Town of Brownsburg

Sanitary Sewer Master Plan – 2023

December 22, 2023

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Acronyms and Abbreviations

AACE	Association for the Advancement of Cost Engineering
ADF	Average daily flow
CR	County Road
GIS	Geographic Information System
gpd	Gallons per day
gpm	Gallons per minute
IAC	Indiana Administrative Code
INDOT	Indiana Department of Transportation
LiDAR	Light Detection and Ranging
LS	Lift Station
MGD	Million gallons per day
P	Population
PE	Population Equivalent
Q	Flow rate
SewerGEMS	Sewer Geospatial Engineering Modeling System
SR	State Road
TDH	Total dynamic head
VFD	Variable frequency drive
WWTP	Wastewater Treatment Plant

Executive Summary

This Sanitary Sewer Master Plan – 2023 provides recommendations for the expansion of the Town's sewer system to serve, ultimately, a service area with the following boundaries:

- West boundary: CR 500E
- North boundary: Boone County line
- East boundary: CR 900 E
- South boundary: Irregular line approximated by CR 300 N and CR 350 N

This future service area includes a large area north of Interstate 74 (I-74) that is currently undeveloped. The Town's existing sewer and lift stations have little additional capacity to serve new development north of I-74.

The backbone of the sewer system includes two constructed regional lift stations and three proposed regional lift stations:

- The US 136 Regional Lift Station near US 136 and CR 625 E (Completed 2016)
- The North Regional Lift Station near CR 700 N and Arbor Springs Drive (Completed 2022)
- The Northwest Regional Lift Station near CR 650 E and CR 700 N (10-year plan)
- The Northcentral Regional Lift Station near US 267 and CR 900 N (20-year plan)
- The Southwest Regional Lift Station near CR 600 E and CR 450 N (20-year plan)

The North and Northwest Regional Lift Stations would be tributary to the US 136 Regional Lift Station. Together, the three lift stations and associated sewers and force mains will convey the majority of flow from north of I-74 to the Brownsburg Wastewater Treatment Plant (WWTP) or "West Plant."

The North Regional and US 136 Regional Lift Stations were completed as part of the Sanitary Sewer Master Plan -2012 Update. The 10-year planning horizon would include a Northeast Interceptor along Ronald Reagan Parkway from CR 700 N to the Boone County Line.

The Northwest Regional Lift Station is proposed as part of a 10-year sewer expansion. The Northwest Regional Lift Station and associated sewers will ultimately convey all flow from CR 500 E to White Lick Creek and between I-74 and CR 800 N as part of the 10-year plan. A north-south interceptor is proposed along CR 650 E that will lead to the Northwest Regional Lift Station. Depending on the depth of the CR 650 E Interceptor, it may be possible to retire the Windridge Landing and Bethesda Lift Stations.

A force main will be constructed from the Northwest Regional Lift Station under I-74. The force main will connect to the proposed 48-inch interceptor under along Northfield Drive near Morningside Drive.

The estimated project cost for the 10-year planning horizon is $25.2 million.

The Northwest Interceptor expansion and associated sewers will convey all flow from CR 500 E to White Lick Creek and all flow between CR 700 N and the Boone County line as part of the 20-year plan, including flow from the North Central LS.

The Southwest Regional Lift Station is proposed as part of a 20-year sewer expansion. The Southwest Regional Lift Station and associated sewers will ultimately convey all flow from CR 500 E to White Lick Creek and between CR 500 N and CR 350 N as part of the 20-year plan. A north-south interceptor is proposed along N CR 575 E that will lead to the Southwest Regional Lift Station. An east-west interceptor is proposed along CR 450 N that will

lead to the Southwest Regional Lift Station. It is proposed that a new force main be constructed to connect Summer Ridge West to the Southwest Regional Lift Station.

The estimated project costs for the 20-year planning horizon are $29.1 million.

The estimated project costs for the 10-year and 20-year planning horizon are $54.3 million.

1 Introduction

1.1 Need for Sewer System Improvements

The Town of Brownsburg, Indiana, is situated in the northeast corner of Hendricks County, approximately northwest of downtown Indianapolis. The Town of Brownsburg provides sewer service within the Town limits and some surrounding incorporated areas. Some previously unincorporated areas to which sewers were extended have since been annexed by the Town.

In recent years, eastern Hendricks County, including the area around the Town, has experienced considerable residential and commercial development. With the further extension of sanitary sewers, the areas north of Interstate 74 and along the future north extension of the Ronald Reagan Parkway are expected to experience the most development. Also, INDOT is reviewing the potential to add another cloverleaf exit along Interstate 74 at CR 650 E. If the proposed cloverleaf is constructed, additional infrastructure is assumed to follow quickly behind. The limited capacity of the Town's sewer infrastructure restricts the potential for significant development, especially north of I-74.

This Sanitary Sewer Master Plan – 2023 will evaluate the Town's existing sewer conveyance system and discuss alternatives to meet the Town's growing sewer service needs. The plan will present recommended improvements, expansions, and upgrades to the sewerage system within the Town's proposed future sewer service area.

1.2 Future Wastewater Service Area

This Sanitary Sewer Master Plan – 2023 is based on a long-term (20-year planning horizon) future service area with the following boundaries:

- West boundary: CR 500 E
- North boundary: Boone County line
- East boundary: CR 900 E
- South boundary: irregular line approximated by CR 300 N and CR 350N

This Sanitary Sewer Master Plan – 2023 also looked at a short-term (10-year planning horizon) service area within the following boundaries:

- West boundary: CR 500 E
- North boundary:
    - Boone County line along Ronald Reagan Parkway.
    - CR 800 N along CR 650 East
- East boundary: CR 900 E
- South boundary:
    - East of White Lick Creek, approximated by CR 300 N
    - West of White Lick Creek, approximated by CR 500 N

The short-term (10-year) service area was based on discussions with the Town of Brownsburg and the 2022 Recreation Zone Improvement Plan completed by Lehman and Lehman, Inc.

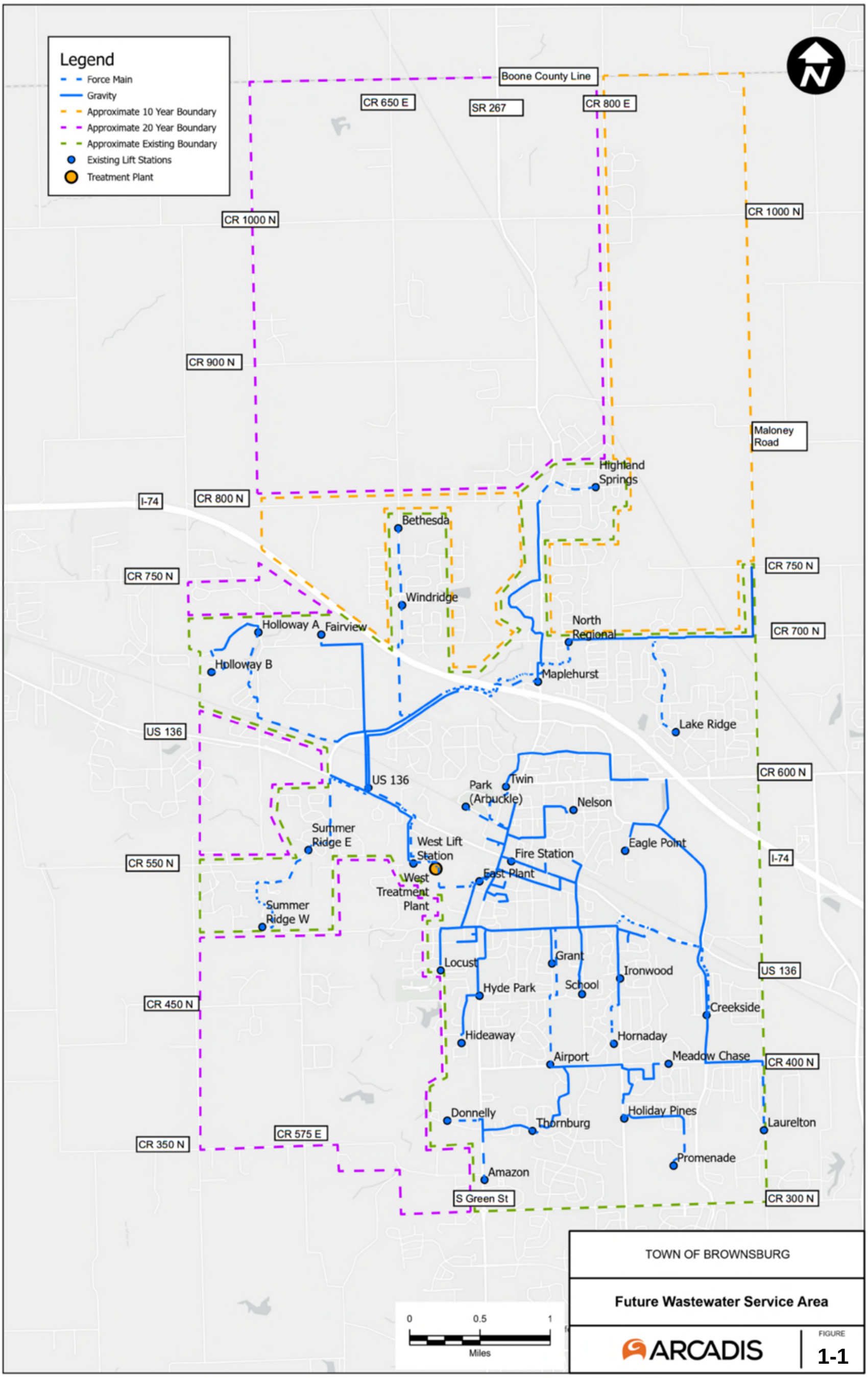


Figure 1-1 Future Wastewater Service Area Boundaries

2 Existing Collection System Conditions

2.1 Existing Conveyance System Overview

The Town's sewerage system includes both combined and separate sanitary sewers. The older, central portion of the Town is served by combined sewers. Two combined trunk sewers – North and South Trunk Sewers, convey wastewater and, during rains, stormwater runoff to the East Plant Pump Station. **Figure 2-1** and **Figure 2-2** shows the existing collection system based on connectivity of lift stations, including sanitary sewers, combined sewers, and pump stations. These figures also show the existing wastewater treatment plant.

The North Trunk Sewer runs north on Green Street and receives flows from combined branch sewers and, on the north end, from separate sanitary sewers and force mains. Its diameter is 12-inches at Northgren Parkway and proceeds south on Green Street, increasing to 24-inches north of US 136 for a short segment before increasing to 42-inches north of College Avenue.

The South Trunk Sewer runs south on Acre Avenue, then east on Tilden Road. Its diameter is 27-inches at Grant Street, increases to 42-inches at Jefferson Street, and increases to 48-inches at Green Street. It conveys flows from combined branch sewers, separate sanitary sewers, and sanitary force mains.

The Town's newer subdivisions are served by separate sanitary sewers, typically tributary to sanitary lift stations. The force mains from some lift stations discharge to combined sewers leading to the East Plant Pump Station. Other sanitary lift stations discharge to the Northwest Sanitary Sewer leading to the West Plant Lift Station.

Constructed in 1995, the 18-inch Northwest Sanitary Sewer conveys sanitary wastewater to the West Plant Lift Station near the West Plant entrance gate along Mardale Drive. The 18-inch Northwest Sanitary Sewer receives flow from the Summer Ridge Lift Stations, Holloway Lift Stations, Windridge Lift Station, and gravity flow adjacent to the sewer.

Constructed in 2016, the US 136 Regional Lift Station conveys sanitary wastewater to the West Plant Screen Building near the West Plant entrance gate along Mardale Drive. The US 136 Regional Lift Station receives flow from the North Regional Lift Station and Maplehurst Lift Station and gravity flow adjacent to the sewer.

Constructed in 2022, the North Regional Sanitary Sewer Lift Station conveys sanitary wastewater to the US 136 Sanitary Sewer Lift Station. As part of the North Regional lift station project, flow from Lake Ridge Lift Station was rerouted to discharge to the new regional lift station. This was intended to remove flow at Twin Street Lift Station, which pumps into the combined sewer system.

2.2 Existing Neighborhoods

Figure 2-3 shows neighborhoods that are greater than 90% built out in green, less than 90% built in yellow, and unserviced neighborhoods in red. The figure shows that future expansion will be north of I-74 and in the southwest corner of the service area.

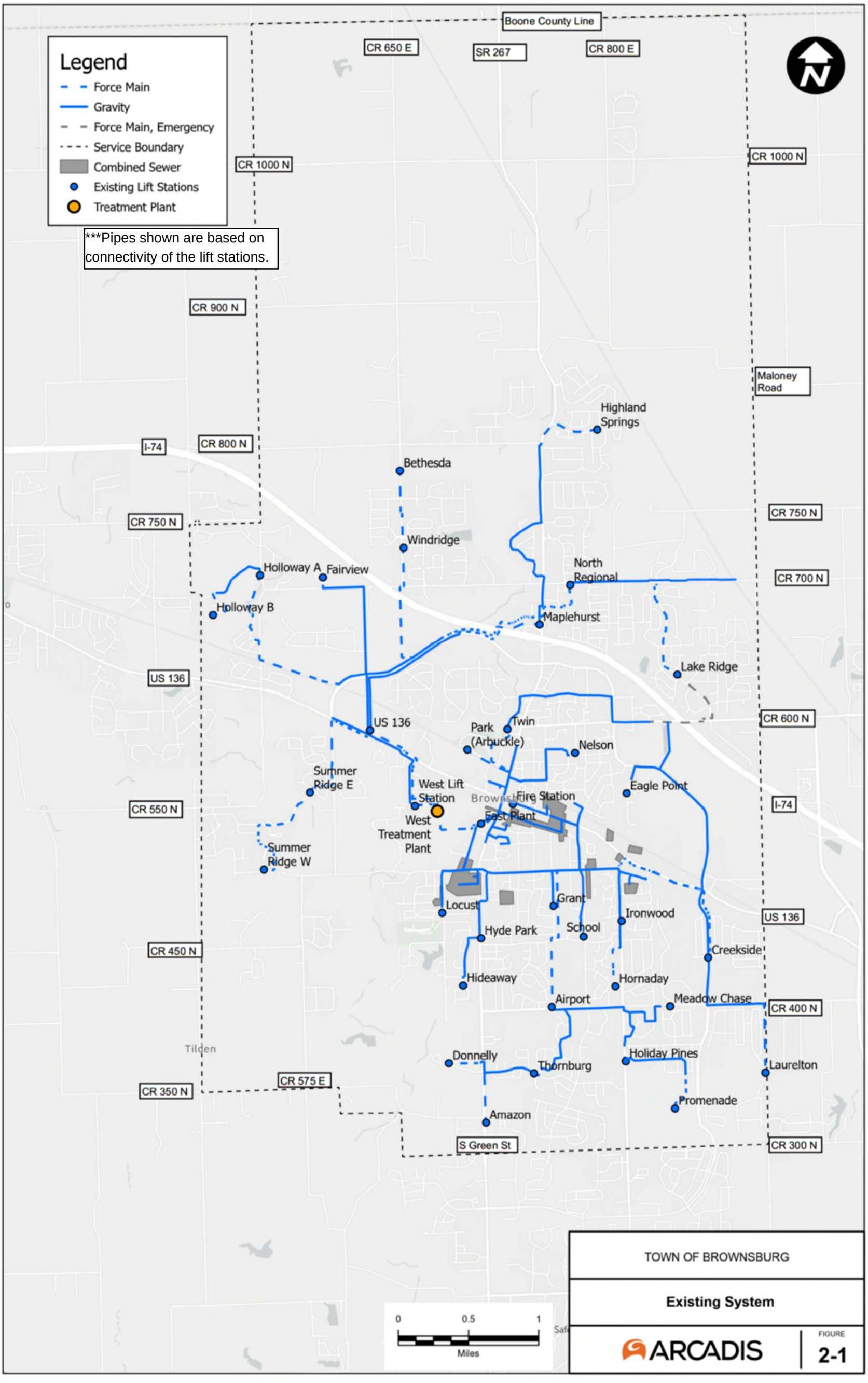


Figure 2-1 Existing System Map Overview

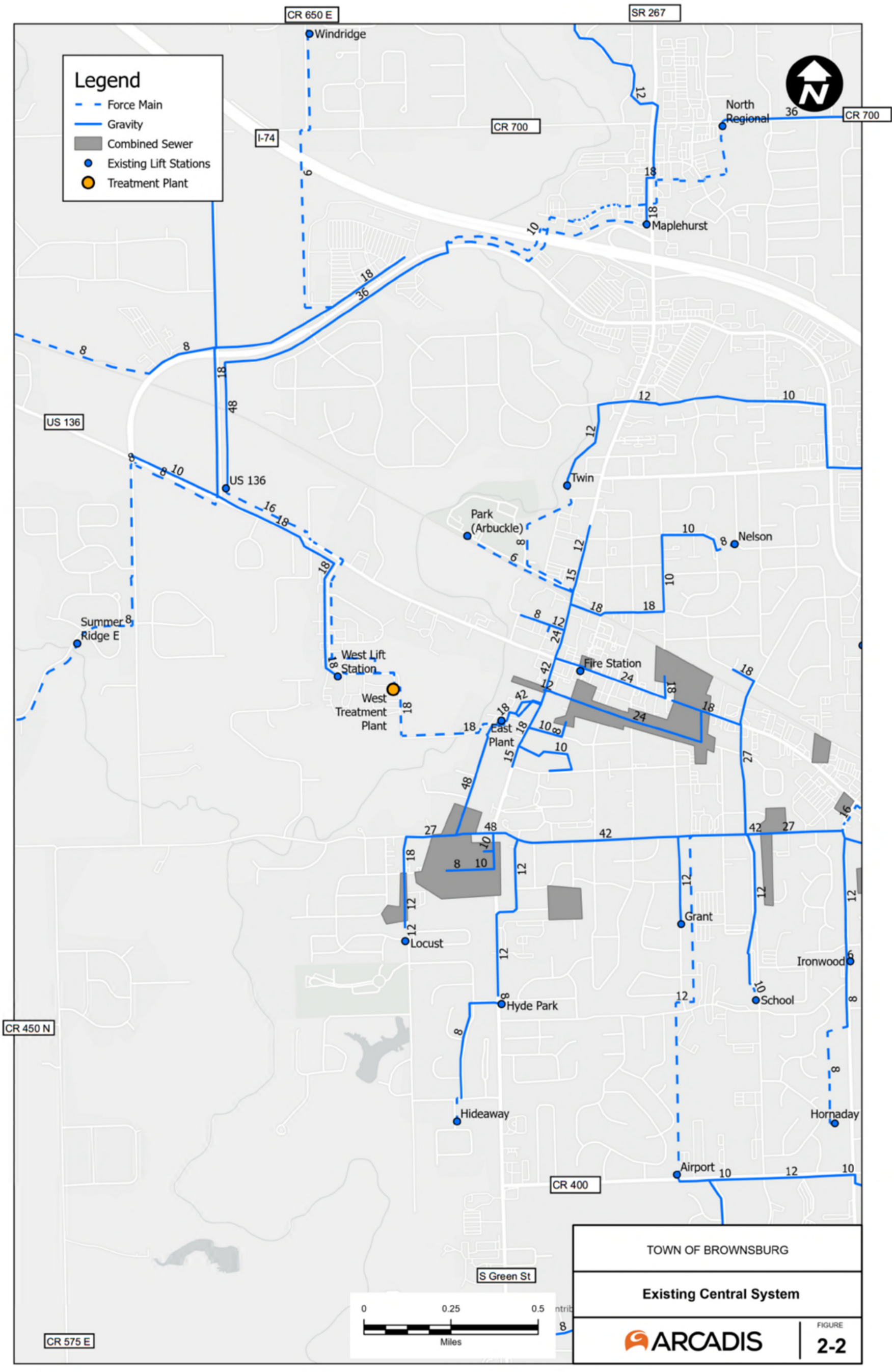


Figure 2-2 Existing Central System Map (Zoomed) Overview

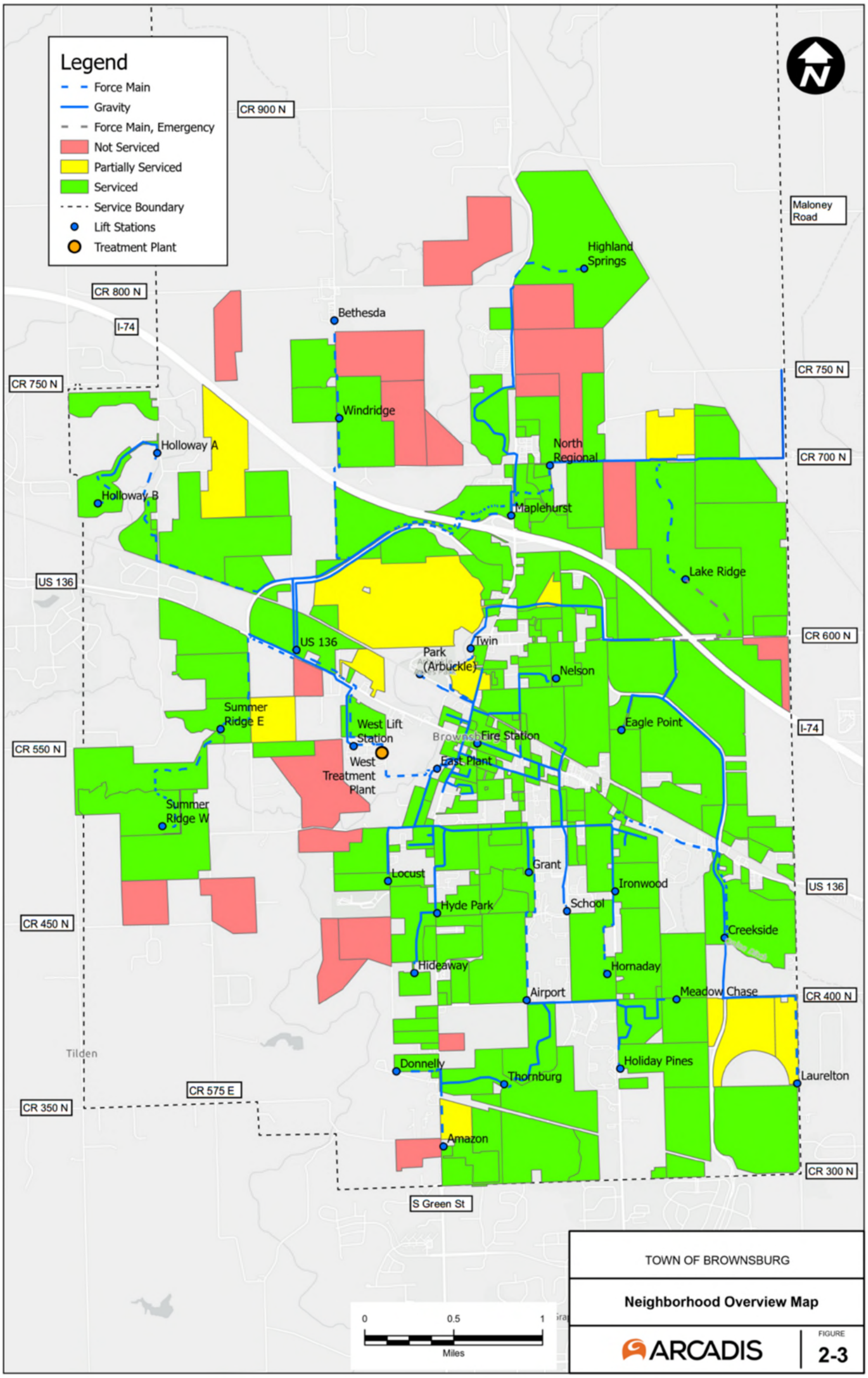


Figure 2-3 Neighborhood Overview Map

2.3 Existing System Items

The Town of Brownsburg currently has 35 lift stations in its system. Minimizing and eliminating lift stations in the future is preferred to help reduce operations and maintenance concerns. During workshops, the Town of Brownsburg indicated areas of improvement for the existing system. These items are summarized in **Figure 2-4** and expanded in more detail below.

- General Item
  - Each lift station should have a backup pumping plan.
- Airport Lift Station
  - No known issues or concerns
- Amazon Lift Station
  - Development to increase the existing lift station capacity to meet the new demand.
  - The Town has indicated that based on pump draw down tests, the Amazon lift station does not meet the rated design capacity. The Amazon LS tested at 90 gpm instead of its design rated capacity of 260 gpm.
  - Amazon Lift Station is also overwhelmed when the La Cabreah Neighborhood dewaters their neighborhood pool, causing issues with the system.
- Park Lift Station (Arbuckle)
  - Replace existing panel and pumps. Pumps should be converted to removable submersible pumps.
- Bethesda Lift Station
  - No known issues or concerns
- Creekside Lift Station
  - The existing lift station has a large wet well with the ability to upsize the existing pumps. The station currently has an 8-inch and 16-inch force main installed, with the 8” force main currently being used. Once the station’s capacity is increased above 940 gpm, which equates to a velocity of approximately 6 ft/sec, the larger force main should be evaluated. The station is currently at 470 gpm.
- Donnelly Lift Station
  - No known issues or concerns
- Eagle Point Lift Station
  - No known issues or concerns
- Fairview Lift Station
  - No known issues or concerns
- Fire Station Lift Station
  - No known issues or concerns
- Grant Lift Station
  - No known issues or concerns
- Hideaway Lift Station
  - No known issues or concerns
- Highland Springs
  - No known issues or concerns
- Holiday Pines Lift Station

    - Holiday Pines Lift Station was built with the intention of increasing the capacity of the station in the future.
- Holloway A & B Lift Stations
    - Water Plant #2 desires the ability to backwash its filters to the existing collection system. Backwash of filters would occur once per week, and the anticipated flow from the backwash process is 100,000 gallons per 4 hours or approximately 420 gpm, which would exceed the capacity of the existing 8" gravity sewers.
- Hornaday Lift Station
    - Remove Dry Pit Station due to increased and challenging maintenance. Provide quick connect for backup pumping.
- Hyde Park Lift Station
    - Remove Dry Pit Station due to increased and challenging maintenance. Provide quick connect for backup pumping.
- Ironwood Lift Station
    - No known issues or concerns
- Lake Ridge Lift Station
    - No known issues or concerns
- Laurelton Lift Station
    - No known issues or concerns
- Locust Lift Station
    - Remove Dry Pit Station due to increased and challenging maintenance. Provide quick connect for backup pumping.
- Maplehurst Lift Station
    - No additional flow should be added to the existing station since the station is at capacity.
- Meadow Chase Lift Station
    - Evaluate the potential to eliminate
- Nelson Lift Station
    - Evaluate the potential to eliminate
- North Regional Lift Station
    - Currently, there are two pumps installed with a firm capacity of 2,500 gpm. When the Northeast Interceptor is complete, the station should add a third pump to increase the firm capacity to 3,500 gpm. The lift station only has a 16-inch force main, so getting additional capacity in the future is limited without additional force main work.
- Promenade Lift Station
    - No known issues or concerns
- School Lift Station
    - Remove Dry Pit Station due to increased and challenging maintenance. Provide quick connect for backup pumping.
- Summer Ridge East Lift Station
    - No additional flow should be added to the existing station since the station is at capacity.
    - Wet Weather Capacity Concerns, located close to the creek.
    - The Summer Ridge East Lift Station is undersized. To increase the capacity of the station the pump impellers should be changed to maximize the capacity of the station.
    - Odor Concern

- Summer Ridge West Lift Station
    - The Summer Ridge West Lift Station was built with the intention to be able to upsize the station in the future. The issue is that the Summer Ridge West Lift Station pumps to the undersized Summer Ridge East Lift Station. When there is no longer a bottleneck in the system, the Summer Ridge West Lift Station capacity should be evaluated.
    - If the force main is upsized or rerouted, review Summer Ridge Pool Grinder Pump Station, which is tied directly to the force main.
- Thornburg Lift Station
    - Additional development is happening around Thornburg Lift Station. For the station to handle the additional flow, the developer is upsizing the existing lift station.
- Twin Street Lift Station
    - Twin Street Lift Station and gravity flow getting to Twin Street Lift Station are known bottlenecks in the system. Look for ways to reroute flow away from Twin Lift Station.
    - Creek influence issue
    - Odor Concern
- West Lift Station
    - Based on existing pumping rates, the station can convey additional flow through the existing 8-inch force main into the West Wastewater Treatment Plant. The pumps can be upgraded when additional capacity is needed for the station.
    - The West Lift Station should have upgrades to the Control Panels and level control sensors.
- Windridge Lift Station
    - Wet weather issues.
- US-136 Regional Lift Station
    - The lift station currently has 3 pumps installed with two force mains. There is space in the station for another pump. Once the Northeast Interceptor is fully constructed and additional flow is being pumped from the North Regional Lift Station, the US-136 Lift Station should install the 4th pump and use both force mains to convey flow to the West Screens Building.
    - As the US-136 pump station gets updated to handle additional flows, VFDs should be added to the pumps to send a consistent sanitary sewer flow to the West Wastewater Treatment Plant.
    - Odor Concern

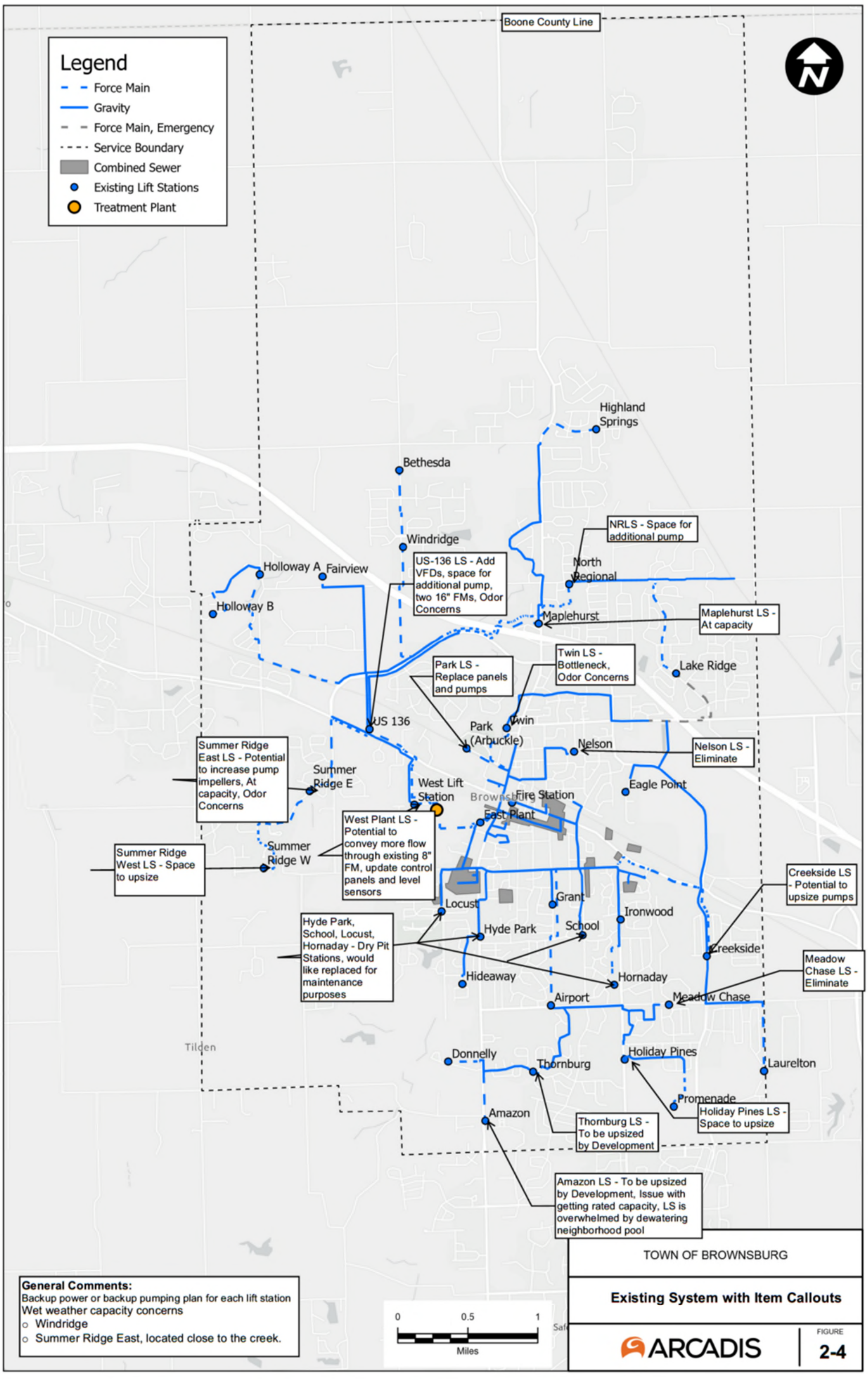


Figure 2-4 Existing System with Item Callouts

3 Flow Projections and Existing Collection System Analysis

3.1 Collection System Flow Projections

Flows were estimated assuming full build-out of the available land. To assist with future flow estimations, the Recreation Zone Improvement Plan from the Town of Brownsburg was consulted (included in **Appendix B**). To assist with flow projections, various sub-areas and area designations are assigned, as shown in **Figure 3-1**. The land use will be predominately single family detached residential development. The plan also projects single family attached, multi-family, industrial, mixed use residential, and planned development. It is expected that 75 percent of development will occur throughout the Town of Brownsburg. See **Table 3-1** for a summary of each zone type and its corresponding units per acre assumed per the Parks Study. The units per acre assumptions are determined based on minimum lot size. The multiple family zone types of units per acre assumption were determined by the number of lots in an acre, multiplied by a factor of 8 for medium density.

For special zone types such as heavy industrial, industrial, and planned development, a flow per gross acre constant was assumed, as shown in **Table 3-2**. These constants were based on IAC 327 with an assumed number of employees per acre as detailed below:

- Heavy Industrial: 60 employees per acre of Office Building / Factory without showers (20 gal/day per employee).
- Industrial: 40 employees per acre of Office Building / Factory without showers.
- Planned Development: 40 employees per acre of Office Building without showers.

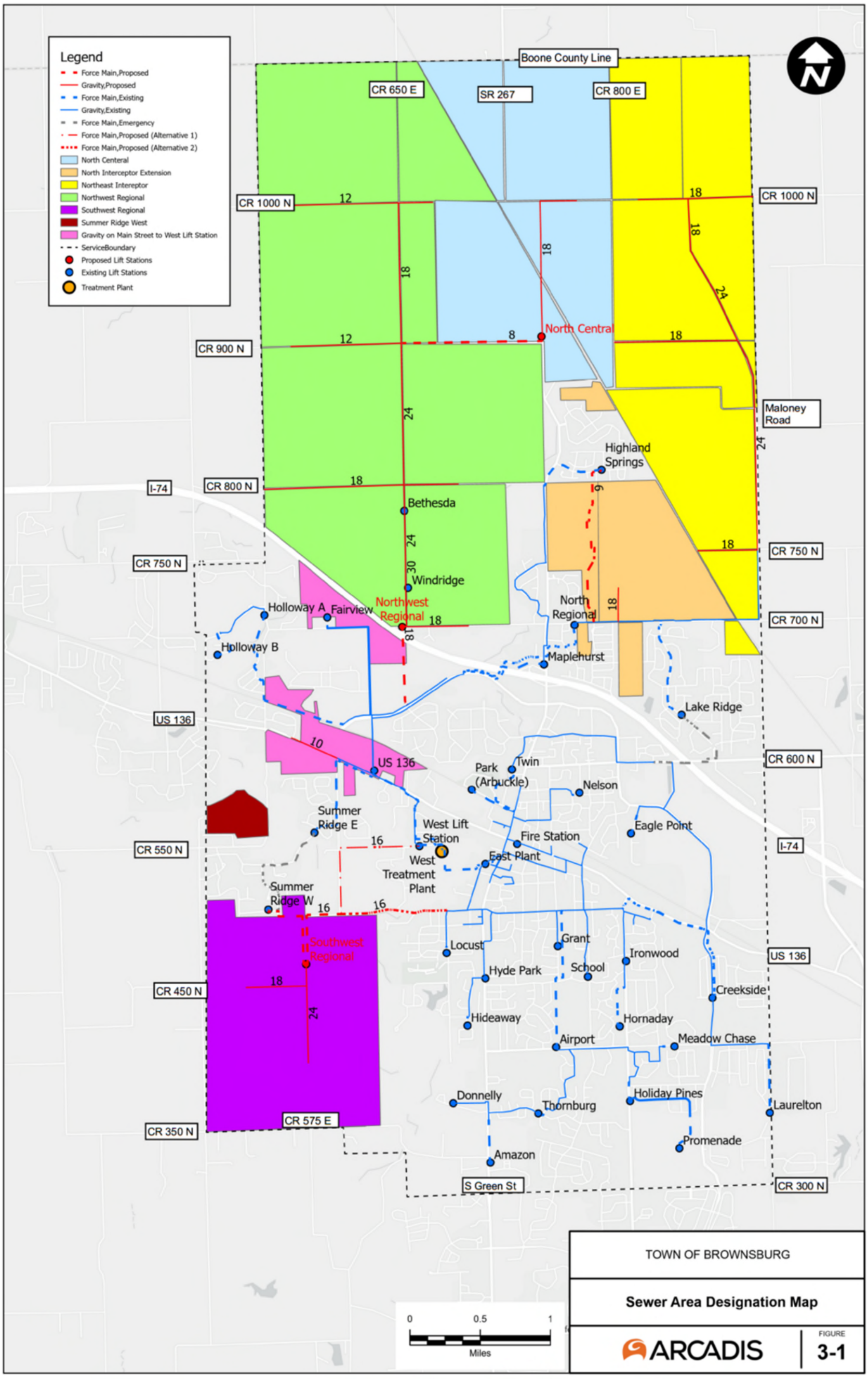


Figure 3-1 Sewer Area Designation Map

Table 3-1 Assumed Units per Acre for flow estimation of each zone type identified. (See Land Map in Appendix B)

Units per Acre Assumptions for Each Zone Type				
Zone Type	**Units / Acre Assumption**	**Min. Lot Size (SF)**	**Percentage of Developable Area (%)**	**Flow per Acre Assumption (gpd/acre)**
Residential Estate (**RE**)	0.67	65,300	75%	155
Low Density Single Family (**R-1**)	2.18	20,000	75%	506
Medium Density Single Family (**R-2**)	3.48	12,500	75%	810
High Density Single Family (**R-3**)	4.84	9,000	75%	1,125
Traditional Residential (**TR**)	9.90	4,500	75%	2,302
Medium Density Multiple Family (**M-2**)	10.69	32,600	75%	2,485

Table 3-2 Assumed Flow per Acre for flow estimation of each zone type identified.

Flow per Acre Assumptions for Special Zone Types	
Zone Type	**Flow per Acre Assumption (gpd/acre)**
Heavy Industrial (**HI**)	1,200
Industrial (I)	800
Planned Development (PD)	800

The average sewer flow is estimated based on 310 gallons per day per single family residence in accordance with IAC 327. The peak hourly sewer flows for the service areas were projected by multiplying the average flows by a peaking factor calculated as follows:

$$Peaking\ Factor: \frac{Q\ Peak\ Hourly}{Q\ Design\ Average} = \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$$

Where: Q = flow rate (MGD), P = Populations in thousands.

The population equivalent was assumed to be 124 gallons per day per person, as determined by the equation below.

$$Population\ Equivalent: \frac{Average\ Sewer\ Flow * Planning\ Safety\ Factor}{Census\ Persons\ per\ Household\ (2016-2020)} = \frac{310\frac{gpd}{home} * 1.15}{2.88\frac{persons}{home}} = 124 gpd/person$$

Gravity sewers were sized at a depth of flow to diameter ratio of 80% of the peak flow using Manning's equation. Typically, gravity sewers were at minimum slope to convey flow at a velocity of 2-2.5 feet per second (fps). The minimum diameter considered for gravity sewers was 12 inch. Force mains were sized to convey no more than 6 fps. Recommended pump station capacities are equal to the peak inflows.

3.2 Lift Stations

Table 3-3 lists the Town's lift stations with rated capacities. An analysis was performed based on available pump run times from January 2023 through mid-November 2023 to identify each station's average daily flow (ADF). Using the ADF, a population was generated assuming 124 gallons per day per person. The population was then utilized to identify a peaking factor for the lift station.

This analysis assumes the lift station is pumping at its design rated capacity. Most of the lift stations have a firm capacity of one of the installed two pumps running as designed. The US Highway 136 lift station contains three pumps; therefore, its firm capacity is based on two pumps running as designed. The Town has indicated that based on pump draw down tests, some stations are not meeting the rated design capacity, most notably the Amazon Lift Station. The Amazon LS tested at 90 gpm instead of its design rated capacity of 260 gpm, as indicated in the table.

Table 3-3 Existing Lift Station Capacities

Lift Station Name	Rated Capacity /Pump	LS Firm Capacity	ADF	Population	Peaking Factor	Current Avg	Current Peak	Available Capacity
	gpm	gpm	gpd			gpm	gpm	gpm
Airport Road LS	950	950	355,038	2863	3.5	246.6	853.0	97.0
Amazon LS	260	260	34,799	281	4.1	24.2	98.9	161.1
Arbuckle / Park LS	700	700						
Bethesda LS	200	200	2,743	22	4.4	1.9	8.3	191.7
Creekside LS*	545	545	183,457	1479	3.7	127.4	469.3	75.7
Donnely Heights LS	80	80	3,872	31	4.4	2.7	11.7	68.3
Eagle Point Park LS	80	80	9,766	79	4.3	6.8	29.0	51.0
Fire Station LS	120	120						
Grant LS	35	35						
Hideaway LS	91	91	6,671	54	4.3	4.6	20.0	71.3
Highland Springs LS	267	267	96,556	779	3.9	67.1	259.3	none
Holiday Pines LS	180	180	27,404	221	4.1	19.0	78.6	101.4
Holloway Hills A LS	222	222	31,154	251	4.1	21.6	88.9	133.1
Holloway Hills B LS	90	90	6,189	50	4.3	4.3	18.5	71.5
Hornaday Road LS	100	100	10,954	88	4.3	7.6	32.4	67.6
Hyde Park LS	250	250	38,139	308	4.1	26.5	107.9	142.1
Ironwood LS	100	100	13,107	106	4.2	9.1	38.6	61.4
Lake Ridge LS*	725	725	205,421	1657	3.6	142.7	520.4	204.6
Laurelton LS	330	330	43,894	354	4.0	30.5	123.4	206.6
Locust Lane LS	100	100	12,225	99	4.2	8.5	36.0	64.0
Maplehurst LS	700	700	367,246	2962	3.4	255.0	879.1	none
Meadow Chase LS	180	180	9,165	74	4.3	6.4	27.2	152.8
Nelson Drive LS	210	210	15,862	128	4.2	11.0	46.4	163.6
North Regional LS*	2500	2500	66,954	540	4.0	46.5	184.0	2316.0
School Street LS	150	150	17,349	140	4.2	12.0	50.6	99.4
Summer Ridge East LS	313	313	108,182	872	3.8	75.1	288.3	24.7
Summer Ridge West LS	400	400	39,358	317	4.1	27.3	111.2	288.8
Thornburg LS	191	191	37,910	306	4.1	26.3	107.3	83.7
Twin Street LS*	1200	1200	236,952	1911	3.6	164.5	592.6	607.4
US Highway 136 LS*	1460	2000	552,682	4457	3.3	383.8	1263.1	736.9
Windridge Landing LS	262	262	57,251	462	4.0	39.8	158.7	103.3

**Pump data used from August 2023 to November 2023 after the North Regional Lift Station start-up*

Based on this analysis, majority of the Town's lift stations appear to have capacity to receive additional flow. Three lift stations are known to need upgrade or expansion: Maplehurst LS, Highland Springs LS, and Summer Ridge East LS. The Summer Ridge East LS shows a small amount of remaining capacity but should be reviewed. With the startup of the North Regional Pump Station in August of 2023 and the removal of the Cadence LS, available flow capacity at Creekside LS, Lake Ridge LS, and Twin Street LS increased. North Regional Pump Station sends additional flow to the US 136 Pump Station. The data for these four stations included in the table above is only for the months following the start-up of the North Regional Lift Station. These needs will be addressed by the recommended improvements.

3.3 Unserviced Neighborhoods

Table 3-4 lists proposed solutions for the Town's neighborhoods where at least one resident has requested a connection to the sanitary sewer system due to a failing or failed septic system. Many of these neighborhoods are on septic due to the location and depth of existing utilities. A solution for the entire neighborhood should be found rather than solutions for individual homes. This need will be addressed by the recommended neighborhood improvement and proposed discharge location for the neighborhood. However, the Town can provide a discharge location for the neighborhood, but the neighborhood will need to vote to make the connections and pay for the local infrastructure. It is assumed that a low pressure system would be required for the unserviced neighborhoods to connect to the existing system, but a gravity system should be reviewed prior to design.

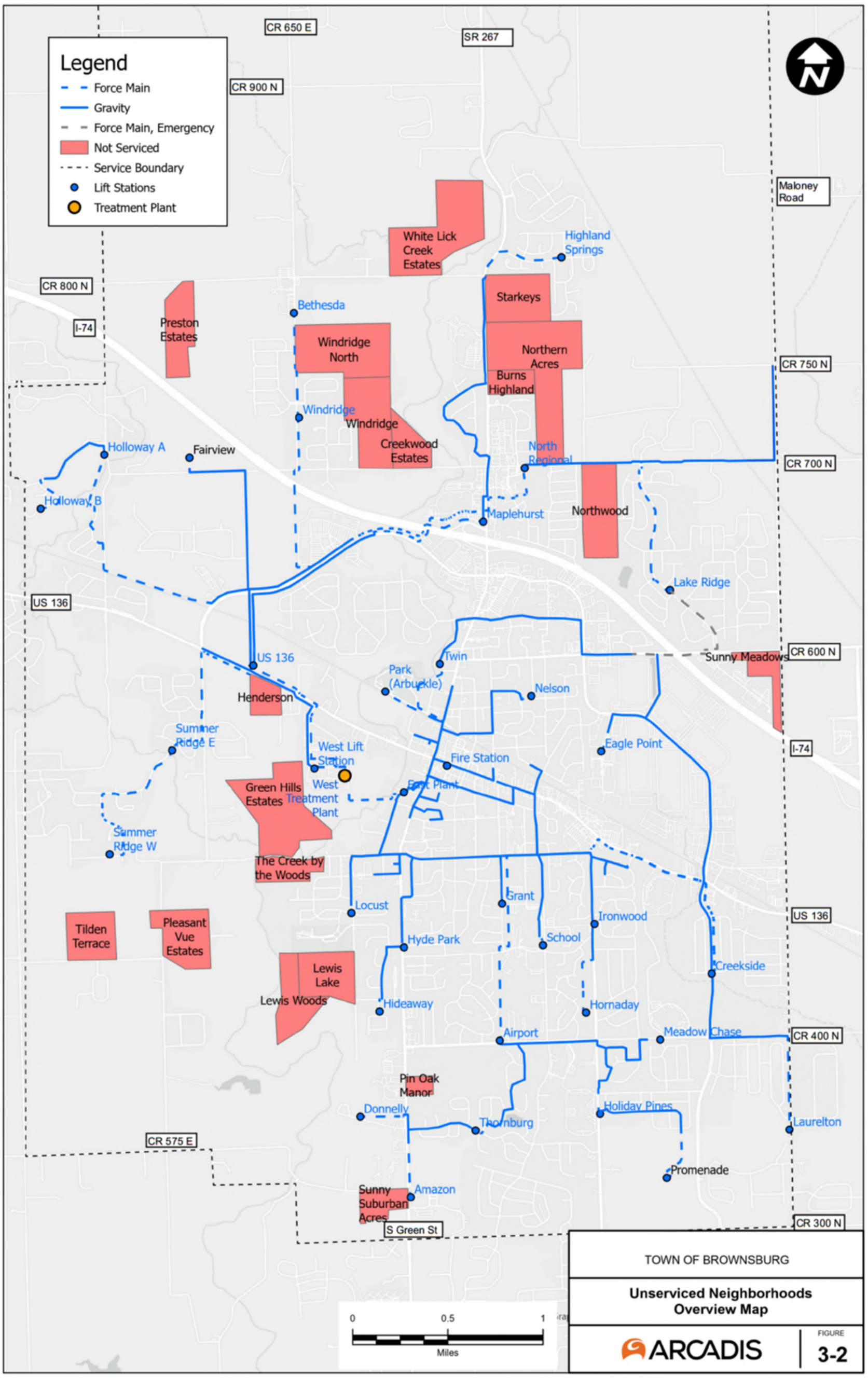


Figure 3-2 Unserviced Neighborhoods Overview Map

Table 3-4 Unserviced Neighborhoods Potential Service Plan

Unserviced Neighborhood	Average Flow (gpm)	Peak Flow (gpm)	Conveyance Method	Impacted Lift Station No. 1	Impacted Lift Station No. 2	Impacted Lift Station No. 3
Sunny Suburban Acres	10.7	43	Low Pressure System	Amazon	Thornburg	Airport
Pinoak Manor	4.8	19	Low Pressure System	Airport		
Lewis Woods	17.5	70	Low Pressure System	Hyde Park		
Lewis Lake -West	8.4	34	Low Pressure System	Hyde Park		
Lewis Lake -East	4.7	19	Low Pressure System	Hyde Park		
Pleasant Vue Estates	26.5	106	Low Pressure System	Summer Ridge West	Summer Ridge East	
Tilden Terrace	19.4	78	Low Pressure System	Summer Ridge West	Summer Ridge East	
The Creek by the Woods	11.8	47	Low Pressure System	East Plant LS		
Green Hills Estates	27.3	109	Low Pressure System	West Plant LS		
Henderson	11	44	Low Pressure System	West Plant LS		
Sunny Meadows	2.4	10	Low Pressure System	Lake Ridge	North Regional	US 136
Northwood	14.1	56	Low Pressure System	North Regional	US 136	
Creekwood Estates	8.4	34	Low Pressure System	New NW LS	US 136	
Windridge	40.5	162	Low Pressure System	New NW LS	US 136	
Windridge North	45	180	Low Pressure System	New NW LS	US 136	
Preston Estates	24.2	97	Low Pressure System	New NW LS	US 136	
Starkeys	14.5	58	Low Pressure System	North Regional	US 136	
Northern Acres	26.8	107	Low Pressure System	North Regional	US 136	
Burns Highland	5.2	21	Low Pressure System	North Regional	US 136	
White Lick Creek Estates	51.4	205	Low Pressure System	Bethesda	Windridge	US 136

4 Model Development

A steady state hydraulic model was developed for the Town of Brownsburg's Lift Stations and Trunk sewer system using the SewerGEMS modeling platform from Bentley. This static hydraulic model provides the Town with a digital representation of their collection system and can help identify locations of capacity deficiencies. The model was developed using the Town's GIS shapefiles, including available inverts and elevations for the three interceptor sewers and connectivity to the 35 lift stations. The development of the static hydraulic model did not include any flow meter, calibration, or fully dynamic approach. The static model is a first step towards a fully

dynamic model capable of understanding how rainfall impacts sewer capacity, the true capacity of the sewer system, including its inherent storage and ability to attenuate flows, and alternative mitigation approaches.

4.1 Model Build

The static model was built utilizing the Town's shapefiles for Sanitary Lines and Sanitary Structures. Both these shapefiles were reviewed, and a skeleton of the sewer collections system was developed. The available GIS data provided a starting point for the horizontal development of the system and consistently reported pipe diameter for most of the sanitary lines. However, the available data included many gaps in vertical data, including manhole rims, manhole inverts, and pipe inverts. **Figure 4-1** shows the GIS gap review and indicates in red the structures where vertical data was unavailable.

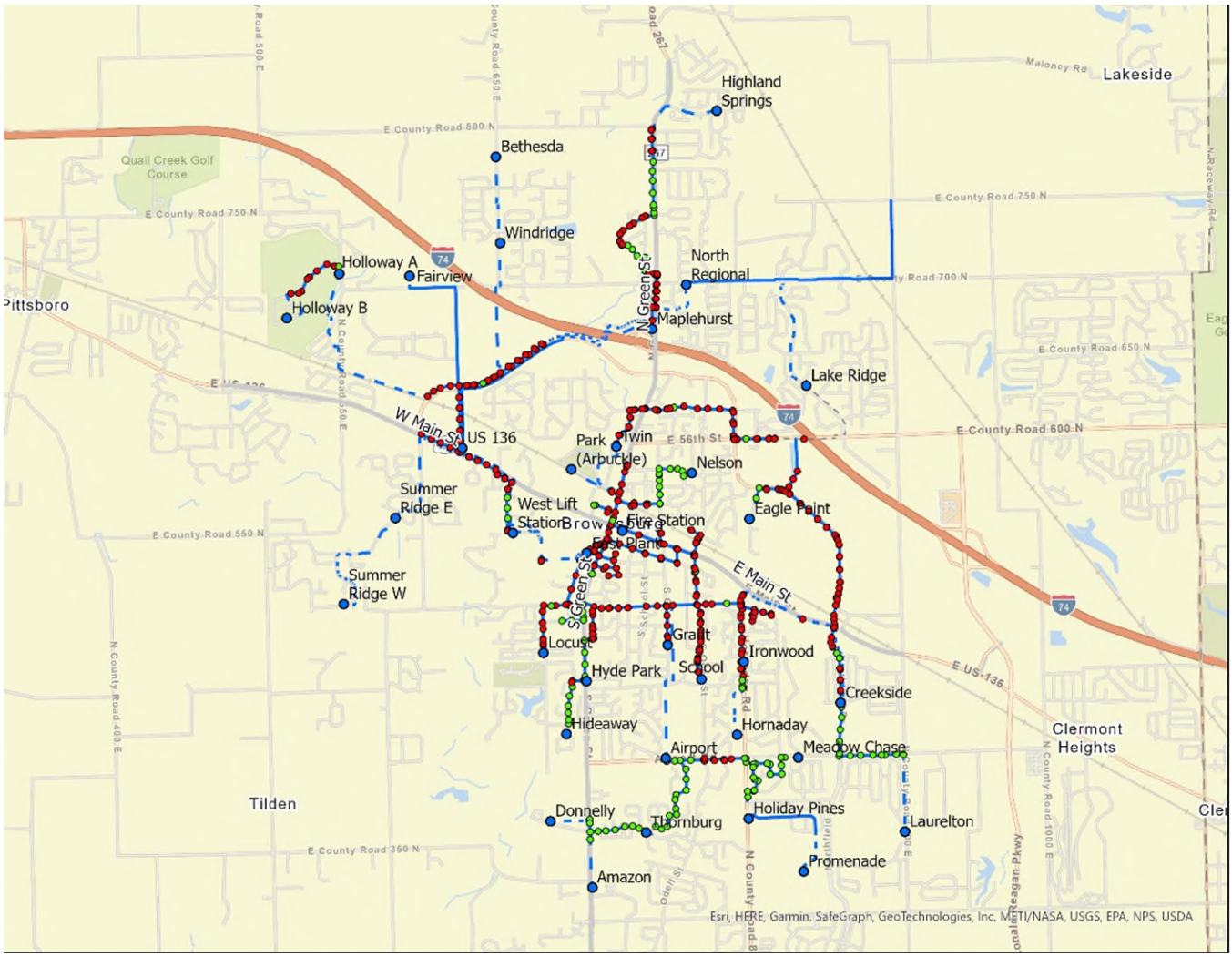


Figure 4-1 GIS Data Gap Review

To complete the sanitary system's representation in the SewerGEMS platform, a combination of LiDAR topographical data available from the State of Indiana, assumptions, and inference tools were used to interpolate the vertical information for the skeleton system in the model system. Assumptions included the interpolation of

upstream and downstream manhole inverts based on minimum slope, minimum depth from ground and to follow the topography.

4.2 Flow Loadings

Once the skeleton model of the sanitary sewer was complete, the lift stations were represented in the model based on their design pumping capacities, and flow loadings were generated for the areas directly tributary to the gravity trunk system. Flow loadings for the existing gravity system were generated based on the flow projection metrics described in Section 3.1 and were input at selected locations within the hydraulic model. **Table 4-1** shows the flow loadings input to select locations within the existing conditions hydraulic model using an average peaking factor of 4.0 as calculated by population.

Table 4-1 Gravity Sewer Loading Points in Existing Conditions

Gravity Sewer Loading Points -Existing Conditions		
GIS Structure Number	**Subdivision / Tributary Area**	**Peak Flow (gpm)**
1036	Sunny Knoll	129
1326	Willow Springs	69
WS-SS-011	Willow Springs	43
CNW-SS-EX	Country Walk	103
1084	Stadium Heights Maple Point	55
1044	Maple Brook Gardens / Gordon Heights	86
1406	Prairie Village	69
1220	Central Area	155
1398	Tilden Road / Acre Avenue	168
1388	Main Street / Town Shopping Center, east of Odell (commercial, 120 acres)	267
1386	Flow Split Main Street west of Odell, east of eastern (commercial, 10 acres)	22
1384	Loading at Main ST. and Grant St. (commercial, 10 acres)	22
1294	Murphy Lane	26
AMS-SS-EX	Austin Meadow / Murphy Meadows.	207
NDT-SS-G3A	Murphy Meadows	164
GUI-SS-004	Green Street By Arbuckle Commons	78
NRG-SS-EX	Northridge to Northfield	65
1078	Northridge to Twin	108
1310	Northridge to Twin	151
1444	Whittington	362
1086	Green Street Village	99
1006	Town of Brownsburg Crossing Apartments 16 units per building	220
1542	Austin Meadows	43
1230	Town of Brownsburg Business Park (commercial, 55 acres)	122

Gravity Sewer Loading Points -Existing Conditions		
GRC-SS-EX1	Town of Brownsburg Square Commercial (commercial, 50 acres)	111
GRC-SS-EX1	Greenridge Communities Apartments Grant Ridge Duplex	96
1072	Whitelick Village / Northfield Commons (commercial, 68 acres)	151
1362	Murphy Meadows	64
1056	Ashwood	43
1176	Gray's Manor	43
1018	Green Acres	17
GUI-SS-001	Town of Brownsburg Meadows Residential Care and nursing home	107
SWI-SS-104	Sering and Wise Southtown Addition	43

The upstream boundaries of the skeleton static model are the lift stations for the system. The static model stops at the lift stations and does not include the small diameter gravity piping tributary to the lift station. Vertical elevations for the lift stations were inferred from LiDAR data. The design total dynamic head (TDH) at each pump station was provided by the Town and were adjusted within the static model to mirror the design rated firm capacity for each lift station. This adjustment was necessary due to insufficient data on the vertical detail of the force main and all the lift stations.

4.3 Model Results

Once the hydraulic model was developed, the static sewer system was evaluated using a pass/fail system. For the static condition analysis, it was assumed that all pump stations would be working at their firm capacity. In most cases, this meant that each station would have one pump running. If the lift station is designed with a firm capacity with two pumps running, then the second pump was turned on to accommodate upstream lift stations. The level of service benchmarks were used to pass /fail system components to identify capacity deficiencies. For this analysis, the level of service benchmarks included:

- Gravity pipes maintain a depth of flow to diameter ratio of < 0.75
- Force mains maintain a velocity of less than 6 ft/s.
- Pump station experiences a peak flow less than or equal to the firm capacity

Figure 4-2 shows the model results for the existing conditions of the sanitary sewer collection system. The figure demonstrates that no capacity deficiencies identified within the gravity sewer trunk system, but that there are potential capacity issues at certain lift stations, including Twin, Summer Ridge East and Thornburg, based on flow surcharging upstream of the lift station.

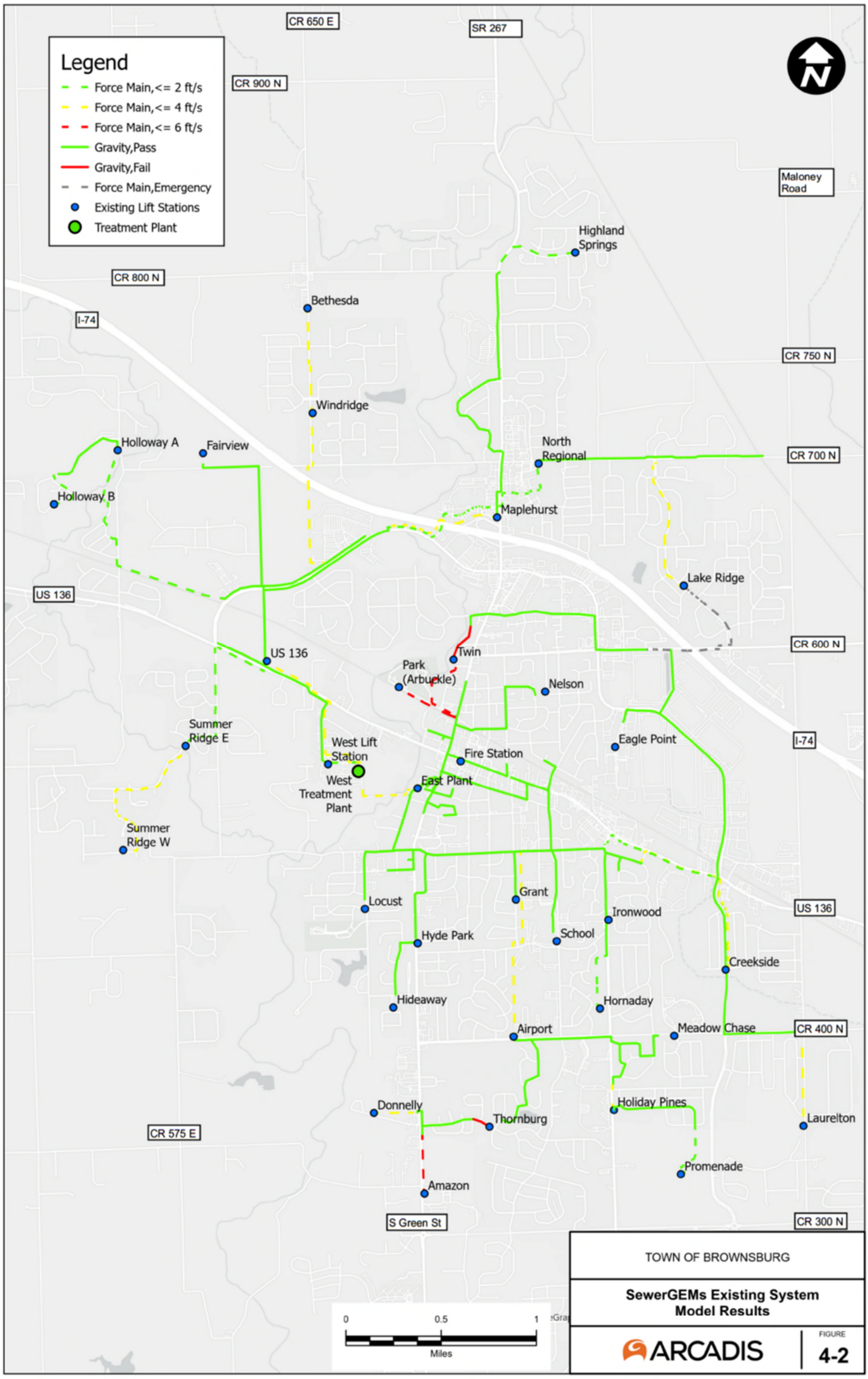


Figure 4-2 SewerGEMs Existing System Model Results

5 Wastewater Treatment Plant Flow Projections

The breakdown of the build-out flow projections for the 10-year and 20-year service areas are included in **Appendix A**. The west plant flow does not include new flow to the east plant.

Table 5-1 Summary of 10-year and 20-year average and peak wastewater flows to the East and West Plants.

Average and Peak Wastewater Flows at 10-year and 20-year Planning Horizons				
	10-year Service Area Flows		20-year Service Area Flows	
	Average (MGD)	Peak (MGD)	Average (MGD)	Peak (MGD)
New Flow to the East Plant	0.2	0.7	0.8	2.6
New Flow to the West Plant	2.8	7.3	3.9	9.6

6 Recommended 10-year Plan

6.1 General

The sewers and lift stations recommended in this section are based on the 10-year planning horizon and the types of intensities of development described in Section 3. Appendices A and B summarize the flow projections used to size the gravity sewers, force mains, and lift stations for the two service area options.

The topography and natural watersheds were considered to determine the locations of sewers and lift stations. The locations of lift stations and sewers are preliminary. These locations will be refined during preliminary design based on the success of land acquisitions, right-of-way availability, studies, and other investigations. Regional lift stations were recommended rather than constructing multiple smaller local lift stations. **Figure 6-1** shows the proposed new 10-year conveyance system facilities.

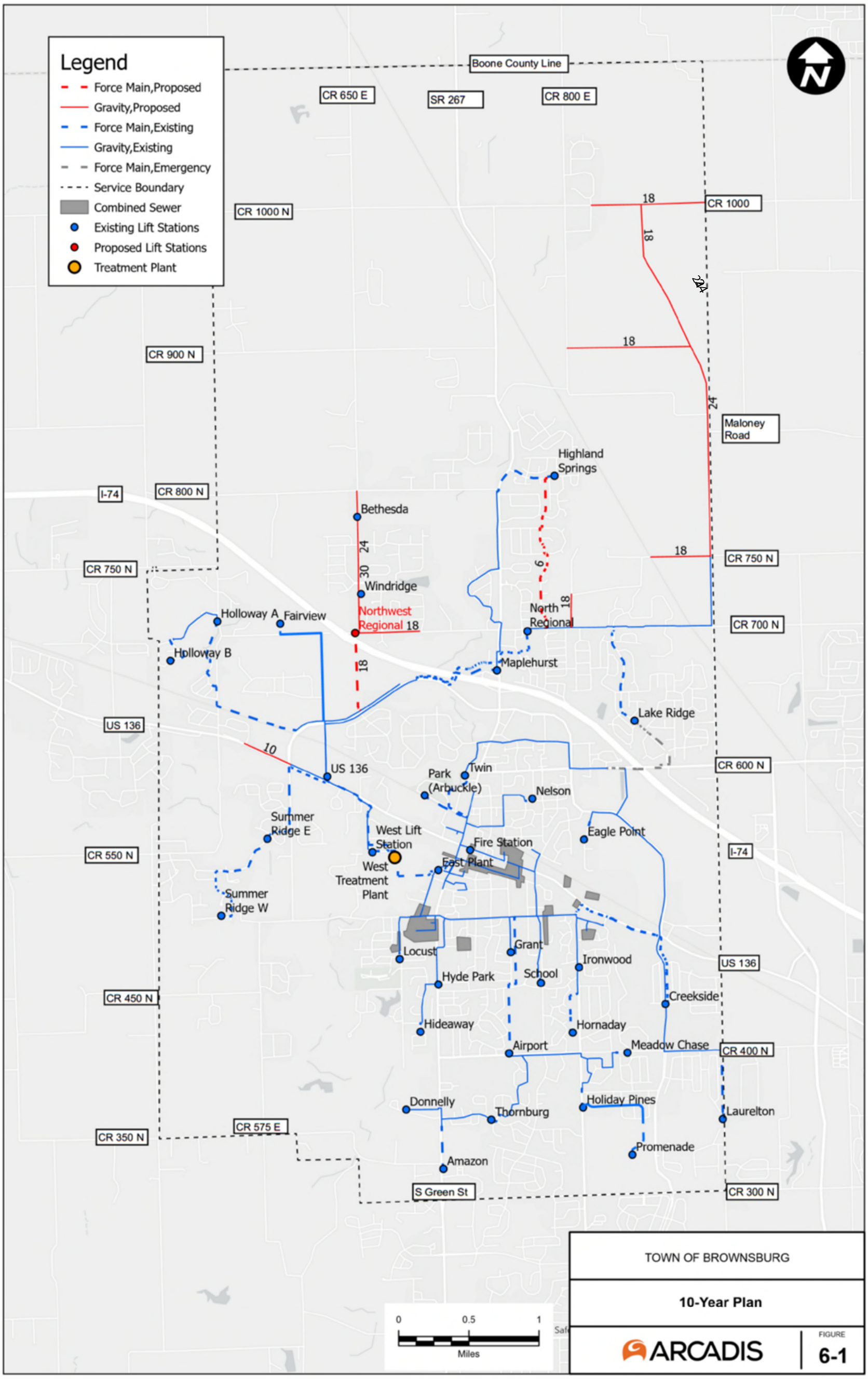


Figure 6-1 10-year Map Overview

6.2 Descriptions of Improvements

This plan proposes that the area north of I-74 along Ronald Reagan Parkway be served by the North Regional Lift Station. This plan proposes that the area north of I-74 along CR 650 E be served by the Northwest Regional Lift Station. The combined flows from these two lift stations will discharge into an interceptor sewer along Northfield Drive that will lead to a third regional lift station, the US 136 Regional Lift Station.

6.2.1 North Regional Lift Station and Associated Sewers

The North Regional Lift Station is located near CR 700 N and Arbor Springs Drive, west of Janean Drive. When construction of the North Regional Lift Station was completed, Lake Ridge Lift Station was redirected to this new regional lift station. This provided some relief to the Town's combined sewers by directing sanitary flow to the North Regional Lift Station and force main. This also relieves the Twin Street Lift Station that received flow from Lake Ridge. The Lake Ridge Lift Station force main was kept in place and can still be pumped to the Creekside Lift Station or Twin Lift Station in case of emergency.

A 36-inch interceptor sewer – the Northeast Interceptor – was constructed along CR 700 N from CR 900 E to Arbor Springs Drive, connecting to the North Regional Lift Station. The future north leg of the Northeast Interceptor north of CR 700 N will parallel the future extension of the Ronald Reagan Parkway from CR 700 N to the Boone County line. It is proposed that the north leg of the Northeast Interceptor be constructed concurrently with future north segments of the parkway. The Northeast Interceptor is proposed to capture flow west of CR 900 E and east of the railroad tracks on the south and east of White Lick Creek on the north.

An 18-inch sewer is proposed to be constructed along N CR 800 E and CR 725 N to capture flow west of the railroad tracks. There is an 18-inch sewer stub at the intersection of CR 700 N and N CR 800 E.

A force main is proposed to be constructed along Janean Drive to reroute flow from Highlands Spring LS to the North Regional LS as growth happens around Highland Springs. Currently, Highland Springs LS pumps to Maplehurst lift station which is at capacity.

The North Regional Lift Station has a 16-inch force main. The force main crosses under I-74 and White Lick Creek and discharges into a receiving manhole along West Northfield Drive.

A 36-inch gravity sewer was constructed parallel to Northfield Drive to Morningside Drive. At Morningside Drive, the interceptor diameter increased to 48-inches. The 48-inch interceptor continues along Northfield Drive to CR 625 E, heads south, and discharges into the US-136 Regional Lift Station on the northwest corner of CR 625 E and US-136. US-136 Regional Lift Station pumps into a 16-inch force main that parallels US-136 and then heads south along Mardale Drive to the wastewater treatment plant. US-136 Regional Lift Station has a second 16-inch force main parallel the original force main that should be used when the station capacity needs to be increased.

The proposed Northeast Interceptor expansion and associated sewers are part of the 10-year sewer expansion plan. See **Figure 6-2** below for approximate sizing and a flow diagram of the Northeast Interceptor.

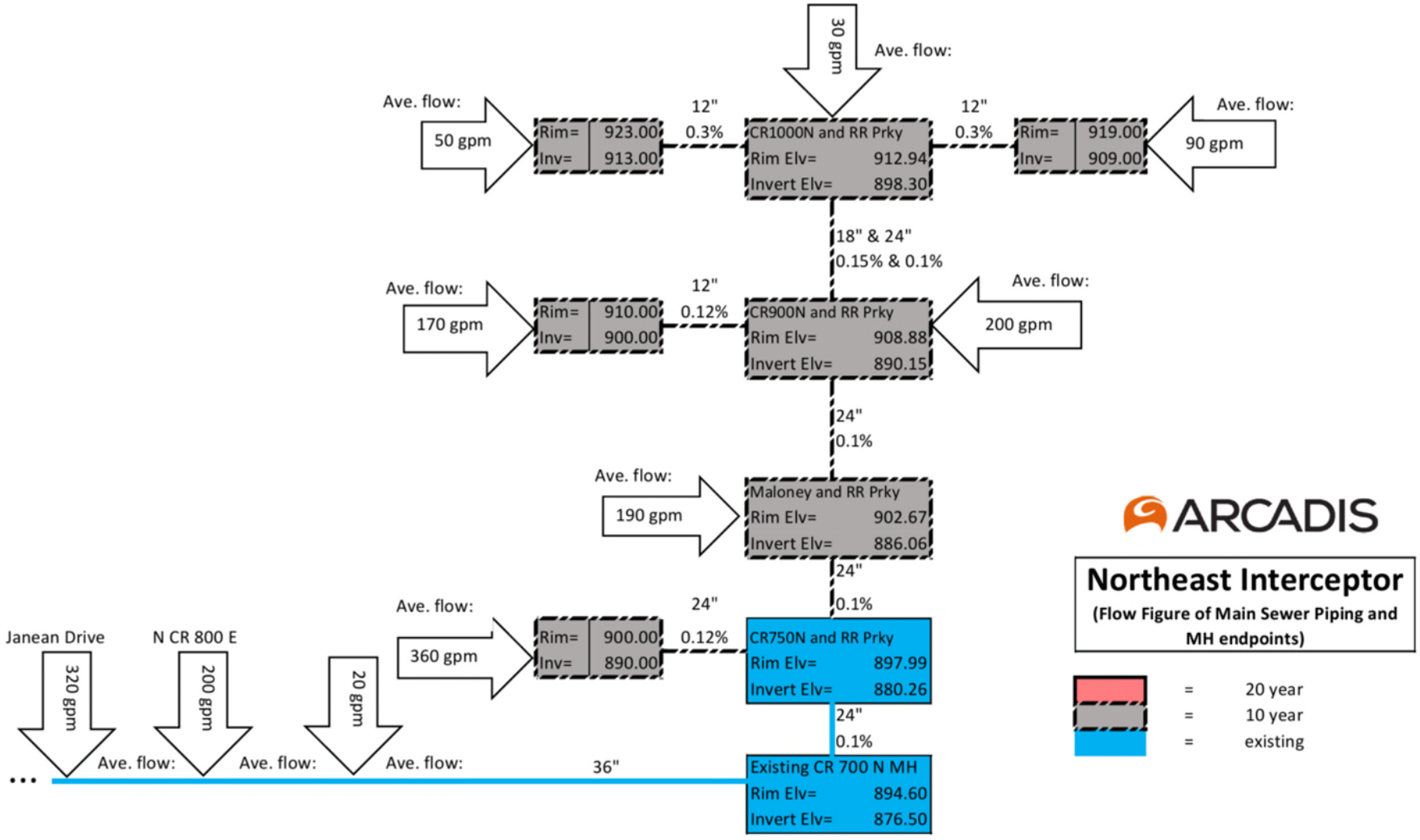


Figure 6-2 Northeast Interceptor Flow Figure

6.2.2 Northwest Regional Lift Station and Associated Sewers

The Northwest Regional Lift Station is proposed to be located near CR 700 N and CR 650 E. A 36-inch interceptor sewer – the Northwest Interceptor – constructed along CR 650 E will connect to the Northwest Regional Lift Station. The Northwest Interceptor will convey flow from as far west as CR 500 E, north of CR 650 N, and as far north as CR 800 N as part of the 10-year planning. Branch sewers will flow by gravity to the Northwest Interceptor from CR 500 E to the west and from some distance east. An 18-inch branch sewer will be constructed along CR 700 N that will connect to the Northwest Regional Lift Station.

The Northwest Regional Lift Station will pump into a force main that will cross under I-74, south along CR 650 E, and discharge into a receiving manhole in West Northfield Drive. During design, redundancy associated with dual force mains shall be evaluated.

(Depending on the depth of the Northwest Interceptor along CR 650 E, gravity flow to the 48-inch Northfield Drive sewer is possible. If that possibility bears out, then construction of the Northwest Regional Lift Station could be avoided.)

Windridge Landing Lift Station (Bethesda is tributary to Windridge) will be redirected to the Northwest Interceptor along CR 650 E. Once the Windridge Landing and Bethesda Lift Stations are removed from the existing 18-inch Northwest Sanitary Sewer, this will free capacity to serve anticipated development west and southwest within the Town service area. In the future, the Northwest Sanitary Sewer will serve only areas south of I-74.

Depending on the depth of the new interceptor, gravity flow from Windridge Landing and Bethesda may be possible. If that possibility bears out, the Windridge Landing and Bethesda Lift Stations could be eliminated.

The proposed Northwest Regional Lift Station and associated sewers to CR 800 N and the force main are part of the proposed 10-year sewer expansion.

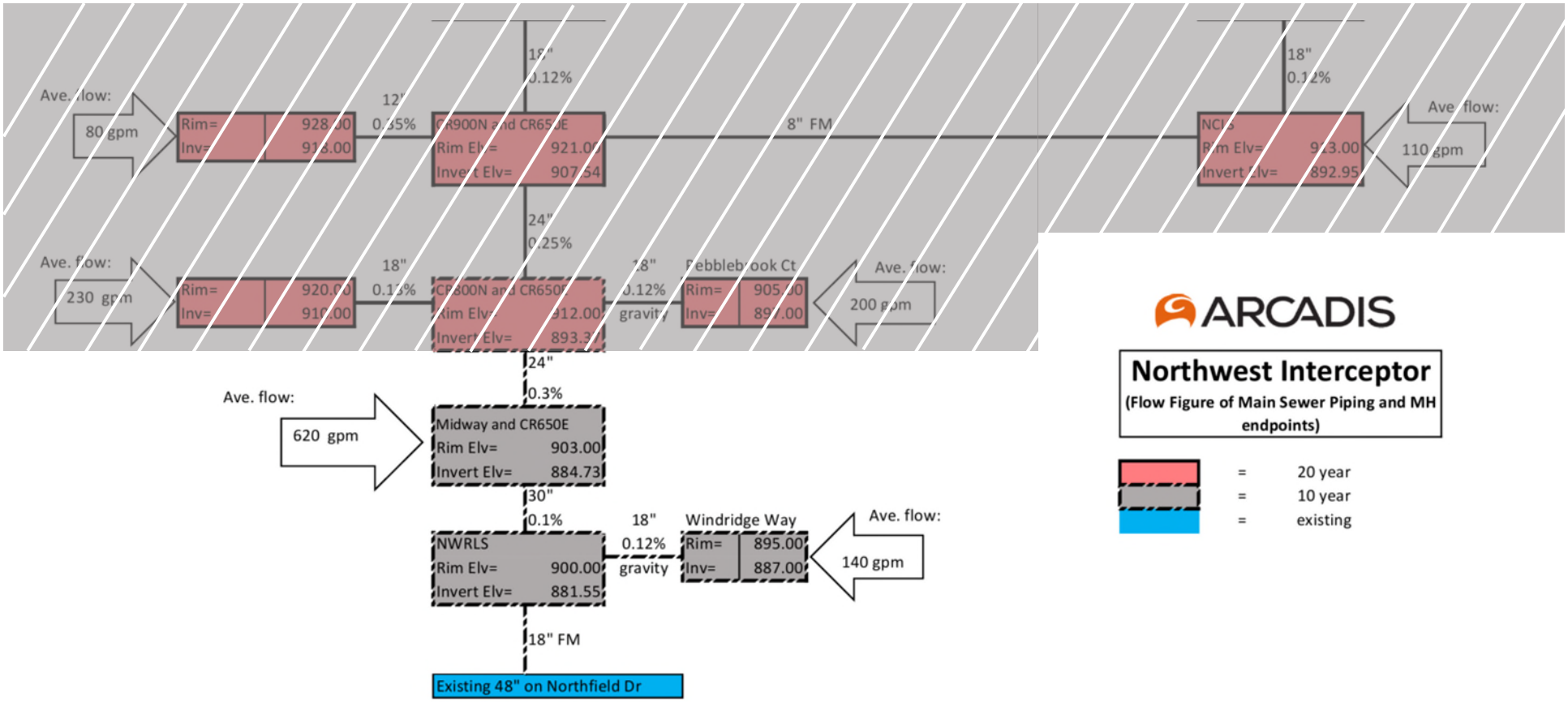


Figure 6-3 10-year Northwest Interceptor Flow Figure

6.2.3 Lift Stations and Interceptors

See the table below for a list of lift stations that are a part of the 10-year planning horizon.

Table 6-1 Summary of Lift Station capacities for the 10-year plan.

Lift Station Capacity – 10-year		
Lift Station	**Existing Capacity (GPM)**	**Proposed Capacity (GPM)**
Northwest Regional Lift Station	N/A	4100
Summer Ridge East Lift Station	313	600
Maplehurst Lift Station	700	Remove Highland Springs LS (267 gpm)
North Regional Lift Station	2500	3500
US-136	2920	5000

See table below for list of interceptors as part of the 10-year planning horizon.

Table 6-2 Summary of Sewer Interceptor sizes for the 10-year plan.

Interceptor Sizes – 10-year	
Interceptor	**Diameter**
Northeast Interceptor – CR 750 N to Maloney Rd	24-inch
Northeast Interceptor – Maloney Rd to CR 900 N	24-inch
Northeast Interceptor – CR 900 N to CR 1000 N	18-inch & 24-inch
Northeast Interceptor – CR 1000 N to Boone County Line	18-inch
Northwest Interceptor – CR 700 N to CR 800 N	24-inch & 30-inch
US 136 Interceptor west of Mardale Drive	10-inch

6.2.4 Other Lift Stations and Sewers

A series of lift stations – Airport (fed by Thornburg, Donnelly, Amazon, Meadow Chase, Holiday Pines), Creekside (Laurelton, Eagle Point), Grant, Hyde Park (Hideway), Ironwood, Locust, and School – pump wastewater from the south, southeast, and east portions of the Town to the South Trunk Sewer along Tilden. Additional expansion in the area is anticipated to increase flow to Laurelton, Creekside, and Holiday Pines.

The Holloway “A” and Holloway “B” Lift Stations serve developments north of US 136 and east of CR 500 E in the west central portion of the service area boundary. Those lift stations currently discharge to the Northwest Sanitary Sewer. It is proposed that service to those subdivisions continue as at present.

The Summer Ridge East and Summer Ridge West Lift Stations serve portions of the southwest area. The Summer Ridge West force main discharges into the Summer Ridge East Lift Station. Gravity sewers from new developments near the two Summer Ridge Lift Stations will connect to these stations. The Summer Ridge East Lift Station force main currently discharges to the Northwest Sanitary Sewer. It is proposed that service to those subdivisions continue as at present. Additional expansion in the area is anticipated to increase flow to Summer Ridge West Lift Station.

Additional expansion is expected along US 136 west of W Northfield Drive. A 10-inch sewer is proposed from W Northfield Drive to Warren Ln.

6.2.5 Implications of “10-year” Versus “20-year” Ultimate Service Areas

The foregoing recommendations are based on sewer sizing for the “20-year” service area to the Boone County line.

Even though it is uncertain whether the Town will ultimately serve to the Boone County line, it is recommended that the sewers be sized for that potential. The incremental cost of the larger pipe sizes is minimal compared to the cost of later providing parallel sewers for additional capacity.

6.2.6 10-year Model Results

Figure 6-4 shows the model results for the 10-year conditions of the sanitary sewer collection system. The figure demonstrates there are no capacity deficiencies identified with the proposed gravity sewer trunk system. An average peaking factor of 3.0 was used for flows in the SewerGEMS model.

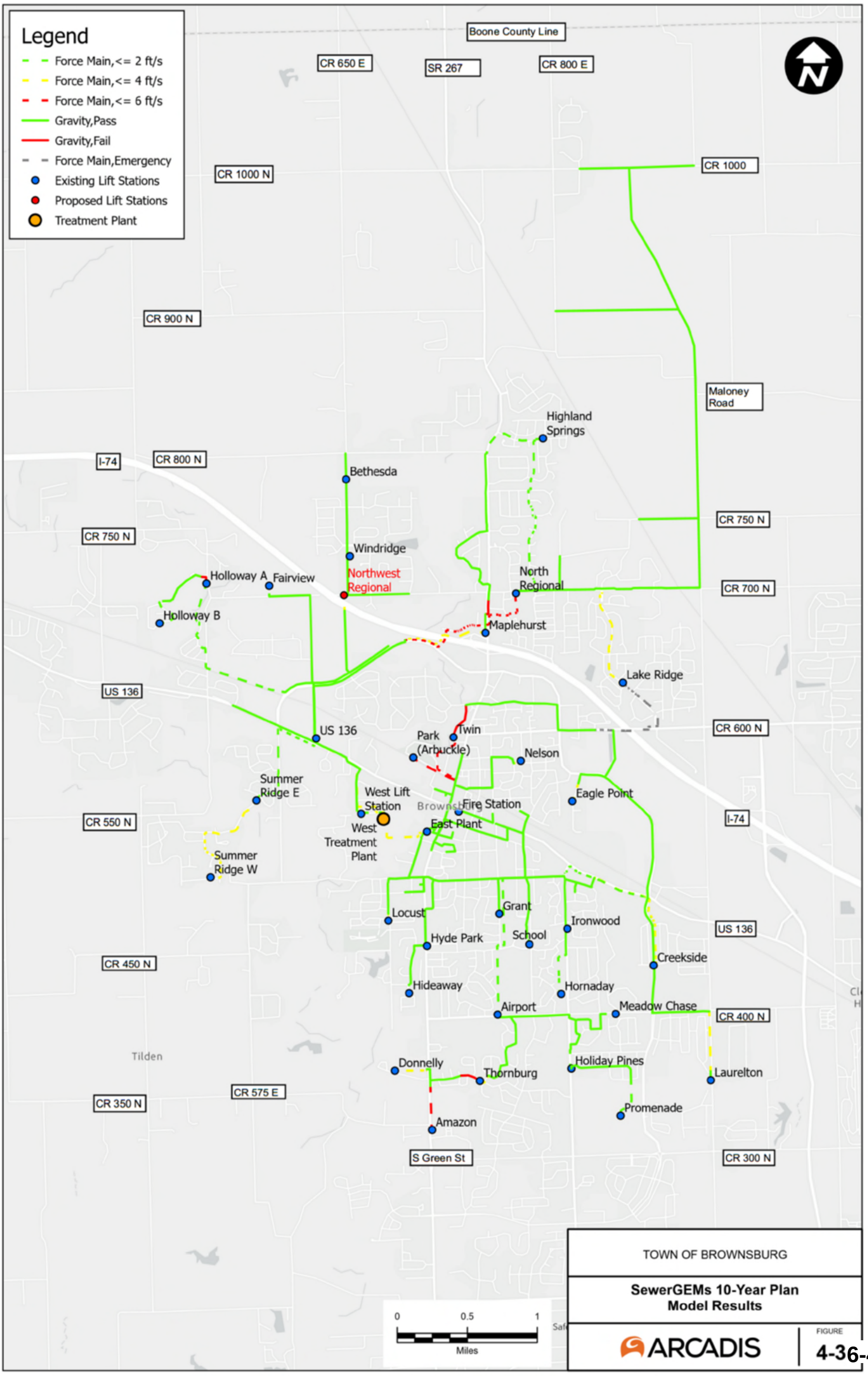


Figure 6-4 SewerGEMs 10-year System Model Results

7 Recommended 20-year Plan

7.1 General

The sewers and lift stations recommended in this section are based on the 20-year planning horizon (full buildout) and the types of intensities of development described in Section 3. **Appendix A** summarizes the flow projections that were used to size the gravity sewers, force mains, and lift stations for the two service area options.

The topography and natural watersheds were taken into consideration to determine the locations of sewers and lift stations. The locations of lift stations and sewers are preliminary. These locations will be refined during preliminary design based on the success of land acquisitions, right-of-way availability, studies, and other investigations. Regional lift station were recommended rather than constructing multiple smaller local lift stations. **Figure 7-1** shows the proposed new conveyance system facilities.

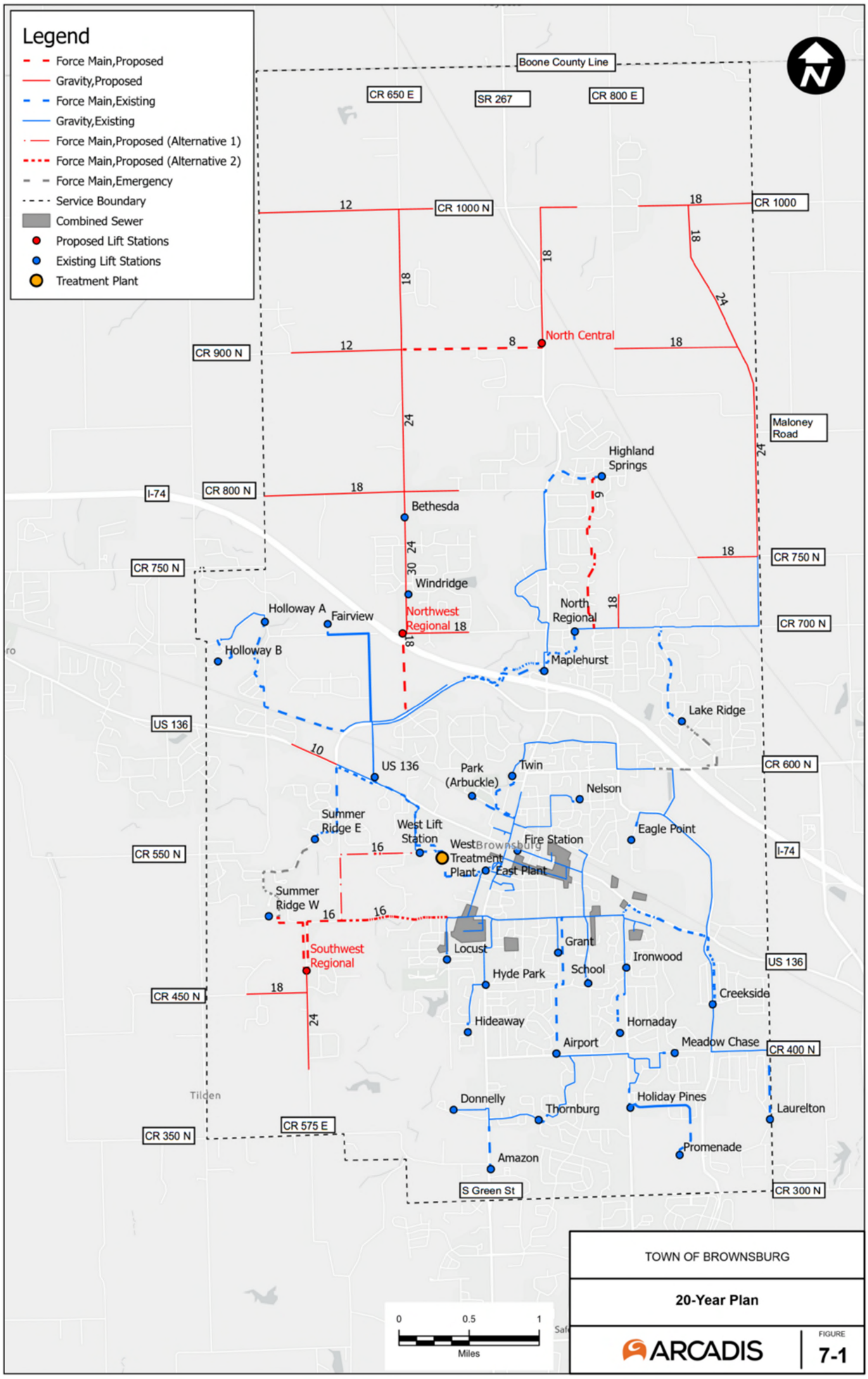


Figure 7-1 20-year Map Overview

7.2 Descriptions of Improvements

This plan proposes that the entire area north of I-74 be served by two major regional lift stations: the North Regional Lift Station and the Northwest Regional Lift Station. The combined flows from these two lift station will discharge into an interceptor sewer along Northfield Drive that will lead to a third regional lift station, the US 136 Lift Station.

7.2.1 Northwest Regional Lift Station and Associated Sewers

The Northwest Regional Lift Station is proposed to be located near CR 700 N and CR 650 E as part of the 10-year planning horizon. See section 6.2.2. for discussion on the Northwest Regional Lift Station.

A 30-inch interceptor sewer – the Northwest Interceptor – constructed along CR 650 E will connect to the Northwest Regional Lift Station. The Northwest Interceptor will convey flow from as far west as CR 500 E, north of CR 800 N, and as far north as the Boone County line. Branch sewers will flow by gravity to the Northwest Interceptor from CR 500 E to west and from some distance east.

The proposed extension of the Northwest Interceptor and associated sewers are part of the proposed 20-year sewer expansion.

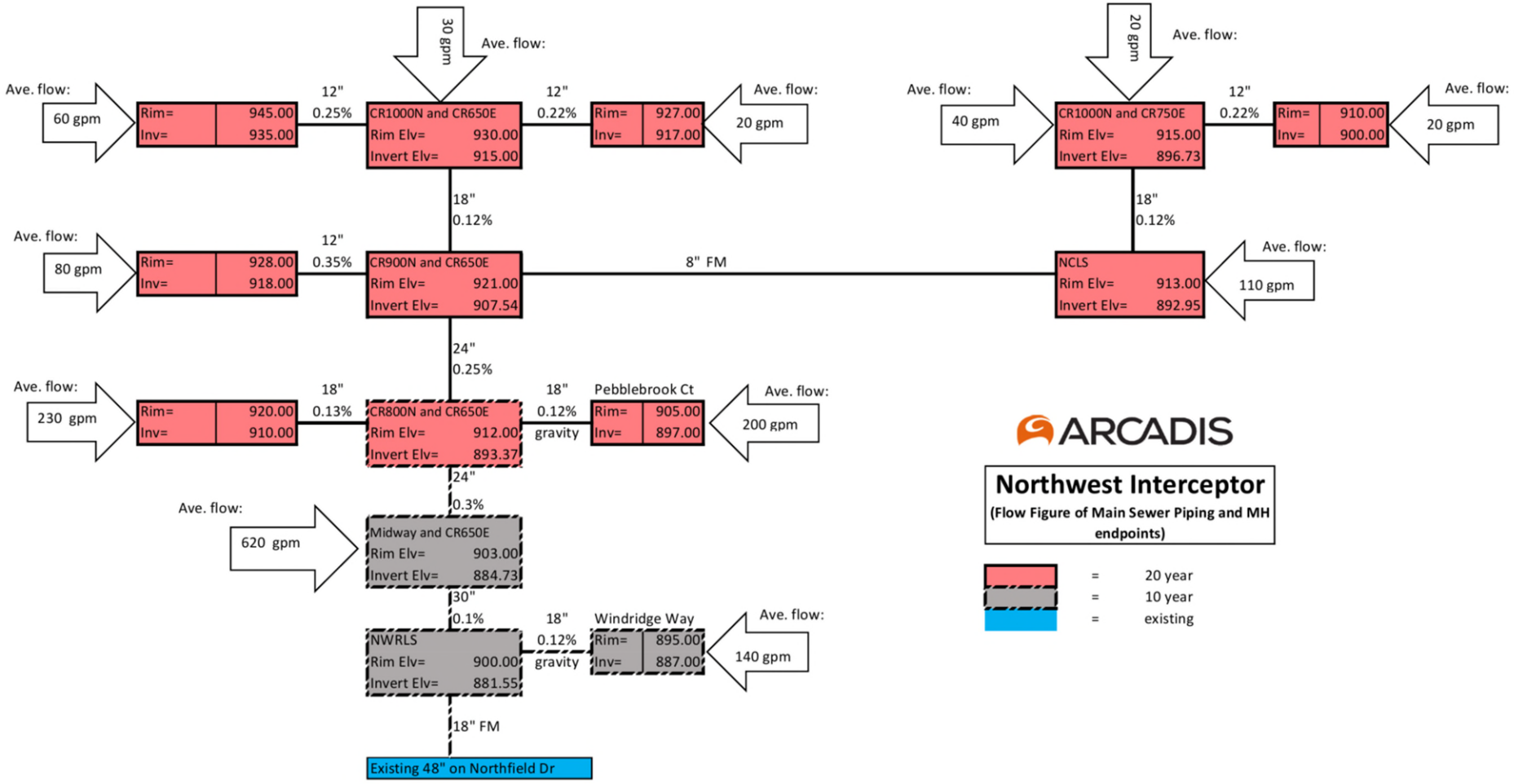


Figure 7-2 Northwest Interceptor Flow Figure

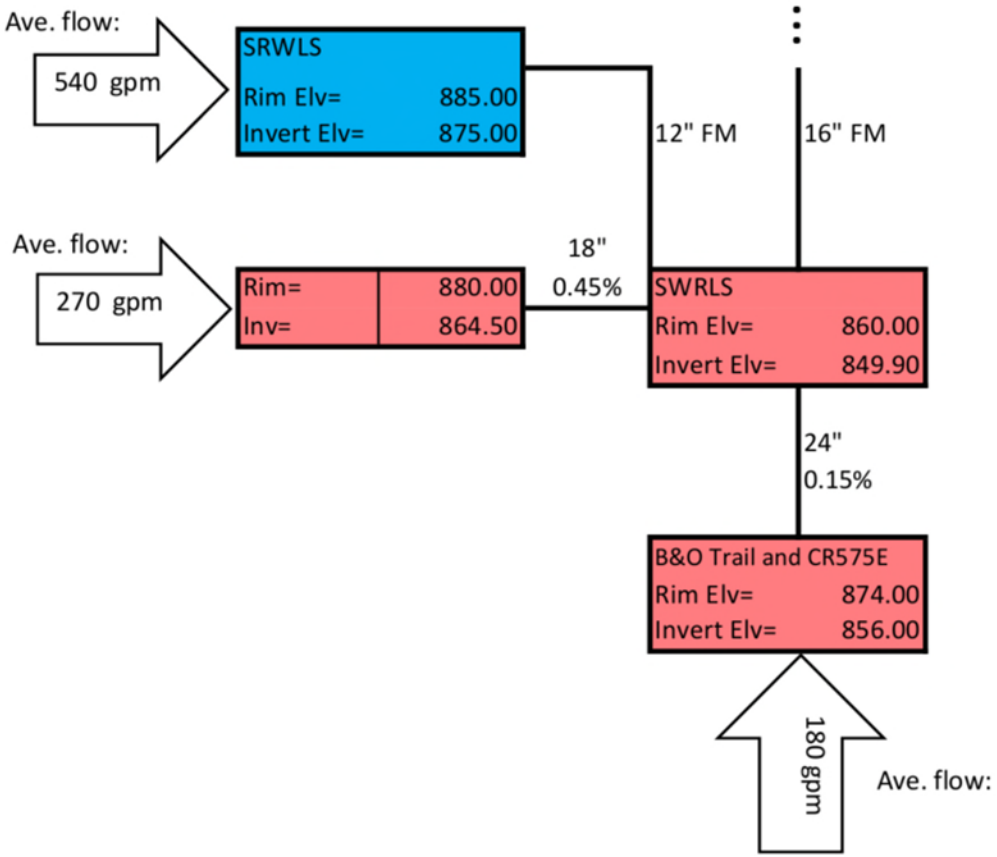
7.2.2 North Central Lift Station and Associated Sewers

Wiley Thompson Ditch, Elder Ditch, and Martin Dungan Ditch traverse the northern portion of the service area and are tributary to White Lick Creek. It is proposed that the area north of the confluence of these ditches be served by sewers leading to a proposed North Central Lift Station located near White Lick Creek, SR 267, and CR 900 N. This lift station will also receive flow from the west of White Lick Creek that cannot flow by gravity to the Northwest Interceptor. The force main will connect to the Northwest Interceptor near CR 900 N.

7.2.3 Southwest Regional Lift Station and Associated Sewers

There are existing planned developments and subdivisions near CR 575 E and CR 450 N that are currently on septic tanks. If those areas are to be provided with sewers, it is proposed that the sewers flow by gravity to a proposed Southwest Regional Lift Station that will be located west of CR 575 E near CR 450 N. The force main from the Southwest Lift Station will run north and discharge into the West Plant Pump Station or gravity sewer on Tilden Drive and, ultimately, the East Plant. Treatment plant flows should be evaluated at the time of design and construction to help determine the discharge location of the force main. If East Plant flows are still low and more flow is desired at the East Plant to take advantage of existing infrastructure, the force main should be discharged to the gravity sewer on Tilden Drive. If not, land should be acquired to route the force main to the West Plant Pump Station.

The Summer Ridge East and Summer Ridge West Lift Stations serve portions of the southwest area. The Summer Ridge West force main discharges into the Summer Ridge East Lift Station. Gravity sewers from new developments near the two Summer Ridge Lift Stations will connect to these lift stations. The Summer Ridge East Lift Station force main currently discharges to the Northwest Sanitary Sewer. It is proposed that a new force main be constructed to connect Summer Ridge West to the Southwest Regional Lift Station.



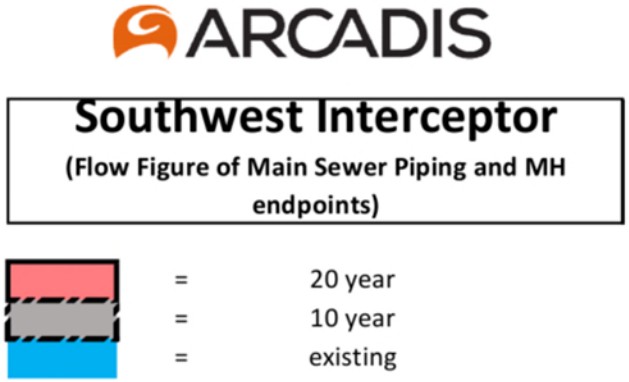


Figure 7-3 Southwest Interceptor Flow Figure

7.2.4 Lift Stations and Interceptors

See table below for list of lift stations as part of the 20-year planning horizon.

Table 7-1 Summary of Lift Station capacities for the 20-year plan.

Lift Station Expansion – 20-year		
Lift Station	**Existing Capacity**	**Proposed Capacity (GPM)**
North Central Lift Station	N/A	650
Southwest Regional Lift Station	N/A	2820
US-136	2920	8600

See table below for list of interceptors part of the 20-year planning horizon.

Table 7-2 Summary of Sewer Interceptor sizes for the 20-year plan.

Interceptor Sizes – 20-year	
Interceptor	**Diameter**
Northwest Interceptor – CR 800 N to CR 900 N	24-inch
Northwest Interceptor – CR 900 N to CR 1000 N	18-inch
Northwest Interceptor – CR 1000 N to Boone County Line	18-inch
Southwest Interceptor – North / South	24-inch
Southwest Interceptor – East / West	18-inch

7.2.5 20-year Model Results

Figure 7-4 shows the model results for the 20-year conditions of the sanitary sewer collection system. The figure demonstrates that there are no capacity deficiencies identified within the proposed gravity sewer trunk system. An average peaking factor of 3.0 was used for flows in the SewerGEMS model.

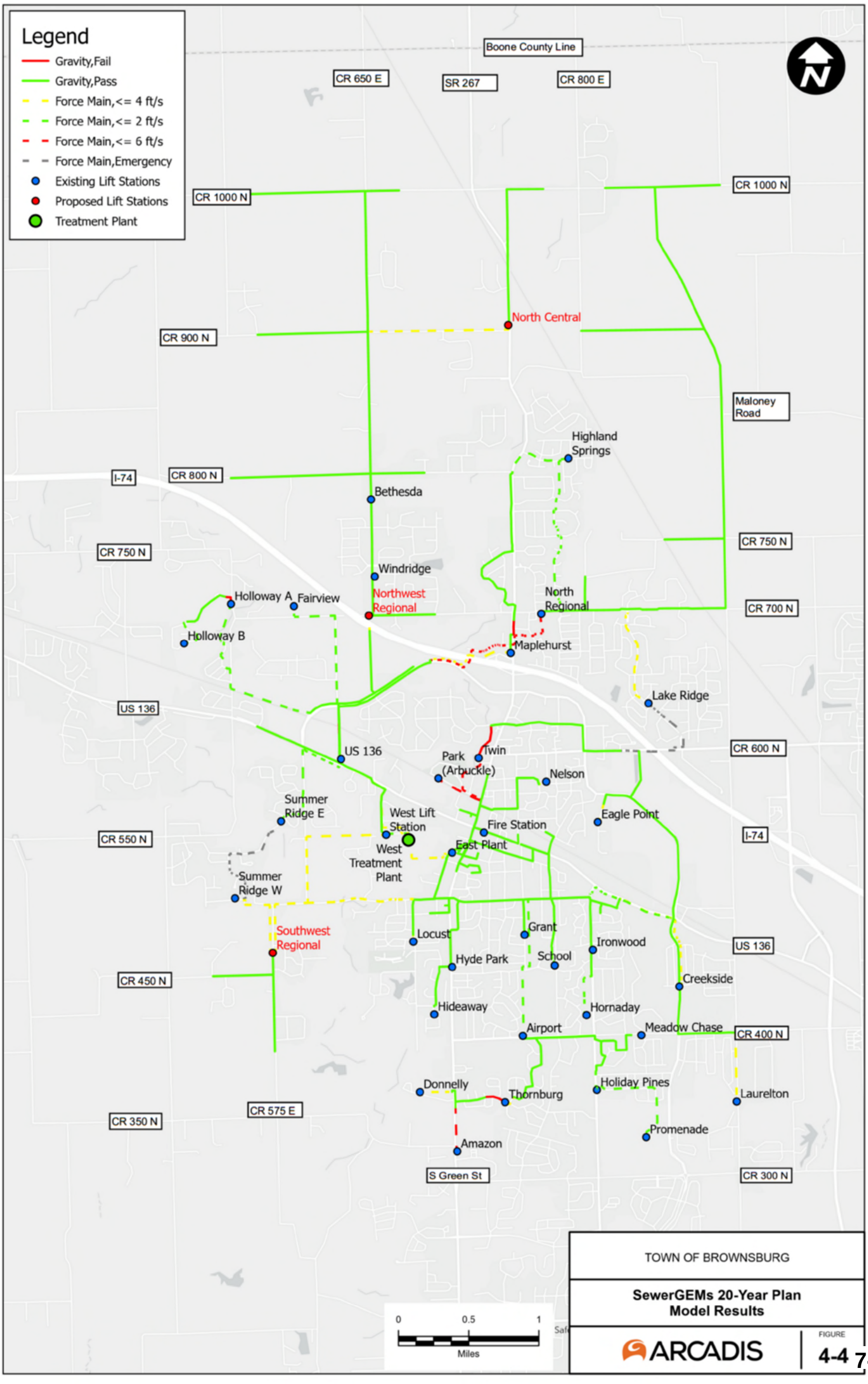


Figure 7-4 SewerGEMs 20-year System Model Results

7.3 Unserviced Neighborhoods

Table 7-3 lists the Town's neighborhoods where at least one resident has requested a connection to the sanitary sewer system due to a failing or failed septic system solution and the proposed solution during the 20-year planning horizon. The installation of proposed interceptors and regional lift stations will help with conveyance options for some of the unserviced neighborhoods.

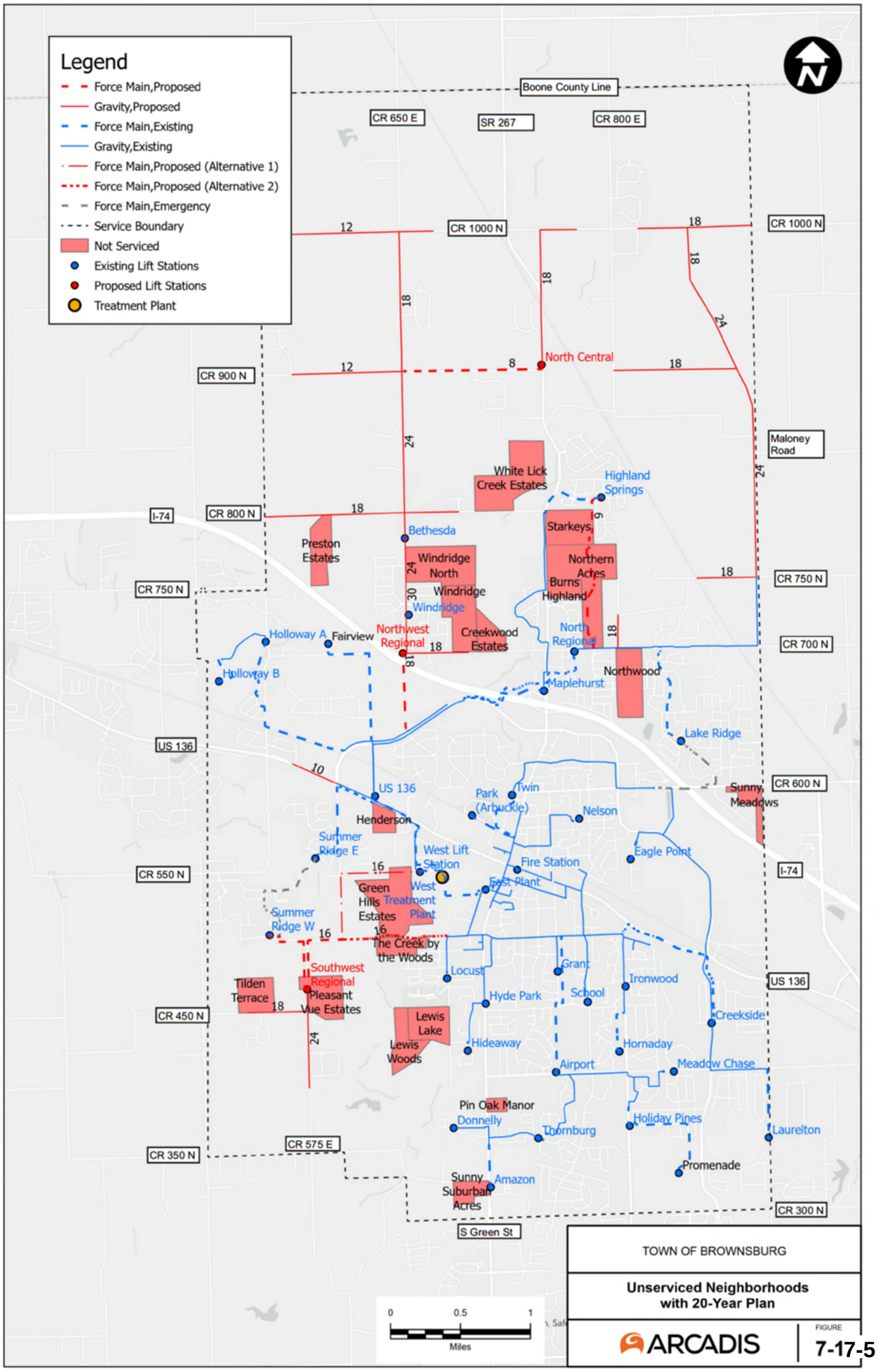


Figure 7-5 Unserviced Neighborhoods with 20-Year Plan

Table 7-3 Unserviced Neighborhood connections per the 20-year plan.

Unserviced Neighborhood	Average Flow (gpm)	Peak Flow (gpm)	Conveyance Method	Impacted Lift Station No. 1	Impacted Lift Station No. 2	Impacted Lift Station No. 3
Sunny Suburban Acres	10.7	43	Low Pressure System	Amazon	Thornburg	Airport
Pin Oak Manor	4.8	19	Low Pressure System	Airport		
Lewis Woods	17.5	70	Low Pressure System	Hyde Park		
Lewis Lake -West	8.4	34	Low Pressure System	Hyde Park		
Lewis Lake -East	4.7	19	Low Pressure System	Hyde Park		
Pleasant Vue Estates	26.5	106	Gravity	Southwest Regional LS		
Tilden Terrace	19.4	78	Gravity	Southwest Regional LS		
The Creek by the Woods	11.8	47	Low Pressure System	East Plant LS		
Green Hills Estates	27.3	109	Low Pressure System	West Plant LS		
Henderson	11	44	Low Pressure System	West Plant LS		
Sunny Meadows	2.4	10	Low Pressure System	Lake Ridge	North Regional	US 136
Northwood	14.1	56	Low Pressure System	North Regional	US 136	
Creekwood Estates	8.4	34	Low Pressure System	Northwest Regional LS	US 136	
Windridge	40.5	162	Gravity	Northwest Regional LS	US 136	
Windridge North	45	180	Gravity	Northwest Regional LS	US 136	
Preston Estates	24.2	97	Gravity	Northwest Regional LS	US 136	
Starkeys	14.5	58	Low Pressure System	North Regional	US 136	
Northern Acres	26.8	107	Low Pressure System	North Regional	US 136	
Burns Highland	5.2	21	Low Pressure System	North Regional	US 136	
White Lick Creek Estates	51.4	205	Low Pressure System	Northwest Regional LS	US 136	

8 Preliminary Cost Estimates and Phasing

Costs are highly variable due to site specificities such as location, depth, geology, support facilities, and ease of construction. Based on the level of project development and the variability inherent in the cost sources, these costs represent an accuracy of -30 to +50 percent based on an AACE Class 4 estimate. These unit costs are expected to be appropriate for Master Level Planning. As the project evolves, construction cost estimates will continually be refined to better represent actual conditions.

The Preliminary Cost Estimate is based on open cut installation for gravity sewers and horizontal directional drill installation for force mains. It includes site adjustment factors such as appurtenances, utility conflicts, dewatering, traffic routing, pavement restoration, excess materials disposal, and construction contingency. The pipe material for gravity sewers is assumed to be PVC, and the pipe material for force mains is assumed to be HDPE.

The depth factor that is considered in the costing for proposed gravity sewer installations is assumed based on rim elevations determined from Google Earth, which aided in a rough setup of main sewer piping with slopes and manhole end points, as discussed in **Figures 6-2**, **6-3**, **7-2**, and **7-3**.

These preliminary cost estimates included a Contingency of 30 percent.

Table 8-1 Preliminary Cost Estimates per 10-year and 20-year planning horizons.

	Diameter (in)	Length (ft)	Cost per LF ($/ft)	Construction Costs ($)	
				10 year	20 year
Northeast Interceptor					
East Branch along 1000 N	18	3,400	$ 410	$ 1,400,000.00	
West Branch along 1000 N	18	1,860	$ 410	$ 770,000.00	
Interceptor from 1000 N to north of Maloney Rd	24	5,340	$ 490	$ 2,620,000.00	
West Branch 900 N	18	4,750	$ 410	$ 1,950,000.00	
Interceptor north of Maloney Rd to E County Rd 750 N	24	8,200	$ 490	$ 4,020,000.00	
West Branch 750 N	18	2,200	$ 410	$ 910,000.00	
Northeast Interceptor Subtotal				$ 11,670,000.00	
North Regional LS					
Highland Springs LS Force Main	6	1,600	$ 220	$ 360,000.00	
Sewer along Janean Dr	18	2,500	$ 410	$ 1,030,000.00	
18" County Road 700 N Stub	18	1,250	$ 410	$ 520,000.00	
North Regional LS Subtotal				$ 1,910,000.00	
North Central LS					
Tree Line to N County Rd 750 E	12	1,350	$ 340		$ 460,000.00
Down N County Rd 750 E	18	5,300	$ 410		$ 2,180,000.00
North Central LS (1 MGD)					$ 2,460,000.00
North Central LS Force Main	8	5,400	$ 240		$ 1,300,000.00
North Central LS Subtotal					$ 6,400,000.00
Northwest Interceptor					
East Branch along 1000 N	12	2,000	$ 340		$ 680,000.00
West Branch along 1000 N	12	5,300	$ 340		$ 1,810,000.00
Interceptor from 1000 N to 900 N	18	5,300	$ 410		$ 2,180,000.00
West Branch along E County Rd 900 N	12	4,100	$ 340		$ 1,400,000.00
Interceptor from E County Rd 900 N to E County Rd 800 N	24	5,250	$ 490		$ 2,580,000.00
West Branch along E County Rd 800 N	18	5,250	$ 410		$ 2,160,000.00
East Branch along E County Rd 800 N	18	2,000	$ 410		$ 820,000.00
Interceptor from E County Rd 800 N to E County Rd 700 N	30	5,400	$ 600	$ 3,240,000.00	
East Branch along E County Rd 700 N	18	2,250	$ 410	$ 930,000.00	
Northwest Regional LS (6 MGD)				$ 5,700,000.00	
Northwest Regional LS Force Main	18	3,100	$ 350	$ 1,090,000.00	
Northwest Interceptor 10 year Plan Subtotal				$ 10,960,000.00	
Northwest Interceptor 20 year Plan Subtotal					$ 11,630,000.00
Northwest Interceptor 10 year and 20 year Plan Subtotal				$	22,590,000
US 136					
West Branch of US 136	12	1,750	$ 340	$ 600,000.00	
Southwest Regional LS					
Summer Ridge West Force Main to Southwest Regional LS	8	4,000	$ 240		$ 960,000.00
Southwest Regional LS Force Main	16	8,300	$ 320		$ 2,660,000.00
West Branch along E County Rd 450 N	18	2,300	$ 410		$ 950,000.00
Interceptor along N County Rd 575 E	24	3,600	$ 490		$ 1,770,000.00
Southwest Regional LS (4.1 MGD)					$ 4,710,000.00
Southwest Regional LS Subtotal					$ 11,050,000.00
Total 10 year (rounded)				$ 25,200,000.00	
Total 20 year (rounded)					$ 29,100,000.00
Total (rounded)				$	54,300,000.00

Appendix A

Estimate of Future Wastewater Flows – 10-year & 20-year Plans

Town of Brownsburg – Potential Residential Growth Work Sheet

NORTHEAST INTERCEPTOR

Zone	Estate (RE)	R-1	R-2	R-3	Traditional	M-2
Min. Lot Size	65,300 sf lots	20,000 sf lots	12,500 sf lots	9,000 sf lots	4,500 sf lots	32,600 sf lots
Units / Acre	**0.67**	**2.18**	**3.48**	**4.84**	**9.90**	**10.69**

Special Zone Types *(gpd/acre)*		
HI	I	PD
1200	**800**	**800**

310	gpd/home
124	Population Equivalent (PE) = 310 gpd /2.88 people per household *1.15 (Safety Factor)

2016-2020 Census Update of Persons per Household = **2.88**

Map Parcel ID	Acres (Approx.)	Flood Hazard Area	Net Developable Acres	Residential Zone	Units per Acre	Potential or Planned Residential Units	Potential New Residental Population	Percentage of Developable Area	Potential New Residential Units per Developable Area	Potential Residential Population per Developable Area	Flow / Gross Acre (gpd/acre)	New Average Flow (mgd)	Population / Population Equivalent	Peaking Factor	Peak Flow (mgd)	Proposed Sewer Diameter (in)
CR 1000 N to Boone County Line (10- year)																
RE16	20.55	0.00	20.55	Estate (RE)	0.67	14	39	75%	10	30	155	0.003	-	-	-	-
RE17	21.31	0.00	21.31	Estate (RE)	0.67	14	41	75%	11	31	155	0.003	-	-	-	-
RE18	32.86	0.00	32.86	Estate (RE)	0.67	22	63	75%	16	47	155	0.005	-	-	-	-
RE19	20.79	0.00	20.79	Industrial	0.00	0	0	75%	0	0	800	0.017	-	-	-	-
RE20	32.68	0.00	32.68	Industrial	0.00	0	0	75%	0	0	800	0.026	-	-	-	-
RE21	67.86	0.00	67.86	Estate (RE)	0.67	45	130	75%	34	98	155	0.011	-	-	-	-
Additional Areas to Service	127.56	0.00	127.56	Estate (RE)	0.67	85	245	75%	64	184	155	0.020				
WEST											**MH-160**	0.085	683	3.901	0.330	12
RE22	81.36	0.00	81.36	Estate (RE)	0.67	54	156	75%	41	117	155	0.013	-	-	-	-
RE23	103.97	0.00	103.97	Industrial	0.00	0	0	75%	0	0	800	0.083	-	-	-	-
RE24	41.04	0.00	41.04	Industrial	0.00	0	0	75%	0	0	800	0.033	-	-	-	-
Additional Areas to Service	113.29	0.00	113.29	Estate (RE)	0.67	76	218	75%	57	163	155	0.018				
EAST											**MH-167**	0.146	1,179	3.753	0.549	12
CR 1000 N to Boone County Line TOTAL												0.231	1,862	3.610	0.833	18
CR 900 N to CR 1000 N (10- year)																
RE54	107.19	0.00	107.19	Industrial	0.00	0	0	75%	0	0	800	0.086	-	-	-	-
RE55	41.94	0.00	41.94	Industrial	0.00	0	0	75%	0	0	800	0.034	-	-	-	-
RE56	32.28	0.00	32.28	Industrial	0.00	0	0	75%	0	0	800	0.026	-	-	-	-
RE57	49.22	0.00	49.22	Industrial	0.00	0	0	75%	0	0	800	0.039	-	-	-	-
RE58	41.09	0.00	41.09	Industrial	0.00	0	0	75%	0	0	800	0.033	-	-	-	-
RE59	38.83	0.00	38.83	Estate (RE)	0.67	26	75	75%	19	56	155	0.006	-	-	-	-
RE60	40.57	0.00	40.57	Estate (RE)	0.67	27	78	75%	20	58	155	0.006	-	-	-	-
RE61	40.44	0.00	40.44	Estate (RE)	0.67	27	78	75%	20	58	155	0.006	-	-	-	-
Additional Areas to Service	47.46	0.00	47.46	Estate (RE)	0.67	32	91	75%	24	68	155	0.007				
WEST											**MH-173**	0.243	1,962	3.592	0.874	12
RE50	67.90	0.00	67.90	Industrial	0.00	0	0	75%	0	0	800	0.054	-	-	-	-
RE51	77.70	0.00	77.70	Industrial	0.00	0	0	75%	0	0	800	0.062	-	-	-	-
RE52	80.25	0.00	80.25	Industrial	0.00	0	0	75%	0	0	800	0.064	-	-	-	-
RE53	117.47	0.00	117.47	Industrial	0.00	0	0	75%	0	0	800	0.094	-	-	-	-
EAST											**MH-172**	0.275	2,215	3.551	0.975	12
CR 900 N to CR 1000 N TOTAL												0.518	4,177	3.316	1.718	18 transition to 24
CR 900 N to Boone County Line TOTAL												0.749	6,039	3.168	2.372	18 transition to 24
Maloney to CR 900 N (10- year)																
R1-14	51.56	0.00	51.56	R-1	2.18	112	323	75%	84	243	506	0.026	-	-	-	-
R1-15	57.34	0.00	57.34	Industrial	0.00	0	0	75%	0	0	800	0.046	-	-	-	-
R1-16	107.39	0.00	107.39	Industrial	0.00	0	0	75%	0	0	800	0.086	-	-	-	-
M2-1	11.43	0.00	11.43	M-2	10.69	122	352	75%	92	264	2,485	0.028	-	-	-	-
R1-17	93.54	0.00	93.54	Industrial	0.00	0	0	75%	0	0	800	0.075	-	-	-	-

NORTHEAST INTERCEPTOR

Zone	Estate (RE)	R-1	R-2	R-3	Traditional	M-2
Min. Lot Size	65,300 sf lots	20,000 sf lots	12,500 sf lots	9,000 sf lots	4,500 sf lots	32,600 sf lots
Units / Acre	0.67	2.18	3.48	4.84	9.90	10.69

Special Zone Types *(gpd/acre)*		
HI	I	PD
1200	800	800

310	gpd/home
124	Population Equivalent (PE) = 310 gpd /2.88 people per household *1.15 (Safety Factor)

2016-2020 Census Update of Persons per Household = **2.88**

Map Parcel ID	Acres (Approx.)	Flood Hazard Area	Net Developable Acres	Residential Zone	Units per Acre	Potential or Planned Residential Units	Potential New Residental Population	Percentage of Developable Area	Potential New Residential Units per Developable Area	Potential Residential Population per Developable Area	Flow / Gross Acre (gpd/acre)	New Average Flow (mgd)	Population / Population Equivalent	Peaking Factor	Peak Flow (mgd)	Proposed Sewer Diameter (in)
Maloney to CR 900 N TOTAL											**MH-???**	0.261	2,106	3.568	0.932	24
Maloney to Boone County Line TOTAL												1.010	8,145	3.043	3.073	24
CR 750 N to Maloney (10- year)																
R1-18	161.95	0.00	161.95	Industrial	0.00	0	0	75%	0	0	800	0.130	-	-	-	-
R1-19	118.70	0.00	118.70	Industrial	0.00	0	0	75%	0	0	800	0.095	-	-	-	-
R1-23	125.70	0.00	125.70	Industrial	0.00	0	0	75%	0	0	800	0.101	-	-	-	-
M2-2	18.91	0.00	18.91	M-2	10.69	202	582	75%	152	437	2,485	0.047	-	-	-	-
M2-3	18.49	0.00	18.49	M-2	10.69	198	569	75%	148	427	2,485	0.046	-	-	-	-
M2-4	20.13	0.00	20.13	M-2	10.69	215	620	75%	161	465	2,485	0.050	-	-	-	-
M2-5	20.04	0.00	20.04	M-2	10.69	214	617	75%	161	463	2,485	0.050	-	-	-	-
CR 750 N to Maloney TOTAL											**MH-165**	0.518	4,176	3.316	1.717	24
CR 750 N to Boone County Line TOTAL												1.528	12,321	2.864	4.376	24
CR 700 N to CR 750 N (10- year)																
R1-24	34.84	0.00	34.84	HI	0.00	0	0	75%	0	0	1,200	0.042	-	-	-	-
M2-6	41.20	0.00	41.20	HI	0.00	0	0	75%	0	0	1,200	0.049	-	-	-	-
R1-38A	25.55	0.00	25.55	HI	0.00	0	0	75%	0	0	1,200	0.031				
CR 700 N to CR 750 N TOTAL											**MH-138**	0.122	983	3.805	0.464	24
CR 700 N to Boone County Line TOTAL												1.650	13,304	2.831	4.670	24

Town of Brownsburg – Potential Residential Growth Work Sheet

NORTH REGIONAL LS NORTH EXTENSION

Zone	Estate (RE)	R-1	R-2	R-3	Traditional	M-2
Min. Lot Size	65,300 sf lots	20,000 sf lots	12,500 sf lots	9,000 sf lots	4,500 sf lots	32,600 sf lots
Units / Acre	0.67	2.18	3.48	4.84	9.90	10.69

Special Zone Types *(gpd/acre)*		
HI	I	PD
1200	800	800

310	gpd/home
124	Population Equivalent (PE) = 310 gpd /2.88 people per household *1.15 (Safety Factor)

2016-2020 Census Update of Persons per Household = **2.88**

Map Parcel ID	Acres (Approx.)	Flood Hazard Area	Net Developable Acres	Residential Zone	Units per Acre	Potential or Planned Residential Units	Potential New Residental Population	Percentage of Developable Area	Potential New Residential Units per Developable Area	Potential Residential Population per Developable Area	Flow / Gross Acre (gpd/acre)	New Average Flow (mgd)	Population / Population Equivalent	Peaking Factor	Peak Flow (mgd)	Proposed Sewer Diameter (in)
Unserviced Neighborhoods (10- year)																
Starkeys	44.00	0.00	44.00	R-2	3.48	90	0	75%	68	194	476	0.021				
Northern Acres	102.83	0.00	102.83	R-2	3.48	166	0	75%	125	359	375	0.039				
Burns Highland	16.50	0.00	16.50	R-2	3.48	32	0	75%	24	69	451	0.007				
Additional Areas to Service	224.63	0.00	224.63	R-2	3.48	783	0	75%	587	0	810	0.384				
Unserviced Neighborhood TOTAL										622	**MH-149**	0.451	3,641	3.370	1.521	18
18" County Road 700 N Stub (10- year)																
R1-13	31.22	0.00	31.22	R-1	2.18	68	196	75%	51	147	506	0.016	-	-	-	-
R1-20	21.84	0.00	21.84	R-1	2.18	48	137	75%	36	103	506	0.011	-	-	-	-
R1-21	59.93	0.00	59.93	R-1	2.18	131	376	75%	98	282	506	0.030	-	-	-	-
R1-22	71.49	0.00	71.49	R-1	2.18	156	448	75%	117	336	506	0.036	-	-	-	-
R2-1	39.11	0.00	31.29	PD	0.00	61	176	75%	46	132	800	0.025				
Additional Areas to Service	127.00	0.00	127.00	R-2	3.48	443	0	75%	332	956	810	0.103				
CR 700 N 18" Stub TOTAL										1,956	**MH-121**	0.221	1,785	3.624	0.802	18

Town of Brownsburg – Potential Residential Growth Work Sheet

NORTHCENTRAL LS NORTH EXTENSION

Zone	Estate (RE)	R-1	R-2	R-3	Traditional	M-2
Min. Lot Size	65,300 sf lots	20,000 sf lots	12,500 sf lots	9,000 sf lots	4,500 sf lots	32,600 sf lots
Units / Acre	0.67	2.18	3.48	4.84	9.90	10.69

Special Zone Types *(gpd/acre)*		
HI	I	PD
1200	800	800

310	gpd/home
124	Population Equivalent (PE) = 310 gpd /2.88 people per household *1.15 (Safety Factor)

2016-2020 Census Update of Persons per Household = **2.88**

Map Parcel ID	Acres (Approx.)	Flood Hazard Area	Net Developable Acres	Residential Zone	Units per Acre	Potential or Planned Residential Units	Potential New Residental Population	Percentage of Developable Area	Potential New Residential Units per Developable Area	Potential Residential Population per Developable Area	Flow / Gross Acre (gpd/acre)	New Average Flow (mgd)	Population / Population Equivalent	Peaking Factor	Peak Flow (mgd)	Proposed Sewer Diameter (in)
CR 1000 to Boone County Line (20- year)																
RE8	66.97	0.00	66.97	Estate (RE)	0.67	45	129	75%	34	96	155	0.010	-	-	-	-
RE9	27.27	0.00	27.27	Estate (RE)	0.67	18	52	75%	14	39	155	0.004	-	-	-	-
Additional Areas to Service	356.43	0.00	356.43	Estate (RE)	0.67	238	685	75%	178	514	155	0.055				
WEST											**MH-148**	0.070	564	3.947	0.276	12
RE12	80.24	3.78	76.46	Estate (RE)	0.67	54	154	75%	40	116	163	0.012	-	-	-	-
RE13	20.27	0.00	20.27	Estate (RE)	0.67	14	39	75%	10	29	155	0.003	-	-	-	-
RE14	59.90	8.84	51.06	Estate (RE)	0.67	40	115	75%	30	86	182	0.009	-	-	-	-
RE15	24.78	5.42	19.36	Estate (RE)	0.67	17	48	75%	12	36	198	0.004	-	-	-	-
Additional Areas to Service	60.75	0.00	60.75	Estate (RE)	0.67	41	117	75%	30	88	155	0.009				
EAST											**MH-154**	0.038	308	4.074	0.155	12
CR 1000 to Boone County Line TOTAL												0.108	871	3.838	0.415	18
CR 900 No to CR 1000 N (20- year)																
RE62	29.72	0.00	29.72	Estate (RE)	0.67	20	57	75%	15	43	155	0.005	-	-	-	-
RE63	102.88	0.00	102.88	Estate (RE)	0.67	69	198	75%	51	148	155	0.016	-	-	-	-
RE64	7.34	0.00	7.34	Estate (RE)	0.67	5	14	75%	4	11	155	0.001	-	-	-	-
RE65	81.37	0.00	81.37	Estate (RE)	0.67	54	156	75%	41	117	155	0.013	-	-	-	-
RE66	80.94	0.00	80.94	Estate (RE)	0.67	54	156	75%	40	117	155	0.013	-	-	-	-
RE67	80.97	0.00	80.97	Estate (RE)	0.67	54	156	75%	41	117	155	0.013	-	-	-	-
R1-12	18.30	0.00	18.30	R-1	2.18	40	115	75%	30	86	506	0.009	-	-	-	-
Additional Areas to Service	184.00	0.00	184.00	Estate (RE)	0.67	123	353	75%	92	265	155	0.029				
WEST												0.097	784	3.866	0.376	12
Additional Areas to Service	360.63	0.00	360.63	Estate (RE)	0.67	241	693	75%	180	520	155	0.056				
EAST												0.056	451	3.997	0.224	12
CR 900 No to CR 1000 NTOTAL											**MH-116**	0.153	1,235	3.739	0.573	18
CR 900 No to Boone County Line TOTAL												0.261	2,107	3.568	0.932	18

Town of Brownsburg – Potential Residential Growth Work Sheet

NORTHWEST INTERCEPTOR

Zone	Estate (RE)	R-1	R-2	R-3	Traditional	M-2
Min. Lot Size	65,300 sf lots	20,000 sf lots	12,500 sf lots	9,000 sf lots	4,500 sf lots	32,600 sf lots
Units / Acre	0.67	2.18	3.48	4.84	9.90	10.69

Special Zone Types *(gpd/acre)*		
HI	I	PD
1200	800	800

310	gpd/home
124	Population Equivalent (PE) = 310 gpd /2.88 people per household *1.15 (Safety Factor)

2016-2020 Census Update of Persons per Household = **2.88**

Map Parcel ID	Acres (Approx.)	Flood Hazard Area	Net Developable Acres	Residential Zone	Units per Acre	Potential or Planned Residential Units	Potential New Residental Population	Percentage of Developable Area	Potential New Residential Units per Developable Area	Potential Residential Population per Developable Area	Flow / Gross Acre (gpd/acre)	New Average Flow (mgd)	Population / Population Equivalent	Peaking Factor	Peak Flow (mgd)	Proposed Sewer Diameter (in)
CR 1000 N to Boone County Line (20- year)																
RE1	81.52	0.00	81.52	Estate (RE)	0.67	54	157	75%	41	117	155	0.013	-	-	-	-
RE2	80.55	0.00	80.55	Estate (RE)	0.67	54	155	75%	40	116	155	0.012	-	-	-	-
RE3	124.51	0.00	124.51	Estate (RE)	0.67	83	239	75%	62	179	155	0.019	-	-	-	-
RE4	40.11	0.00	40.11	Estate (RE)	0.67	27	77	75%	20	58	155	0.006	-	-	-	-
RE5	40.19	0.00	40.19	Estate (RE)	0.67	27	77	75%	20	58	155	0.006	-	-	-	-
RE6	78.35	0.00	78.35	Estate (RE)	0.67	52	151	75%	39	113	155	0.012	-	-	-	-
Additional Areas to Service	218.93	0.00	218.93	Estate (RE)	0.67	146	421	75%	110	315	155	0.034				
WEST											MH-174	0.103	831	3.850	0.397	12
RE7	77.08	0.00	77.08	Estate (RE)	0.67	51	148	75%	39	111	155	0.012	-	-	-	-
RE10	35.64	0.00	35.64	Estate (RE)	0.67	24	68	75%	18	51	155	0.006	-	-	-	-
RE11	40.84	4.20	36.64	Estate (RE)	0.67	27	78	75%	20	59	173	0.006	-	-	-	-
Additional Areas to Service	109.92	0.00	109.92	Estate (RE)	0.67	73	211	75%	55	158	155	0.017				
EAST											MH-151	0.041	330	4.061	0.166	12
CR 1000 N to Boone County Line TOTAL												0.144	1,160	3.757	0.541	12
CR 900 N to CR 1000 N (20- year)																
RE68	147.46	0.00	147.46	Estate (RE)	0.67	98	283	75%	74	212	155	0.023	-	-	-	-
RE69	75.76	0.00	75.76	Estate (RE)	0.67	51	146	75%	38	109	155	0.012	-	-	-	-
RE70	81.62	0.00	81.62	Estate (RE)	0.67	54	157	75%	41	118	155	0.013	-	-	-	-
RE71	100.96	0.00	100.96	Estate (RE)	0.67	67	194	75%	51	145	155	0.016	-	-	-	-
RE72	62.30	0.00	62.30	Estate (RE)	0.67	42	120	75%	31	90	155	0.010	-	-	-	-
RE73	88.68	0.00	88.68	Estate (RE)	0.67	59	170	75%	44	128	155	0.014	-	-	-	-
Additional Areas to Service	178.54	0.00	178.54	Estate (RE)	0.67	119	343	75%	89	257	155	0.028				
WEST											MH-171	0.114	920	3.823	0.436	12
North Central LS												0.261	-	-	-	-
Additional Areas to Service	175.08	0.00	175.08	Estate (RE)	0.67	117	336	75%	88	252	155	0.027	219			
EAST											MH-170	0.288	2,326	3.534	1.019	
CR 900 N to CR 1000 N TOTAL												0.402	3,245	3.413	1.374	18
CR 900 N to Boone County Line TOTAL												0.546	4,406	3.295	1.800	18
CR 800 N to CR 900 N (20- year)																
R1-1	162.31	0.00	162.31	R-1	2.18	354	1,018	75%	265	764	506	0.082	-	-	-	-
R1-2	119.61	0.00	119.61	R-1	2.18	261	750	75%	195	563	506	0.061	-	-	-	-
R1-6	41.58	0.00	41.58	R-1	2.18	91	261	75%	68	196	506	0.021	-	-	-	-
Additional Areas to Service	326.26	0.00	326.26	R-1	2.18	711	2,047	75%	533	1,535	506	0.165				
WEST											MH-175	0.329	2,653	3.487	1.147	18
R1-7	80.85	0.00	80.85	R-1	2.18	176	507	75%	132	380	506	0.041	-	-	1.845	-
R1-8	51.53	0.00	51.53	R-1	2.18	112	323	75%	84	242	506	0.026	-	-	-	-
R1-9	40.39	0.18	40.21	R-1	2.18	88	253	75%	66	190	509	0.020	-	-	-	-
R1-10	27.17	0.00	27.17	R-1	2.18	59	170	75%	44	128	506	0.014	-	-	-	-
R1-11	27.59	8.48	19.11	R-1	2.18	60	173	75%	45	130	731	0.014	-	-	-	-

Town of Brownsburg – Potential Residential Growth Work Sheet

NORTHWEST INTERCEPTOR

Zone	Estate (RE)	R-1	R-2	R-3	Traditional	M-2
Min. Lot Size	65,300 sf lots	20,000 sf lots	12,500 sf lots	9,000 sf lots	4,500 sf lots	32,600 sf lots
Units / Acre	0.67	2.18	3.48	4.84	9.90	10.69

Special Zone Types *(gpd/acre)*		
HI	I	PD
1200	800	800

310	gpd/home
124	Population Equivalent (PE) = 310 gpd /2.88 people per household *1.15 (Safety Factor)

2016-2020 Census Update of Persons per Household = **2.88**

Map Parcel ID	Acres (Approx.)	Flood Hazard Area	Net Developable Acres	Residential Zone	Units per Acre	Potential or Planned Residential Units	Potential New Residental Population	Percentage of Developable Area	Potential New Residential Units per Developable Area	Potential Residential Population per Developable Area	Flow / Gross Acre (gpd/acre)	New Average Flow (mgd)	Population / Population Equivalent	Peaking Factor	Peak Flow (mgd)	Proposed Sewer Diameter (in)
White Lick Creek Estates	91.50	0.00	91.50	R-2	3.48	319	918	75%	239	689	810	0.074	598	3.933	0.292	12
															202.644299	
Additional Areas to Service	181.48	0.00	181.48	R-1	2.18	395	1,138	75%	296	854	506	0.092				
EAST											**MH-152**	0.207	1,670	3.645	0.755	18
												0.281	2,268	3.543	0.996	18
CR 800 N to CR 900 N TOTAL												0.536	4,324	3.303	1.771	24
CR 800 N to Boone County Line TOTAL												1.082	8,729	3.013	3.261	24
CR 700 N to CR 800 N (10- year)																
R1-3	66.02	0.00	66.02	R-1	2.18	144	414	75%	108	311	506	0.033	-	-	-	-
R1-4	58.32	0.00	58.32	R-1	2.18	127	366	75%	95	274	506	0.030	-	-	-	-
R1-5	74.40	0.00	74.40	R-1	2.18	162	467	75%	122	350	506	0.038	-	-	-	-
Preston Estates	43.00	0.00	43.00	R-2	3.48	150	432	75%	112	324	810	0.035				
Additional Areas to Service	107.34	0.00	107.34	R-1	2.18	234	673	75%	175	505	506	0.054				
WEST											**MH-175**	0.190	1,531	3.673	0.697	18
Windridge North	80.00	0.00	80.00	R-2	3.48	279	803	75%	209	602	810	0.065			1.845	
Windridge	72.00	0.00	72.00	R-2	3.48	251	723	75%	188	542	810	0.058				
Creekwood Estates	15.00	0.00	15.00	R-2	3.48	52	151	75%	39	113	810	0.012				
Bethesda LS												0.302				
Windridge Landing LS												0.390				
Additional Areas to Service	125.89	0.00	125.89	R-1	2.18	274	790	75%	206	592	506	0.064				
												0.199	1,605	3.658	0.728	18
EAST											**MH-132**	0.892	7,191	3.095	2.760	18
CR 700 N to CR 800 NTOTAL												1.082	8,722	3.013	3.259	24 transition to 30
CR 700 N to Boone County Line TOTAL												2.164	17,451	2.712	5.869	24 transition to 30

Town of Brownsburg – Potential Residential Growth Work Sheet

SOUTHWEST AREAS

Zone	Estate (RE)	R-1	R-2	R-3	Traditional	M-2
Min. Lot Size	65,300 sf lots	20,000 sf lots	12,500 sf lots	9,000 sf lots	4,500 sf lots	32,600 sf lots
Units / Acre	0.67	2.18	3.48	4.84	9.90	10.69

Special Zone Types (*gpd/acre*)		
HI	I	PD
1200	800	800

310	gpd/home
124	Population Equivalent (PE) = 310 gpd /2.88 people per household *1.15 (Safety Factor)

2016-2020 Census Update of Persons per Household = **2.88**

Map Parcel ID	Acres (Approx.)	Flood Hazard Area	Net Developable Acres	Residential Zone	Units per Acre	Potential or Planned Residential Units	Potential New Residental Population	Percentage of Developable Area	Potential New Residential Units per Developable Area	Potential Residential Population per Developable Area	Flow / Gross Acre (gpd/acre)	New Average Flow (mgd)	Population / Population Equivalent	Peaking Factor	Peak Flow (mgd)	Proposed Sewer Diameter (in)	Proposed FM Diameter (in)
SOUTHWEST LS (20- year)																	
R2-3	14.04	0.00	14.04	R-1	2.18	31	88	75%	23	66	506	0.007	-	-	-	-	-
R2-4	75.01	0.00	75.01	R-3	4.84	363	1,046	75%	272	784	1,125	0.084	-	-	-	-	-
RE73	88.68	0.00	88.68	Estate (RE)	0.67	59	170	75%	44	128	155	0.014	-	-	-	-	-
R1-44	32.84	0.00	32.84	R-1	2.18	72	206	75%	54	155	506	0.017					
R1-45	18.55	0.32	18.22	R-1	2.18	40	116	75%	30	87	515	0.009					
R1-46	70.63	0.00	70.63	R-1	2.18	154	443	75%	115	332	506	0.036					
R1-47	41.64	0.00	41.64	R-1	2.18	91	261	75%	68	196	506	0.021	-	-	-	-	-
R1-48	56.94	0.00	56.94	R-1	2.18	124	357	75%	93	268	506	0.029	-	-	-	-	-
R1-49	80.05	0.00	80.05	R-1	2.18	174	502	75%	131	377	506	0.041	-	-	-	-	-
R1-50	34.16	0.00	34.16	R-1	2.18	74	214	75%	56	161	506	0.017					
Tilden Terrace	34.45	0.00	34.45	R-2	3.48	120	346	75%	90	259	810	0.028					
Pleasant Vue Estates	47.00	0.00	47.00	R-2	3.48	164	472	75%	123	354	810	0.038					
Additional Areas to Service	556.54	0.00	556.54	R-1	2.18	1,212	3,491	75%	909	2,618	506	0.282					
WEST												0.376	3,036	3.438	1.294	18	
												0.246					
SOUTHWEST LS AREA										5,784	**MH-166, MH-169**	0.623	5,021	3.243	2.019	24	16
												432.730			**1,402.35**	694	
US-136 Area (10- year)								75%									
TR-7	35.11	0.00	35.11	Traditional	9.90	348	1,001	75%	261	751	2,302	0.081	-	-	-	-	-
TR-6	51.72	3.34	48.38	PD	0.00	137	395	75%	103	296	800	0.039	-	-	-	-	-
M2-7	20.47	0.00	20.47	M-2	10.69	219	630	75%	164	473	2,485	0.051	-	-	-	-	-
M2-8	31.27	0.00	31.27	M-2	10.69	334	963	75%	251	722	2,485	0.078	-	-	-	-	-
M1-1	28.39	0.00	28.39	R-3	4.84	137	396	75%	103	297	1,125	0.032					
MU-1	32.33	0.00	32.33	Industrial	0.00	0	0	75%	0	0	800	0.026					
MU-2	35.42	0.00	35.42	Industrial	0.00	0	0	75%	0	0	800	0.028					
R1-41	11.68	0.00	11.68	R-1	2.18	25	73	75%	19	55	506	0.006					
R1-42	31.14	0.00	31.14	PD	0.00	0	0	75%	0	0	800	0.025					
R1-43	32.82	0.00	32.82	PD	0.00	0	0	75%	0	0	800	0.026					
Henderson	19.50	0.00	19.50	R-2	3.48	68	196	75%	51	147	810	0.016					
												0.158	1,273	3.730	0.589		
US-136 AREA										2,740	**MH-161**	0.407	3,283	3.409	1.388	18	
CREEK BY THE WOODS LS (10- year)																	
R2-2	39.82	0.00	39.82	R-1	2.18	87	250	75%	65	187	506	0.020					
Green Hills Estates	48.50	0.00	48.50	R-2	3.48	169	487	75%	127	365	810	0.039					
GREEN HILLS LS AREA										552		0.059	479	3.984	0.237		6
															164.48		
The Creek by the Woods	21.00	0.00	21.00	R-2	3.48	73	211	75%	55	158	810	0.017					
CREEK LS AREA										158		0.017	137	4.203	0.072	12	4
															49.67		
LEWIS LS (10- year)																	

Town of Brownsburg – Potential Residential Growth Work Sheet

SOUTHWEST AREAS

Zone	Estate (RE)	R-1	R-2	R-3	Traditional	M-2
Min. Lot Size	65,300 sf lots	20,000 sf lots	12,500 sf lots	9,000 sf lots	4,500 sf lots	32,600 sf lots
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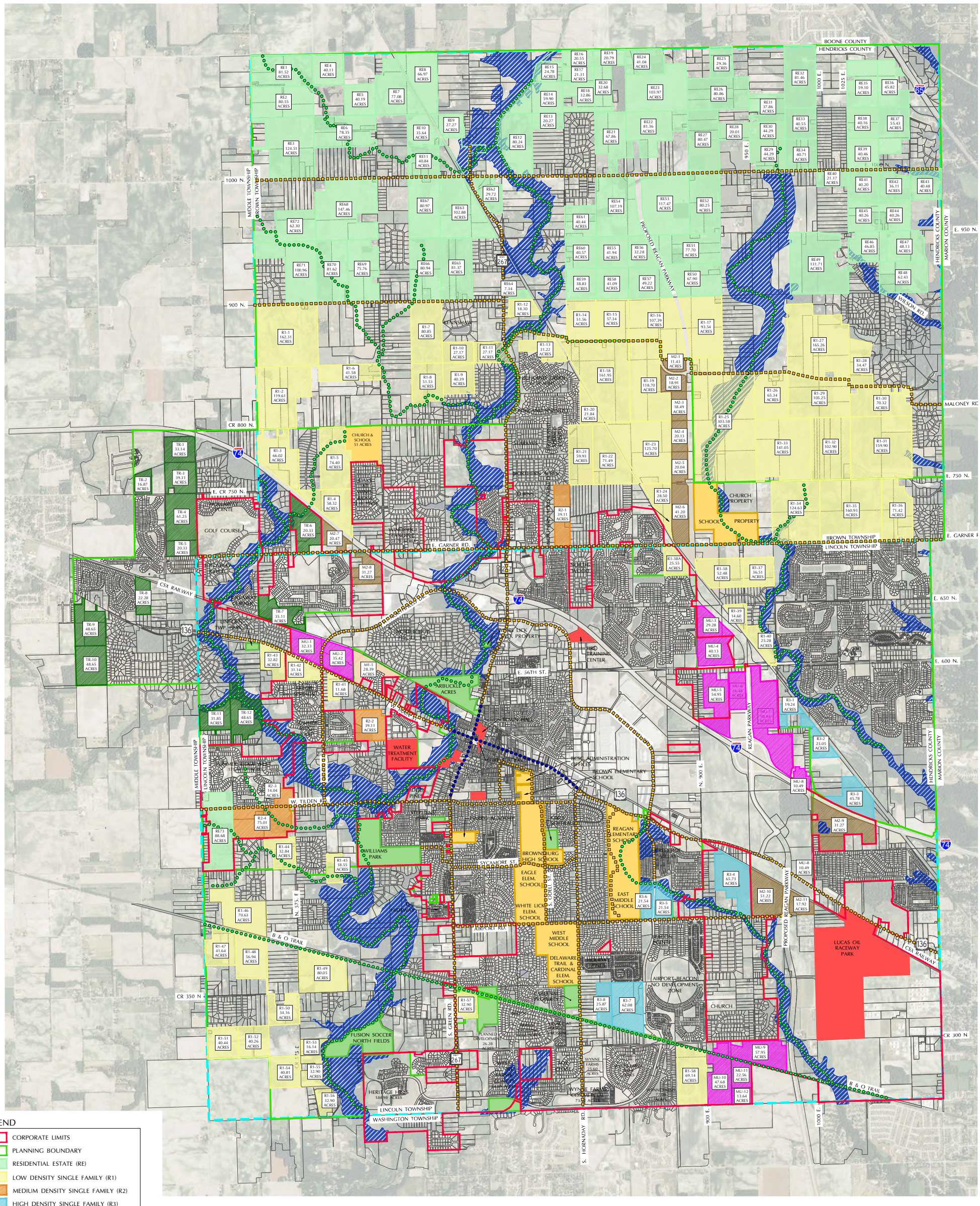
Lewis Woods	31.00	0.00	31.00	R-2	3.48	108	311	75%	81	233	810	0.025					
Lewis Lake - West	15.00	0.00	15.00	R-2	3.48	52	151	75%	39	113	810	0.012					
Lewis Lake - East	8.30	0.00	8.30	R-2	3.48	29	83	75%	22	62	810	0.007					
LEWIS LS AREA										409		0.044	355	4.046	0.178	12	4
												31			**123.62**		
SUMMER RIDGE WEST LS (10- year)																	
TR-11	31.85	3.29	28.56	Traditional	9.90	315	908	75%	237	681	2,567	0.073	-	-	-	-	-
TR-12	55.03	20.46	34.57	Traditional	9.90	545	1,569	75%	409	1,177	3,664	0.127	-	-	-	-	-
Summer Ridge West LS												0.576					
SUMMER RIDGE WEST LS AREA											**MH-168**	0.776	6,258	3.153	2.447		8
SUMMER RIDGE WEST LS AREA + SOUTHWEST REGIONAL LS												**1.399**	11,279	2.903	4.060		16

Appendix B

Town of Brownsburg Recreation Zone Improvement Plan 2022-2031

TOWN OF BROWNSBURG

2022 RECREATION IMPACT FEE STUDY



JUNE 2022

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