



OFFICE OF THE DRAIN COMMISSIONER

Kenneth J Yonker, Drain Commissioner

June 24, 2024

Julius Suchy
Township of Ada
Sent via email

Re: Knapp's Corner Drain Project

The Knapp's Corner Drain improvement project has been ongoing since 2010. This letter serves a general summary of the history and background, evaluation efforts, a proposed solution, impacts, and funding.

Background

The Knapp's Corner Drain serves a 170-acre watershed comprised primarily of fully built out commercial sites. The drain was constructed in 2001 to manage stormwater runoff from increased development of the shopping centers around the Knapp Street/East Beltline area.

Stormwater runoff is collected in a network of gravity sewer pipes and routed into a retention basin located on the east side of the watershed (See attached map). The initial design documents indicate that constructing a positive storm sewer outlet would be challenging due to the topography of the area because the site is surrounded by low-lying areas, pocket ponds, and wetlands that inhibit positive drainage. Given the cost savings of a retention basin instead of a pipe outlet (\$457,000 vs. \$2 Million), the design team chose to construct a retention basin. A retention basin functions to temporarily hold water and infiltrate through the bottom and sides of the basin rather than discharge through a pipe. The retention basin was built on an existing orchard and designed to store and infiltrate a 100-year, 24-hour storm event (6.15 inches). The basin was originally constructed with a sediment forebay to settle fine sediment prior to infiltrating in the primary basin. The only outlet for the basin is an emergency spillway located on the northside of the basin.

In 2001, during construction of the basin, a large rain event caused the basin to overtop and flood 2315 Dunnigan Avenue. By 2004, the basin was excessively silted in and was not matching the infiltration rates assumed during design. Measures to remove siltation or till the top soil failed to restore the infiltration capacity. In 2010, the basin was expanded with the Knapp's Crossing development. In May 2010, due to excessive rainfall, the basin filled nearly to the overflow spillway and temporary pumps were brought in to lower the water level. Discharge was pumped north over the emergency spillway but resulted in flooded parcels. Surface runoff undermined an adjoining block retaining wall causing it to fall. In November 2011, a forcemain was installed to route pumped water south to Knapp Street and into a natural watercourse along the Grand Rapids Township hall property. In 2016, we were made aware of elevated chloride levels in the drinking water wells for the properties adjacent to the basin due to de-icing agents used in the watershed. In 2020, we were notified of flooding problems and drainage trespass for outletting into the natural watercourse south of Knapp Street so pumping ceased through the forcemain and we commenced pumping and hauling water direct to the Grand River.

Based on water level measurements, the basin currently infiltrates at less than 1 inch/day due to poor underlying soils, siltation of the top soil, and groundwater mounding. The existing Knapp's Corner basin has a capacity of 46 acre-feet and can only handle a 30-year storm event before overtopping and flooding homes (assuming a 1,500 gpm pump continuously running during the storm event). Water quality monitoring data yields a time-weighted average chloride concentration of 1,100 mg/L for the stormwater runoff from the watershed.

For the following reasons, we have determined the Knapp's Corner Drain retention basin to be failed infrastructure and in need of suitable rehabilitation:

- Lack of infiltration as primary outlet
- Flooded one home and multiple properties. Based on our evaluation, six homes are at risk of flooding if the pond overtops again.
- Contamination of groundwater wells via chloride transmission
- Block retaining wall failed once and continues to be at risk of falling.

Evaluation

A number of evaluations, studies, or investigations have been commissioned to determine a prudent and feasible solutions to these problems (documents listed below available upon request):

- May 2005 – FTCH – “Knapp's Corner Infiltration Basin Relocation”
- September 2010 – FTCH – “Knapp's Corner Infiltration Basin Remediation”. Letter focused on removal of inadequate soils and expansion of the basin.
- September 2010 – FTCH – “Review of Downstream Impacts from a Pumped Discharge to Knapp Street”
- 2011 to 2019 – KCDC – Infiltration measurements
- November 2016 – Prein&Newhof – “Knapp's Corner Infiltration Basin Hydrogeologic Investigation”
- 2016 to present – Prein&Newhof – Water quality sampling in basin
- March 2018 – Prein&Newhof – “Knapp's Corner Basin Outlet Study”. 10 routes were considered for a permanent gravity or pumped pipe outlet.
- January 2019 – Prein&Newhof – “Hydraulic Capacity Analysis, Knapp's Corner Drain District”. Supplemental to the March 2018 report considering three additional routes for an outlet.
- March 2019 – Drummond Carpenter – “Knapp's Corner Meijer Stormwater Management Plan”. Evaluation of onsite runoff characteristics and methods to reduce discharge.
- October 2020 – Prein&Newhof – “Lamberton Creek-Leonard Leffingwell Drain Capacity Analysis” Summarizing hydraulic modeling of Lamberton Creek to determine suitability of outletting west.
- April 2023 – Barr Engineering – “Wetland Delineation Report, Kent County ISD Parcels”.
- May 2023 – Prein&Newhof – “Geotechnical Investigation, Proposed Detention Basins”. Geotechnical evaluation of proposed detention basins on the Kent Intermediate School District property (west outlet).
- November 2023 – Drummond Carpenter – “Cost Estimation of Green Stormwater Infrastructure for Knapp's Basin”
- December 2023 – Drummond Carpenter – “Area and Depth Enlargement Modeling for Knapp's Basin”
- March 2024 – Prein&Newhof – “Knapp's Corner Outlet, Dunnigan & 3 Mile Road”. Preliminary investigation summarizing survey topography and soil borings, pipe route, and environmental review.

Since 2017, a project team consisting of City of Grand Rapids engineering staff, Kent County Drain Commission staff, Prein&Newhof (engineering) and Drummond Carpenter (environmental/engineering) have regularly met to discuss outlet alternatives for a final solution. The basis of design for any permanent solution includes 1) restore storage or hydraulic capacity to system, either at the Knapp's Corner basin or elsewhere; 2) provide water quality improvements to mitigate chloride transport; 3) cost-effective and simple solution for long-term maintenance.

The primary focus for an outlet from 2019 to 2023 was to construct a pump station at the existing Knapp's Corner basin and a force main west to the Kent Intermediate School District property to discharge into an existing KCDC detention basin. The basin outlets by gravity into Lamberton Creek. Since this alternative requires a pump station and discharge into a watercourse with limited capacity, it was decided that the basin on the KISD property would be retrofitted to store back-to-back 100-year storms without discharging. The preliminary estimate of cost for this alternative was \$14 Million (est. in September 2023). On September 6, 2023, our project team met with EGLE staff at the KISD property to determine permitting requirements for discharging into the KISD basin and Lamberton Creek. EGLE concluded that any discharge would most likely require additional "red file" review by the EPA.

On September 12, 2023, the property owner immediately north of the existing Knapp's Corner basin) approached us to consider purchasing his property. Purchase of the 2257 Dunnigan Avenue property would facilitate expansion of the existing basin by approximately 20% and, with sufficiently sized pipe outlet, would provide 100-year, 24 hour (6.27 inches) plus a 2-year, 24 hour rain event (2.5 inches). Based on the difficulty of EPA review and the ability to store more water on the existing site, the team decided to abandon an outlet west into Lamberton Creek and pursue an outlet east to the Grand River.

The current proposed project is a 24" gravity storm sewer outlet pipe (sized to pass 8 cfs) from the basin to Dunnigan Avenue, thence north along Dunnigan Avenue to 3 Mile and thence east to Grand River Drive, into the Cook Drain (KCDC jurisdiction), and into the Grand River. Basin improvements include expansion of the footprint of the basin and construction of water quality features including a meandering stream, wetland pushouts and pocket ponds, and plantings. The original retention basin was constructed on non-wetland/non-floodplain so EGLE permitting is limited to Part 301 impacts for the discharge location into the Cook Drain (no EPA red file review required). We are in preliminary discussions with the single property owner over whose property we require an easement.

Advantages of the current proposed outlet include: low level of long term maintenance compared to a pump station system, onsite detention (compared to two sites using the KISD property), limited EGLE permitting, increased ecological and water quality improvements, and lower cost (the current project estimate is \$11.7 Million).

Impacts

The proposed outlet will discharge stormwater runoff into the Cook Drain and the Grand River in Ada Township. The project proposes a peak discharge rate of 8 cfs into the Cook Drain which has sufficient capacity to handle the additional flow without causing detrimental impacts to adjoining properties. Stabilization measures will be installed at the proposed outlet to minimize any potential erosion. The additional flow is negligible compared to the base flow (4,300 cfs) of the Grand River.

A weighted average of the current average flow and salt concentration from Knapp's Corner (0.25 cfs and 1,100 mg/l) and the Grand River (4,300 cfs and 46 mg/l) yields a combined salt concentration of 46.06 mg/l which is a negligible increase. We anticipate no negative impacts by discharging the Knapp's Corner Drain stormwater runoff into either the Cook Drain or Grand River.

Project Funding

The Kent County Drain Commissioner's office obtained a \$2 Million American Rescue Plan Act (ARPA) grant. The City of Grand Rapids has obtained a \$6 Million ARPA grant. KCDC is currently pursuing a \$700,000 grant from the National Fish and Wildlife Foundation for ecological restoration in the existing basin. The Kent County Road Commission has committed at least \$500,000 for improvement of roads with the project. The remainder of the cost will be paid for by the City of Grand Rapids.

Thank you for your understanding.

Sincerely,



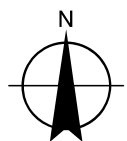
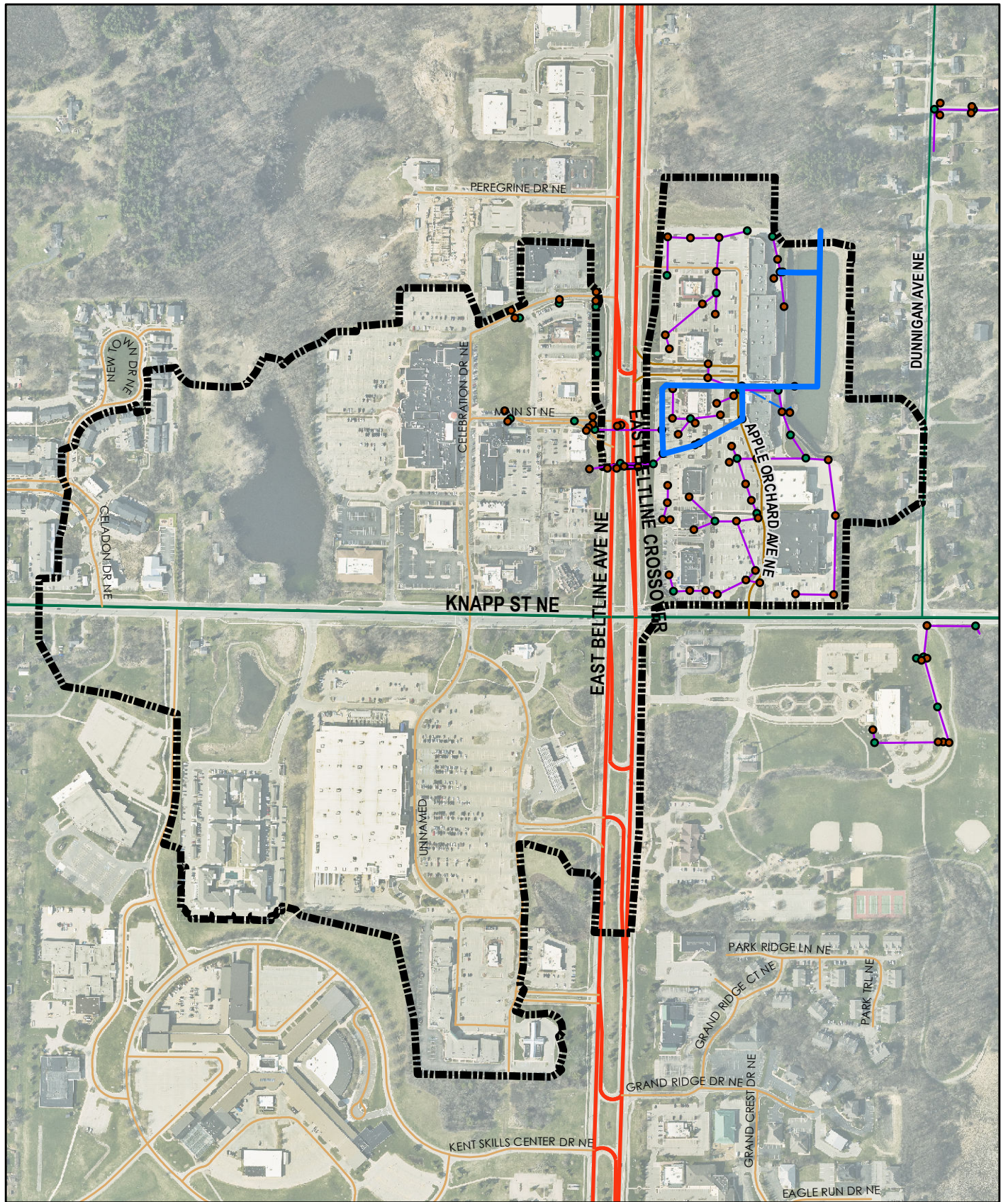
Kenneth J. Yonker
Kent County Drain Commissioner

Attachments:



Drainage District Map

Knapp's Corner Retention basin map

Proposed Outlet Map



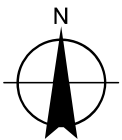
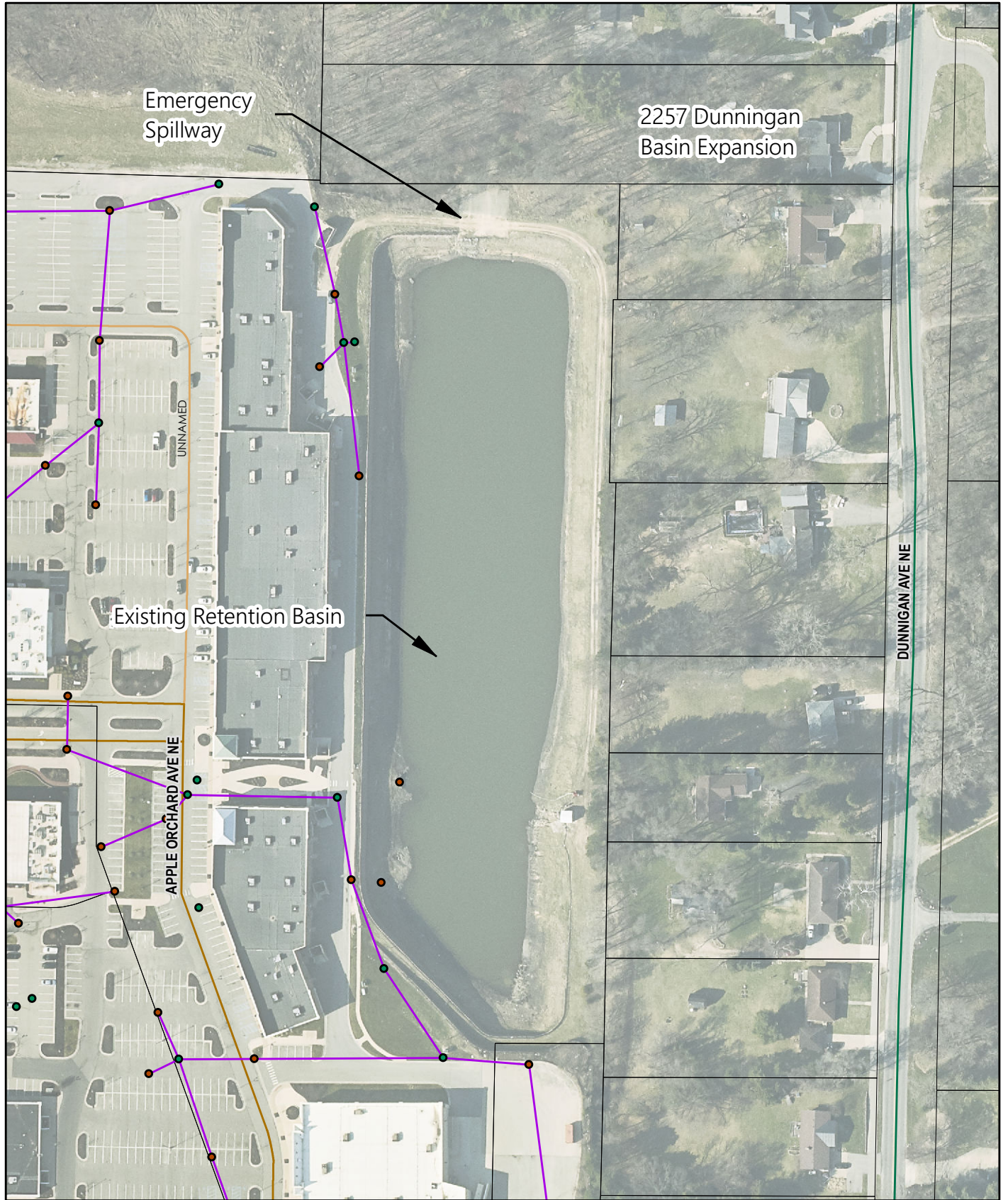
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-  Knapps Corner Drain and Branches
-  Knapp's Corner Watershed



KNAPPS CORNER DRAIN Watershed Boundary

City of Grand Rapids
Grand Rapids Township
Kent County, MI

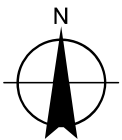
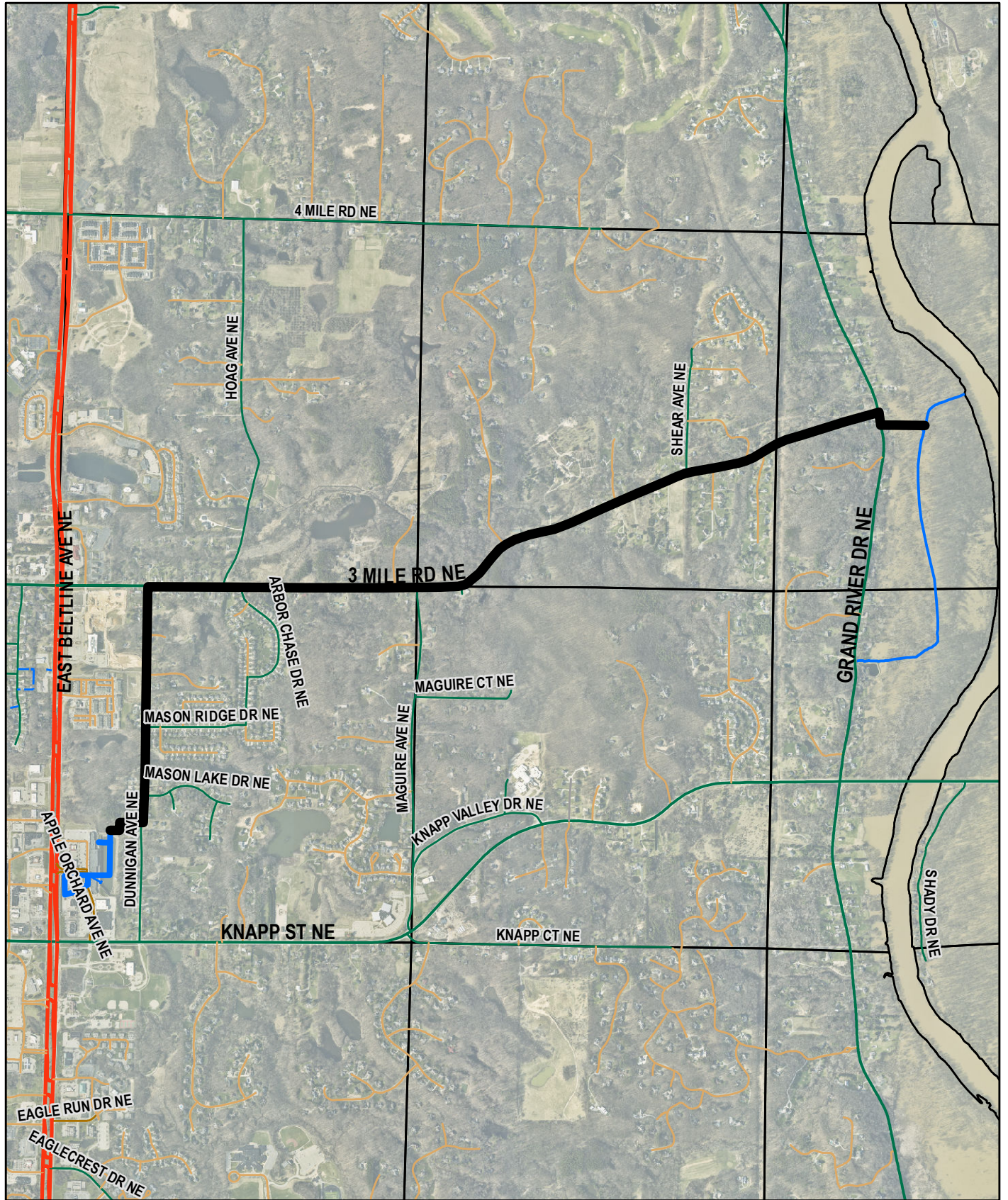


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KNAPPS CORNER DRAIN
Watershed
Boundary

City of Grand Rapids
Grand Rapids Township
Kent County, MI



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— Knapp's Corner Drain Outlet

— Knapps Corner Drain and Branches



KNAPPS CORNER DRAIN Proposed Outlet Route

City of Grand Rapids
Grand Rapids Township
Kent County, MI