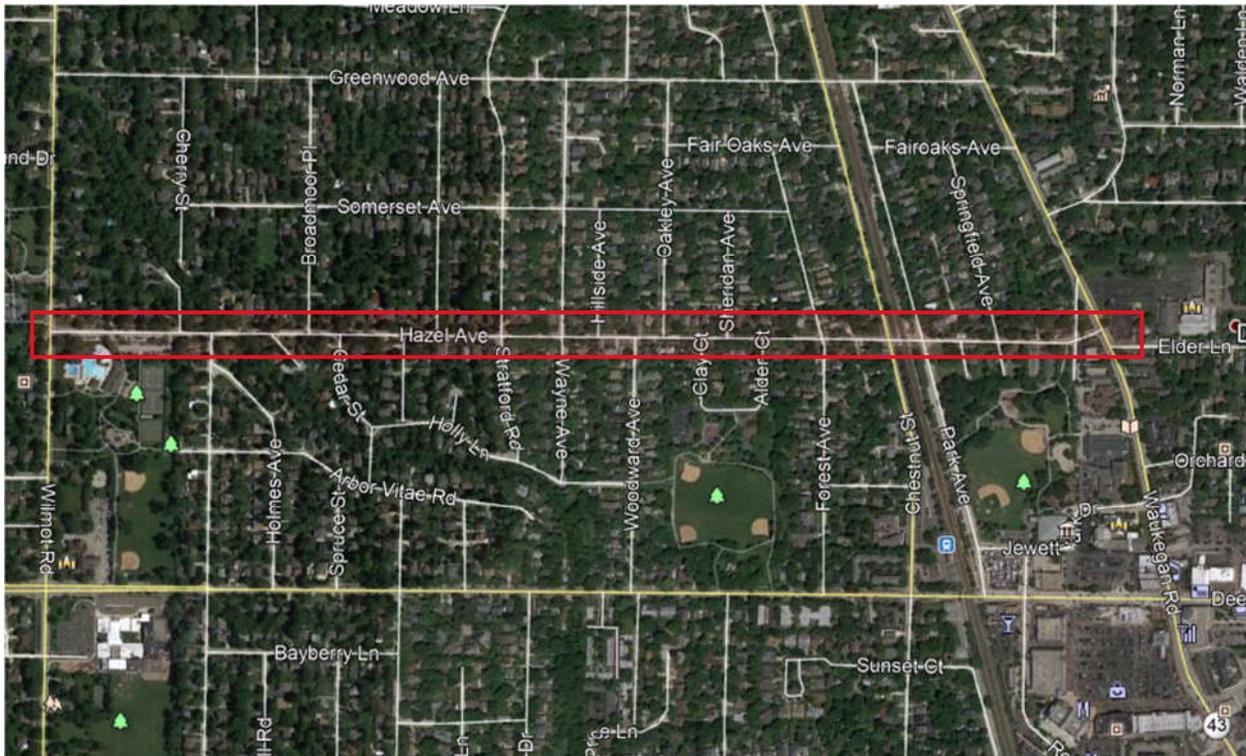


Drainage Technical Memorandum

Hazel Avenue: Wilmot Road to Waukegan Road

Section: 20-00108-00-PV

October 26, 2020



Village of Deerfield

Lake County, Illinois

CONSULTING
ENGINEERS



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PROJECT DESCRIPTION

The proposed improvement is located along Hazel Avenue in southeast Lake County, Illinois, in the Village of Deerfield. See attached location map. The project extends approximately 5,375 feet between Wilmot Road and Waukegan Road. The roadway width varies from 24 feet wide at the west end (Wilmot Road to Wayne Avenue), 21 feet wide in the center section (Wayne Avenue to Chestnut Street), and 20 feet wide at the east end (Park Avenue to Waukegan Road).

The proposed improvement entails reconstruction from Wilmot Road to Waukegan Road. The pavement width will be maintained at 24 feet wide from Wilmot Road to Wayne Avenue and widened to 22 feet wide from Wayne Avenue to Waukegan Road. New B-6.12 curb and gutter will be provided from Illinois Trail to Waukegan Road. The existing 4-foot carriage walk will be replaced with a 6-foot carriage walk and the existing 4-foot sidewalk will be replaced with 5-foot sidewalk in its current locations. The existing storm sewer will receive capacity improvements throughout the corridor. Other improvements will include ADA sidewalk upgrades, spot sanitary and watermain improvements, bridge deck sealing and driveway improvements.

If the scope of work changes during the PS&E stage, this Technical Memorandum may have to be reconsidered and updated as needed for the revised scope.

DRAINAGE PROBLEMS/COMPLAINTS

The Village has not provided any recorded flooding incidents within the project area.

EXISTING DRAINAGE

The existing drainage patterns generally follow the roadway slopes of Hazel Avenue. Hazel Avenue drains via curb and gutter that is connected to various storm sewer systems and has eight (8) different outlet locations. Hazel Avenue does not have a watershed boundary within the project limits. All outlets are connected to the West Fork North Branch Chicago River watershed. The project is located within a 500 Yr floodplain starting approximately 50 feet east of Wilmot Road to west of Illinois Trail (approximately 575 feet) and from Appletree Lane to approximately 150 feet east of Cedar Street (approximately 810 feet) as indicated in the FIRM map included as Attachment 2. The Existing Drainage Plan is included as Attachment 3.

The Hazel Avenue roadway and parkway drain into a closed drainage system of which the storm sewer trunk line varies in location between the north parkway and south parkway. The trunk line ranges in size from 18" to 42".

Each outlet is as defined:

Outlet 1

Outlet 1 is a 48" storm sewer that begins in the south parkway at the project limit of Wilmot Road, continues easterly to STA 10+38.41 where it traverses to the north parkway, and then continues easterly where it discharges to West Fork North Branch Chicago River at SN 049-6152 (STA 18+98.11). The tributary area of Outlet 1 extends west of Wilmot Road through Appletree lane.

Outlet 2

Outlet 2 is a 27" storm sewer that begins in the north parkway at STA 31+ 61.89, continues westerly to STA 29+52.02 where it traverses to the south parkway and continues westerly where it discharges to West Fork North Branch Chicago River at SN 049-6152 (STA 21+06.63). The tributary area to Outlet 2 includes east of the SN 049-6152 to the midpoint between the intersections of Hazel Avenue and Stratford Road.

Outlet 3

Outlet 3 is a 42" storm sewer located in the north parkway from Wayne Avenue westerly to Stratford Road, then traverses south along Stratford Road and discharges to the West Fork North Branch Chicago River beyond the project limit. The tributary area to Outlet 3 includes Hazel Avenue from Wayne Road to Stratford Road, then south along Stratford Road.

Outlet 4

Outlet 4 is a 30" storm sewer located in the south parkway from STA 40+18.08 westerly to Wayne Avenue, then south along Wayne Avenue and discharges into West Fork North Branch Chicago River beyond the project limit. The tributary area to Outlet 4 includes southeast of the intersection of Hazel Avenue and Wayne Avenue to near Woodward Avenue and south along Wayne Avenue.

Outlet 5

Outlet 5 is a 24" storm sewer located in the north parkway from STA 49+77.49 westerly to Woodward Avenue, then south along Woodward Avenue and discharges into West Fork North Branch Chicago River beyond the project limit. The tributary area to Outlet 5 includes east of the intersection of Hazel Avenue and Woodward Avenue to near the intersection of Hazel Avenue and Forest Avenue and south along Woodward Avenue.

Outlet 6

Outlet 6 is a 15" storm sewer located in the north parkway from STA 52+30.26 westerly to Forest Avenue, then south along Forest Avenue and discharges into West Fork North Branch Chicago River beyond the project limit. The tributary area to Outlet 6 includes the intersection of Hazel Avenue and Forest Avenue to west of Chestnut Street and north along Forest Avenue.

Outlet 7

Outlet 7 is an 18" storm sewer located in the north parkway from STA 54+06.40 westerly to Chestnut Street, then south along Chestnut Street and discharges into West Fork North Branch Chicago River beyond the project limit. The tributary area to Outlet 7 extends from west of Chestnut Street easterly to the Metra Railroad and north along Chestnut Street.

Outlet 8

Outlet 8 is a 27" storm sewer located in the north parkway from that drains from STA 64+00.00 westerly to the Metra Railroad, then south along Park Avenue and discharges into West Fork North Branch Chicago River beyond the project limit. The tributary area to Outlet 8 extends from the Metro Railroad to west of Waukegan Road.

DESIGN CRITERIA

This project, as defined in the Lake County Watershed Development Ordinance (WDO), is classified as a Public Road Development. Per the WDO, a Watershed Development Permit is required for any Public Road Development that meets the following criteria (WDO Article 300.07 and 300.08):

- A. One and one-half (1.5) acres or more of new impervious surface; and
- B. One and one-half (1.5) acres or more of new impervious surface per mile, for linear or nonlinear projects; or
- C. Any development that hydrologically disturbs 5,000 square feet or more.

The resultant new impervious area due to widening of roadway, carriage walk, and sidewalk is XXX acres as depicted in Attachment 5 and 6. The project does not hydraulically disturb 5,000 square feet or more. Therefore, site runoff storage is not required and will not be provided.

However, Article 600.06 of the WDO states soil erosion and sediment control measures are necessary for this project and that Best Management Practices (BMPs) shall be used.

The storm sewer system has been modeled in Storm CAD to assess the capacity of the existing drainage system to determine if larger pipes are needed to convey the projected flow. The updated bulletin 75 rainfall tables were utilized. The results of these calculations conclude that this project will require upsizing of storm sewer pipes, new structures, revised inverts/connections, etc. The storm sewer system was evaluated to check for capacity during the 10-year, 24-hour storm with the hydraulic grade line below the rim of any drainage structure during the 100-year, 24-hour storm event. Inlet spacing computations are done based off IDOT criteria. The Storm CAD results are included as Attachment 7.

PROPOSED DRAINAGE

The existing storm sewer system will receive capacity improvements at spot locations throughout the project by providing additional structures, increased storm sewer size, flanking inlets, etc. The trunk line will remain in place throughout the project limits. The capacity improvements will improve the flow of water to the trunk line. The Proposed Drainage Plan is included as Attachment 3. The existing and proposed typical sections are included as Attachment 4.

The recommendations per outlet is as follows:

Outlet 1

Based on the proposed modeling, the existing main line storm sewer does not need to be replaced. Three additional manholes will be proposed along the main line to collect the additional inlets and laterals that are being proposed at St 17+2.50/20.40LT and at two low points at STA 12+40.67 and 15+96.22. Flanking Inlets are proposed at these locations to improve the drainage. Existing inlets are proposed to be removed and replaced to match the proposed edge of pavement. A manhole at St 18+75.84/19.79 RT is proposed to be removed and replaced with an invert change. The existing 6", 8" and 10" storm sewer lines will be removed and replaced with 12" storm sewer to maximize storm water flow into the main trunk line.

Outlet 2

Based on the proposed modeling, the existing main line storm sewer does not need to be replaced. A flanking inlet is proposed at the low point at STA 24 + 31.00 and two additional laterals proposed at St

27+89.11 both left and right. One additional manhole is proposed at St 21+13.03/4.73 RT along the main line to collect the additional laterals. Existing inlets are proposed to be removed and replaced to match the proposed edge of pavement. The existing 6", 8" and 10" storm sewer lines will be removed and replaced with 12" storm sewer to maximize storm water flow into the main trunk line.

Outlet 3

Based on the proposed modeling, the existing main line storm sewer does not need to be replaced. No other capacity improvements are needed for this outlet. Existing inlets are proposed to be removed and replaced to match the proposed edge of pavement. The existing 6", 8" and 10" storm sewer lines will be removed and replaced with 12" storm sewer to maximize storm water flow into the main trunk line.

Outlets 4, 5, 7

Based on the proposed modeling, the existing main line storm sewer does not need to be replaced. One additional manhole is proposed along the main line to collect the additional inlets and laterals that are proposed at St 38+ 27.60/11.55 LT, St 43+ 45.56/13.89 LT and St 53+ 25.53/18.28 LT. Existing inlets are proposed to be removed and replaced to match the proposed edge of pavement. The existing 6", 8" and 10" storm sewer lines will be removed and replaced with 12" storm sewer to maximize storm water flow into the main trunk line.

Outlet 6

Based on the proposed modeling, the existing main line storm sewer does not need to be replaced. No other capacity improvements are needed for this outlet. Existing inlets are proposed to be removed and replaced to match the proposed edge of pavement. The existing 6", 8" and 10" storm sewer lines will be removed and replaced with 12" storm sewer to maximize storm water flow into the main trunk line.

Outlet 8

Based on the proposed modeling, the existing main line storm sewer does not need to be replaced. Three additional manholes will be proposed along the main line to collect the additional inlets and laterals that are being proposed at STA 55+50.83/6.45 RT at the low point and at STA 60+59.30/6.75 RT and a flanking inlet is proposed at the low point at STA 57 + 38.16. Existing inlets are proposed to be removed and replaced to match the proposed edge of pavement. . The existing 6", 8" and 10" storm sewer lines will be removed and replaced with 12" storm sewer to maximize storm water flow into the main trunk line.

EROSION AND SEDIMENT CONTROL

Erosion and sediment control measures will be incorporated to limit any sediment from leaving the project site, including perimeter erosion barrier, inlet protection, ditch checks, temporary and permanent seeding, and erosion control blankets on steep slopes. The project shall incorporate the required BMP measures as required by the ordinance.