

Water and Wastewater Services to the Zion Crossroads Planning Area

Board of Supervisors Work Session

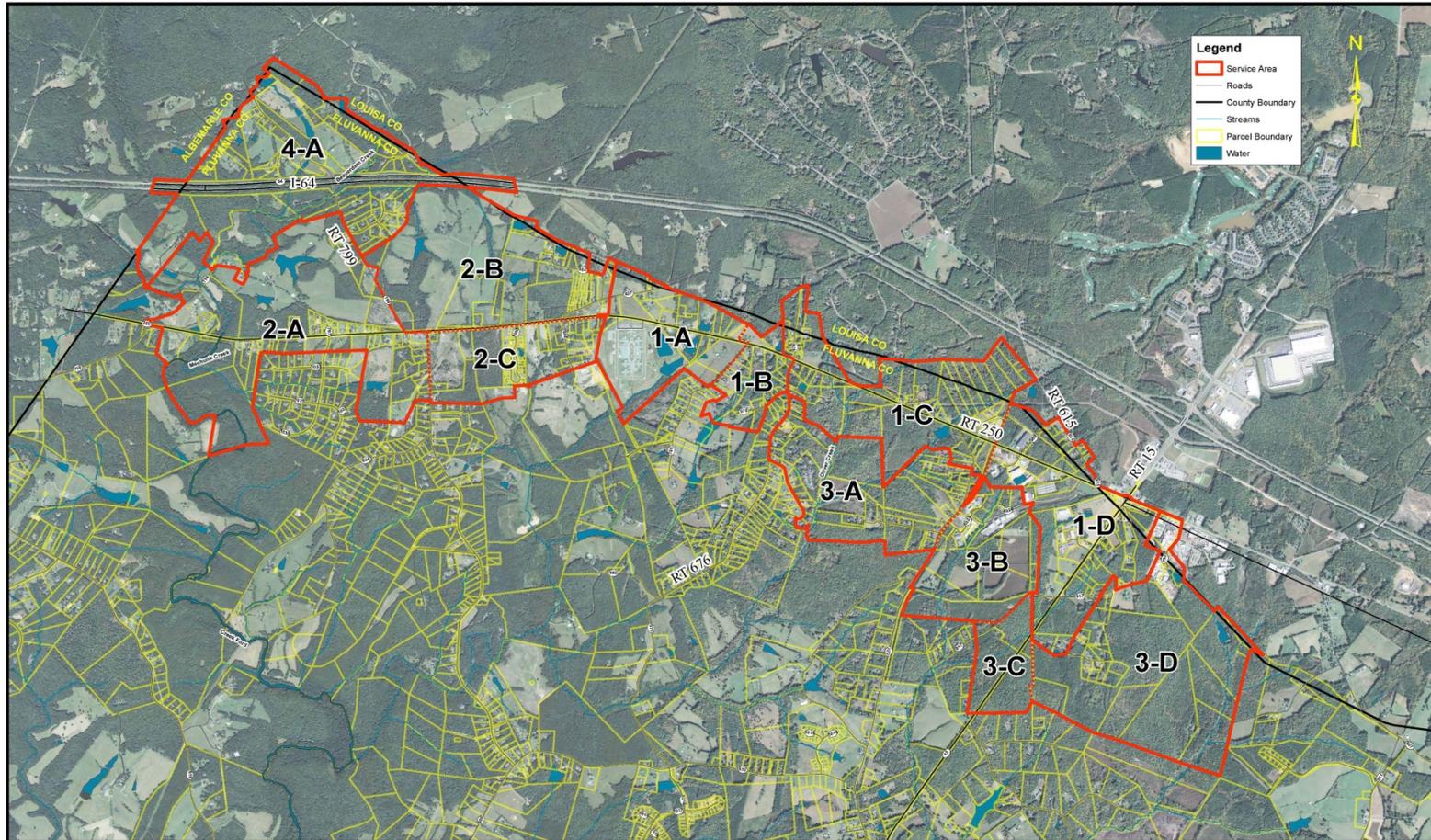


Agenda

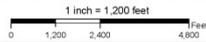


- ▶ **Introductions**
- ▶ **Overview of Service Area**
- ▶ **Water Source Options**
- ▶ **Wastewater Treatment Options**
- ▶ **Demand Projections**
- ▶ **Water System Layout**
- ▶ **Wastewater System Layout**
- ▶ **Preliminary Recommendations**
- ▶ **Moving Forward**

Overview of Service Area



Service Area Overview



COUNTY OF FLUVANNA
PER FOR WATER/WASTEWATER SERVICES

Zion Crossroads Planning Area





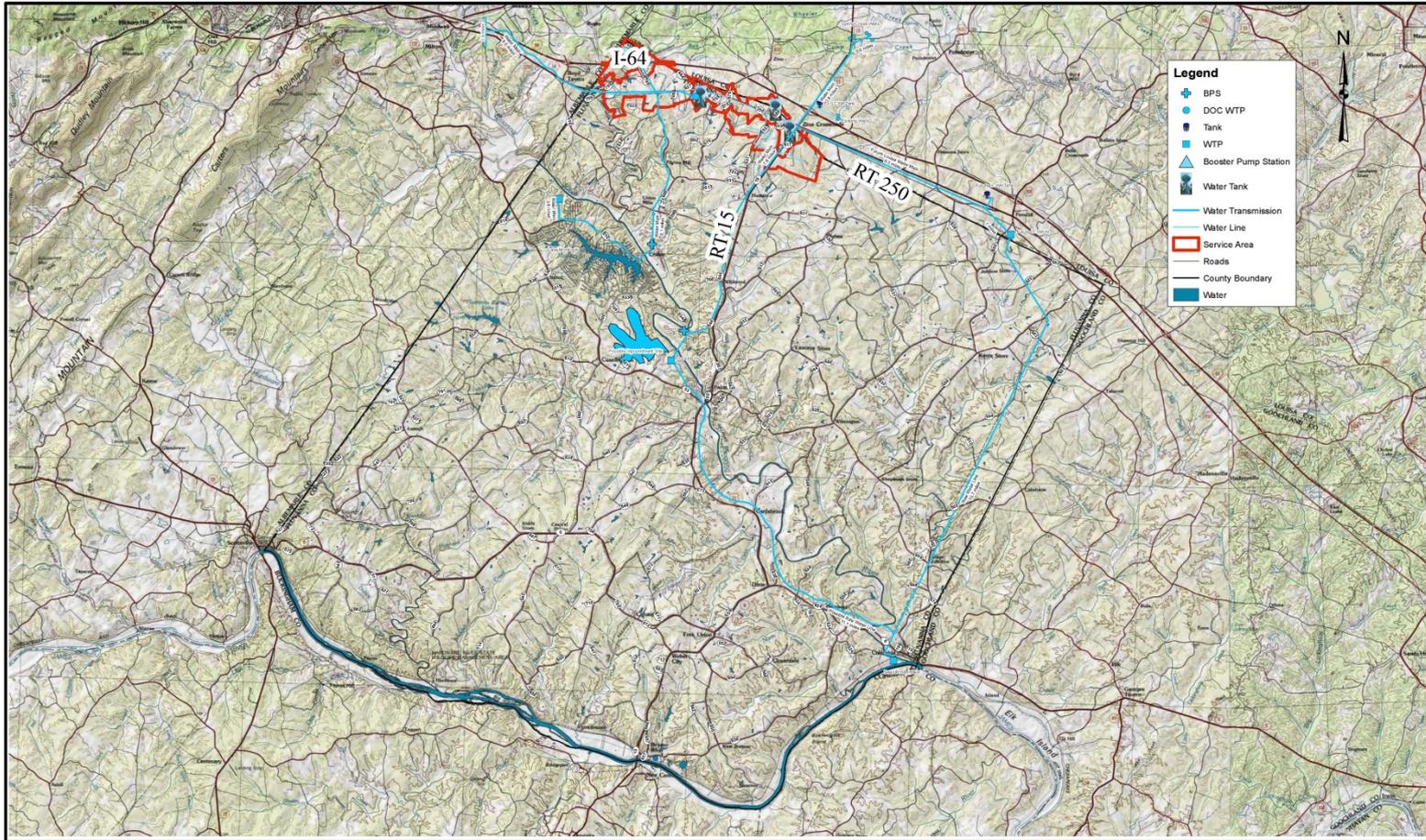
▶ Groundwater

- Existing Wells – Minimal Additional Capacity
- New Wells on DOC Property – investigation in progress
- LCWA – Green Springs Wells – capacity good, but legal issues

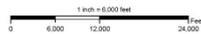
▶ Surface Water

- DOC – 75,000+ GPD, Short Term – good rate, within SA
- Lake Monticello (Aqua System) – higher rate, further distance
- Albemarle – maybe for short term, emergency - distance
- JRWA – James River – good long term source
 - Fluvanna Plant, Long Term – locate in Pleasant Grove?
 - LCWA Plant, Long Term – near Ferncliff – moving forward

Water Source Options



Long Term Water Options



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Wastewater Treatment Options



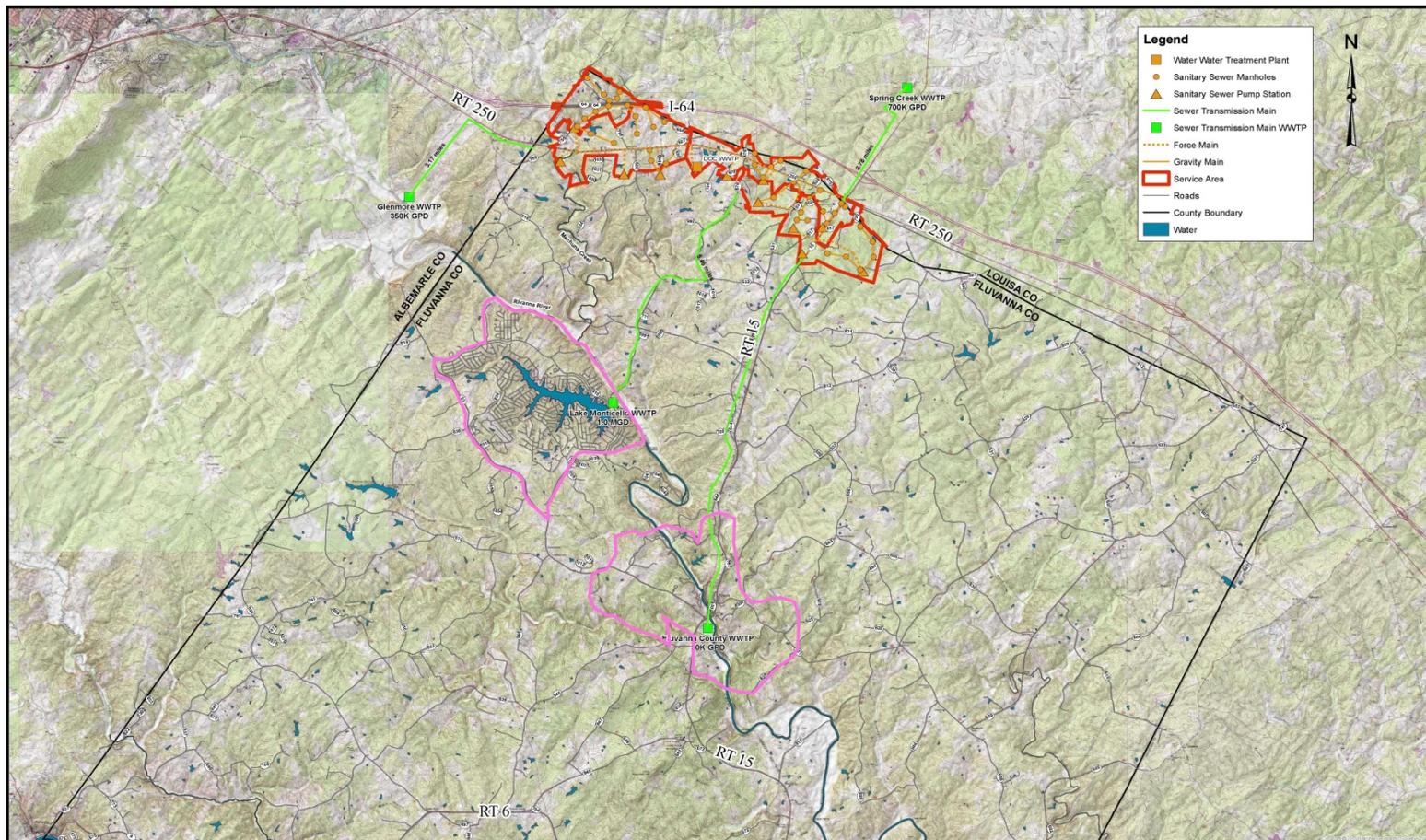
▶ Short & Mid Term Options

- DOC – 100,000 GPD available (option to 125,000 GPD) – further expansion? Current permitted capacity 300,000 GPD, small stream may be an issue for discharge limits
- LCWA – Spring Creek WWTP – expandable to 1.5 MGD
- Albemarle (Glenmore) – Limited Capacity, Costly Pumping, Stringent limits
- Lake Monticello (Aqua) – Limited available, costly
- Alternative WWTP w/Land Treatment/Reuse

▶ Long Term Options

- Fluvanna WWTP, Rivanna River Discharge
- Alternative WWTP w/Land Treatment
- Water Reuse
- Nutrient Trading, Stormwater/Agricultural/Forested TMDL Credits

Wastewater Treatment Options



- Legend**
- Water Treatment Plant
 - Sanitary Sewer Manholes
 - Sanitary Sewer Pump Station
 - Sewer Transmission Main
 - Sewer Transmission Main WWTP
 - Force Main
 - Gravity Main
 - Service Area
 - Roads
 - County Boundary
 - Water



Long Term Sewer Options



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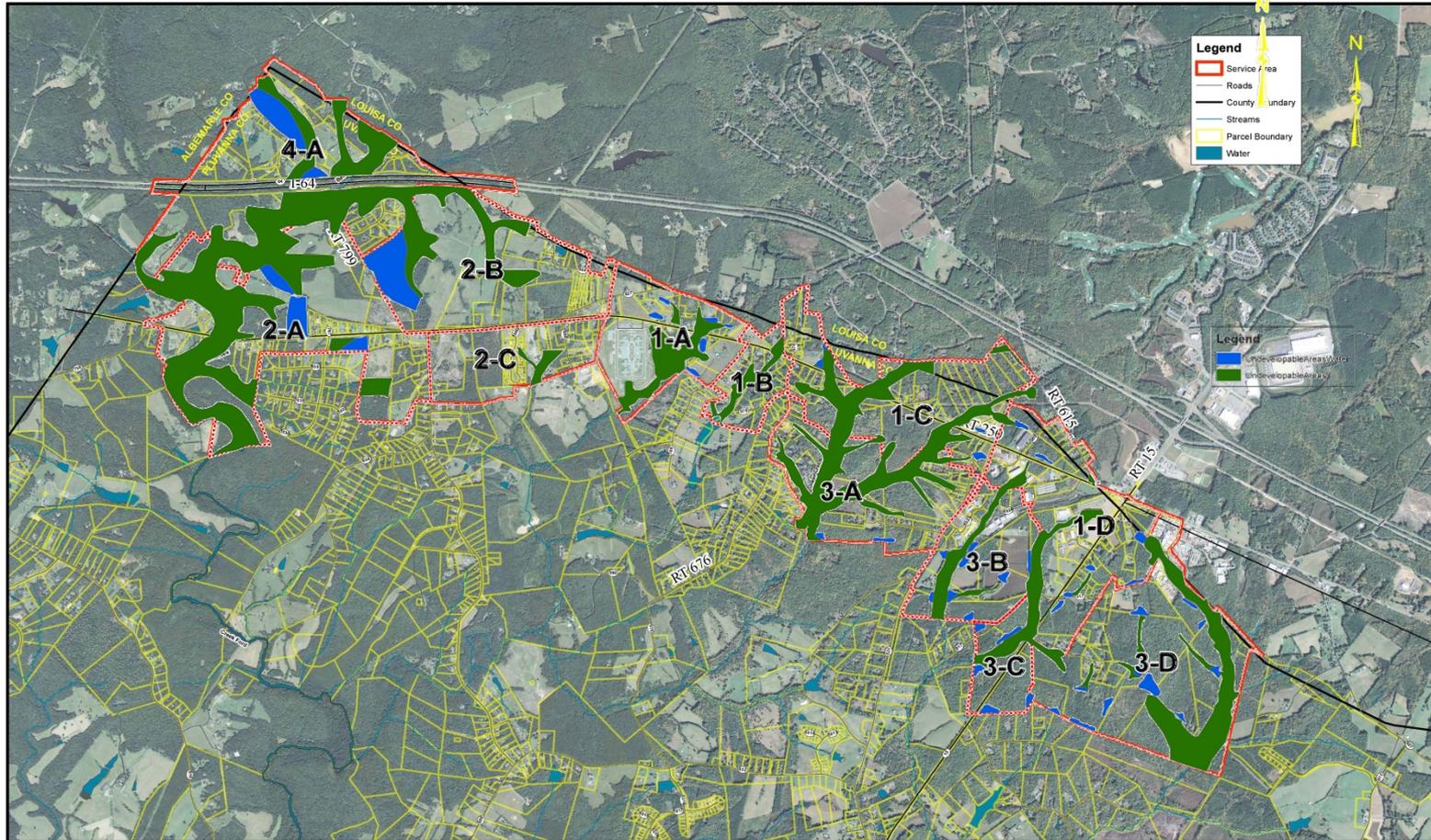




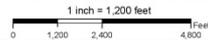
► Methodology

- Divided Service Area into Subareas (1A thru 4A)
- Determined Developable Area, (65% to 90%)
 - Removed water features
 - Removed steep slopes
 - Considered existing development
- Conceptual Layouts of Service Area w/Possible Land Use
- Applied Flow Values in Gals/Day/Acre
 - Ranged from 500 GPD/Ac (Res) to 2,000 GPD/Ac (Urban Mix Use)
 - Prepared upper end demands (increased some Land Uses)
- Applied Demand Factors (to size infrastructure)
 - Water Demand Factor = $1.8 \times$ Average Daily Flow
 - Wastewater Demand Factor = $2.5 \times$ Average Daily Flow

Demand Projections



Service Area Overview



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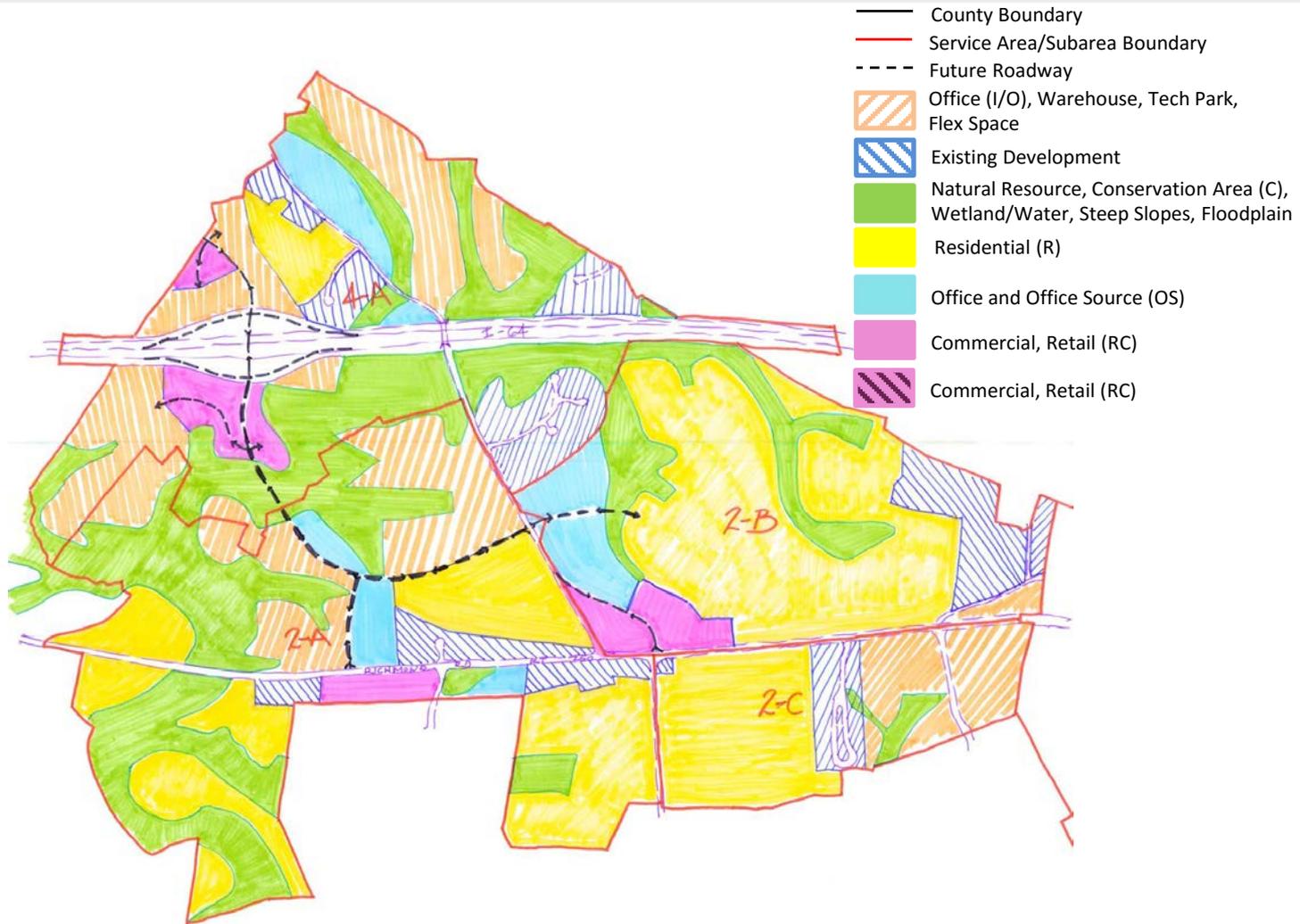
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Service Area – East



Service Area – West



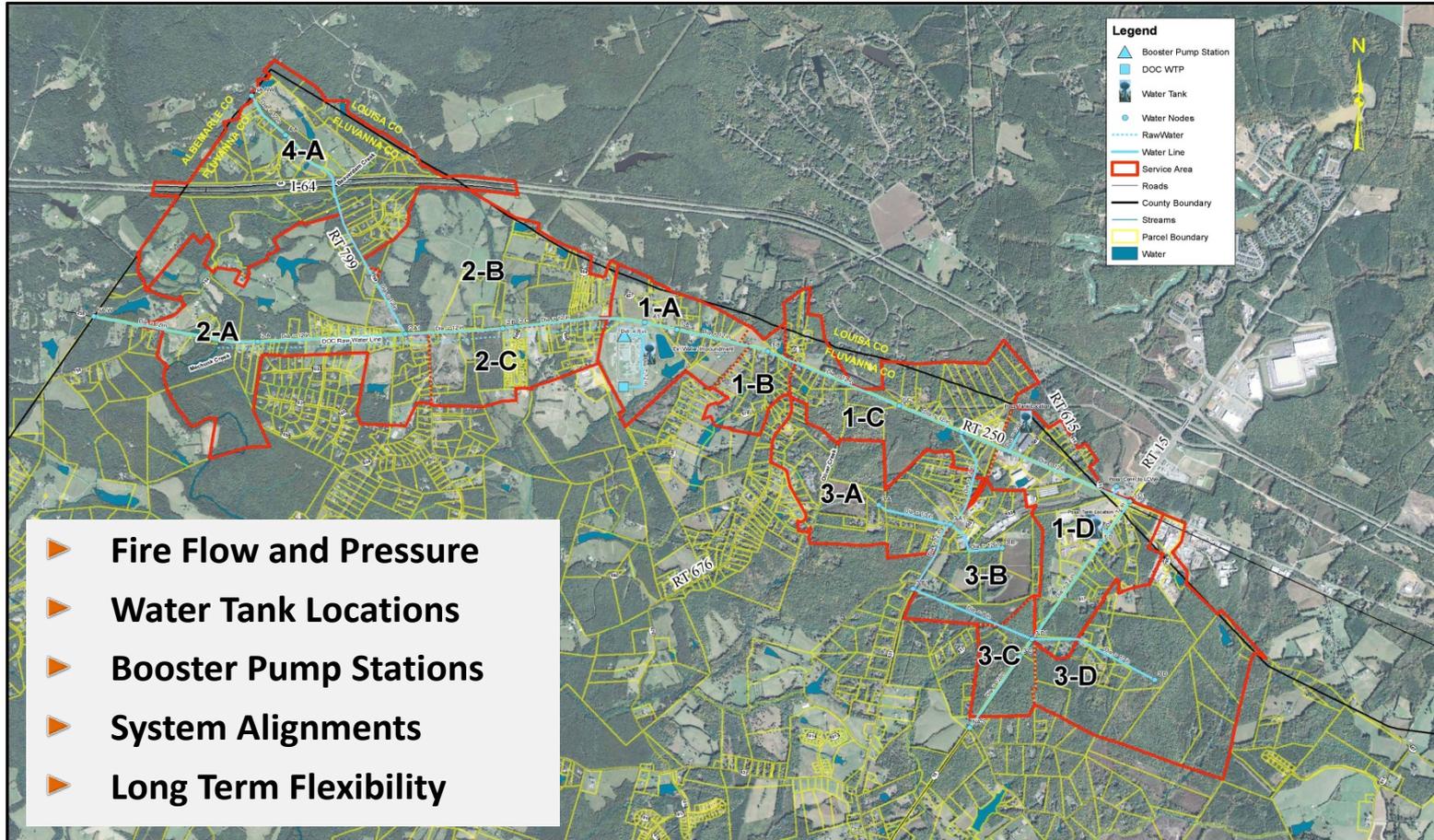
Demand Projections – Water and Wastewater



Service Area	Build-Out Flow (GPD)	50% Build-Out Flow (GPD)	Upper Level Build-Out Flow (GPD)	Upper Level 50% Build-Out Flow (GPD)
1	700,000	350,000	900,000	450,000
2	500,000	250,000	800,000	400,000
3	400,000	200,000	600,000	300,000
4	200,000	100,000	300,000	150,000
Total	1,900,000	950,000	2,500,000	1,250,000

- ▶ **Time to Achieve Build-Out Flows is Unknown**
- ▶ **Louisa Zion Crossroads Area at 100,000 GPD**

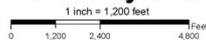
Water System Layout



- ▶ Fire Flow and Pressure
- ▶ Water Tank Locations
- ▶ Booster Pump Stations
- ▶ System Alignments
- ▶ Long Term Flexibility



Proposed Water System Layout

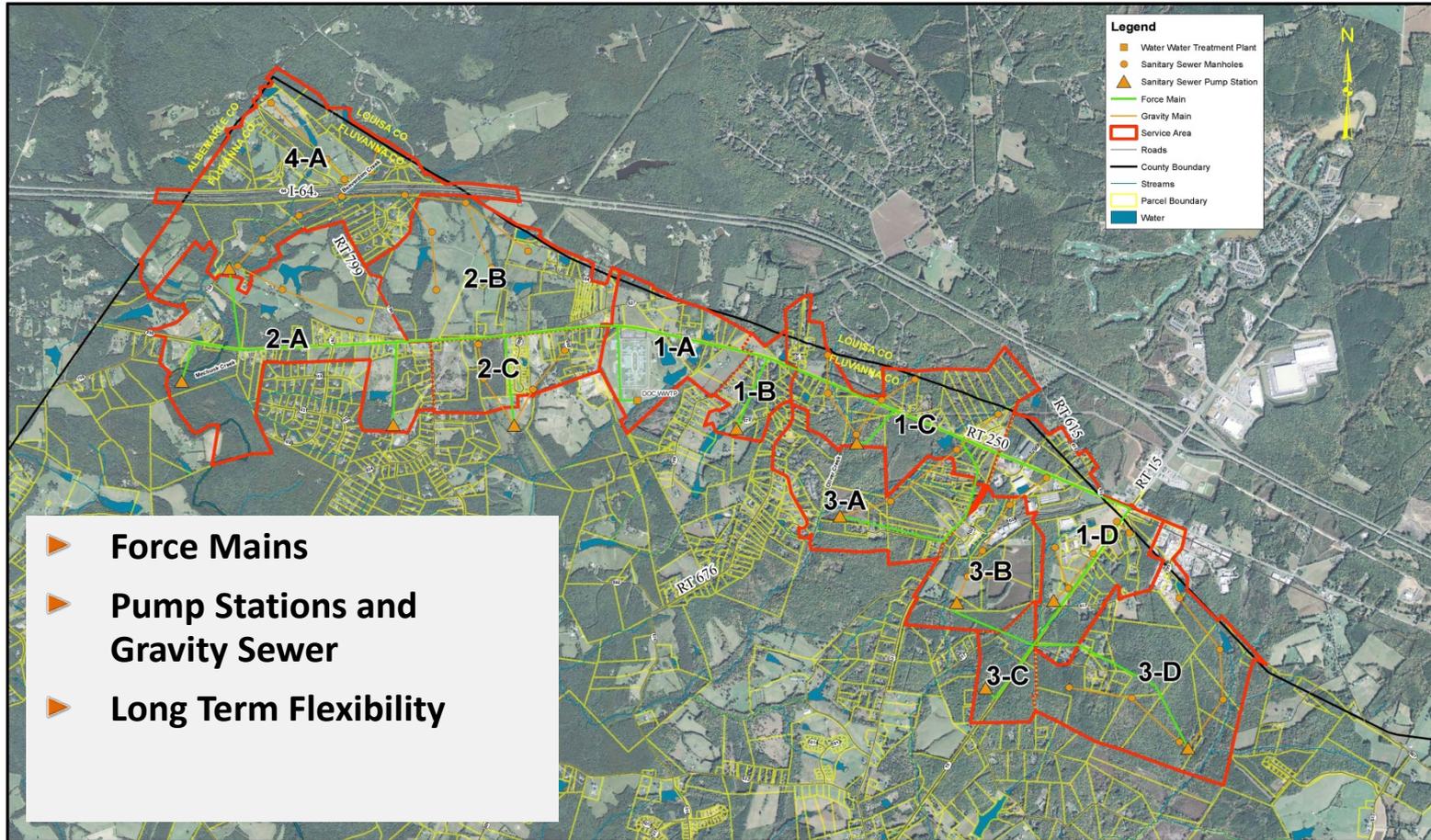


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Wastewater System Layout

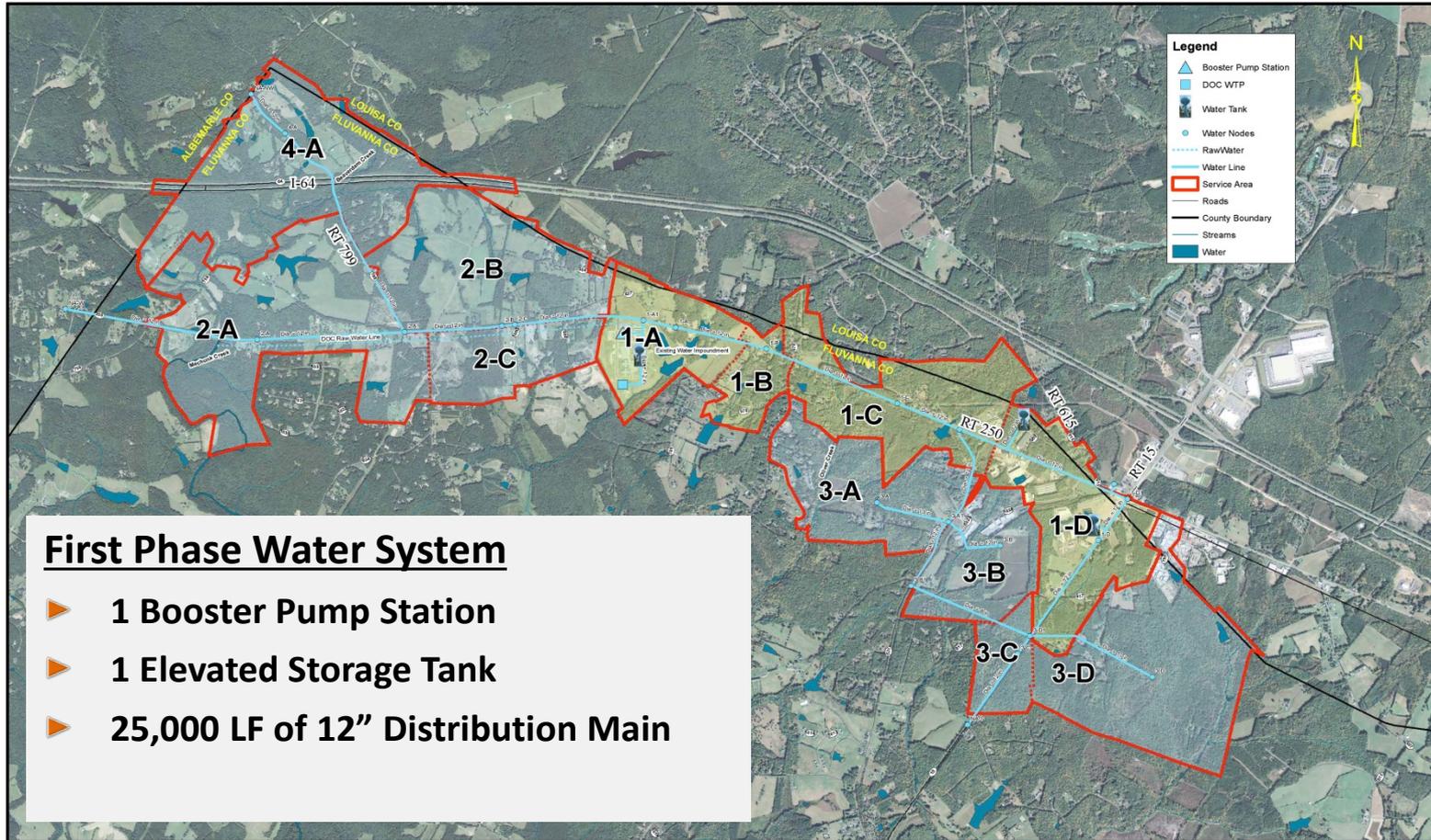


- ▶ Force Mains
- ▶ Pump Stations and Gravity Sewer
- ▶ Long Term Flexibility

	<p>Proposed Sewer System Layout</p> <p style="font-size: small;">1 inch = 1,200 feet</p> <p style="font-size: x-small;">0 1,200 2,400 4,800 Feet</p>	<p style="font-size: x-small;">COUNTY OF FLUVANNA PER FOR WATER/WASTEWATER SERVICES</p> <p style="font-size: x-small;">Zion Crossroads Planning Area</p>	
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Water System Phases

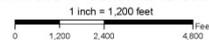


First Phase Water System

- ▶ 1 Booster Pump Station
- ▶ 1 Elevated Storage Tank
- ▶ 25,000 LF of 12" Distribution Main



Water System Phased Improvements

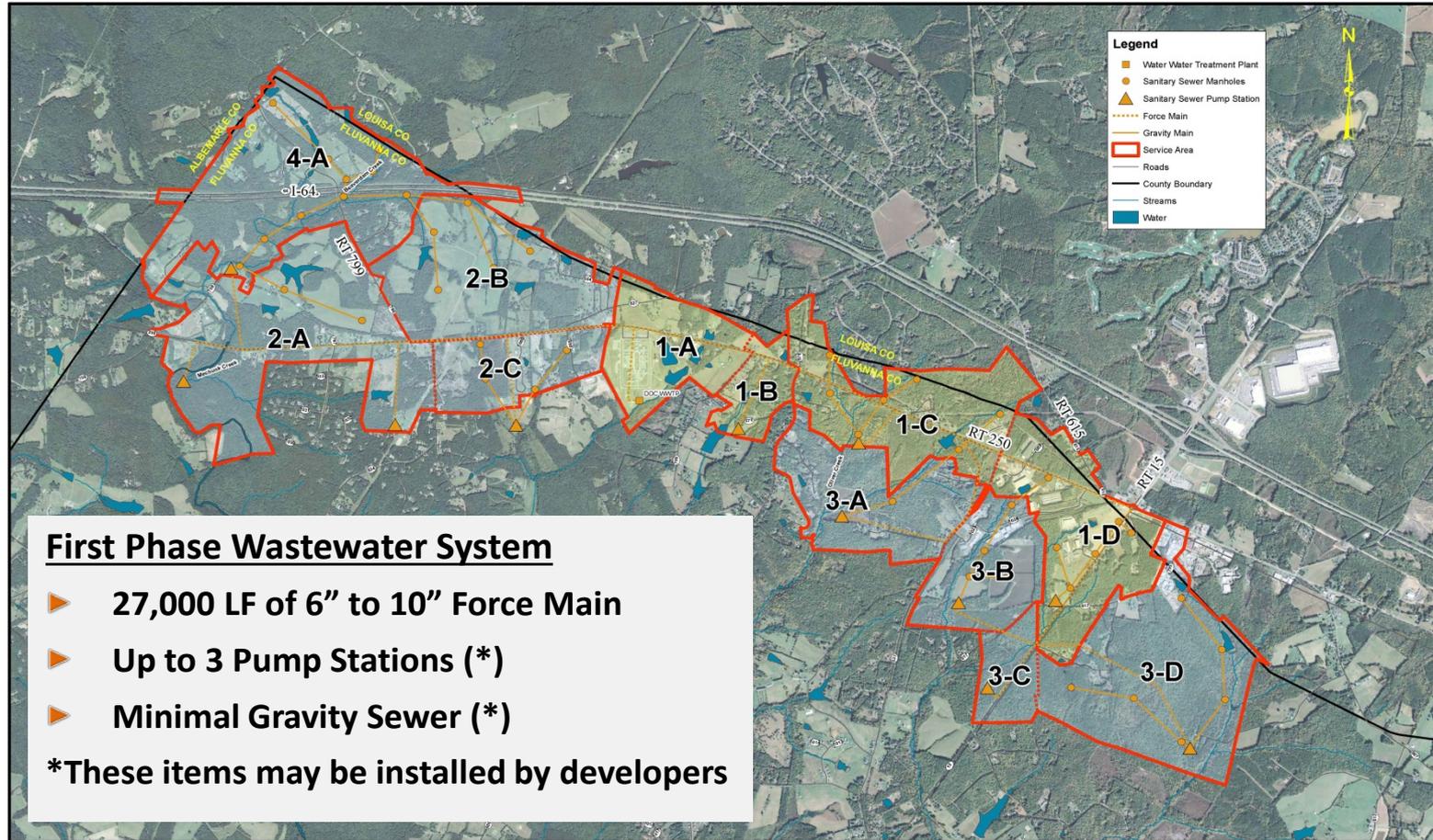


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Wastewater System Phases

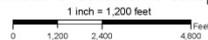


First Phase Wastewater System

- ▶ 27,000 LF of 6" to 10" Force Main
 - ▶ Up to 3 Pump Stations (*)
 - ▶ Minimal Gravity Sewer (*)
- *These items may be installed by developers



Sewer System Phased Improvements



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Project Cost Estimates (Budget Level)



- ▶ **First Phase Water System (5 Million)**
 - 1 Booster Pump Station – 0.5 Million
 - 1 Elevated Storage Tank – 1.8 Million
 - 25,000 LF of 12” Distribution Main – 2.7 Million

- ▶ **First Phase Wastewater System (3 Million)**
 - 27,000 LF of 6” to 10” Force Main – 2 Million
 - Up to 3 Pump Stations (*) – assume 0.5 Million
 - Minimal Gravity Sewer (*) – assume 0.5 Million
 - * These items may be installed by developers

Moving Forward



- ▶ **Submit Draft PER – 1/15/15**
- ▶ **Receive County Comments – 2/5/15**
- ▶ **Final PER – 3/1/15**
- ▶ **Preliminary Design – Tank siting, alignment routings, preliminary permitting – 6/1/15**
- ▶ **Final Design/Easements/Permitting – 1/1/16**
- ▶ **Construction of Phase 1 Improvements – 3/1/16 to 3/1/17**
- ▶ **Start up of New Systems – 3/1/17**
- ▶ **Above schedule has opportunities for improvement**