US Army Corps of Engineers®

CHICAGO DISTRICT

Lansing and Calumet City Levees, IL

# Appendix C: MECHANICAL ENGINEERING

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# 1 Lansing, IL

## 1.1 Current System

The Lansing Levee system is currently served by two pump stations, as show in Figure 1-1. They are designated as Lansing Pump Station **East** of 170th and Burnham Avenue, and Lansing Pump Station **West** of 170th and Burnham Avenue. A site visit was performed for this Feasibility Study during October 2019, and it was found that both pump stations were fulfilling the Village's pumping requirements, even with general wear and tear at both stations due to age of installation of pumps. Outlet flap gates at both stations also looked to be in working order, even with similar wear and tear due to age. Both pump stations were constructed sometime around 1985. The USACE *2019 Non-Federal Inventory and Review Report* for the Lansing Levee System reported the pumps to be rated as *acceptable* and the flap gates as *minimally acceptable*, which matches the observations made by Feasibility team during October 2019 site visit.

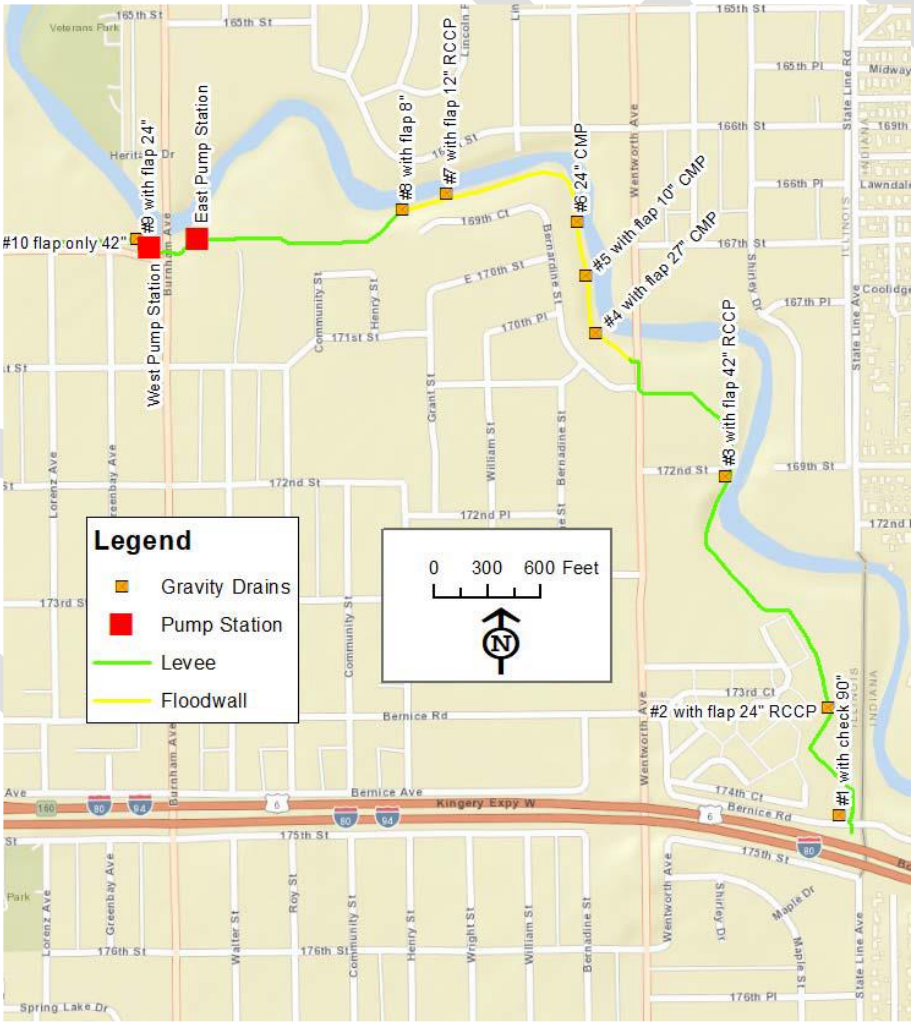


*Figure 1-1 Lansing IL Map*

### 1.1.1 Lansing Pump Station East of 170th and Burnham Avenue

Summary of Lansing Pump Station **East:**

- Triplex vertical axial flow propeller/mixed flow type storm water pumps designed for 19,000 gallons per minute (GPM) at 20.5 feet of total dynamic head (TDH) with a 125 HP motor.
- One submersible type pump designed for 3000 GPM at 22 feet TDH with a 20 HP motor.
- One submersible type pump designed for 500 GPM at 22 feet TDH with a 5 HP motor.
- Total of three main pumps and two submersible pumps for a total capacity of 60,500 GPM.

### 1.1.2 Lansing Pump Station West of 170th and Burnham Avenue

Summary of Lansing Pump Station **West:**

- Triplex vertical axial flow propeller/mixed flow type storm water pumps designed for 52,000 GPM at 15.1 feet of total dynamic head (TDH) with a 250 HP motor.
- There were also two smaller pumps, but no documentation available to properly confirm capacity of pumps.
- Estimated total capacity of system is 156,000 GPM.

## 1.2 Feasibility Level of Design Recommendation

The local sponsor reported no capacity issues with the current pump stations in Lansing. As part of upgrading the current levee and floodwall of the Lansing system, the recommendation at this feasibility level is to **replace-in-kind** all major components of both pump stations. This is to ensure operability for the future of upgraded levee and floodwall, as well bring them to the federal standard provided by the Corps.

The following mechanical components are recommended to be replaced-in-kind:
Lansing Pump Station **East:**

- Three vertical axial flow storm water pumps
- Two smaller submersible pumps
- (see section 1.1.1 for available pump information)

Lansing Pump Station **West:**

- Three vertical axial flow storm water pumps
- Two smaller pumps, possibly submersible
- (see section 1.1.2 for available pump information)

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# 2 Calumet City, IL

## 2.1 Current System

The Calumet City Levee system is currently served by two main pump stations as show in Figure 2-1. The map below also shows a third pump station, but this is a single submersible pump used to serve the State Line Storm Water Detention Basin. The two main pump stations are designed as Greenbay Avenue Pump Station and Lincoln Avenue Pump Station. A site visit was performed for this Feasibility Study during October 2019, and multiple pumps were found to be in operable at Lincoln Avenue Pump Station. The local sponsor also that reported that both pump stations were generally fulfilling the City's pumping requirements, even with the outages. Both pump stations were constructed sometime around 1984. The USACE *2019 Non-Federal Inventory and Review Report* for the Calumet City Levee System reported the pumps to be rated as un*acceptable* and the flap gates as *minimally acceptable*, which matches the observations made by Feasibility team during October 2019 site visit.

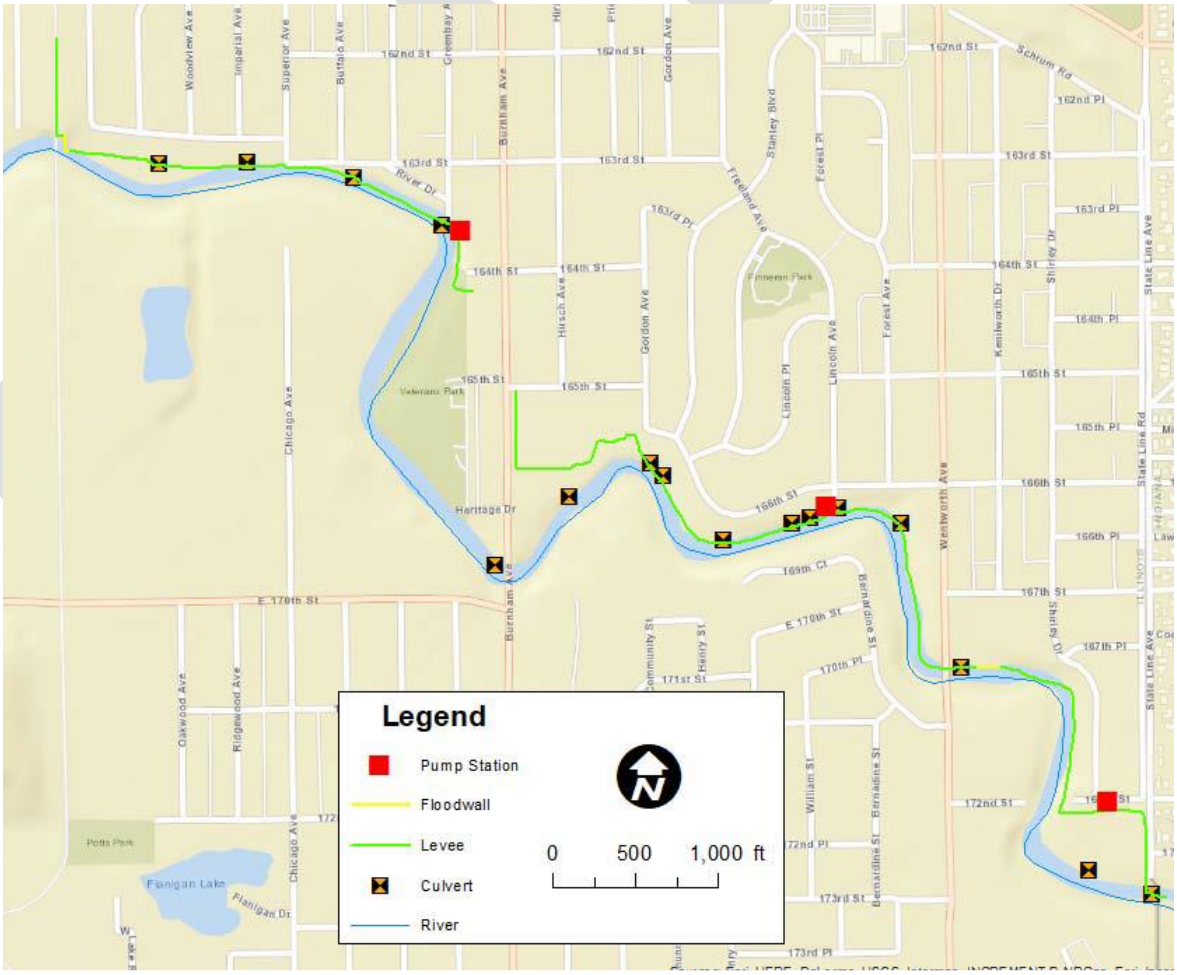


*Figure 2-1 Calumet City IL Map*

### 2.1.1 Greenbay Avenue Storm Water Pump Station

Summary of Greenbay Avenue Pump Station:

- Triplex, variable speed, vertical axial flow propeller/mixed flow type storm water pumps at an unknown capacity, with 150 HP motor (three pumps at equal capacity).
- Also includes a 5 HP submersible pump.
- These details were found in a Robinson Engineering report provided by the local sponsor. Total pumping capacity unknown, and further details and documentation would be needed to be provided by local sponsor to determine capacity.
- All three pumps were operating during site visit in October 2019.

### 2.1.2 Lincoln Avenue Storm Water Pump Station

Summary of Lincoln Avenue Pump Station:

- Triplex, variable speed (one of three pumps is constant speed), vertical axial flow propeller/mixed flow type storm water pumps at an unknown capacity, with 150 HP motor (three pumps at equal capacity).
- Also includes a 5 HP submersible pump.
- These details were found in a Robinson Engineering report provided by the local sponsor. Total pumping capacity unknown, and further details and documentation would be needed to be provided by local sponsor to determine capacity.
- Pumps #2 and #3 (possibly all three) were out-of-order during site visit in October 2019.

## 2.2 Feasibility Level of Design Recommendation

The local sponsor reported no capacity issues with the current pump stations in Calumet City. Even with the numerous pumps that were out-of-order at the date of the site visit. As part of upgrading the current levee and floodwall of the Calumet City system, the recommendation at this feasibility level is to **replace-in-kind** all major components of both pump stations. This is to ensure operability for the future of upgraded levee and floodwall, as well bring them to the federal standard provided by the Corps.

The following mechanical components are recommended to be replaced-in-kind:
Greenbay Avenue Pump Station**:**

- Three vertical axial flow storm water pumps
- One smaller submersible pump
- (see section 2.1.1 for available pump information)

Lincoln Avenue Pump Station**:**

- Three vertical axial flow storm water pumps
- One smaller submersible pump
- (see section 2.1.2 for available pump information)

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