



**ENGINEER'S REPORT
FOR
PROPOSED SITE REDEVELOPMENT
6000-6040 NORTH BAILEY AVE
TOWN OF AMHERST, NEW YORK
PROP # 1723**

**November 17, 2023
(Updated August 23, 2024)**

GENERAL

This project is a redevelopment of a 17.426-acre parcel of land currently occupied with five (5) multitenant buildings (26,709 S.F., 35,678 S.F., 90,130 S.F., 59,591 S.F., and 34,632 S.F.) with associated loading docks, parking, utility, and drainage infrastructure. It is located at the Southwest corner of North Bailey Ave and Romney Road in the Town of Amherst. The property abuts general commercial properties along all property boundaries.

Existing Conditions:

The site is currently occupied by five (5) buildings and associated parking lot and loading docks. The site currently is sheet draining any runoff from pavement surface existing on-site drainage structures.

The site contains existing domestic and fire water services. The existing Domestic water service is tapped off the 8" Main along North Bailey Ave and enters the site at the Southeast corner of property. The existing Fire water service is tapped of the 8" Main along North Bailey Road and enters the site near the Northeast corner of property.

Existing Sanitary Sewers connection for the property is located South of property that discharges into the existing Town of Amherst sewer district.

PROJECT OVERVIEW

The proposed project (*Figure 1*) consists of; clearing of land and relocation of existing utilities; Construct building addition of 10,069 S.F. between the Two Southern Buildings. Site improvements including improvements to the associated parking lot, drainage infrastructure and sites grading and utilities.

PROPOSED FACILITIES

Storm Water

SWPPP Engineer's Report prepared by Carmina, Wood, Morris DPC dated November 2023

Water System

The existing water service to the site is to reuse for this proposed project. The existing service is tapped off the existing 8" water main along North Bailey Ave R.O.W. The proposed development will reuse the existing domestic and fire water services, which each have their own dedicated hot box enclosure with meter and backflow devices. The existing 8" Fire service enters the site near the NE corner of property and the existing 3" domestic service enters the site near the SE corner of property.

Disinfection of the water services following installation will be continuous feed, according to AWWA C-651, latest revision.

Summary: *(Refer to Figure 2)*

Proposed Building Increased:	10,069 S.F.
Operating Demand Increase:	1.86 gpm
Peak Demand Increase:	3.36 gpm
Water Main:	8" main along North Bailey Ave
Static Pressure:	96
Head Loss Friction:	0 psi
Loss through meter/RPZ:	13.0 psi per service
Elevation Loss:	0.9 psi
Bends Loss:	0 psi
Required Pressure after RPZ:	20 psi
Proposed Pressure after RPZ:	82.1 psi

Sanitary Sewer:

Sanitary services will reuse building connection which will discharge into the existing sanitary sewer lateral that discharges along sanitary main along Meyer Road. The proposed building additions will reuse the existing lateral sanitary connections.

Summary:

Proposed New Building S.F.:	10,069 S.F.
Existing Buildings S.F.:	246,740 S.F.
Proposed Flow:	$0.1 * 10,069 = 1,007 \text{ GPD}$
Additional GPD =	<u>1,007 GPD</u>
Total Increased Sanitary Flow:	1,007 GPD

FIGURES:

- 1 *Site Location Plan & Engineering Plan*
- 2 *Sanitary & Water Calculations*
- 3 *SWPPP Stormwater Report*
- 4 *Water Quality Unit Detail*

APPENDICES:

- A *FEMA Flood Areas*

FIGURE 1

SITE LOCATION PLAN ENGINEERING PLANS

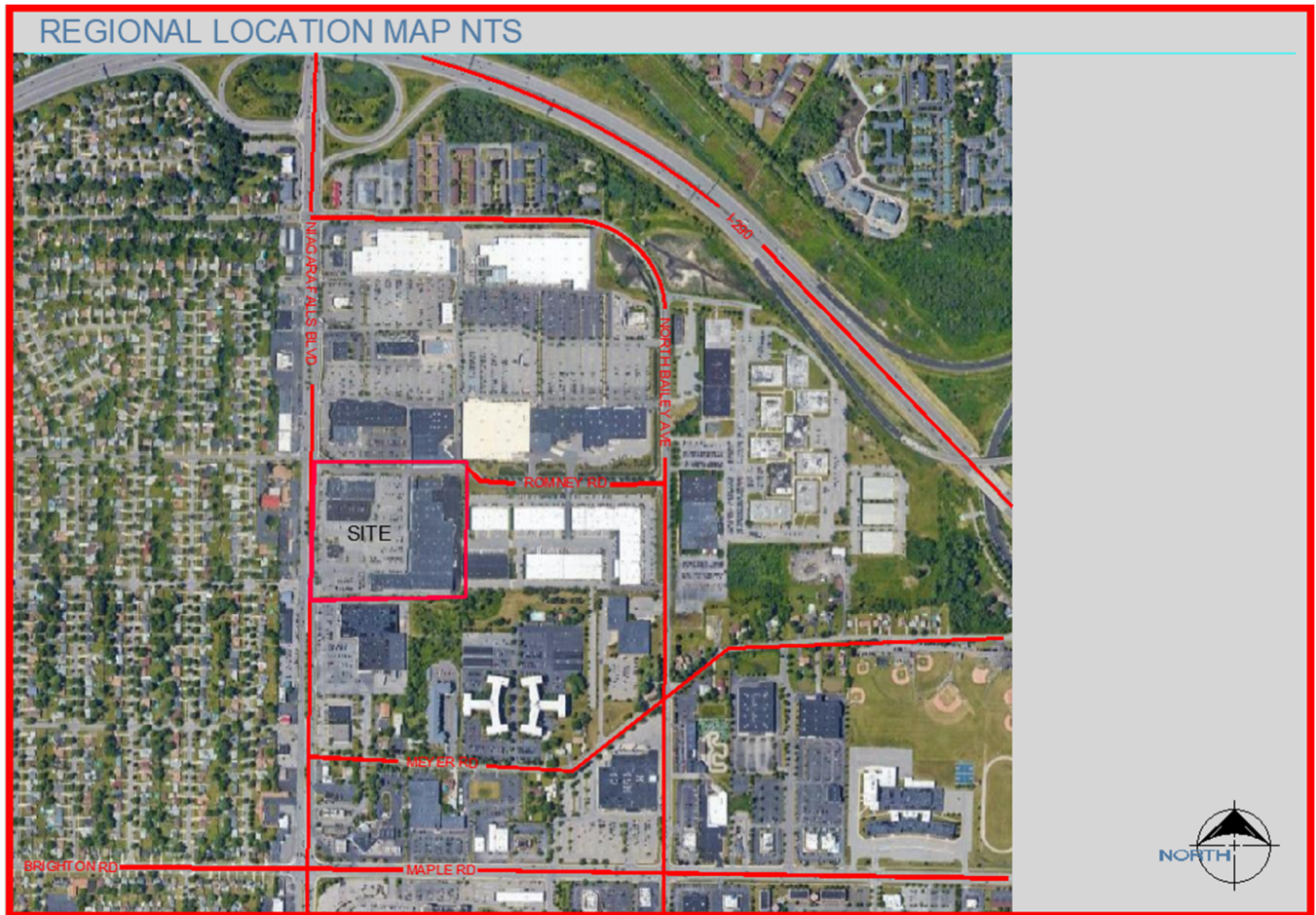


FIGURE 2

SANITARY & WATER CALCULATIONS

SANITARY SEWER CALCULATIONS:

PROPOSED NEW BUILDING: 10,069 S.F.

Required GPD = 0.1 GPD / S.F. *NYSDEC Design standard for WWTS

Proposed = 10,069 * 0.1 GPD = 1,007 GPD

INCREASED SANITARY FLOW = 1,007 GPD

PEAK SANITARY DEMAND

Total Demand = 1007 GPD x 1.1 = 1,108 GPD
 Per Population = 30 Per Capita

Peak Factor: $(18+VP) / (4+VP)$ P in Thousands

Peak Factor = 4

Peak Sanitary Demand = 1108 x 4.38 = 4,853 gpd
 0.005 MGD

WATER CALCULATIONS:

Demand: = 1,007 GPD

GPM: = GPD / 9hr / 60min

ASSUMED 9HR SHIFT = 1,007 / 9 / 60

1.86 GPM

PEAK FACTOR: = GPM X 1.8

= 1.86 X 1.8

Q = 3.36 GPM PEAK

HEADLOSS FRICTION: = $\frac{(10.44) \times (L) \times (Q)^{1.85}}{(C)^{1.85} \times (D)^{4.866}}$

Q = GPMIn

L = LENGTH OF PIPE = $\frac{(10.44) \times (50) \times (3.36)^{1.85}}{(140)^{1.85} \times (2)^{4.866}}$

C = DESIGN COEF OF PIPE

$(140)^{1.85} \times (2)^{4.866}$

D = PIPE DIAMETER

0 PSI

ELEVATION LOSS: = (BUILDING INTAKE - HYDRANT HEIGHT) X 0.433
 = (579.5 - 577.5) X 0.433
 = **0.9 PSI**

LOSS THROUGH RPZ & METER:

RPZ = 12 PSI (STANDARD)
 METER = 1 PSI (STANDARD)
 = **13 PSI After Hotbox**

LOSS DUE TO BENDS:

RESISTANCE EQUIVALENT LENGTH METHOD)

TOTAL = **0 FT ADDITIONAL PIPE**

STATIC PRESSURE @ HYDRANT:

= **96 psi**

PRESSURE AFTER RPZ / METER / BENDS / ELEVATION / HEADLOSS:

= 96 - 13 PSI - 0.9 PSI
 (HYD) (RPZ) (FRICTION)
 = **82.1 psi**

REQUIRED RESIDUAL PRESSURE = 20 PSI

PROPOSED RESIDUAL PRESSURE = 82.1 PSI

THEREFORE **PROPOSED** **>** **REQUIRED**
 82 PSI (GREATER) 20 PSI

FIGURE 3

SWPPP Report



ENGINEER'S REPORT

for

Amherst Development Park
6000-6040 North Bailey Ave
Town of Amherst, Erie County, New York

Prepared for

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November 2023



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- Water Quality and Runoff Reduction Calculations
- Stormwater Runoff Summaries and Runoff Delineation Maps
- HydroCAD Analysis

Section 1 - Location & Description

This project is a site redevelopment of the existing Amherst Development Park located on the south side of Ridge Lea Road and on the west side of North Bailey Ave in the Town of Amherst. The site is located north of Meyer Road and east of Niagara Falls Boulevard. The Boulevard Consumer Square is located north and west of the project site, Amherst Commerce Park is located east of the project site and Boulevard Towers Apartments are located south of the project site. The site is currently fully developed and occupied by existing commercial buildings that will remain. Proposed construction will include two building additions and parking lot/driveway expansions. Site construction will also include utility improvements and new stormwater management areas. The overall site is 17.14 of which 6.95 acres will be disturbed by construction activities. The project site is currently zoned R-D.

Section 2 - Stormwater Drainage System

The existing site is generally flat. An existing open/closed drainage system onsite drains north to an open swale along the north side of Romney Rd. Three existing 3'x5' arch stormwater conveyance pipes are also located onsite within a 30' wide Town of Amherst Drainage easement. These conveyance pipes flow from the south property line to north and discharge into the open swale along Romney Rd. The existing swale flows east along Romney Rd and north along North Bailey Ave and outlets to an existing stormwater management pond located adjacent to Interstate 290. Runoff from the pond is then conveyed north via open and closed drainage systems and discharges to Ellicott Creek and ultimately the Niagara River. All proposed stormwater runoff from the project site will continue to discharge to the existing stormwater system along Romney Road.

This project is subject to the Boulevard Central Special Stormwater Design Conditions adopted by the Town of Amherst. In addition to the requirements of the NYSDEC SPDES General Permit, the project must also provide the following criteria for Projected Growth Redevelopment Scenarios and Enhanced Phosphorus Removal:

- Provide 10% escalation of proposed peak flow when compared to existing conditions peak flows.
- Median curve number (CN) to compute existing conditions.
- Water Quality volume based on the 1-year, 24-hour storm according to Chapter 10 of the NYSDEC Stormwater Management Design Manual.

For purposes of the runoff analysis and the stormwater drainage system design, portions of the project site were classified as "Redevelopment" per NYSDEC Stormwater Management Design Manual Chapter 9 requirements. The nature of this construction project will be a "Redevelopment" with an increase in impervious area. The proposed stormwater management system was designed to attenuate proposed runoff to existing conditions prior to discharge.

The proposed stormwater drainage system will consist of a combination of overland sheet flow and HDPE pipe channel flow connected by a series of drainage inlets located throughout the project site. Proposed stormwater runoff will be collected and conveyed to an underground stormwater chamber detention area onsite and discharged via outlet control pipes to the existing stormwater system along Romney Road.

The bioretention areas will provide Runoff Reduction and Water Quality volume requirements for "New Development" areas. The filter area planting soil depth varies throughout the bioretention areas but maintains a minimum of at least 18 inches of soil. The 18 inches of soil is an acceptable deviation per the NYSDEC where existing grades prevent the full 2.5'-4' foot soil depth. A series of 6" underdrains below the planting soil will be located throughout the bioretention areas connected by overflow drainage inlets to convey runoff directly to the closed stormwater management system. Water quality treatment structures will be installed onsite to address water quality requirements for "Redevelopment" areas.

The NYSDEC Stormwater Management Design Manual requires a five-step process for Stormwater Management Planning as outlined in Chapter 3. The five steps include:

1. Site planning to preserve natural features and reduce impervious cover: No existing natural features exist onsite.
2. Calculation of Water Quality Volume (WQv) for site. See "Storm Sewer Drainage Calculations".

3. Incorporation of Green Infrastructure techniques and standard SMPs with Runoff Reduction Volume (RRv) capacity. Bioretention areas were incorporated into the site design to provide required RRv and WQv for “New Development” areas. See “Storm Sewer Drainage Calculations”.
4. Use of standard SMPs where applicable, to treat the portion of water quality volume not addressed by green infrastructure techniques and standard SMPs with RRv capacity. Water quality treatment structures will be installed onsite to address water quality requirements for “Redevelopment” areas. See “Storm Sewer Drainage Calculations”.
5. Design of volume and peak rate control practices where required. See “Storm Sewer Drainage Calculations”.

The NYSDEC Stormwater Management Design Manual requires (5) five different criteria be considered when designing a stormwater management system. Those criteria are Water Quality, Runoff Reduction Volume, Channel Protection, Overbank Flooding and Extreme Storm Protection. Below is a summary of each item and how it is incorporated into this project.

Water Quality:

The NYSDEC requires water quality treatment prior to discharge. This will be achieved by the application of bioretention areas and water quality treatment structures. The total WQv provided was 0.749 ac-ft and equal to the required WQv of 0.749 ac-ft. The required water quality volume was calculated based on the proposed 6.95 acres of proposed development area.

Runoff Reduction Volume:

The NYSDEC requires reduction of the total water quality volume by green infrastructure techniques and SMPs to replicate pre-development hydrology. Bioretention areas were incorporated into the site layout to provide the required RRv for contributing runoff areas in the WQv. The RRv provided was 0.094 ac-ft and greater than the required RRv min. of 0.056 ac-ft. The required runoff reduction volume was calculated based on 3.03 acres of proposed “new development” area that includes 1.97 acres of “new impervious” area.

100% of the required WQv was not reduced due to the followings site specific limitations: Drainage areas with impermeable soils, Type D. In addition, below is a summary of how each green infrastructure technique was evaluated and determined to be feasible or infeasible:

1. Conservation of natural areas: no natural existing features present onsite.
2. Sheetflow to riparian buffers or filter strips: no riparian buffers possible on the site; filter strips not feasible given the limited area for development.
3. Vegetated Open Swales: swales were not feasible given the limited area for development.
4. Tree Plantings: new trees were planted throughout the site.
5. Disconnection of Roof Top Runoff: disconnection not feasible for these types of projects.
6. Stream Daylighting: is not feasible given the limited area for development.
7. Rain Garden: bioretention areas installed throughout site.
8. Green Roof: the proposed use of the building makes this an unfeasible practice.
9. Stormwater Planter: this method is not recommended for these types of projects.
10. Rain Barrels & Cisterns: collected water would not be used for irrigation.
11. Porous Pavement: porous pavement is not recommended for areas with impermeable soils (Type D) and areas with sediment laden runoff (salting in winter months).

Channel Protection:

The NYSDEC requires that 24-Hour extended detention be provided for the proposed 1-year storm event. A volume of 10,004 cf will be accommodated in the stormwater detention areas onsite.

Overbank Flooding:

The NYSDEC requires that the 10-year proposed storm event be attenuated with detention and that the outlet be restricted to the 10-year existing storm event. Storage of this storm will be provided within the onsite stormwater detention areas. At this storm event the stormwater drainage system will allow discharge of 13.54 cfs, which is below the existing peak 10-year runoff of 20.51 cfs.

Extreme Storm Protection:

The NYSDEC requires that the 100-year proposed storm event be attenuated with detention and that the outlet be restricted to the 100-year existing storm event. Storage of this storm will be provided within the onsite stormwater detention areas. At this storm event the stormwater drainage system will allow discharge of 25.60 cfs, which is below the existing peak 100-year runoff of 41.10 cfs.

Town of Amherst:

The Town requires that the 25-year proposed storm event be attenuated with detention and that the outlet be restricted to the 10-year existing storm event *under the 10% escalation scenario*. Storage of this storm will be provided within the onsite stormwater detention areas. At the 25-year storm event the stormwater drainage system will allow discharge of 19.34 cfs, which is below the existing peak 10-year runoff of 20.51 cfs.

Design Criteria:

Storm pipes: 10-year storm

RUNOFF ANALYSIS OF PROPOSED DEVELOPMENT AREA:

STORM EVENT	EXISTING RUNOFF (cfs)	PROPOSED RUNOFF (cfs)	10% ESCALATION (cfs)
1 YEAR	8.12	7.30	8.03
2 YEAR	11.64	9.40	10.34
5 YEAR	16.25	11.90	13.09
10 YEAR	<u>20.51</u>	13.54	14.89
25 YEAR	27.36	18.03	<u>19.83</u>
50 YEAR	33.68	21.83	24.01
100 YEAR	41.10	25.60	28.16

WATER QUALITY SUMMARY:

WQv REQUIRED = 0.749 AC-FT

RRv MIN. REQUIRED = 0.056 AC-FT

RRv PROVIDED WITHIN BIORETENTION AREAS = 0.094 AC-FT

WQv PROVIDED WITHIN BIORETENTION AREAS = 0.234 AC-FT

WQv PROVIDED BY TREATMENT STRUCTURES = 0.515 AC-FT

TOTAL WQv PROVIDED = 0.749 AC-FT

BIORETENTION FILTER AREA SUMMARY:

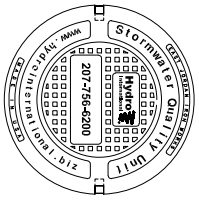
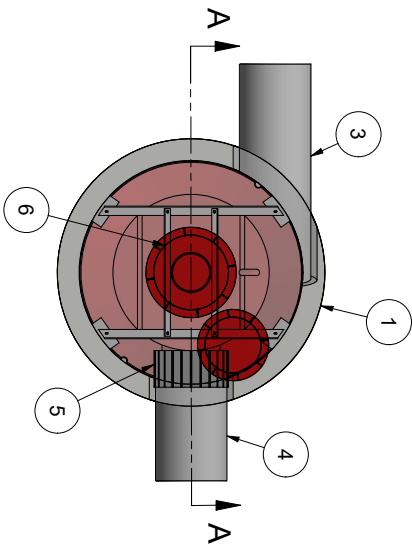
FILTER AREA = 9,266 SF

See attached "Storm Sewer Drainage Calculations" for additional information.

FIGURE 4

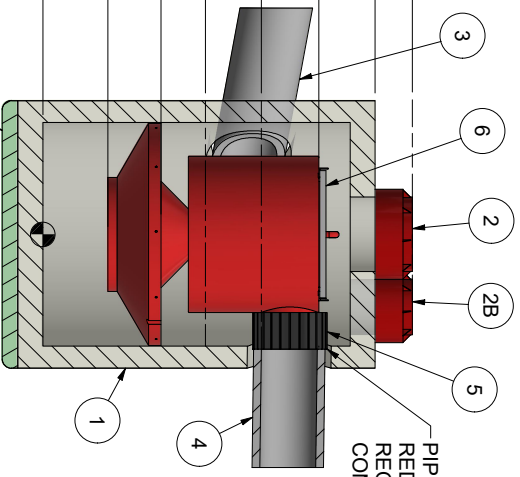
Water Quality Unit Detail

OUTLET STUB ID: 18" (450 mm)
OUTLET STUB OD: 18.7" (475 mm)



HYDRO FRAME AND COVER (INLUCDED)
GRADE RINGS BY OTHERS AS REQUIRED

- RIM: VARIES
- T.O.S.: 8.9 ft [2.717 m] (MINIMUM)
- LEDGER: 7.41 ft [2.257 m]
- OUTLET: 5.86 ft [1.788 m] (MINIMUM)
- INLET: 4.36 ft [1.330 m]
- SKIRT: 3.17 ft [.965 m]
- BOTTOM OF INTERNALS: 1.75 ft [.533 m]
- SUMP: 0 ft [0.00 m]



SECTION A-A
STONE BASE PER PROJECT SPECIFICATIONS

NOTE: NOT FOR CONSTRUCTION.
CONTACT HYDRO FOR SITE SPECIFIC DETAIL

- 1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.
- 2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING DOWNSTREAM DEFENDER MANHOLE.



PROJECTION

IF IN DOUBT ASK

DATE:	10/8/2019	SCALE:	1 / 50
DRAWN BY:	MRJ	CHECKED BY:	MRJ
APPROVED BY:			

TITLE: 6ft-DIAMETER

GENERAL ARRANGEMENT



STOCK NUMBER:	DD GA-10	MATERIAL:	
WEIGHT:	N/A		
NEXT ASSY:			
DRAWING NO.:	DD GA-10		
SHEET SIZE:	1 OF 1		
SHEET:			Rev: A

EQUIPMENT PERFORMANCE

The stormwater treatment unit shall adhere to the hydraulic parameters given in the chart below and provide the removal efficiencies and storage capacities as follows:

1. The treatment system shall use an induced vortex to separate pollutants from stormwater runoff.
2. Peak Hydraulic Capacity: 8.0 cfs (227 l/s)
3. Sediment Storage Capacity: 2.10 cu. yd. (1.59 cu. m)
4. Continuous Oil Storage Capacity: 216 gal. (818 liters)
5. Sediment shall be stored in a zone that is isolated from the main flow path and protected from reentrainment by a benching skirt.
6. For more product information including regulatory acceptances, please visit <https://hydro-int.com/en/products/downstream-defender>

PARTS LIST

ITEM	QTY	SIZE (in)	SIZE (mm)	DESCRIPTION
1	1	72	1800	PRECAST MANHOLE (BY HYDRO VIA PRECASTER)
2	3	24	600	FRAME AND COVER
2B	1	18	450	FRAME AND COVER
3	1	18 (MAX)	450 (MAX)	MAX INLET PIPE (BY OTHERS)
4	1	18 (MAX)	450 (MAX)	MAX OUTLET PIPE (BY OTHERS)
5	1			PIPE COUPLING (BY OTHERS)
6	1			INTERNAL COMPONENTS (PRE-INSTALLED)

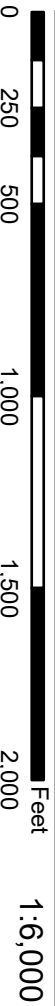
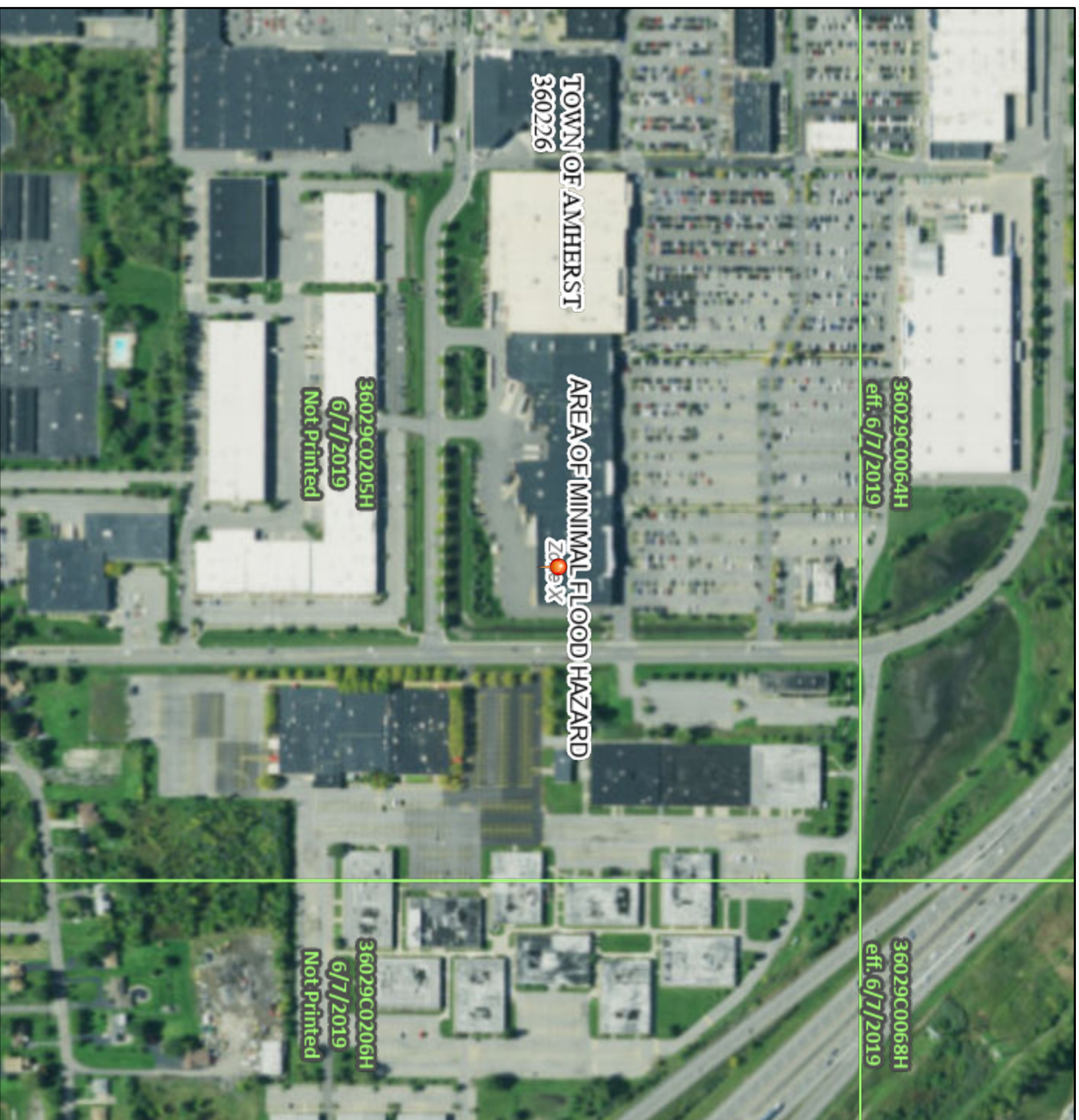
APPENDIX A

FEMA Flood Areas

National Flood Hazard Layer FIRMette



78°49'14"W 43°0'5"N



78°48'37"W 42°59'39"N

Legend

SEE HIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

	Without Base Flood Elevation (BFE) Zone A, V, A99
	With BFE or Depth Zone AE, AO, AH, VE, AR Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee. See Notes. Zone X
	Area with Flood Risk due to Levee Zone D

OTHER AREAS

	NO SCREEN Area of Minimal Flood Hazard Zone X
	Effective LOMRs
	Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES

	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall

OTHER FEATURES

	20.2 Cross Sections with 1% Annual Chance
	17.5 Water Surface Elevation
	Coastal Transect
	Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature

MAP PANELS

	Digital Data Available
	No Digital Data Available
	Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.



This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **11/17/2023 at 9:20 AM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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