Town of River Bend

Flood Resiliency Action Plan (FRAP)

Town of River Bend, North Carolina
45 Shoreline Drive
River Bend, NC 28562

252-638-3870

www.riverbendnc.org

September 18, 2025

1.0 Purpose

This Flood Resiliency Action Plan (FRAP) is designed to assist the town in identifying critical public infrastructure, specifically its water and sewer systems, part of which lie within areas that are vulnerable to flooding. Herein, collectively, these features will be referred to as "assets". The assets have been mapped and identified as a whole and in greater detail within sections of the FRAP. The town used the map data to develop an action plan to mitigate flood damage to its assets.

With funding from the North Carolian Division of Water Infrastructure, the town completed an Asset Inventory Analysis (AIA) of its water and sewer systems in 2025. The town is currently developing an AIA for its stormwater system. These AIA's were professionally developed through the collaboration of a professional engineering firm and town staff. The AIA's include maps of the systems. This mapping is essential to both the town's daily operation and maintenance of the systems, as well as for long-term planning, such as is the purpose of this FRAP.

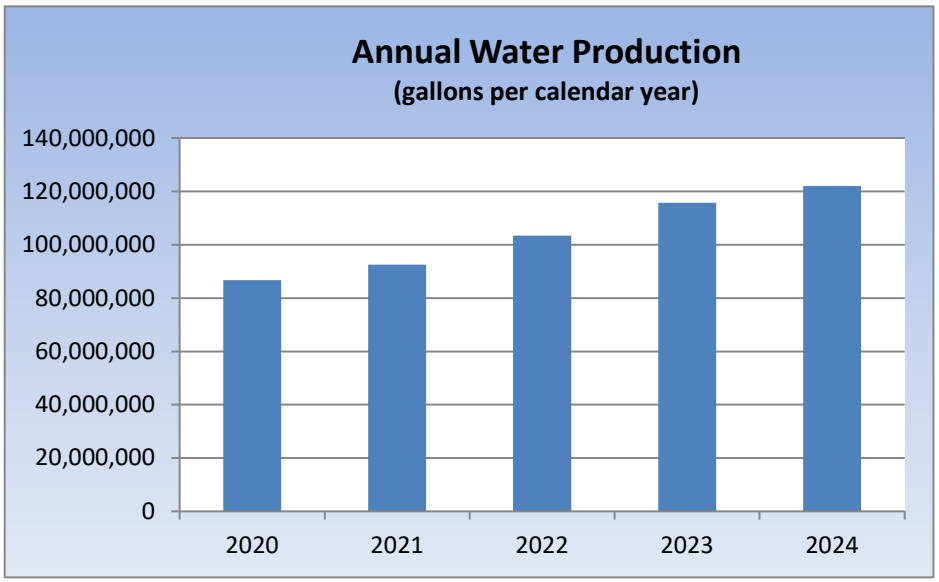
After asset identification, town staff assessed the assets relative to their overall importance to the town's operations, their vulnerability to flooding and their importance in the delivery of critical services. Based on this prioritization, the town can use that data to help develop long-term budget planning through the annual budget process and through even longer-term planning through the town's Capital Improvement Plan (CIP).

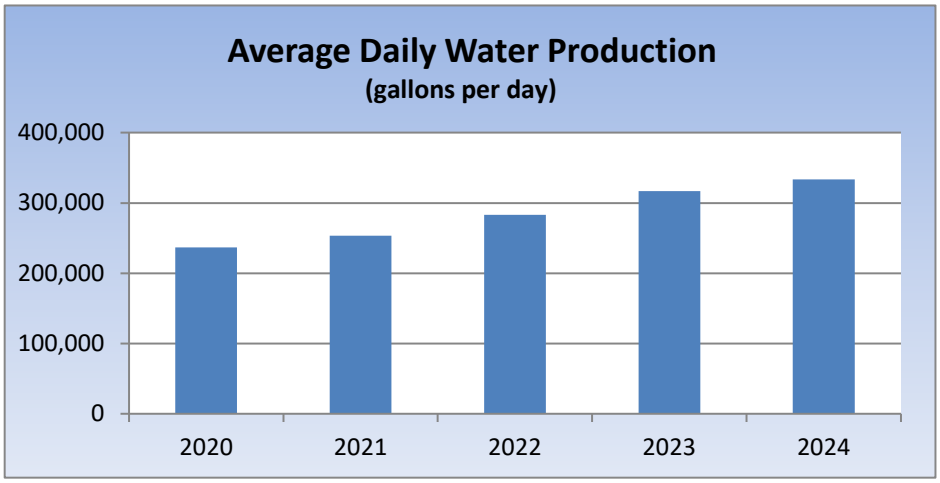
The FRAP will serve as a planning tool but due to numerous variables, the projects may not necessarily be completed in the exact order of priority. For example, if grant funding is received or anticipated to address a project, the town may move onto another project while those funds are being utilized. Also, as the town is developed and population density changes and new infrastructure is installed or existing infrastructure is stressed, being pragmatic about project prioritization may become necessary.

This plan will be reviewed annually by the Town Manager and Public Works Director with the intent to update the project priority list at least every five years. Since assets have long life expectancy, the goal is to plan for projects up to 10 years out.

2.0 Water System

The town's water system consists of 3 wells, 3 treatment units, 2 elevated water tanks (with a combined capacity of 400,000 gallons) and 19 miles of pipe. The system has a capacity to produce 925,000 gallons per day. The town utilizes ground water as its source of raw water. As of 2024, the town has about 1,500 water customers and produced an average of 335,937 gallons of water per day. See historical data below.

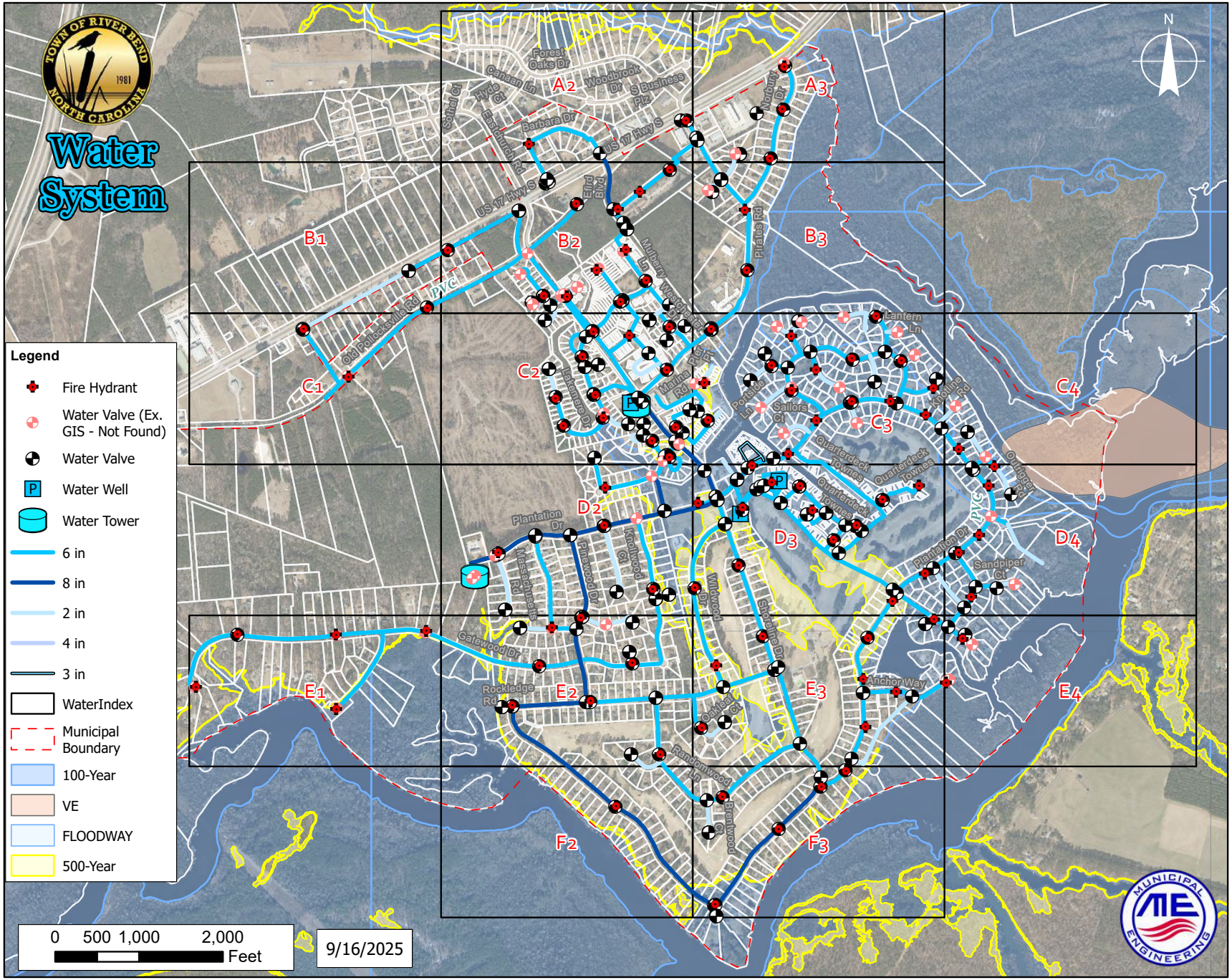




About 30% of the town's water system is located within the 100-year floodplain. That includes 2 of 3 wells and 2 of 3 treatment units which are within the 100-year floodplain and therefore are more vulnerable to flooding.

2.1 Water System Maps

Following are maps of the water system. The first map shows a bird's eye view of the entire water system. The following 18 pages show close-up details of each map panel.


Water System
TOWN OF RIVER BEND
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NORTH CAROLINA
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Water Valve
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Barbara Dr
Woodbrook Dr
S Business Plz
Forest Oaks Dr
Canaan Ln
Hyde Ct
Sorrel Ct
Bandwich Rd
Enid Blvd
Norbury Dr
Pirates Rd
Mulberry Wood Ln
Old Pollocksville Rd
PVC
Latimer Dr
Martha Plant Rd
Lantern Ln
Portside Ln
Sailors Ct
Knowline Rd
Quarterdeck Townes
Outrigger Rd
Plantation Dr
Sandpiper Ct
Mesquite Rd
Bluewood Dr
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Gatewood Dr
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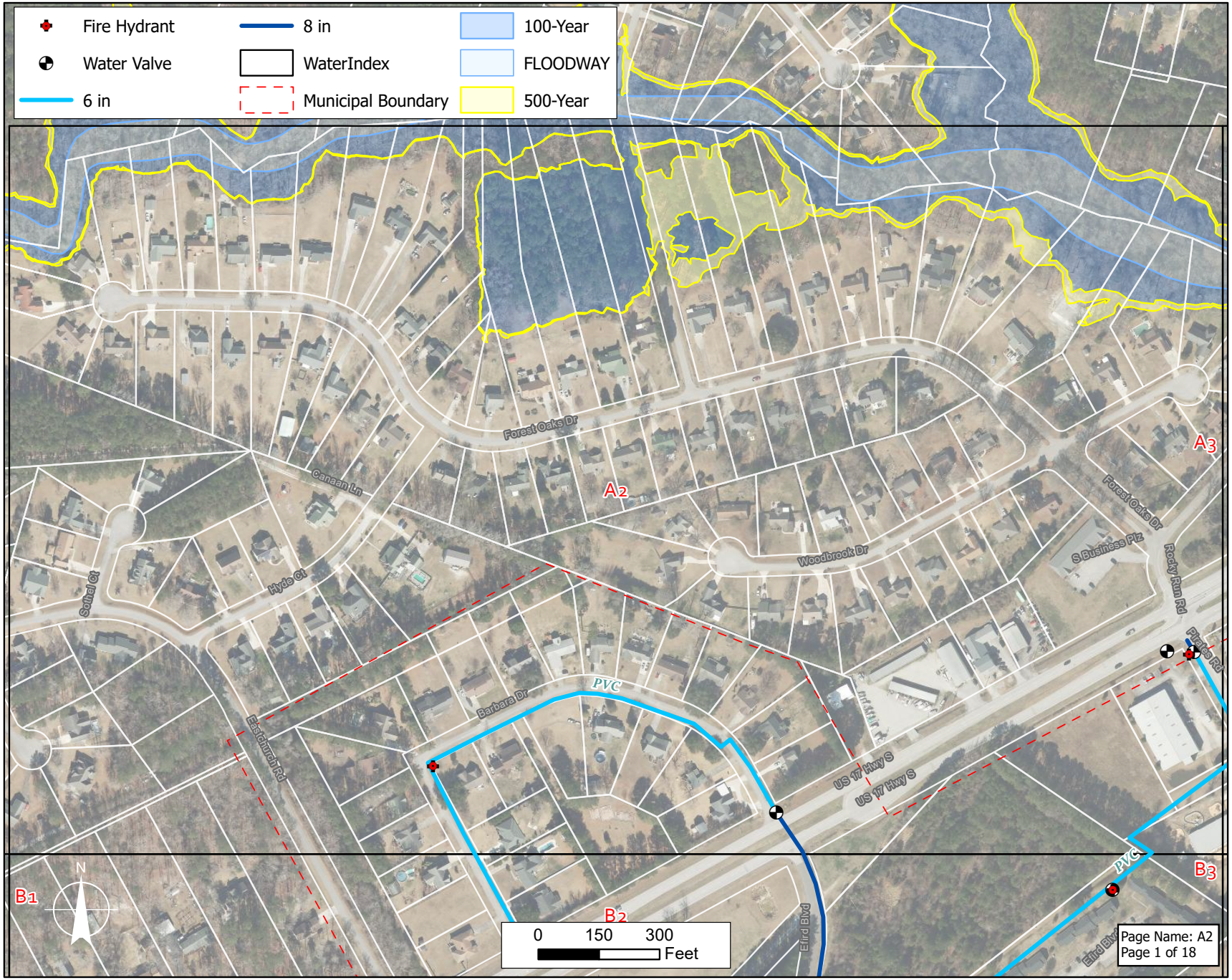
Oakleaf Ct
Randonwood Ln
Brentwood Ct
Shoreline Dr
Anchor Way
MUNICIPAL ENGINEERING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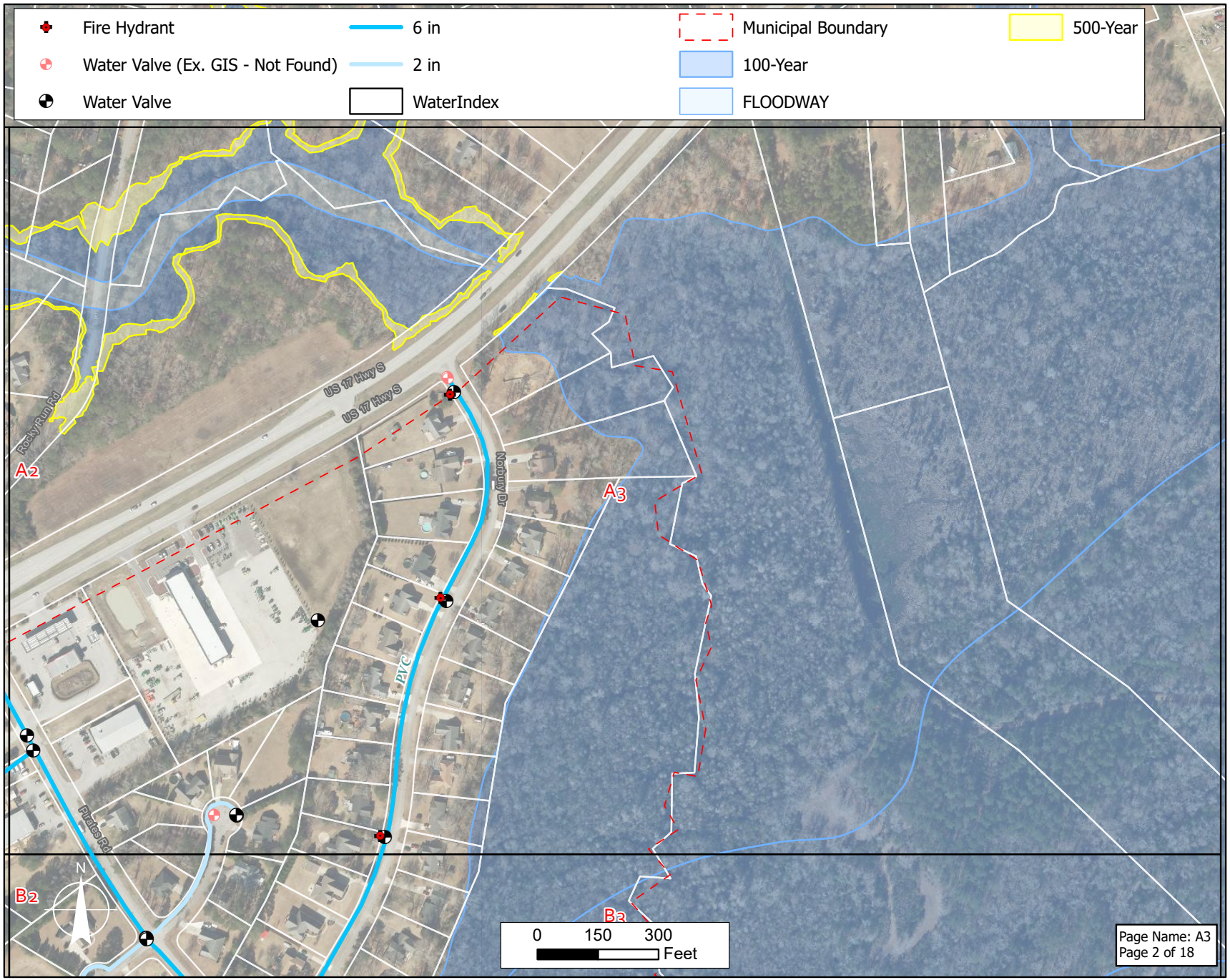
Page 1 of 18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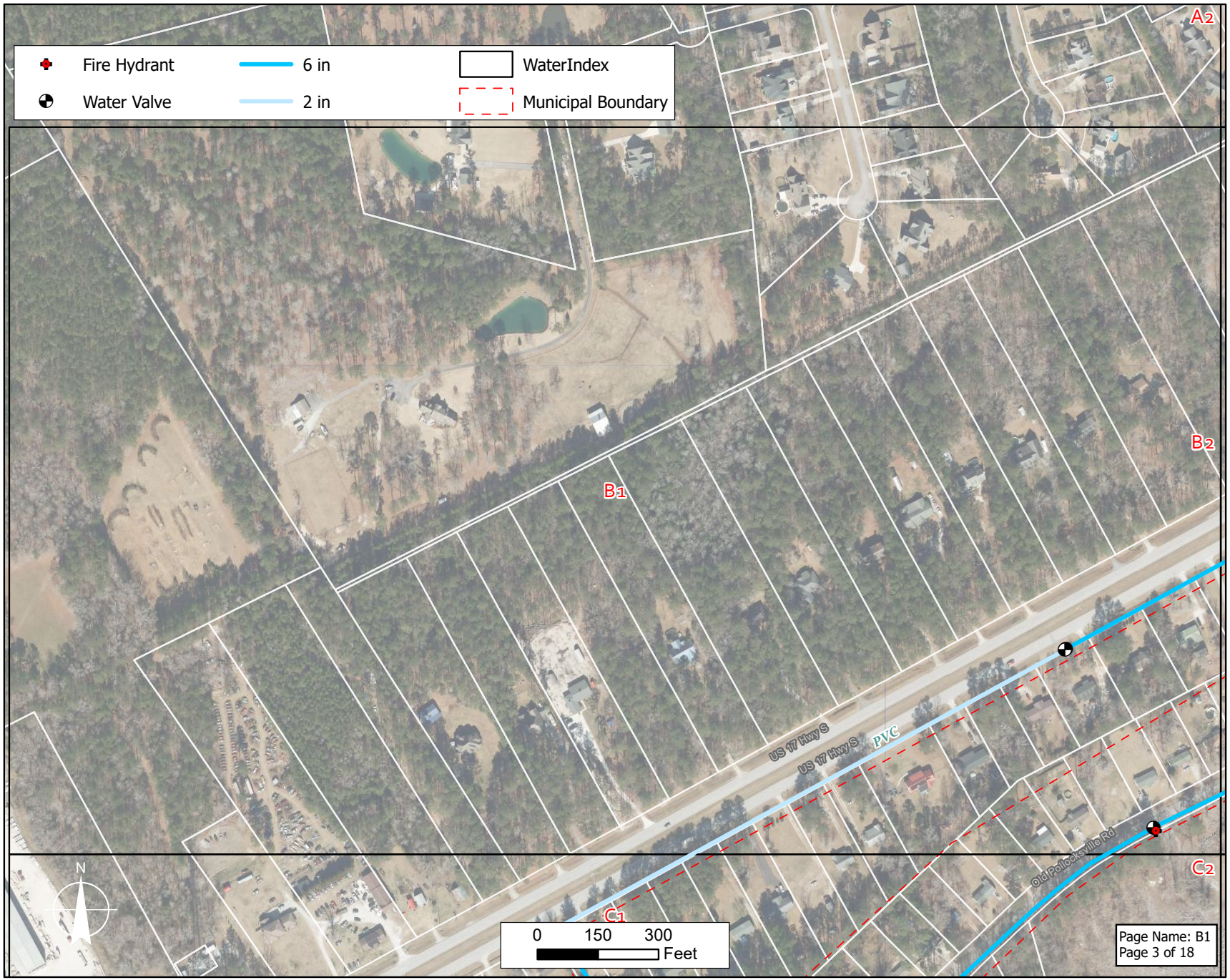
Page 2 of 18


Fire Hydrant
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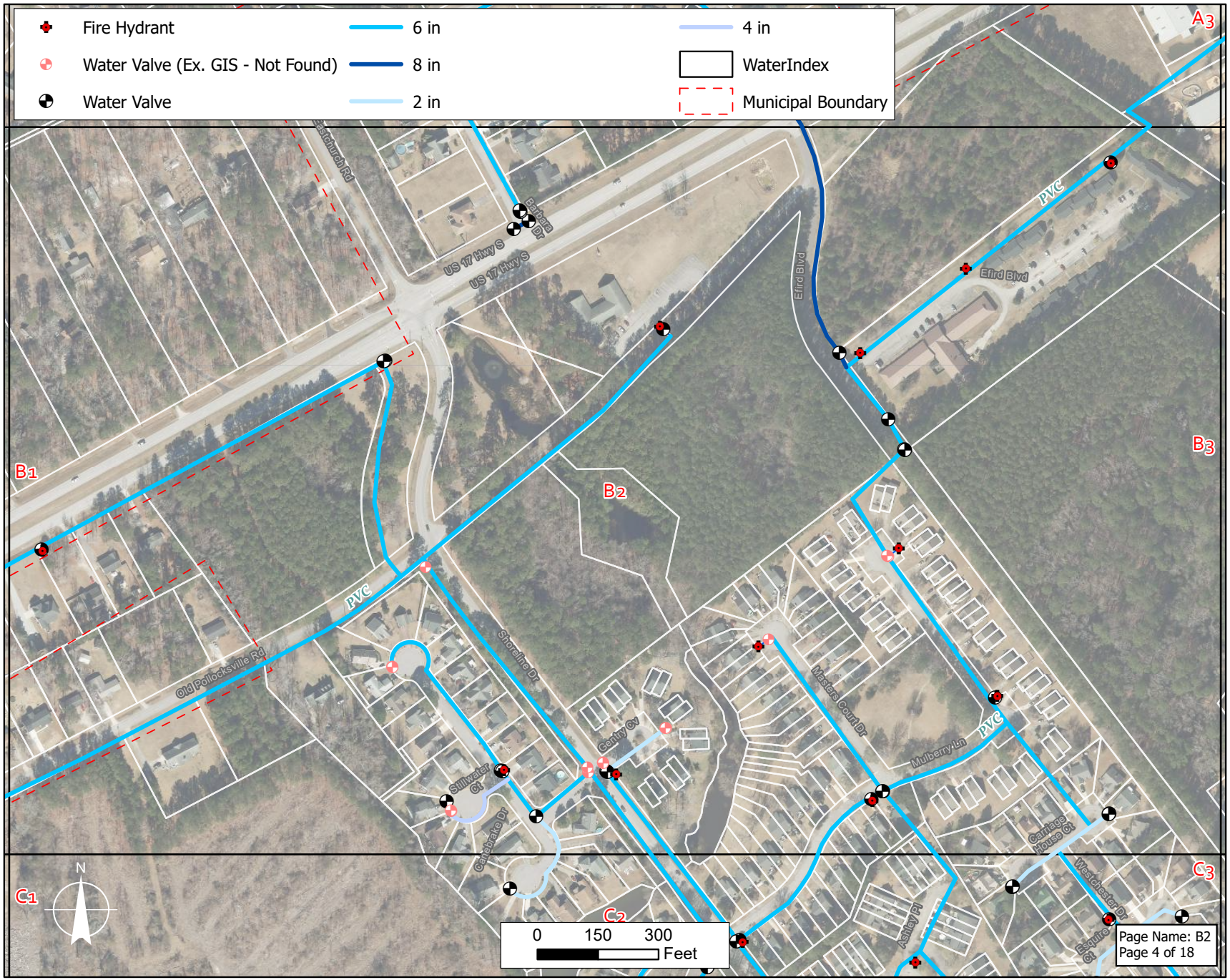
Page 3 of 18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Masters Court Dr
Mulberry Ln
Stillwater Ct
Gamebake Dr
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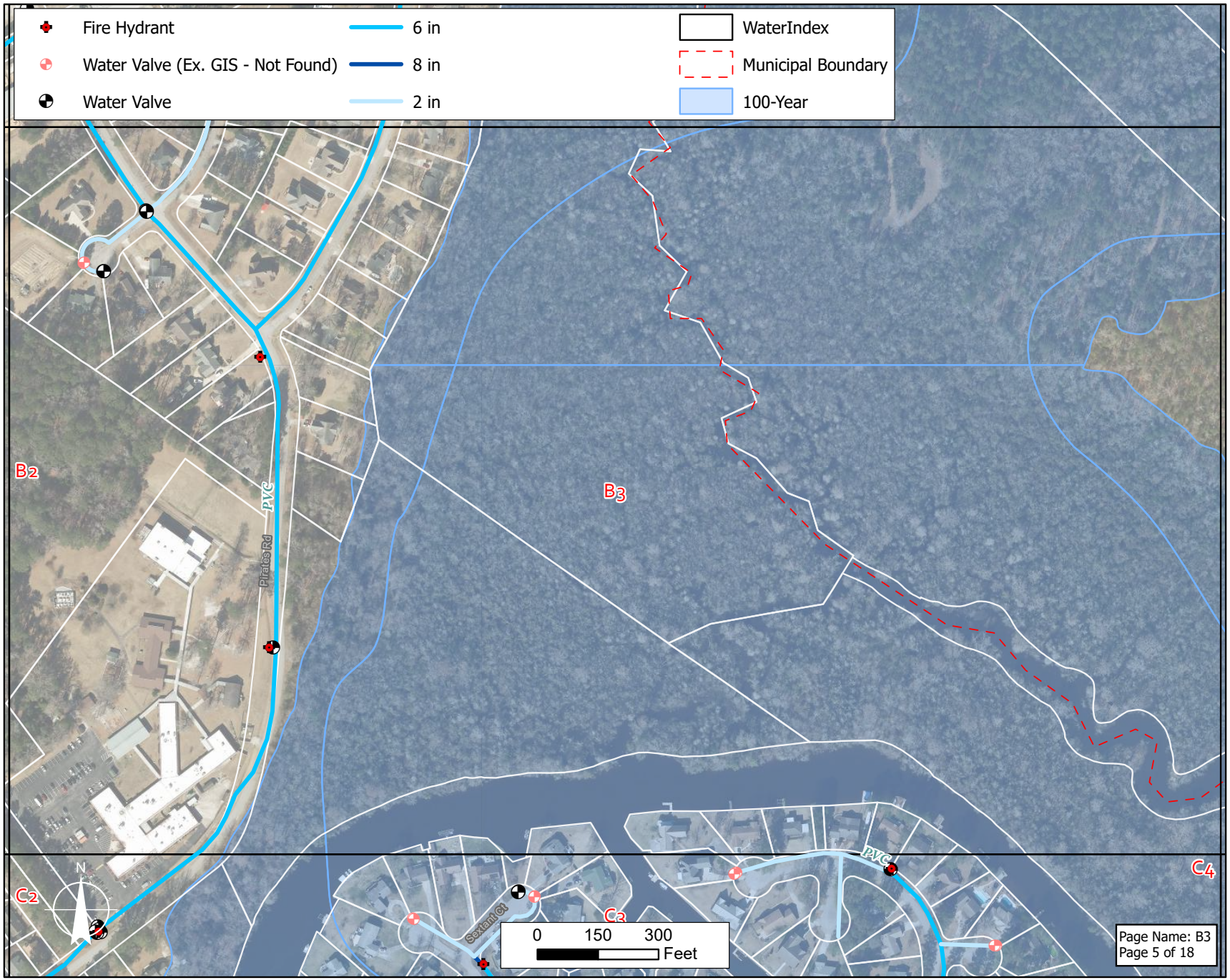
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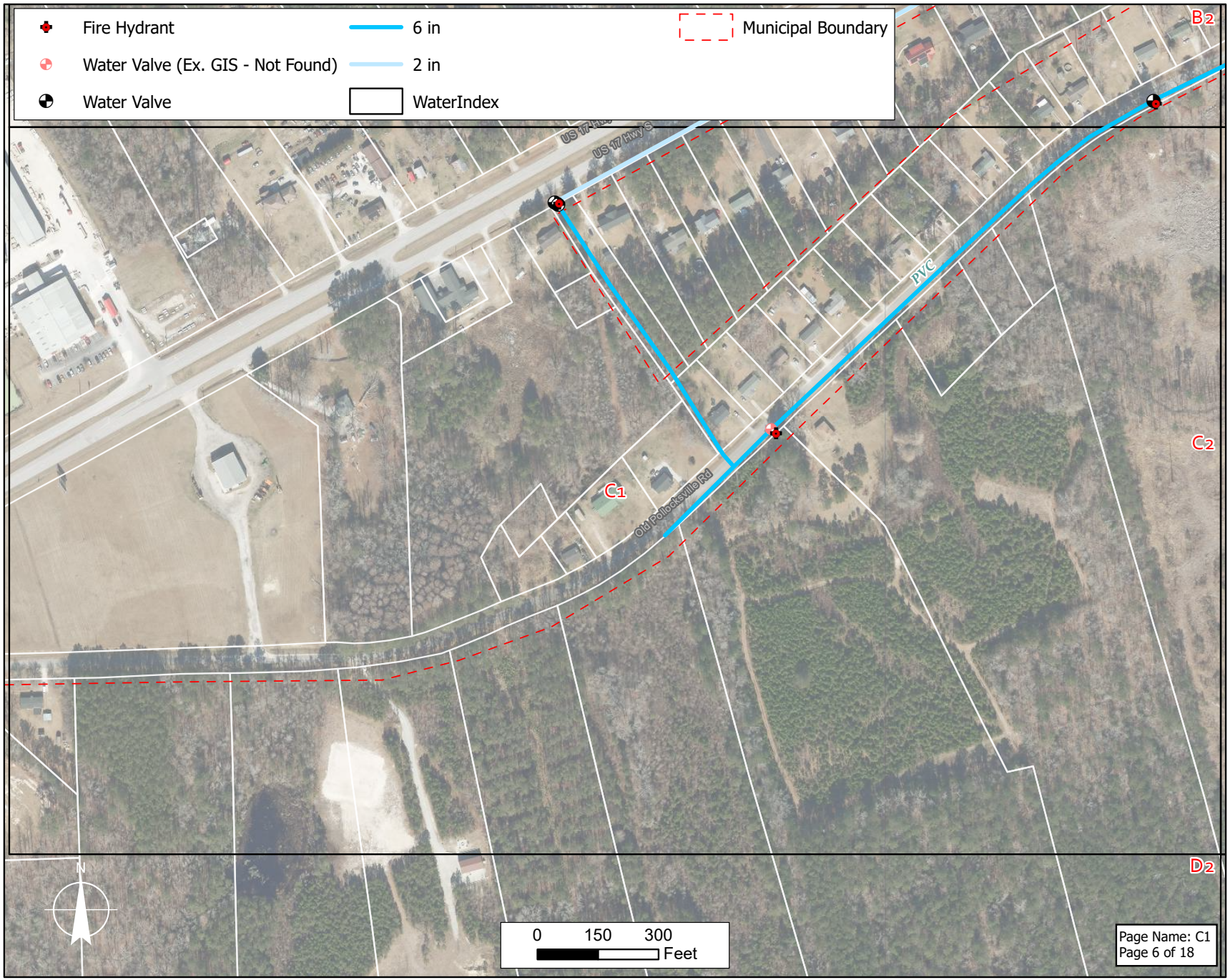
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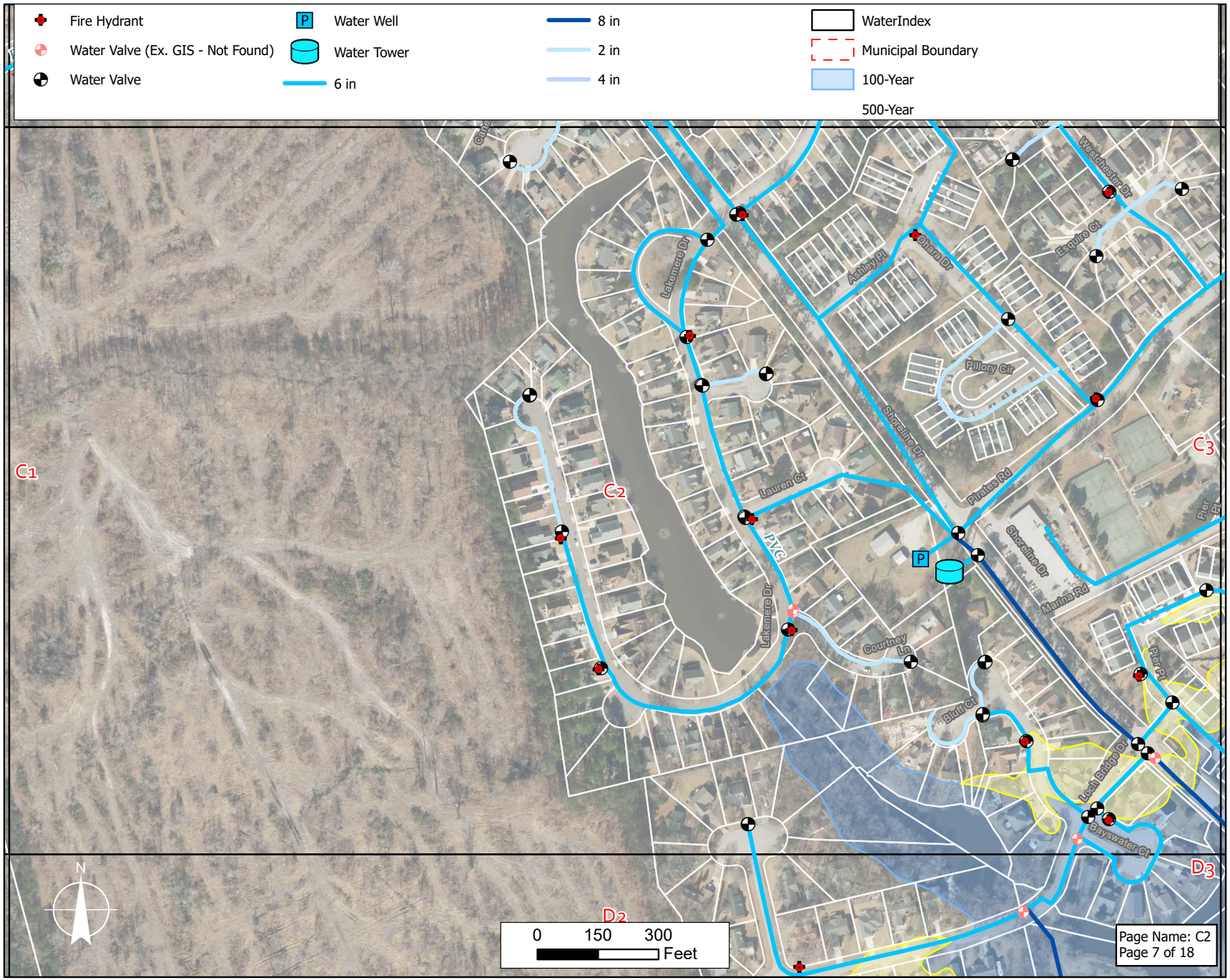
Page 6 of 18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O'Hara Dr
Westchester Dr
Esquire Ct
Pillory Cir
Shoreline Dr
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Lauren Ct
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Courtney Ln
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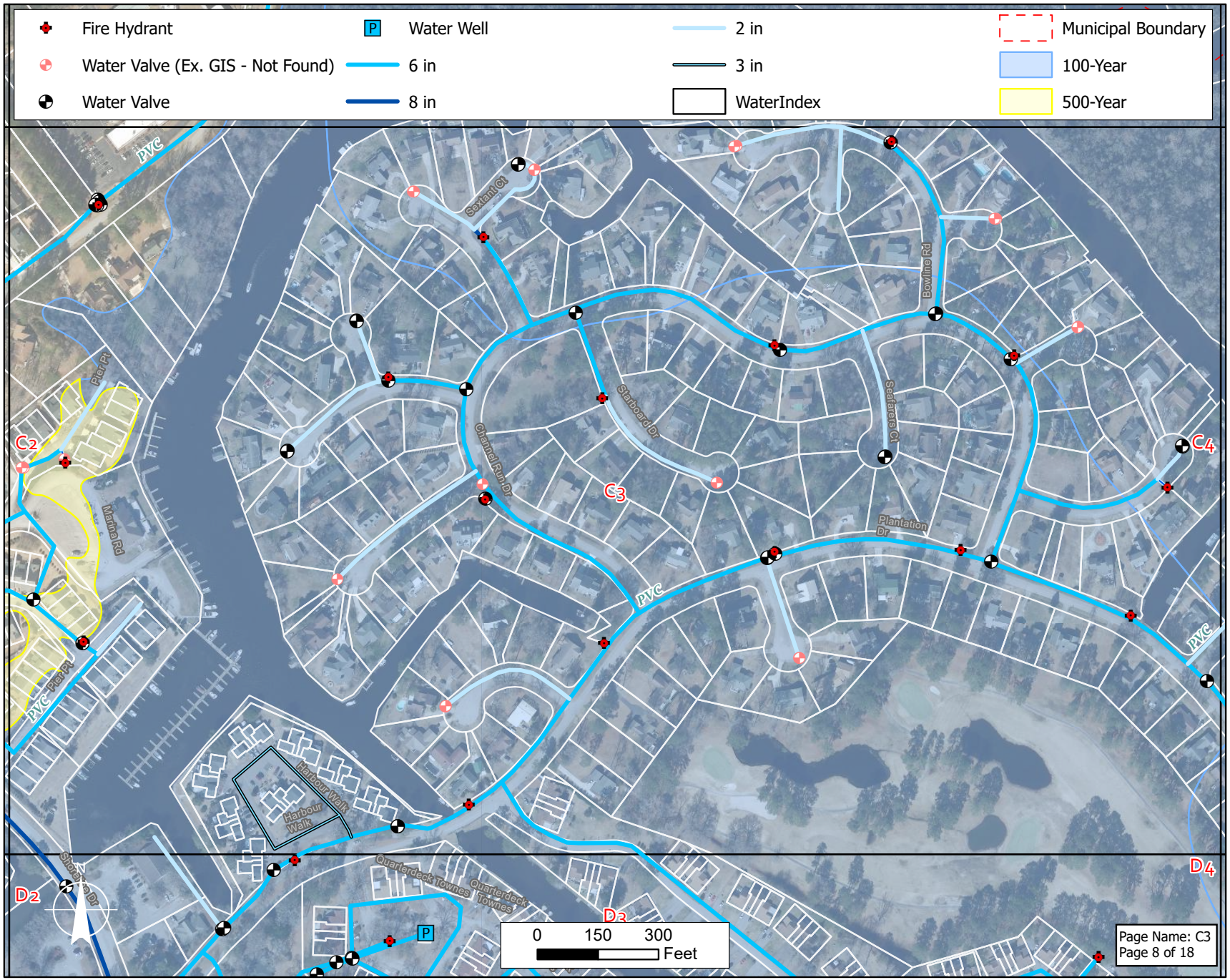
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Sextant Ct
Bowline Rd
Starboard Dr
Seafarers Ct
Channel Run Dr
Plantation Dr
Pier Pl
Marina Rd
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Harbour Walk
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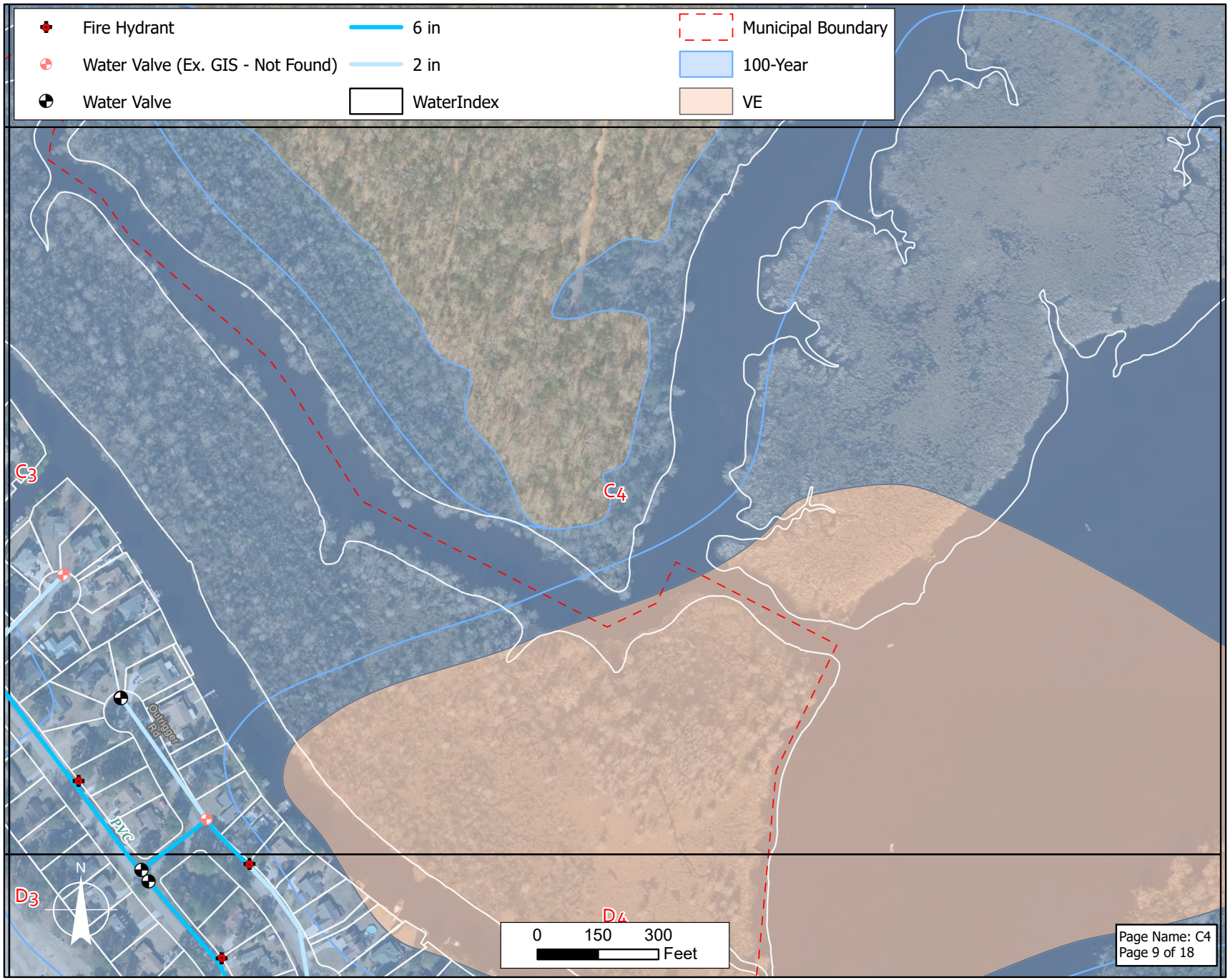
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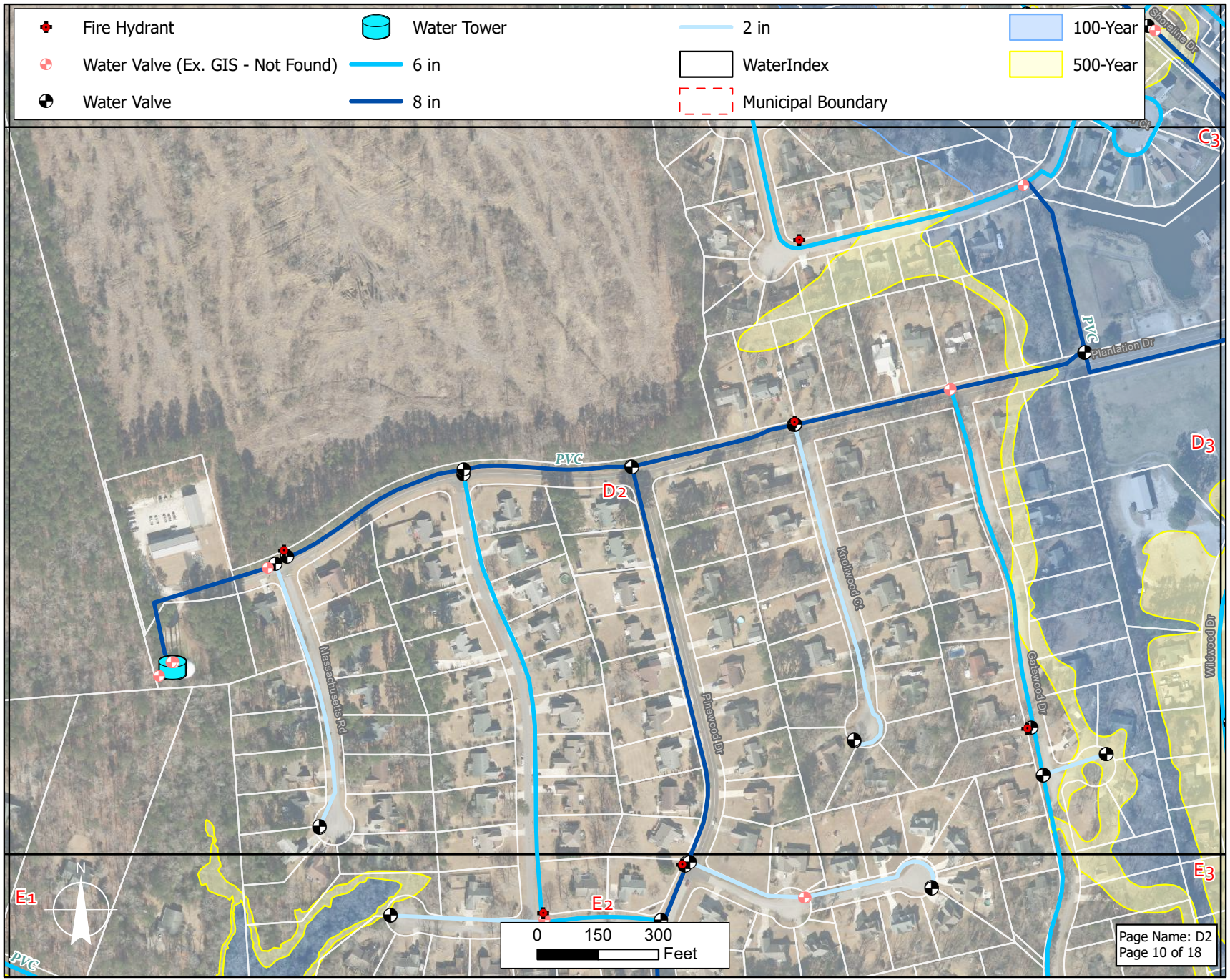
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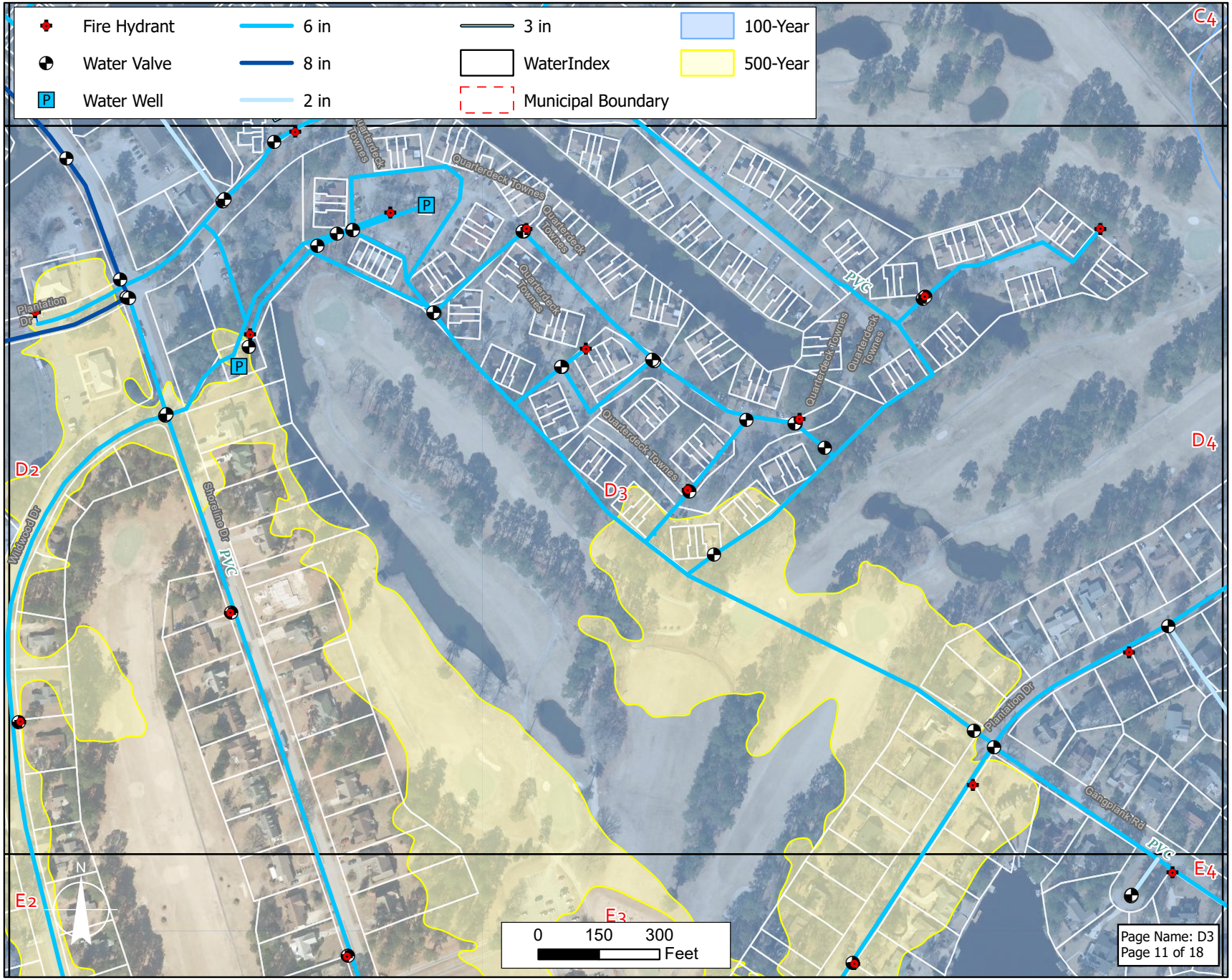
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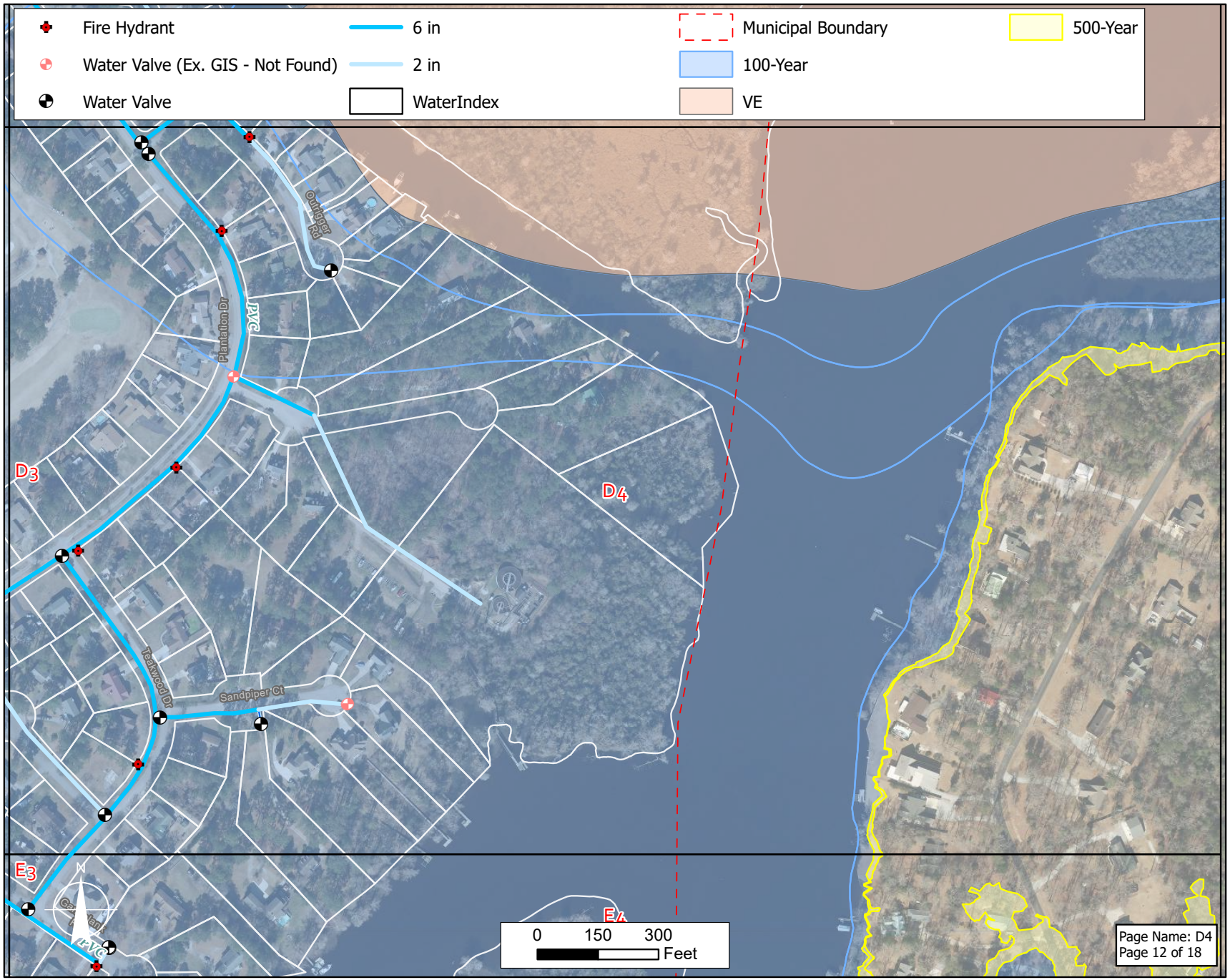
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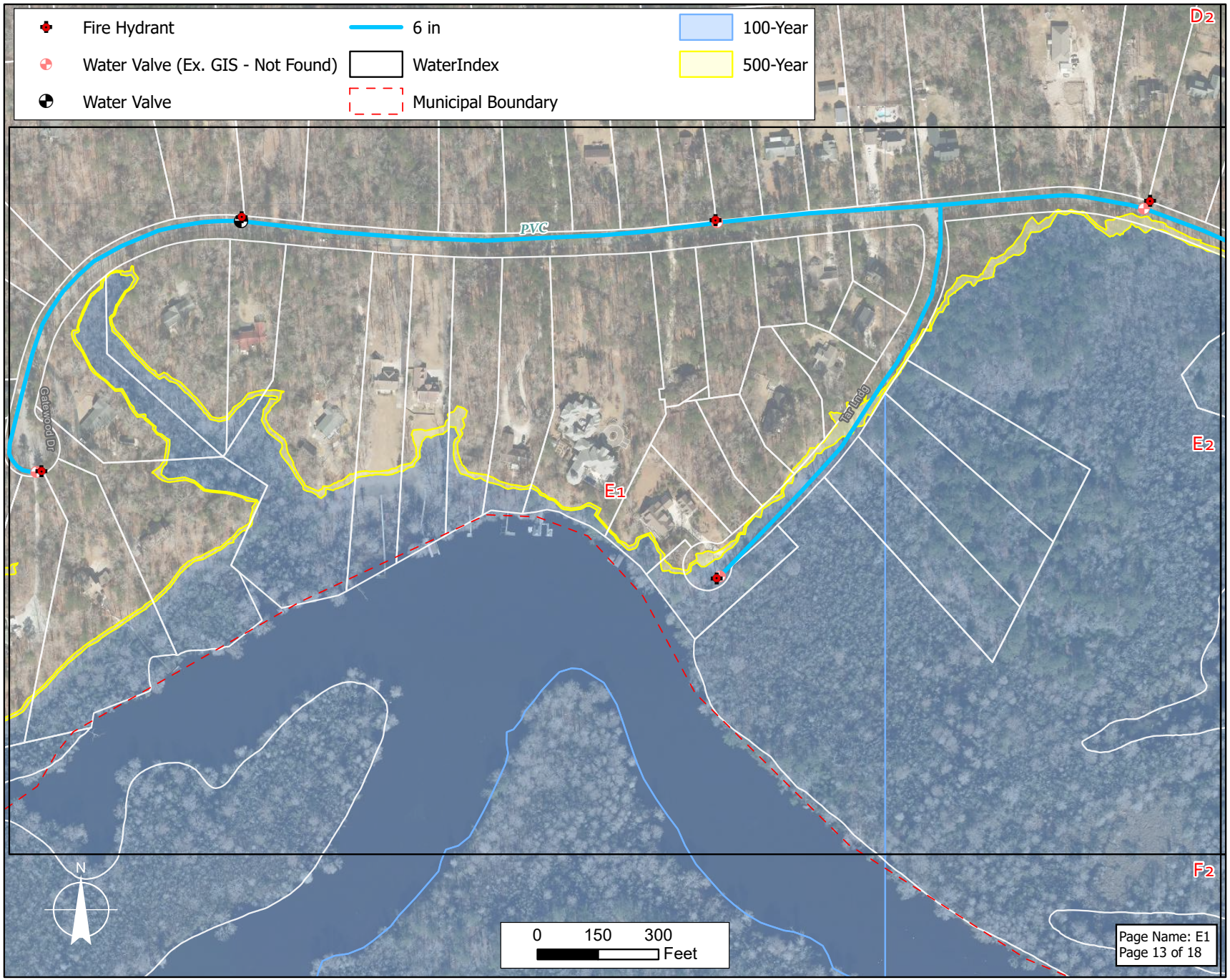
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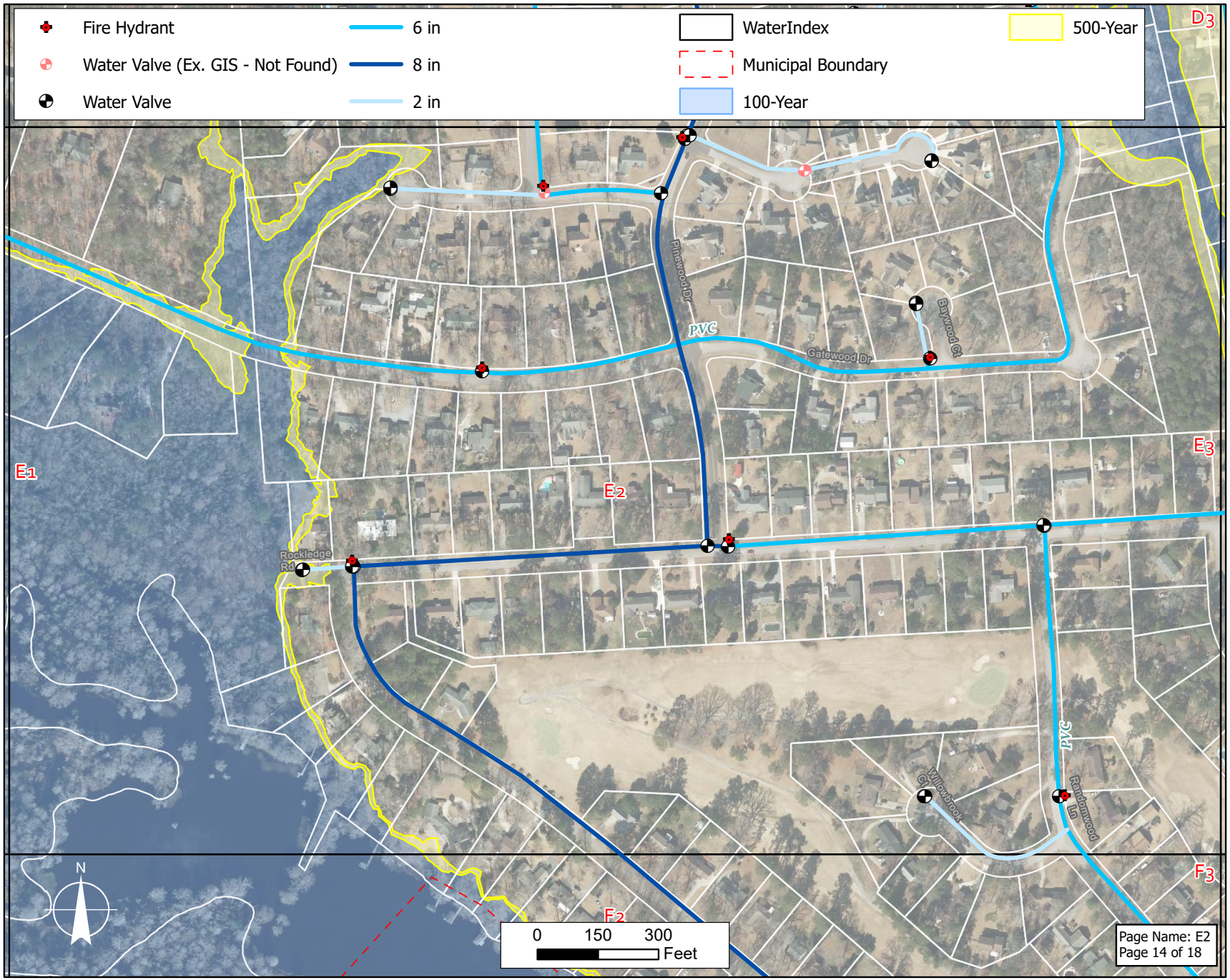
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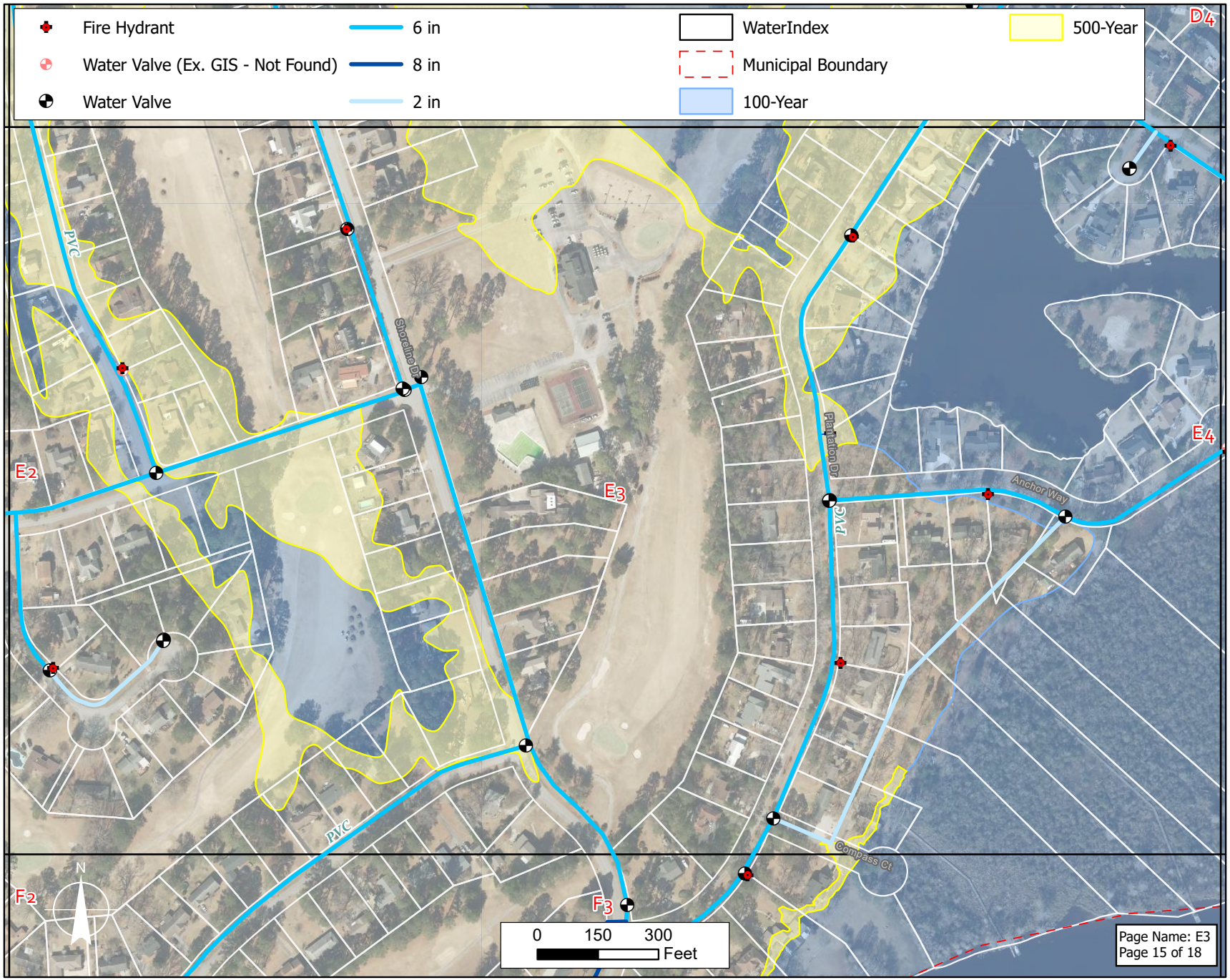
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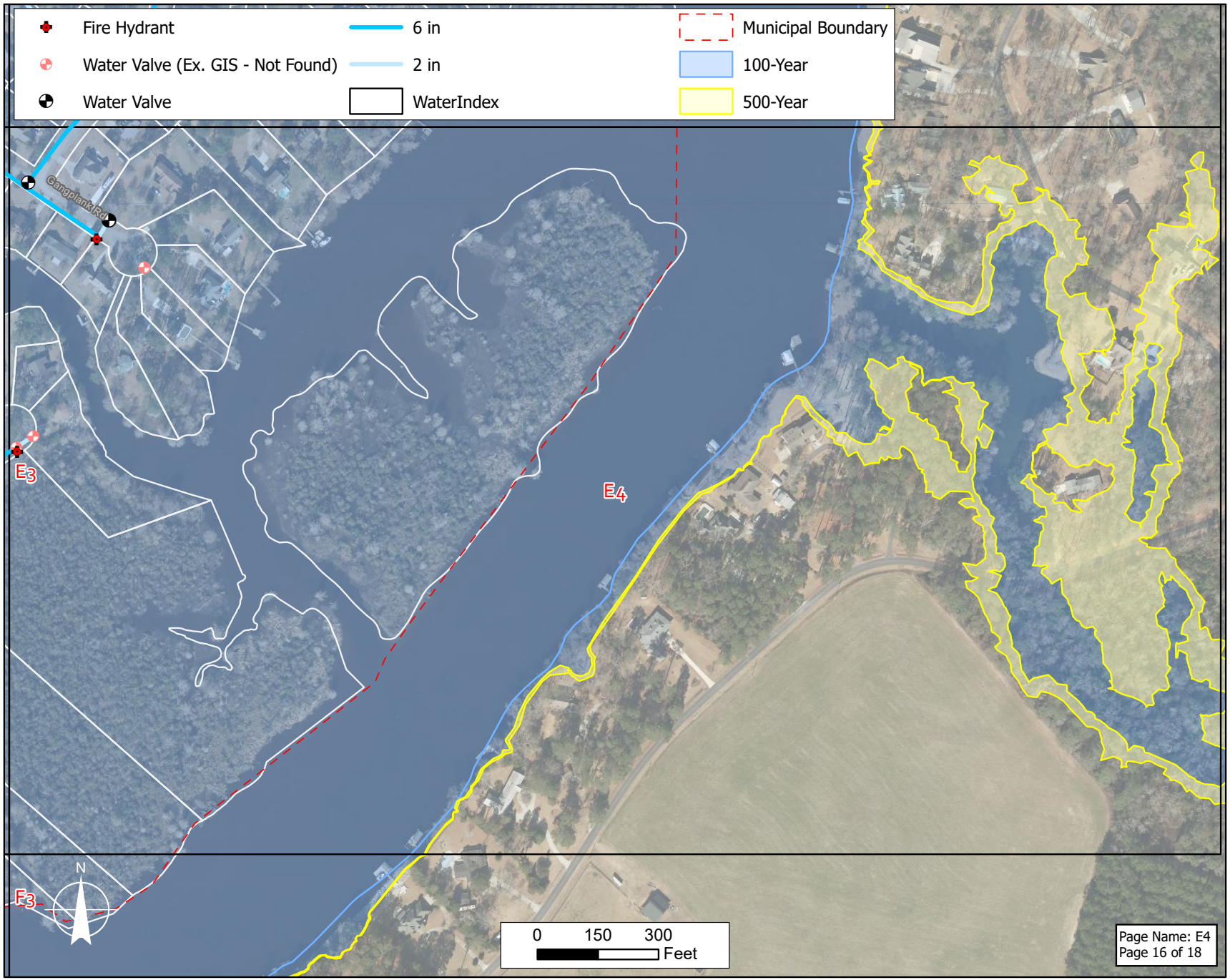
Page 15 of 18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Page 16 of 18


Fire Hydrant
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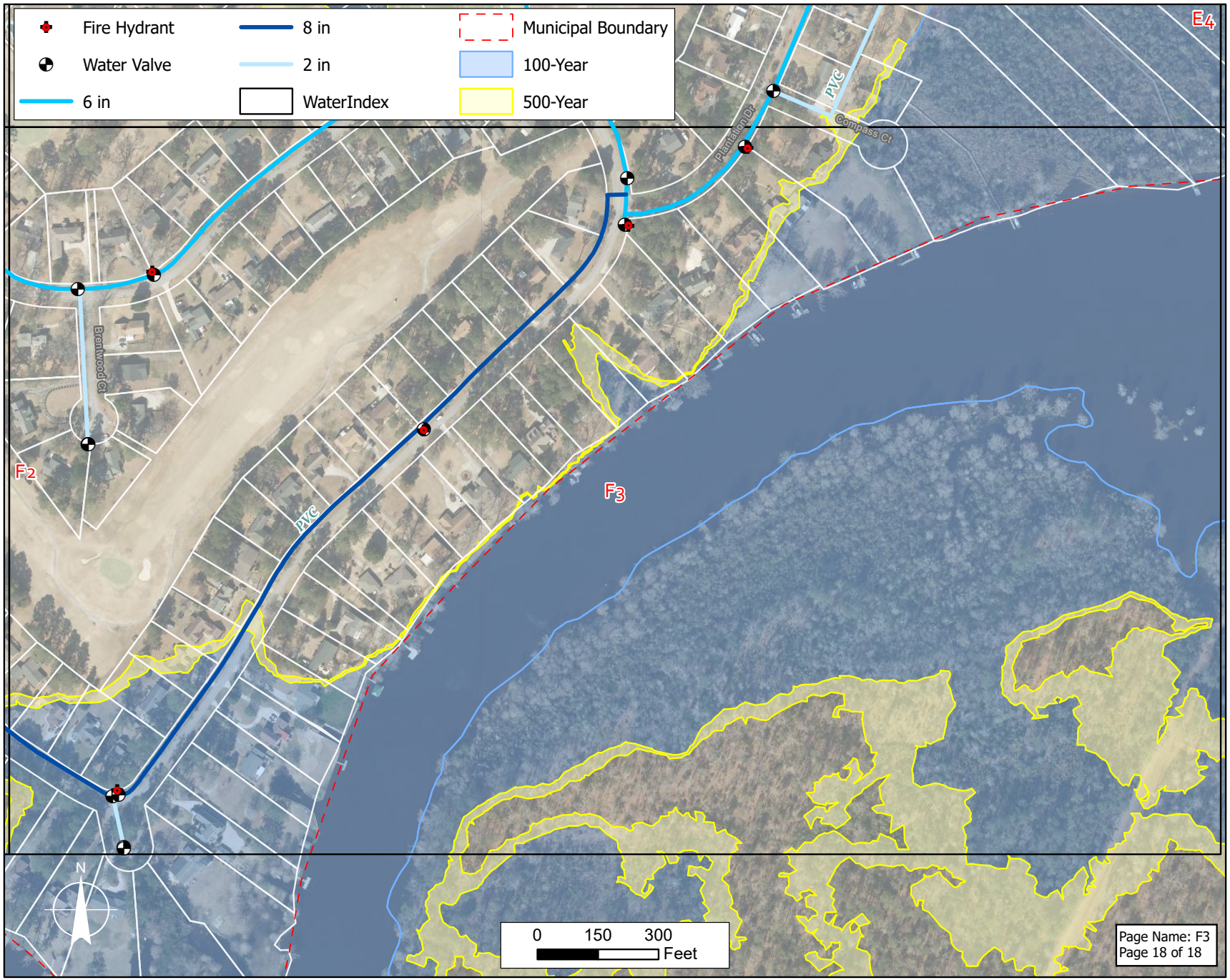
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Page 18 of 18

2.2 Water Asset Vulnerability

Following is a list of the most vulnerable components of the town's water system in order of priority action for resiliency.

Priority Rank	Asset	Address	Flood Zone	Project Scope/Action	Estimated Cost
1	Well # 1	52 Shoreline Drive	AE	relocate	$ 2,000,000
2	Well #2	30B Quarterdeck	AE	relocate	2,000,000
3	Treatment Unit #1	52 Shoreline Drive	AE	relocate	5,000,000
4	Treatment Unit #2	52 Shoreline Drive	AE	relocate	5,000,000
5	Well #3	25B Shoreline Drive	X	relocate	2,000,000
6	Treatment Unit #3	25B Shoreline Drive	X	relocate	5,000,000
7	Backup Generator for #1 & #2	52 Shoreline Drive	AE	relocate	100,000
8	Backup Generator for #3	25B Shoreline Drive	X	relocate	100,000
				GRAND TOTAL	**$ 21,200,000**

2.3 Water System Action Plan

The most effective flood mitigation strategy is to relocate vulnerable assets to outside of the flood hazard area. The town has received funding to construct a new water treatment plant and 2 new wells on property that is located outside of the 500-year flood plain. This project will relocate all assets listed above that are within the AE flood zone to a Zone X area.

In the future, when system expansion is required, the town will consider the location of new equipment relative to its flood hazard vulnerability and take steps to either avoid location within a floodplain or flood proof structures that must be located within a floodplain. Part of the floodproof strategy will include elevating system components above the base flood elevation, plus an additional 2 feet of freeboard, in accordance with the town's Flood Damage Prevention Ordinance.

2.4 Water System Capital Improvement Planning

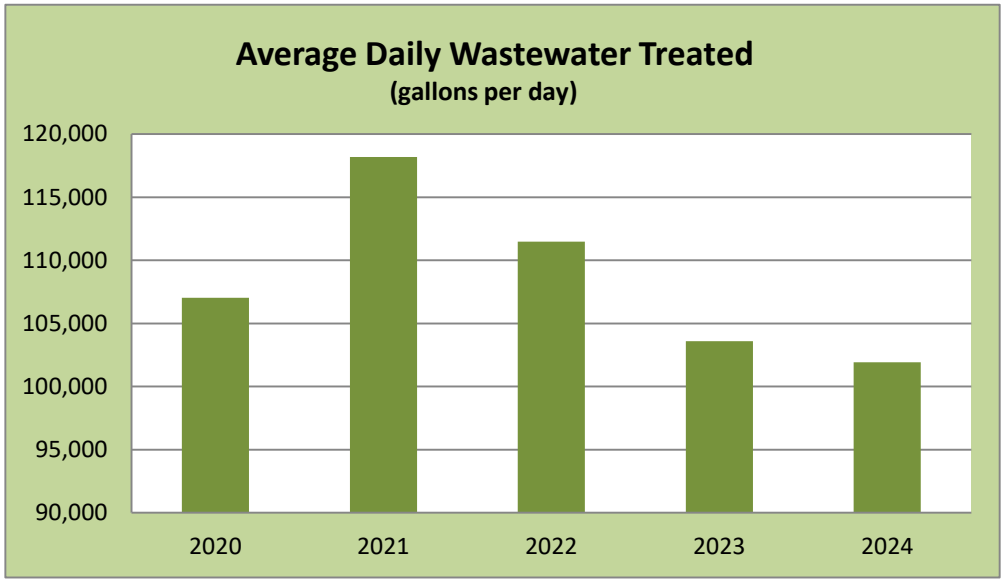
The town maintains a Capital Improvement Plan (CIP) for the water system. The CIP is projected out for a 10-year period. The town uses this CIP to plan and budget for capital projects within the system, which includes projects that achieve flood resiliency.

Water Capital Improvement Plan 2025-2036

CAPITAL IMPROVEMENT PLAN Water Fund		Prior Year	Upcoming Year	Future Years				
		2024-2025	2025-2026	2026-2027	2027-2028	2028-2029	2029-2030	2031-2036
Appropriation: Annual		75,000	15,000	20,000	20,000	25,000	30,000	150,000
Appropriation: Grant/Loan/Other Funds		9,252,105	2,000,000					
Appropriation: For Vehicles (50/50 with sewer)		5,000	5,500	5,500	6,000	6,500	6,500	49,500
FY Appropriation:		$ 9,332,105	$ 2,020,500	$ 25,500	$ 26,000	$ 31,500	$ 36,500	$ 199,500
Previous Year Ending Balance		$ 500						
Capital Projects	**Prior Project yr.**							
Administration:								
Vehicle Replacement (split Water/Sewer)	Per schedule					24,500	20,500	22,000
Backhoe (split with water and general)	21-22							60,000
Treatment								
Well #1 Replacement			1,000,000					
Well #2 Replacement			1,000,000					
Treatment House Corrosion Prevention	20-21							18,000
Filter Media Rehab	24-25 (all 3)	60,000						
Well #1 Pump Replacement	13-14							
Water Treatment Plant Improvements	24-25	9,252,105						
Sampling Station Replacement	23-24						10,000	
Distribution								
Line Extension (2 on Old Pollocksville Rd.)			25,000	25,000				
Howell Center and Riverstone Backflow	11-12							
Industrial Meter Replacement					6,000			
Elevated Tank Projects							30,000	
	FY Expenditures:	9,312,105	2,025,000	25,000	6,000	24,500	60,500	100,000
Any reserves shown in ending balance line		**2024-2025**	**2025-2026**	**2026-2027**	**2027-2028**	**2028-2029**	**2029-2030**	**2031-2036**
are accounted for in fund balance	**Ending Balance**	**$ 20,500**	**$ 16,000**	**$ 16,500**	**$ 36,500**	**$ 43,500**	**$ 19,500**	**$ 143,000**
Adopted by Council 2/25/25								

3.0 Sewer System

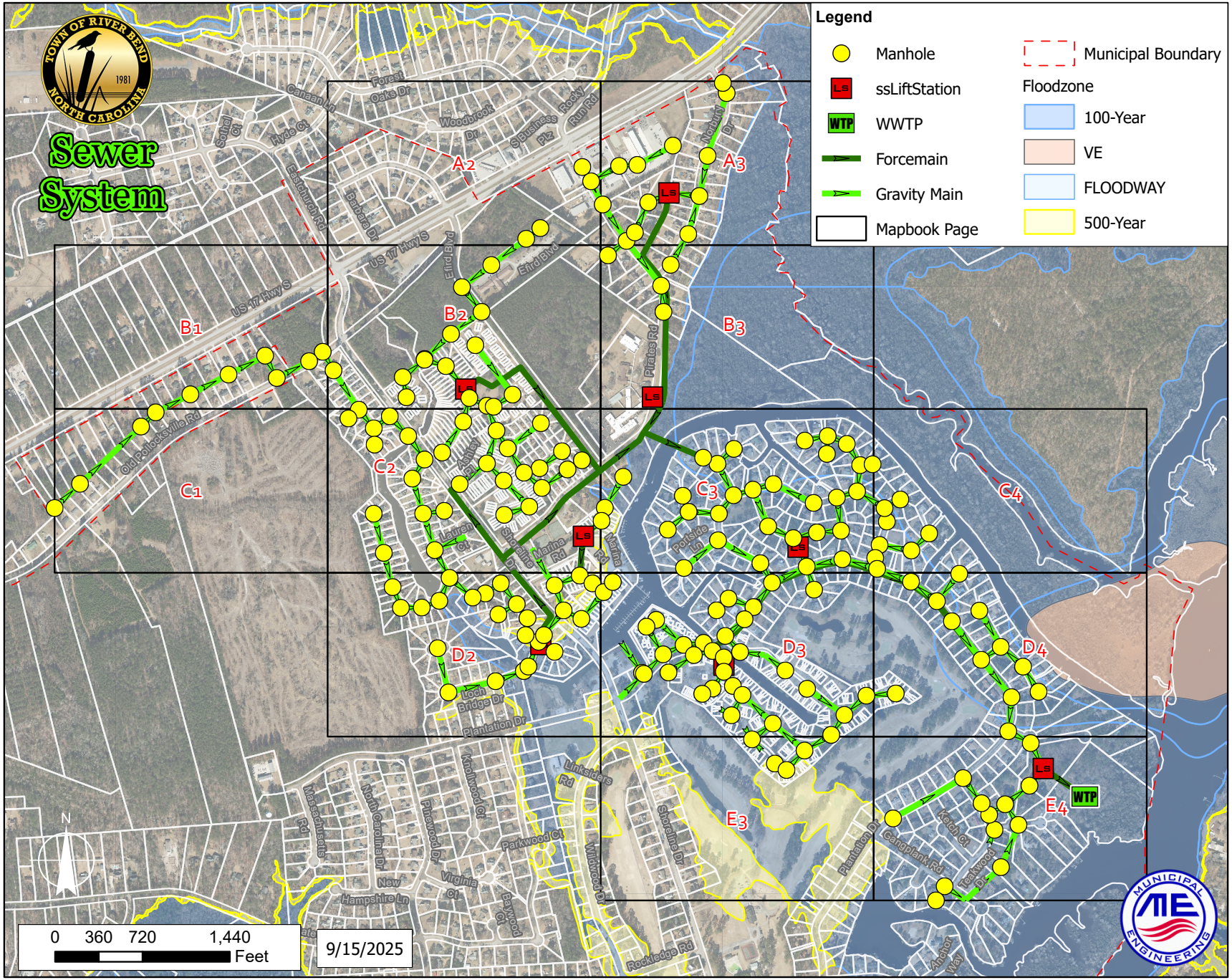
The town's sewer system consists of 1 wastewater treatment plant (WWTP), 8 lift stations, and 11 miles of pipe. The system has a capacity to treat and discharge 330,000 gallons per day. As of 2024, the town has about 1,000 sewer customers and treated an average of 102,096 gallons of sewer per day. See historical data below.



The town's WWTP and 4 lift stations are located within the 100-year flood plain and therefore are more vulnerable to flooding.

3.1 Sewer System Maps

Following are maps of the sewer system. The first map shows a bird's eye view of the entire sewer system. The next 14 pages show close-up details of each map panel.


Sewer System
Legend
Manhole
ssLiftStation
WWTP
Forcemain
Gravity Main
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Municipal Boundary
Floodzone
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US 17 Hwy S
E Front Blvd
Pirates Rd
Old Pollocksville Rd
Marina Rd
Shoreline Dr
Loch Bridge Dr
Plantation Dr
Linksiders Rd
Rocklege Rd
Gangplank Rd
Keelson Ct
Teakwood Dr
Anchor Way
Knollwood Dr
Pinewood Dr
Parkwood Ct
Windwood Dr
Massachusetts Rd
North Carolina Dr
New Hampshire Ln
Virginia Ct
Maryland Ct
Canaan Ln
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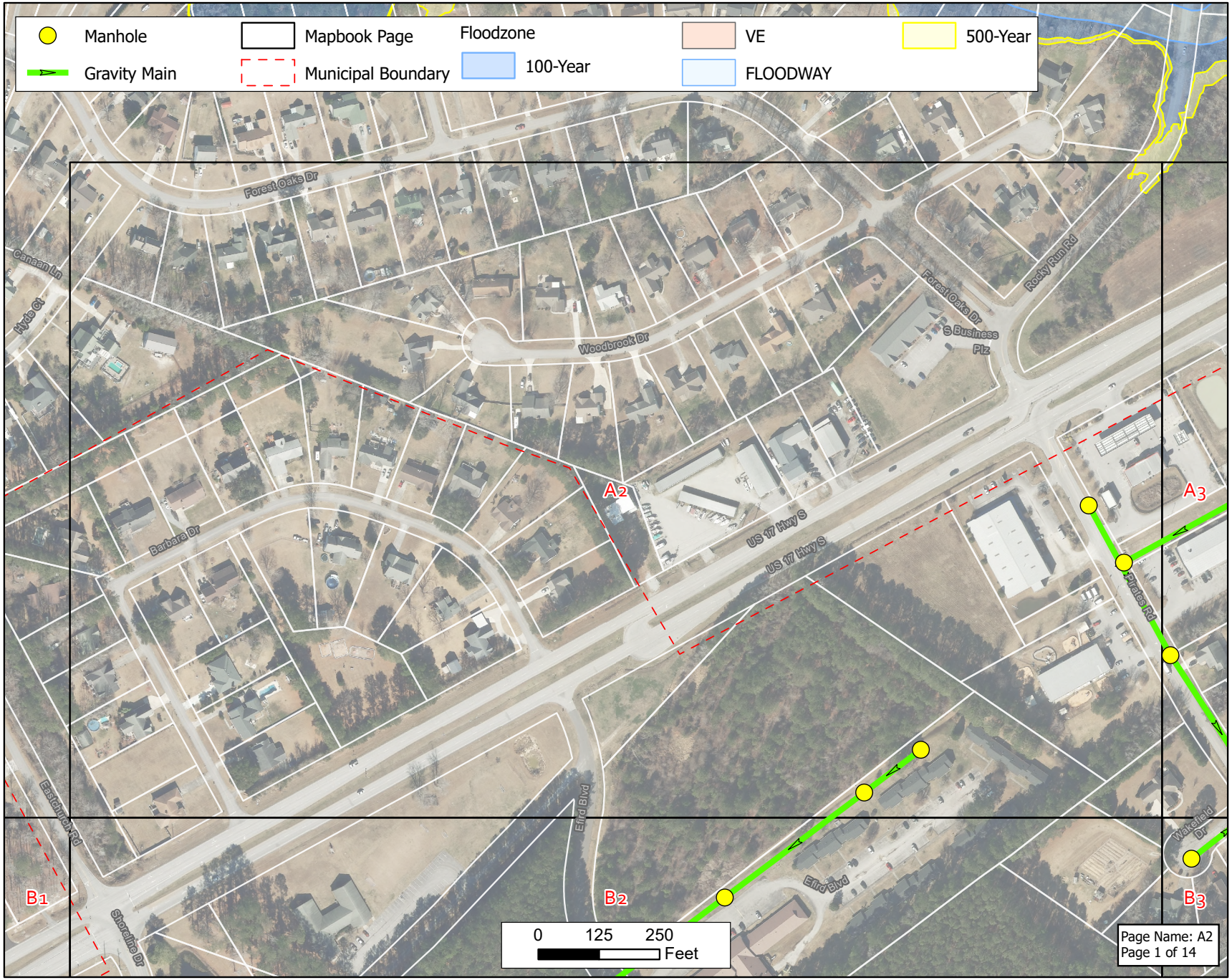
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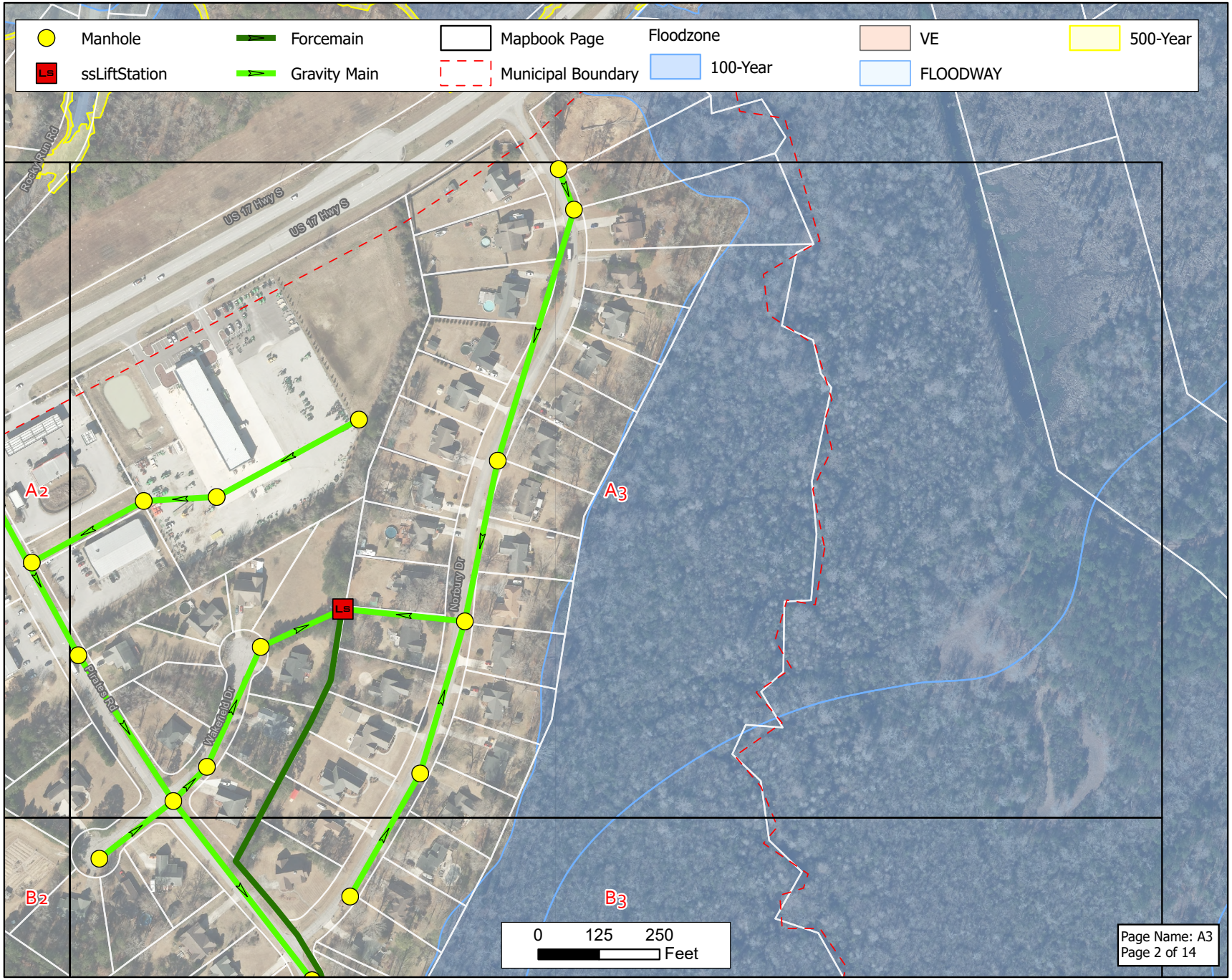
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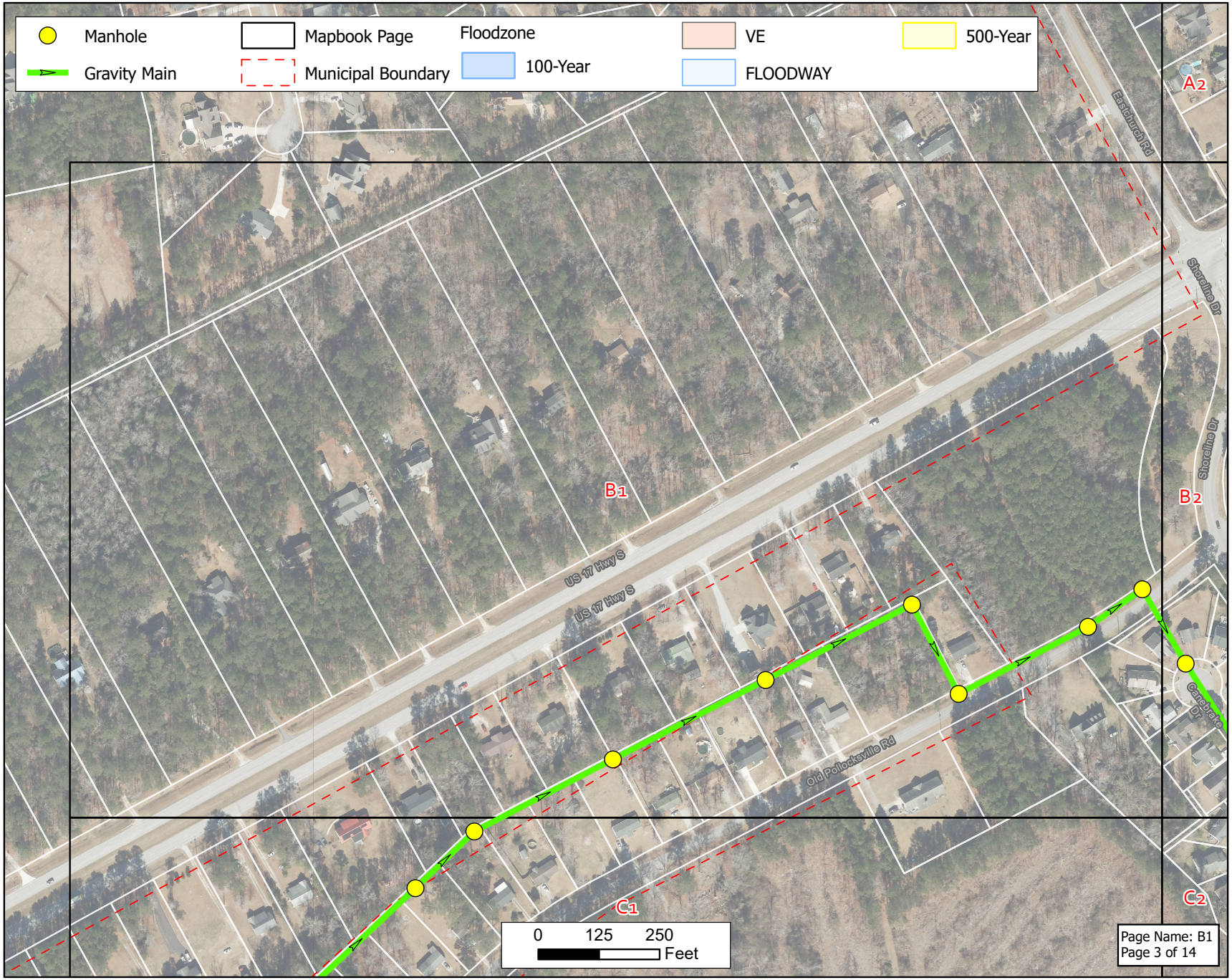
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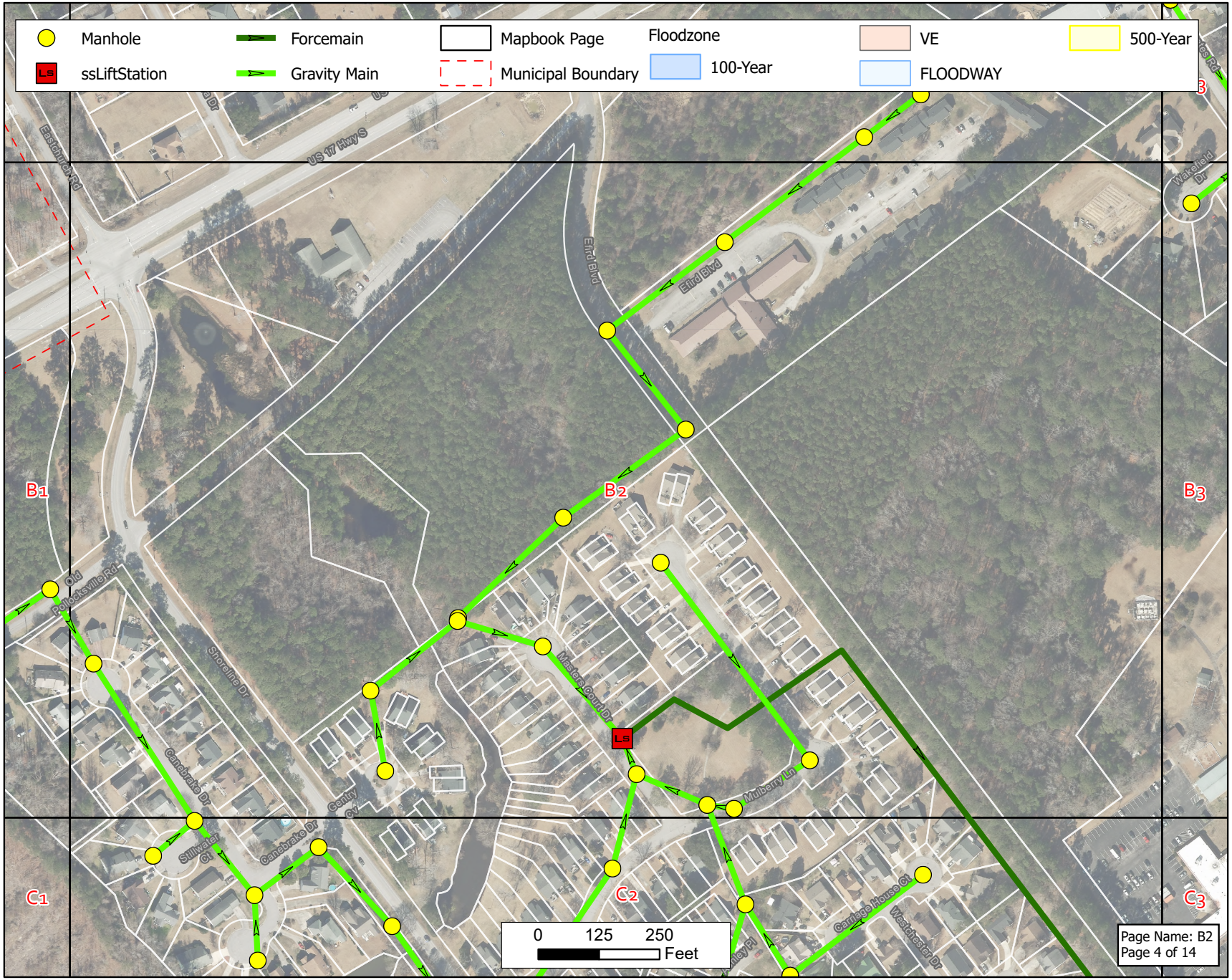
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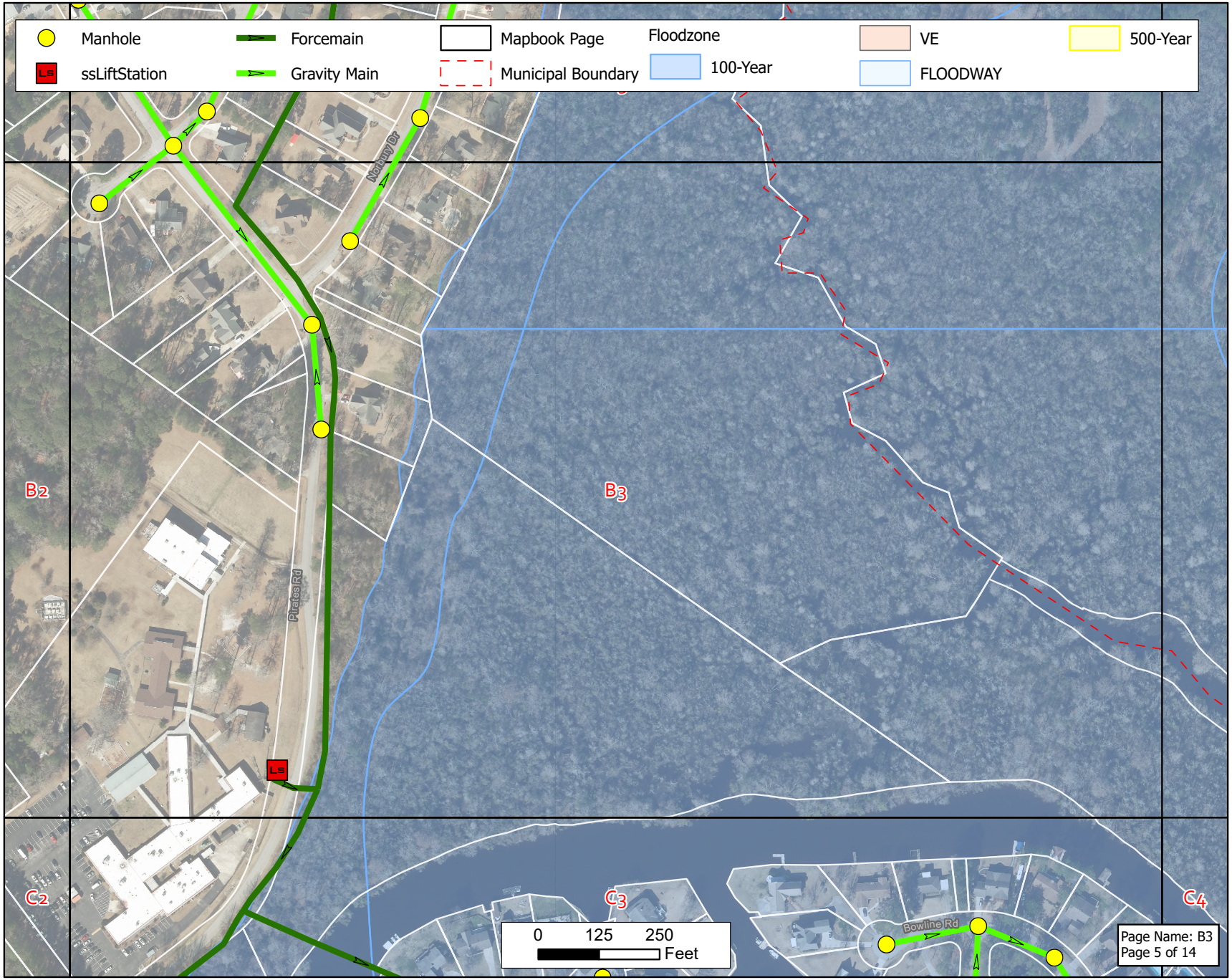
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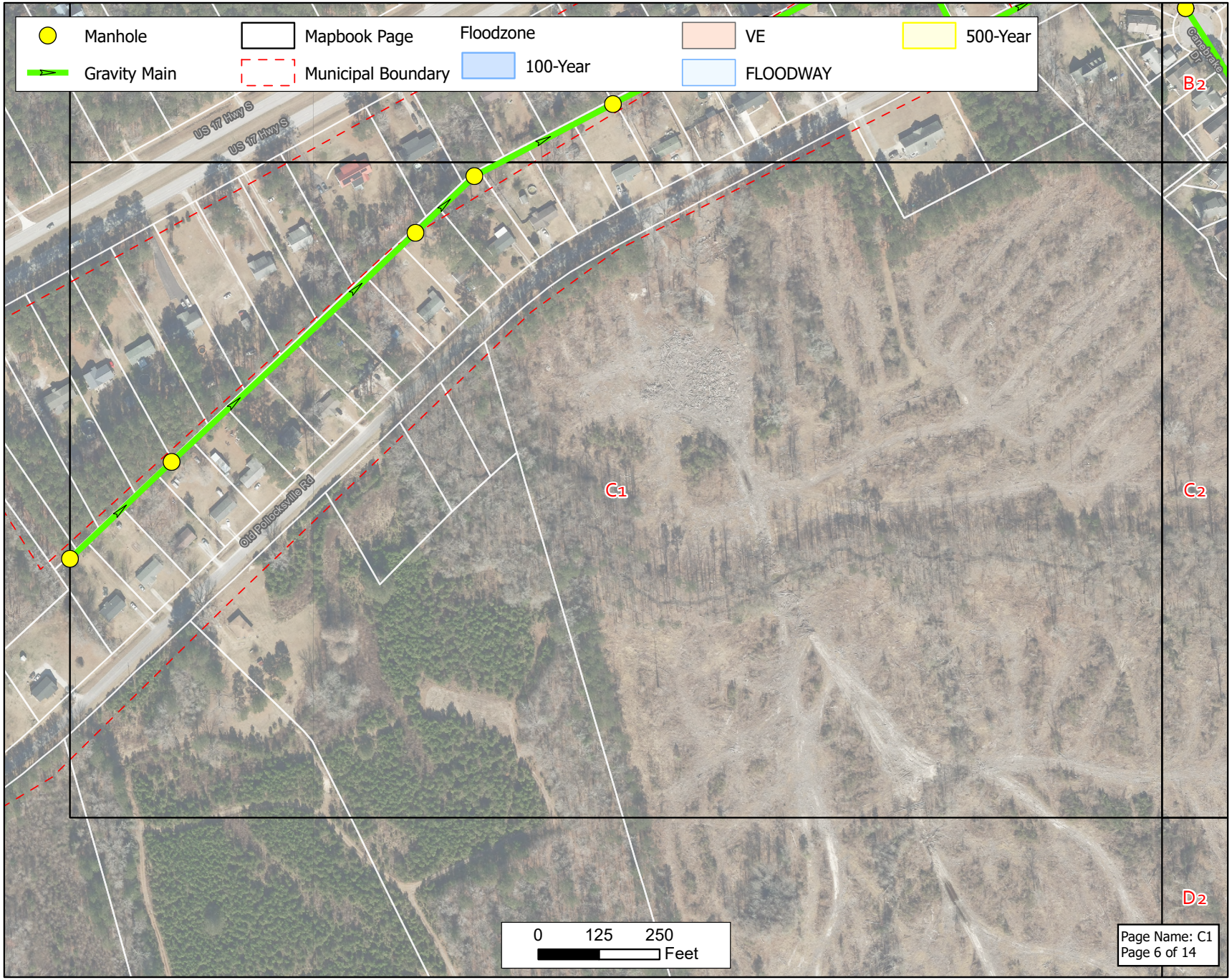
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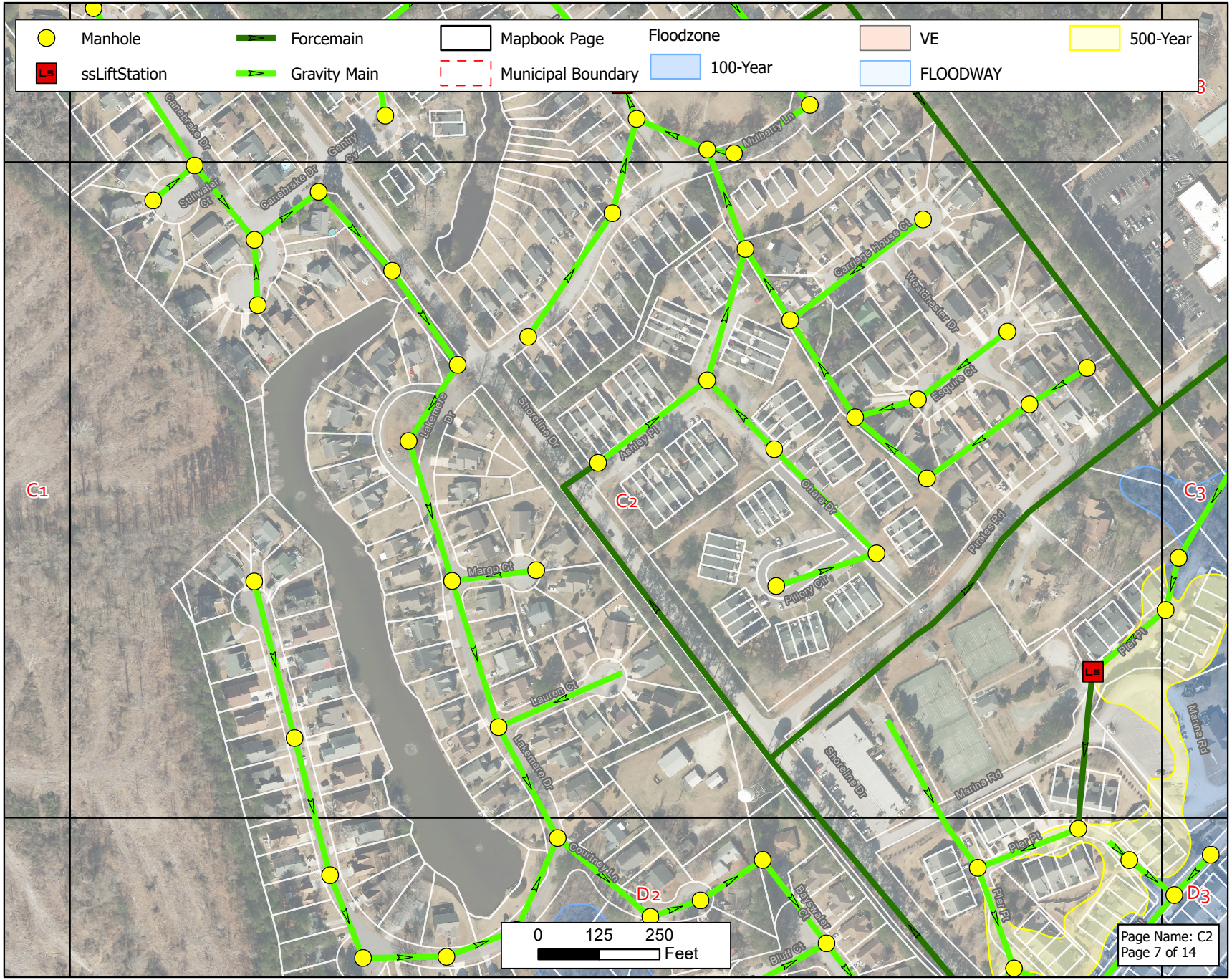
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Pillow Cir
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Lauren Ct
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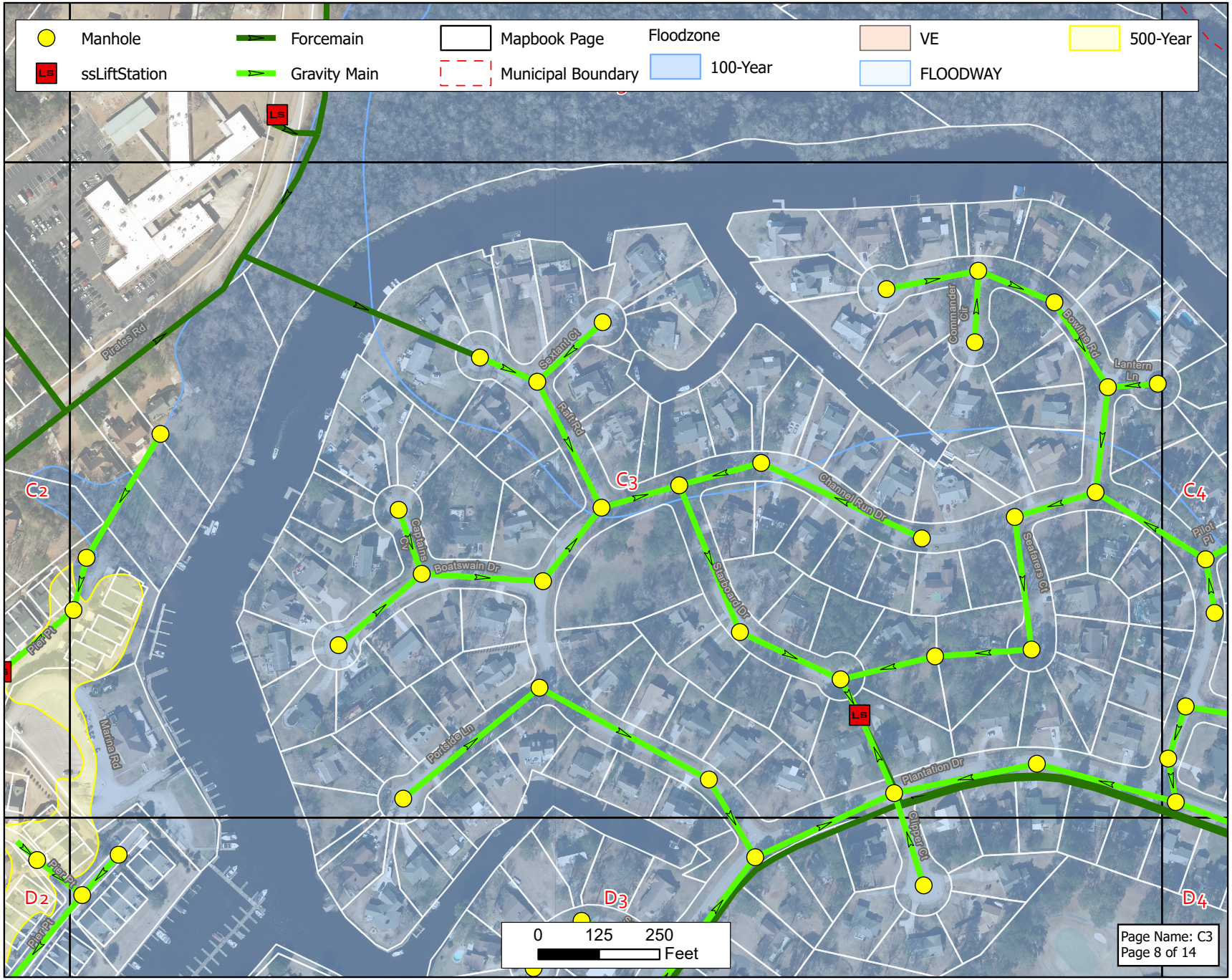
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Starboard Dr
Seafarers Ct
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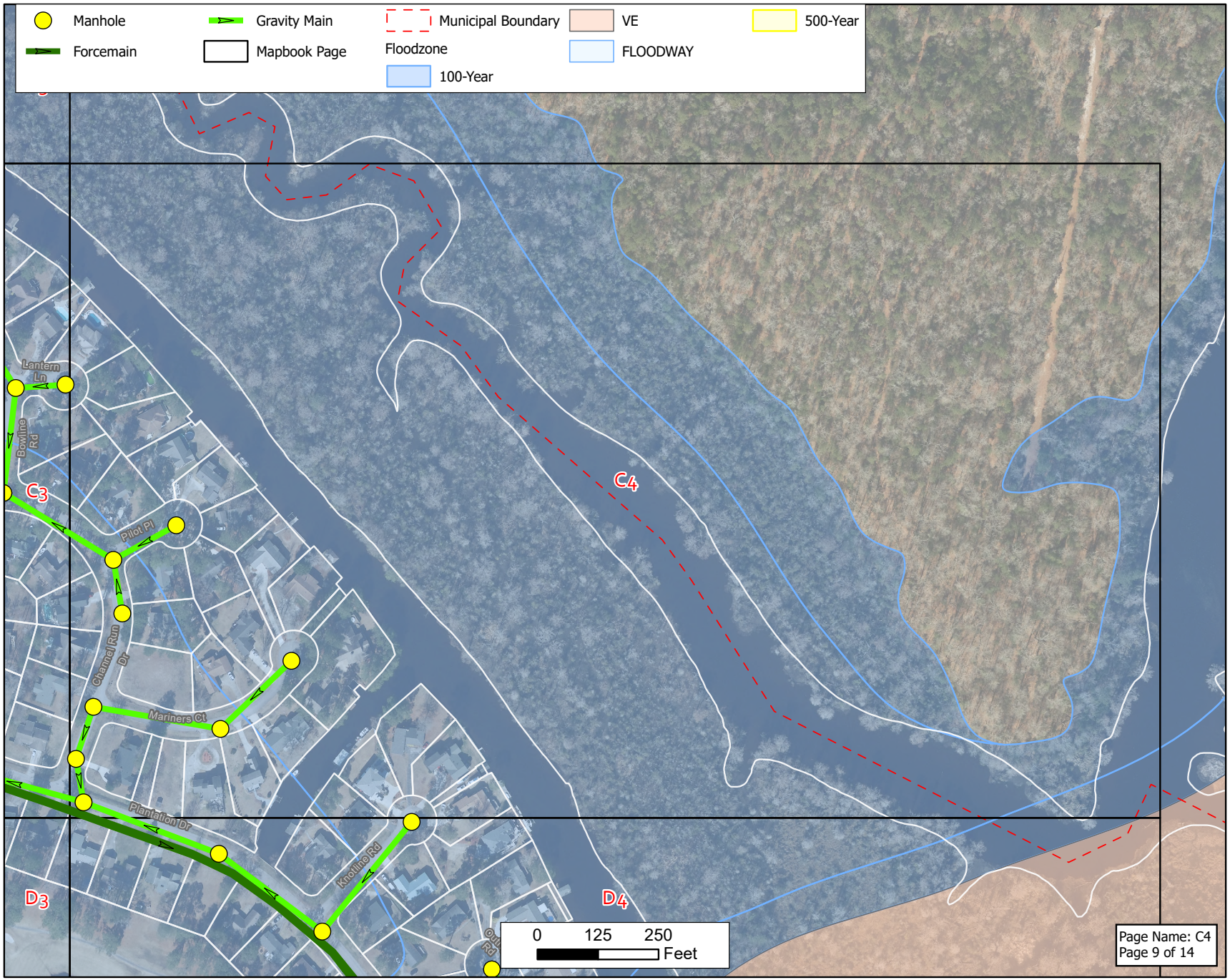
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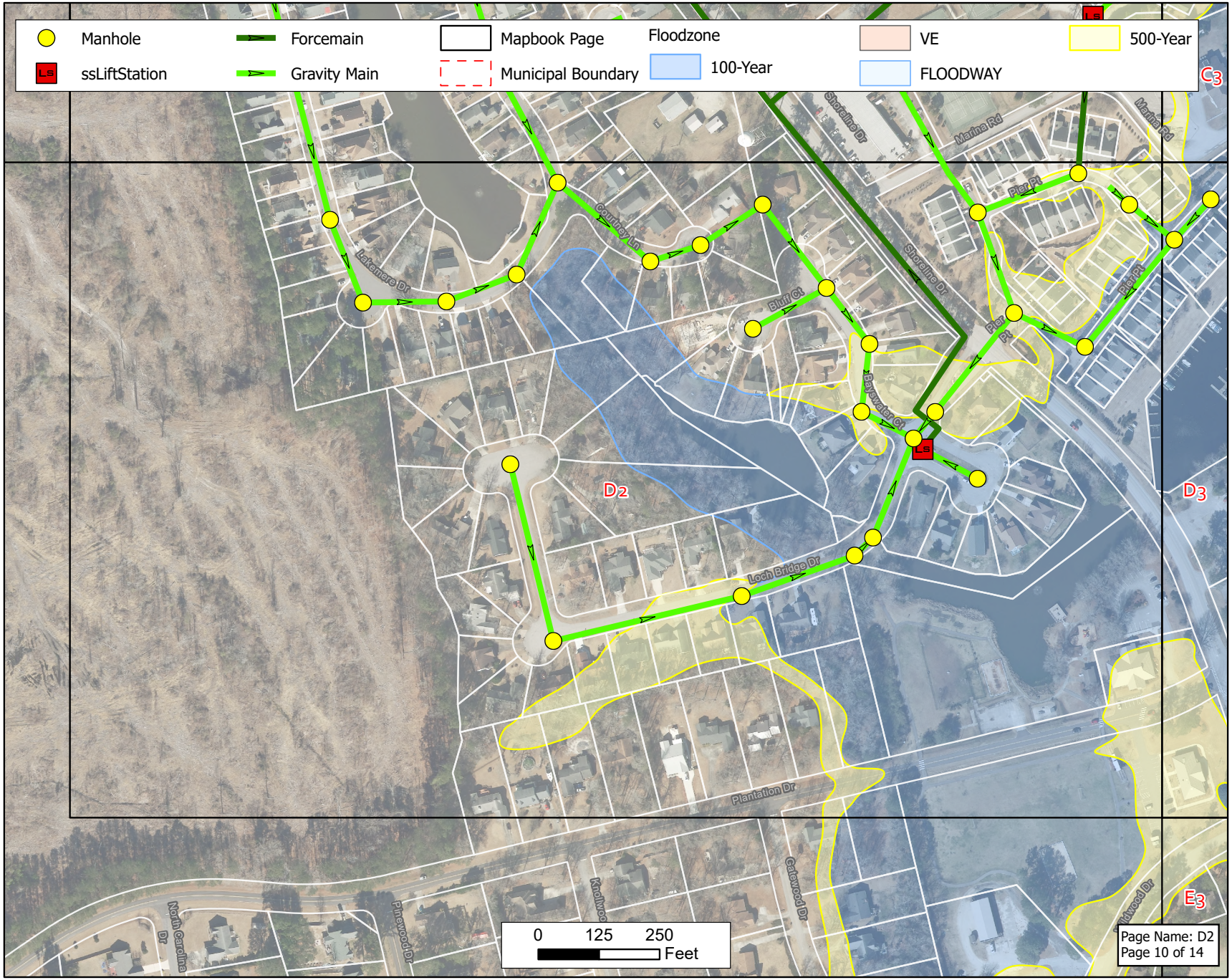
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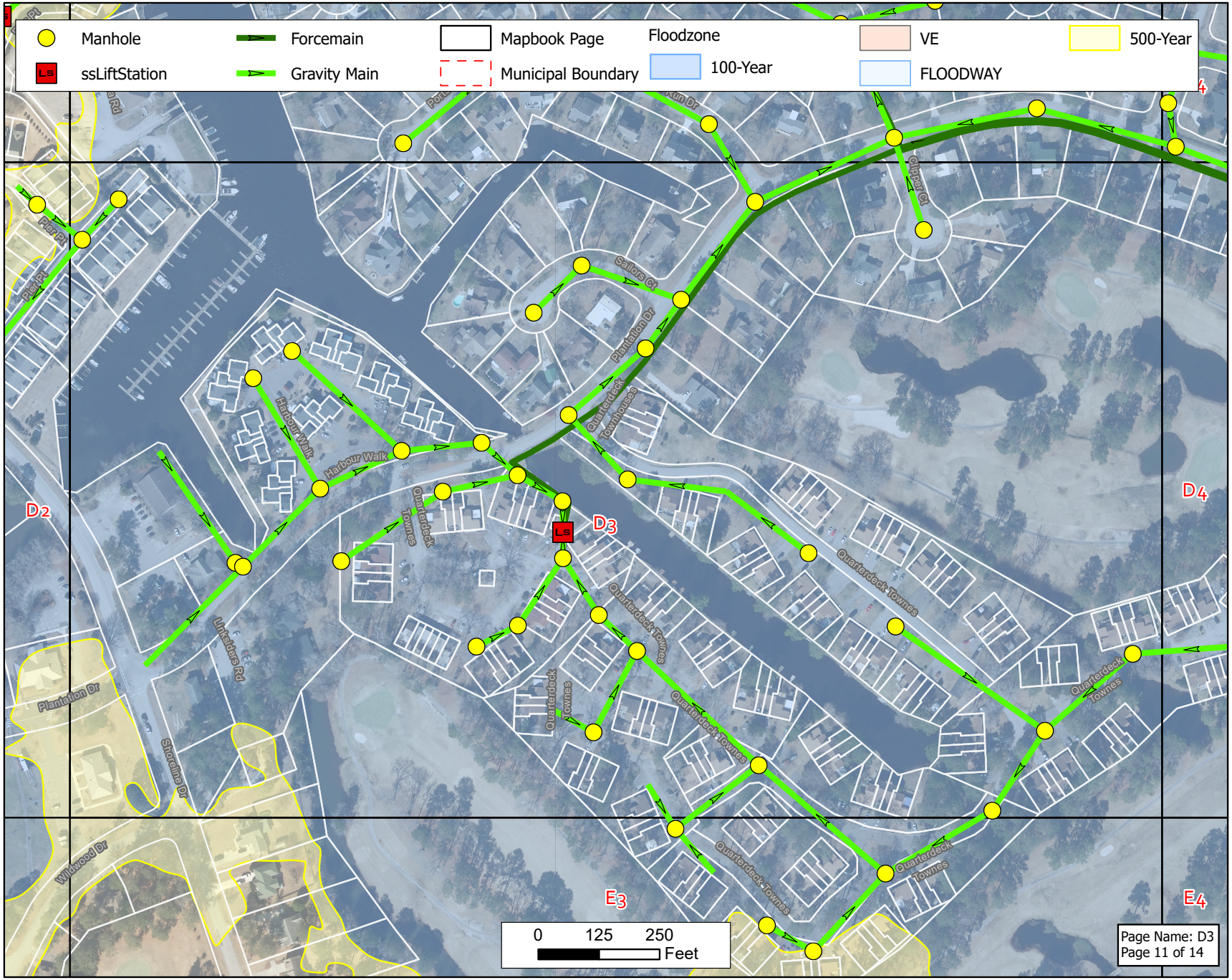
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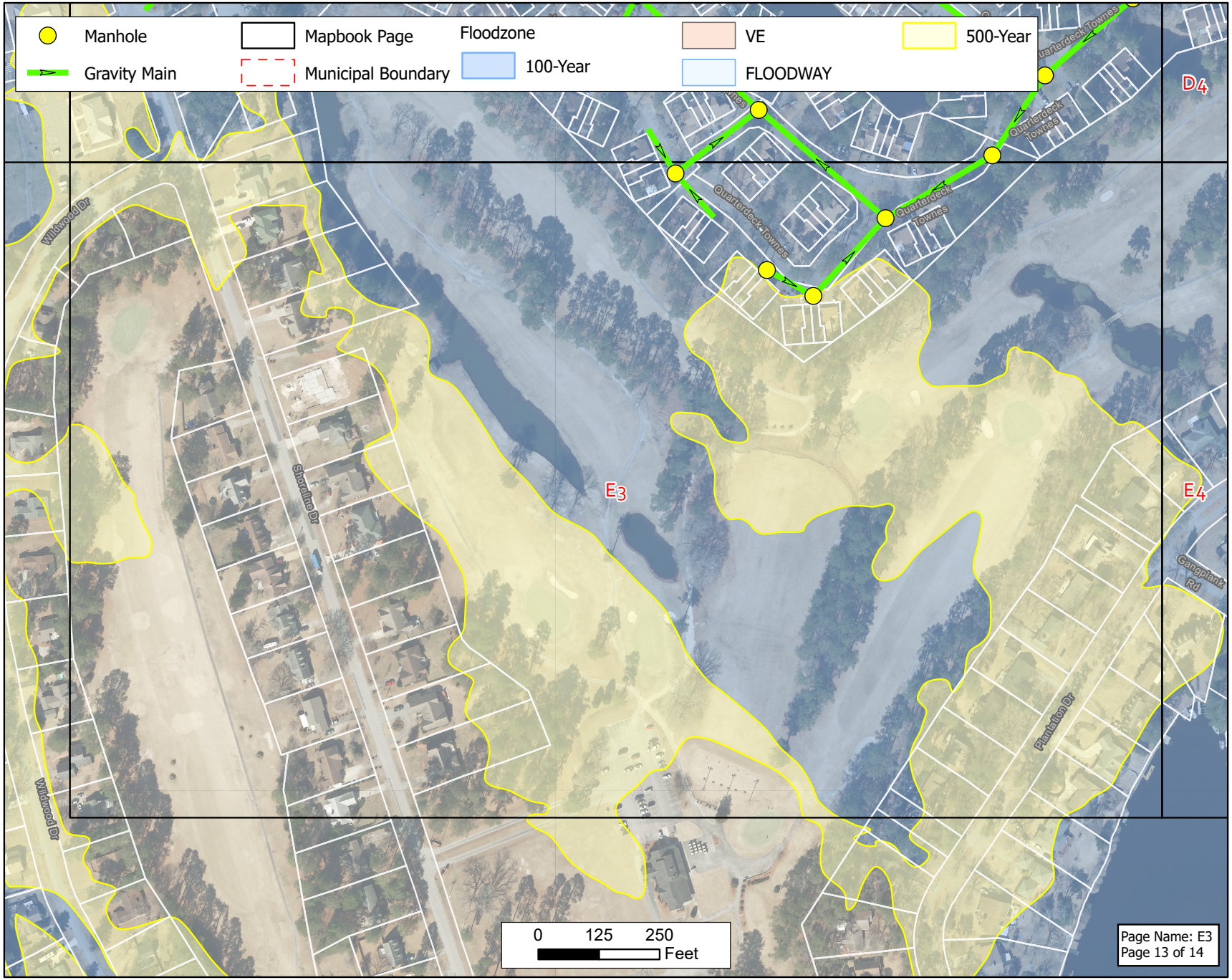
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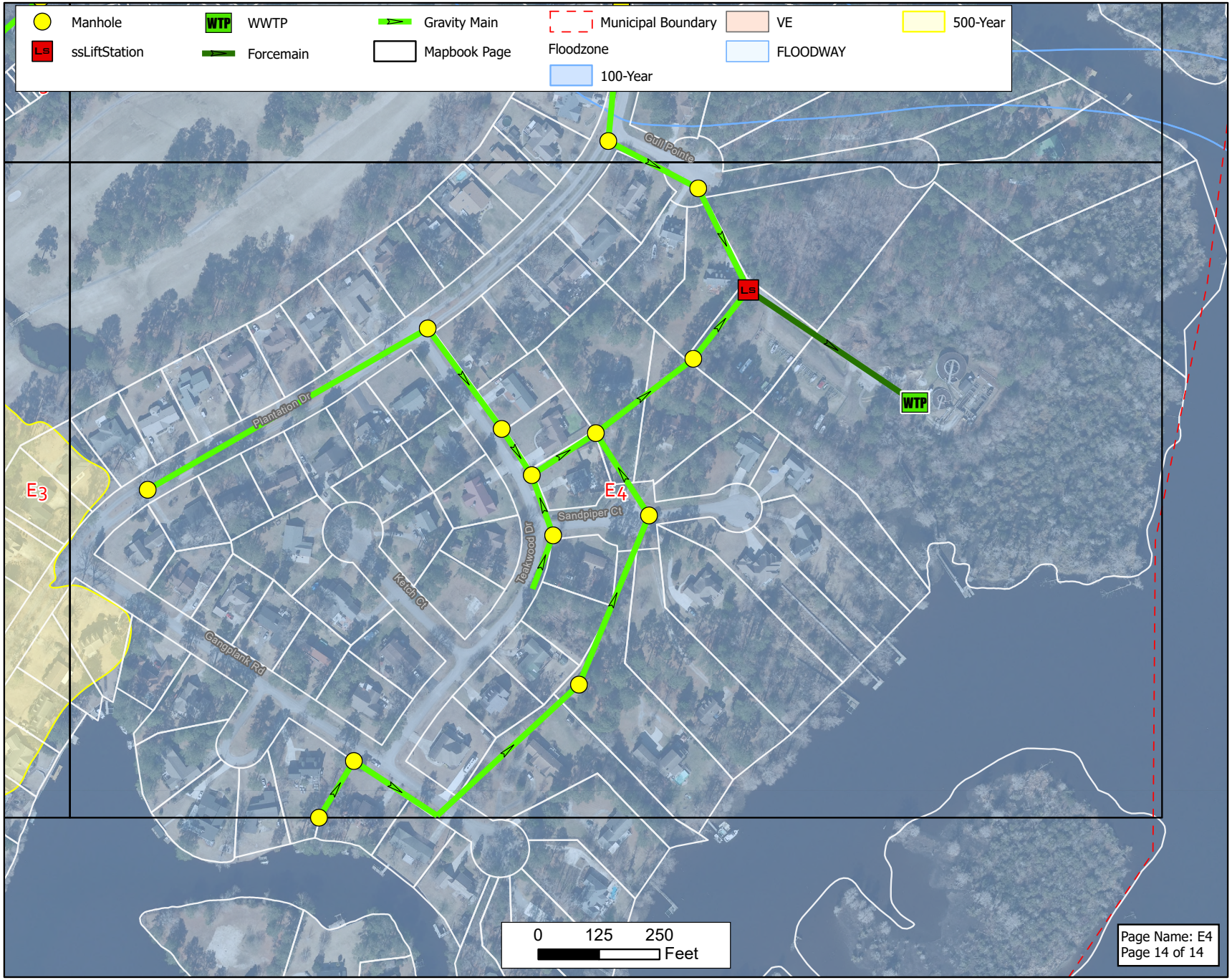
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3.2 Sewer Asset Vulnerability

As shown in the chart below, the town's WWTP is located within an AE designated flood zone. However, prior its construction, the footprint for the facility was built-up and much of the WWTP is located at an elevation that is above the base flood elevation. Essentially, the WWTP is located on an "island" and is therefore less vulnerable to flooding than its location alone may initially appear. The land around it has a low elevation and is vulnerable to flooding. While parts of the WWTP have a lower risk of flooding, this "island" condition means that the facility is often inaccessible during flood events.

Following is a list of the most vulnerable components of the town's water system in order of priority action for resiliency.

Priority Rank	Asset	Address	Flood Zone	Project Scope/Action	Estimated Cost
1	Wastewater Treatment Plant	102 Gull Pointe	AE	Elevate/Floodproof	$ 5,000,000
2	Lift Station #1	102 Gull Pointe	AE	Seal	125,000
3	Lift Station #2	111 Starboard Drive	AE	Seal	125,000
4	Lift Station #3	22 B Quarterdeck	AE	Seal	125,000
5	Lift Station #6	200 Lochbridge	AE	Seal	125,000
6	Lift Station #5	109 Wakefield Drive	X	Seal	125,000
7	Lift Station #4	26B Masters Court	X	Seal	125,000
8	Lift Station #7	43 Pier Pointe IV	X	Seal	125,000
9	Lift Station #8	140 Pirates Road	X	Seal	125,000
				GRAND TOTAL	**$ 6,000,000**

In addition to the assets listed above, the town has numerous manholes which lie within the 100-year floodplain. All of those manholes have been sealed.

3.3 Sewer System Action Plan

The most effective flood mitigation strategy is to relocate vulnerable assets to outside of the flood hazard area. The town has received funding to rehabilitate parts of its existing wastewater treatment plant (WWTP). The existing WWTP is located within the 100-year floodplain. Relocation of that entire facility is cost prohibitive. During the current rehabilitation project, the town plans to elevate and/or floodproof any existing WWTP components within Phase I of the project. The town is seeking funding for Phase II of that project, which will include elevation and/or floodproofing of components within Phase II.

In the future, when system expansion is required, the town will consider the location of new equipment relative to its flood hazard vulnerability and take steps to either avoid location within a floodplain or flood proof structures that must be located within a floodplain. Part of the floodproof strategy will include elevating system components above the base flood elevation, plus an additional 2 feet of freeboard, in accordance with the town's Flood Damage Prevention Ordinance.

Within the sewer collection system, there are numerous manholes. Over the years, the town has taken steps to seal manholes that are located within the 100-year flood plain. The town will continue to monitor those manholes and complete annual inspects to ensure that each manhole is sealed and will re-seal as needed.

3.4 Sewer System Capital Improvement Planning

The town maintains a Capital Improvement Plan (CIP) for the sewer system. The CIP is projected out for a 10-year period. The town uses this CIP to plan and budget for capital projects within the system, which includes projects that achieve flood resiliency.

Sewer Capital Improvement Plan 2025-2036

CAPITAL IMPROVEMENT PLAN Sewer Fund		Prior Year	Upcoming Year	Future Years				
		2024-2025	2025-2026	2026-2027	2027-2028	2028-2029	2029-2030	2031-2036
Appropriation: Annual		20,000	20,000	30,000	30,000	35,000	35,000	216,000
Appropriation: Grant Funds		9,108,500	10,000,000					
Appropriation: Vehicles (50/50 with water)		5,000	5,500	5,500	6,000	6,500	6,500	49,500
	FY Appropriations:	$ 9,133,500	$ 10,025,500	$ 35,500	$ 36,000	$ 41,500	$ 41,500	$ 265,500
	Previous Year Ending Balance	$ 3,500						
Capital Projects	**Prior Project yr.**							
Administration:								
Vehicle Replacement (split Water/Sewer)	Per schedule					24,500	20,500	22,000
Backhoe (split with Water/General)	21-22							60,000
Collection:								
Upgrade Lift Station (lining,pumps,electrical, etc.)	13-14		25,000			30,000		35,000
Lining Sewer Manholes				17,000			19,000	40,000
Backup Generator								50,000
Treatment:								
WWTP Enhancemnets Phase I	24-25	9,108,500						
WWTP Enhancemnets Phase II			10,000,000					
Soft start for WWTP blowers/blower motor	15-16							
WWTP Lift Station rehab	15-16				40,000			
Backup Generator								60,000
	FY Expenditures:	9,108,500	10,025,000	17,000	40,000	54,500	39,500	267,000
Any reserves shown in ending balance line		**2024-2025**	**2025-2026**	**2026-2027**	**2027-2028**	**2028-2029**	**2029-2030**	**2031-2036**
are accounted for in fund balance	**Ending Balance**	**$ 28,500**	**$ 29,000**	**$ 47,500**	**$ 43,500**	**$ 30,500**	**$ 32,500**	**$ 31,000**
Adopted by Council 2/25/25								

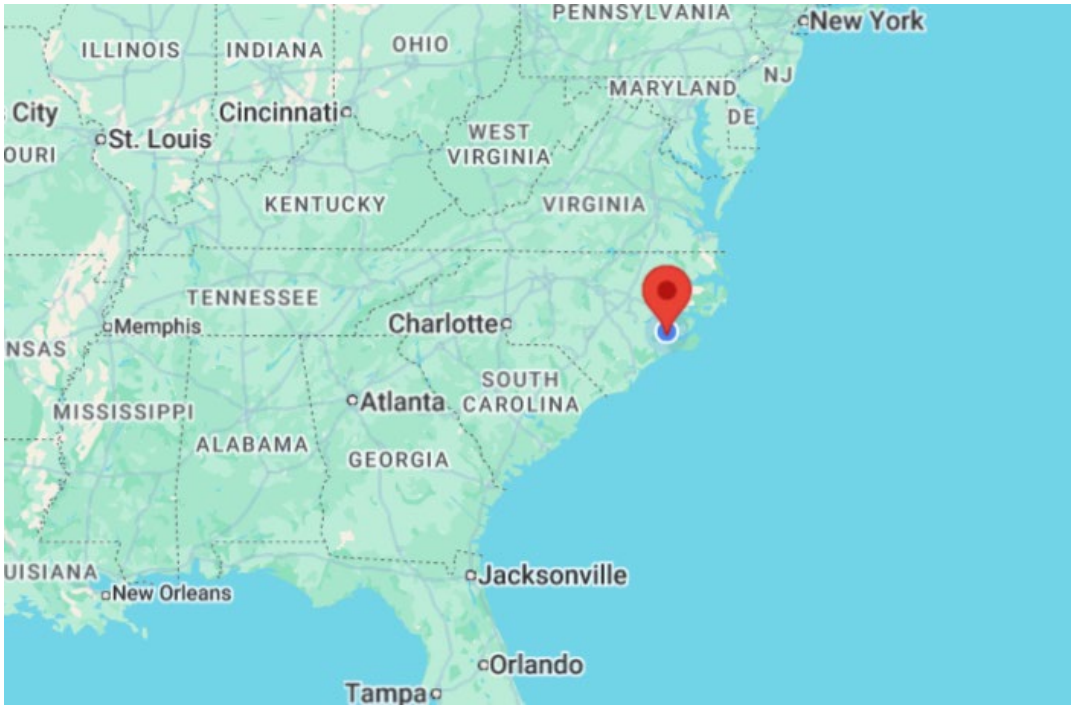
4.0 Conclusion

The Town recognizes that its geographic location, as shown on the following vicinity maps, increases its vulnerability to flooding. The town is located in close proximity to the North Atlantic Ocean and is therefore vulnerable to impacts from hurricanes. The town is also located along the Trent River, and close to the Neuse River and Pamlico Sound. These water bodies pose risk of flooding, which could be unrelated to hurricanes and could occur year round. Examples of such risks are: riverine flooding, Nor'easters, tidal flooding and sea level rise. Due to these and other vulnerabilities, the town is a participating member in the Pamlico Sound Hazard Mitigation Plan (PSHMP). That plan addresses potential impacts from many sources, which include: flooding, hurricanes and climate change, including sea level rise. The town uses that plan to help develop its long-range strategy to mitigate against flood damage to its assets. The PSHMP is updated on a 5-year cycle and identifies specific projects in River Bend that will contribute to flood resiliency and mitigation. Many of the PSHMP priority projects in our FRAP are identified in the PSHMP.

Additionally, the town works with and relies upon data from FEMA, and North Carolina Emergency Management to prepare for flood impacts and other natural disasters which could impact its assets. The town also seeks funding from state and federal agencies to assist in making its assets more resilient to flood damage.

The Town of River Bend is largely a residential community with a very small business/industrial footprint. The town is mostly developed and has little vacant, acreage available for future development. The town does not expect any land use changes that would substantially alter the current land use conditions. The town does have, and enforces, zoning regulations as well as a Flood Hazard Damage Prevention Ordinance. The zoning regulations limit the maximum amount of impermeable coverage on individual lots to 24%. The town will continue to monitor land use conditions and how they impact flood resiliency and make adjustments, as necessary, to reduce such impacts on its assets.

River Bend location relative to North Atlantic Ocean



River Bend location relative to Pamlico Sound