Table 3-4
Summary of Groundwater Alternative Appropriation Criteria

		DEMAND	SERVICE AREA MDE AVAILABLE RECHARGE					ESTIMATED WELL REQUIREMENTS	
		❶	❶	❷	❸	❹	❺	❶	❷
			Priority + Future Service Area						
Alt	Growth Area	Probable Maximum Additional Water Requirement [gpd]	Area [ac]	Total Available Recharge [gpd]	Remaining Available Recharge [gpd]	Projected Water Surplus [gpd]	Total Required MDE GW Recharge Area [ac]	Number of Additional Wells based on Average MDE Appropriation per Groundwater Well [-]	Total Exploration Sites [-]
G-1	***Hampstead***	***528,000***	***2,656***	***934,979***	***214,364***	***-313,636***	***891***	***20***	***28***
G-2	*Mount Airy*	*364,000*	*3,543*	*1,197,463*	*532,598*	*168,598*	*0*	*5*	*54*
G-3	***New Windsor***	***198,000***	***953***	***290,665***	***94,665***	***-103,335***	***339***	***3***	***22***
G-4	***Taneytown***	***1,164,000***	***3,274***	***949,460***	***366,460***	***-797,540***	***2,750***	***16***	***5***
G-5	***Union Bridge***	***594,000***	***1,430***	***436,150***	***227,850***	***-366,150***	***1,200***	***6***	***11***
G-6	*Westminster*	*1,176,000†*	*8,543*	*3,007,136*	*1,531,136*	*355,136*	*0*	*9*	*38*
G-7	*Union Mills*	*N/A*	*1,600*	*563,310*	*563,310*	*563,310*	*0*	*10*	--
G-8	*Manchester*	*124,000††*	*0*	*0*	*0*	*0*	*0*	*6*	--
	WSA Totals	**4,148,000**	**20,399**	**6,815,853**	**2,967,073**	**-1,056,927**	**5,180**	**75**	**158**

Notes:

❶ Projected maximum groundwater requirement (see Table 2-1)
❶ Area of Priority+Future Service Area (GIS layer supplied by County)
❷ Total Available Recharge in Priority+Future Service Areas based on recommended MDE method (Recharge = 1yrQ10 - 7Q10 by hydrogeomorphic region)
❸ Adjusted Available Recharge in Piority+Future Service Areas (Total Available adjusted by subtracting existing allocations)
❹ Projected Surplus of Available Recharge (Max(❸,0)-❶)
❺ The amount of additional land that a given WSA would need to own/control to obtain an appropriation permit to meet total projected demands by groundwater (-MIN(❶/,0)*❷/❶)
❶ Estimated number of wells needed to meet maximum probable GW demands ❶
❷ Total number potential wells sites identified by the County and its water service areas for exploration

† Assumed existing withdrawals in Westminster are equal to actual yield because existing wells are known to have significantly lower yields than the permitted amount
†† Manchester needs additional wells to access water that is already appropriated, but cannot be used due to reduced well capacities.

Alternative G-1: Hampstead Wells

MALCOLM PIRNIE

Description of Alternative:

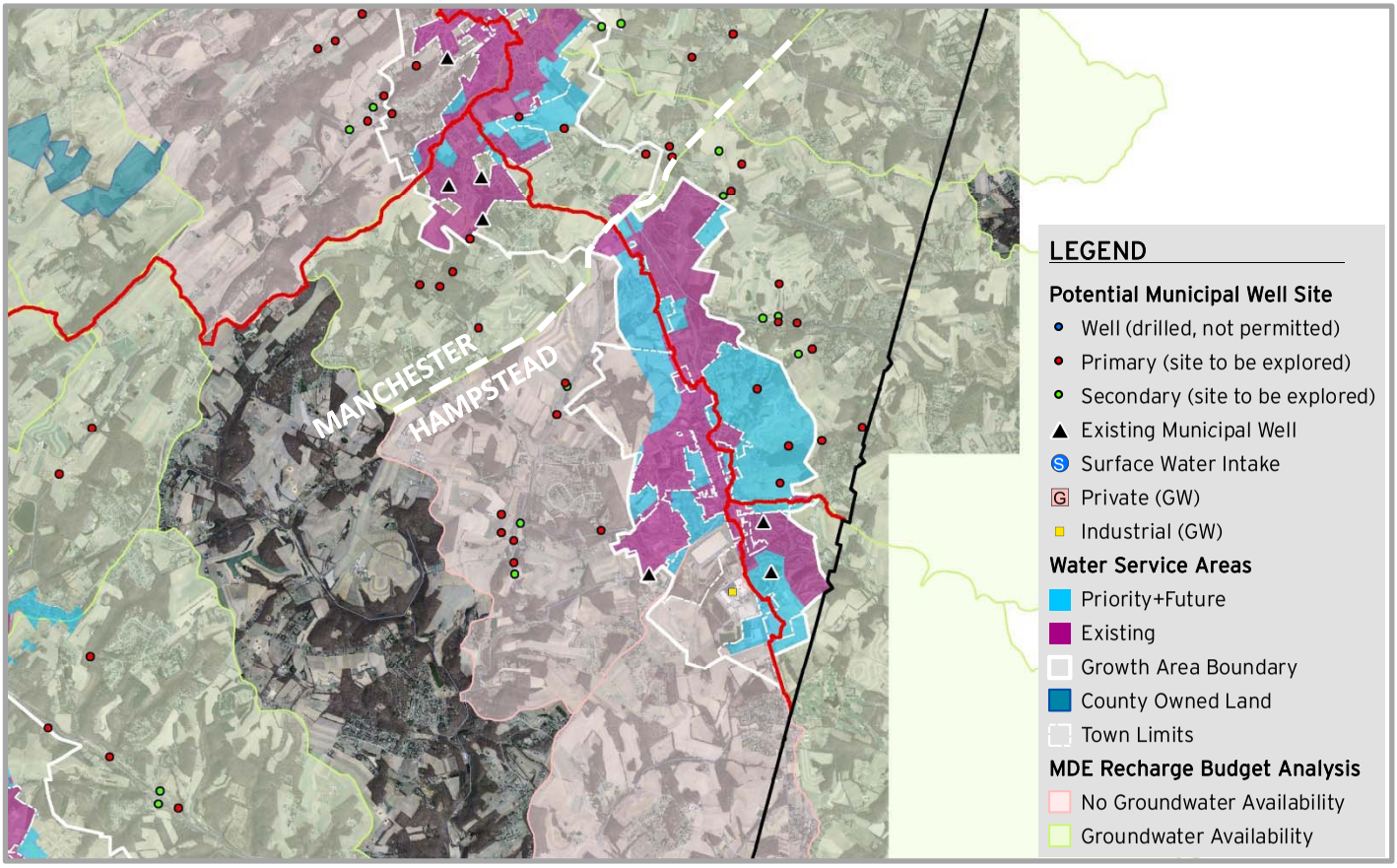
- Develop a sufficient number of additional groundwater wells in and around the Hampstead Water Service Area to meet projected demands

Hampstead Wells (G-1)		
Yield to offset future needs (mgd)	0.528	
# Wells (range)	4	15
# Wells (likely)	7	
# Wells (avg. MDE appropriation)	20	
# Well Exploration Sites†	--	
# Primary Well Sites Identified†	20	
# Secondary Well Sites Identified†	8	

Key Implementation Steps:

- Obtain own/control status of well site(s) and sufficient net recharge area by watershed, according to MDE methodology
- Begin MDE water appropriation permit process
- Drill and develop well site(s)
- Conduct pumping test(s) and source water quality analyses
- Finalize MDE water appropriation permit process
- Install permanent wellhead and fencing and construct treatment/transmission infrastructure necessary to connect wells to the WSA distribution system

† Sites explored in watersheds with groundwater availability given own/control of future service area acreages



Alternative G-2: Mount Airy Wells

MALCOLM PIRNIE

Description of Alternative:

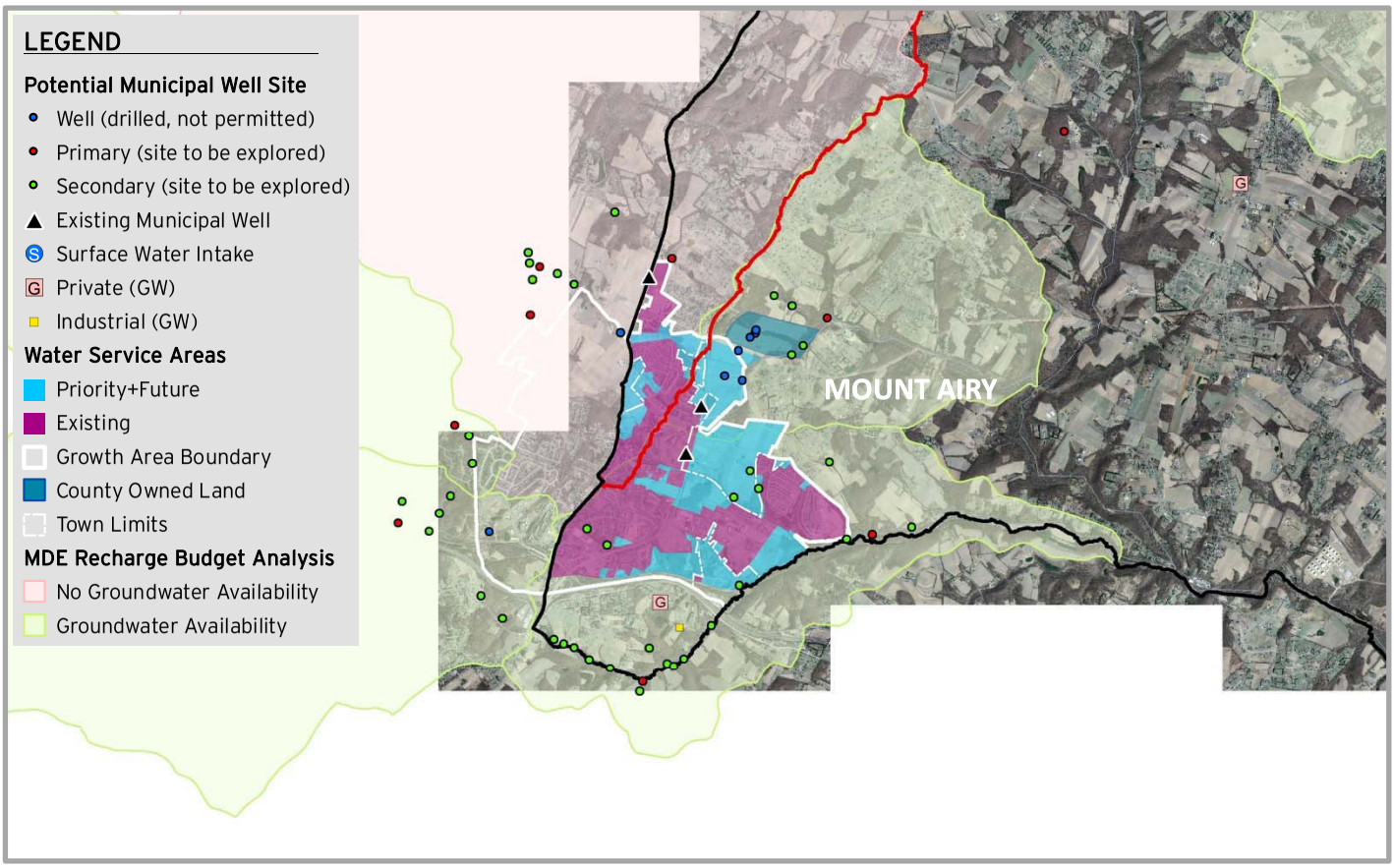
- Develop a sufficient number of additional groundwater wells in and around the Mount Airy Water Service Area to meet projected demands

Mount Airy Wells (G-2)		
Yield to offset future needs (mgd)	0.364	
# Wells (range)	4	7
# Wells (likely)	4	
# Wells (avg. MDE appropriation)	5	
# Well Exploration Sites†	8	
# Primary Well Sites Identified†	8	
# Secondary Well Sites Identified†	38	

Key Implementation Steps:

- Obtain own/control status of well site(s) and sufficient net recharge area by watershed, according to MDE methodology
- Begin MDE water appropriation permit process
- Drill and develop well site(s)
- Conduct pumping test(s) and source water quality analyses
- Finalize MDE water appropriation permit process
- Install permanent wellhead and fencing and construct treatment/transmission infrastructure necessary to connect wells to the WSA distribution system

† Sites explored in watersheds with groundwater availability given own/control of future service area acreages



Alternative G-3: New Windsor Wells

MALCOLM PIRNIE

Description of Alternative:

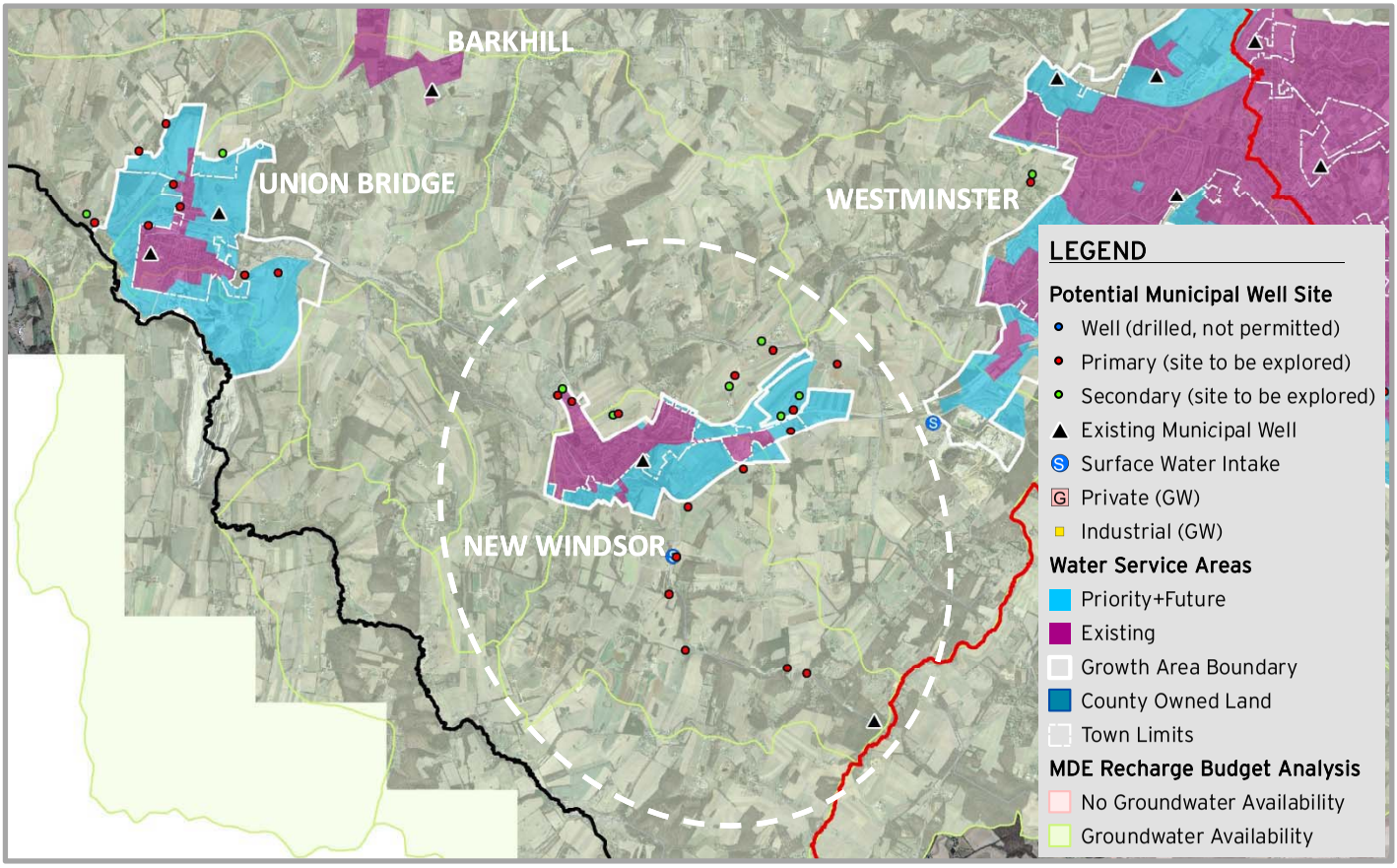
- Develop a sufficient number of additional groundwater wells in and around the New Windsor Water Service Area to meet projected demands

New Windsor Wells (G-3)		
Yield to offset future needs (mgd)	0.198	
# Wells (range)	2	3
# Wells (likely)	2	
# Wells (avg. MDE appropriation)	3	
# Well Exploration Sites†	--	
# Primary Well Sites Identified†	16	
# Secondary Well Sites Identified†	6	

Key Implementation Steps:

- Obtain own/control status of well site(s) and sufficient net recharge area by watershed, according to MDE methodology
- Begin MDE water appropriation permit process
- Drill and develop well site(s)
- Conduct pumping test(s) and source water quality analyses
- Finalize MDE water appropriation permit process
- Install permanent wellhead and fencing and construct treatment/transmission infrastructure necessary to connect wells to the WSA distribution system

† Sites explored in watersheds with groundwater availability given own/control of future service area acreages



Alternative G-4: Taneytown Wells

MALCOLM PIRNIE

Description of Alternative:

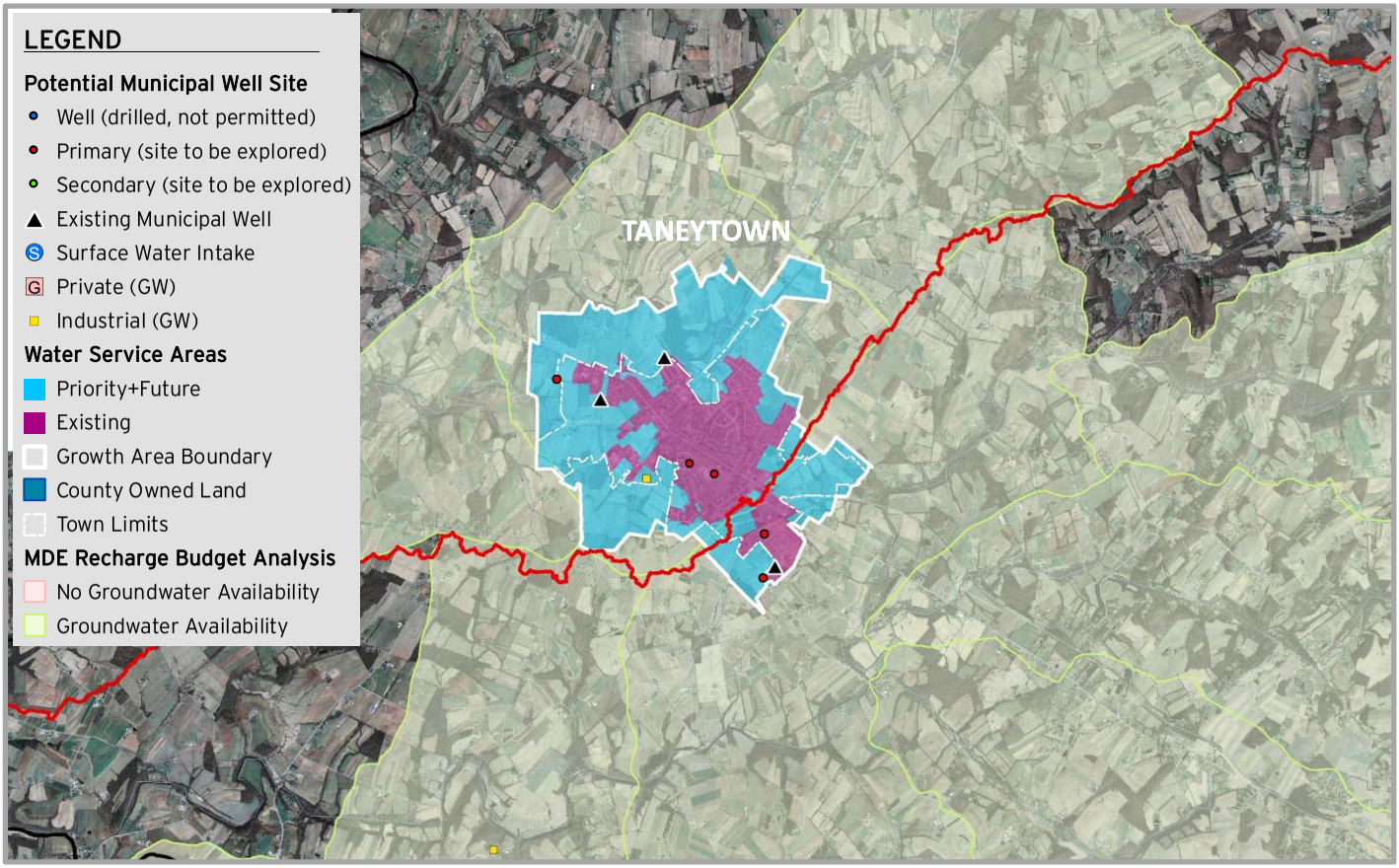
- Develop a sufficient number of additional groundwater wells in and around the Taneytown Water Service Area to meet projected demands

Taneytown Wells (G-4)		
Yield to offset future needs (mgd)	1.164	
# Wells (range)	3	21
# Wells (likely)	11	
# Wells (avg. MDE appropriation)	16	
# Well Exploration Sites†	--	
# Primary Well Sites Identified†	5	
# Secondary Well Sites Identified†	--	

Key Implementation Steps:

- Obtain own/control status of well site(s) and sufficient net recharge area by watershed, according to MDE methodology
- Begin MDE water appropriation permit process
- Drill and develop well site(s)
- Conduct pumping test(s) and source water quality analyses
- Finalize MDE water appropriation permit process
- Install permanent wellhead and fencing and construct treatment/transmission infrastructure necessary to connect wells to the WSA distribution system

† Sites explored in watersheds with groundwater availability given own/control of future service area acreages



Alternative G-5: Union Bridge Wells

MALCOLM PIRNIE

Description of Alternative:

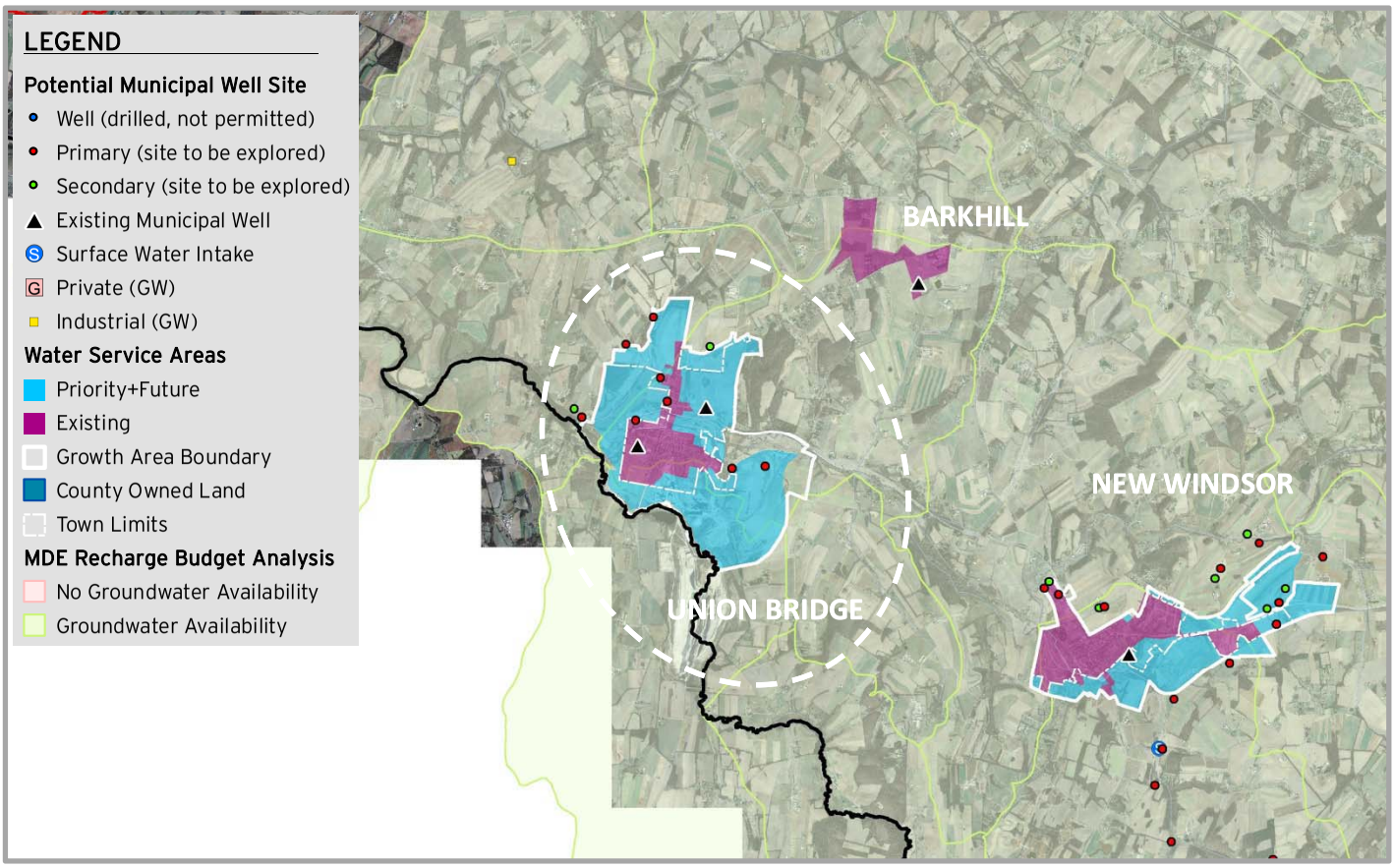
- Develop a sufficient number of additional groundwater wells in and around the Union Bridge Water Service Area to meet projected demands

Union Bridge Wells (G-5)		
Yield to offset future needs (mgd)	**0.594**	
# Wells (range)	**3**	**9**
# Wells (likely)	3	
# Wells (avg. MDE appropriation)	**6**	
# Well Exploration Sites†	**--**	
# Primary Well Sites Identified†	**9**	
# Secondary Well Sites Identified†	**2**	

Key Implementation Steps:

- Obtain own/control status of well site(s) and sufficient net recharge area by watershed, according to MDE methodology
- Begin MDE water appropriation permit process
- Drill and develop well site(s)
- Conduct pumping test(s) and source water quality analyses
- Finalize MDE water appropriation permit process
- Install permanent wellhead and fencing and construct treatment/transmission infrastructure necessary to connect wells to the WSA distribution system

† Sites explored in watersheds with groundwater availability given own/control of future service area acreages



Alternative G-6: Westminster Wells

MALCOLM PIRNIE

Description of Alternative:

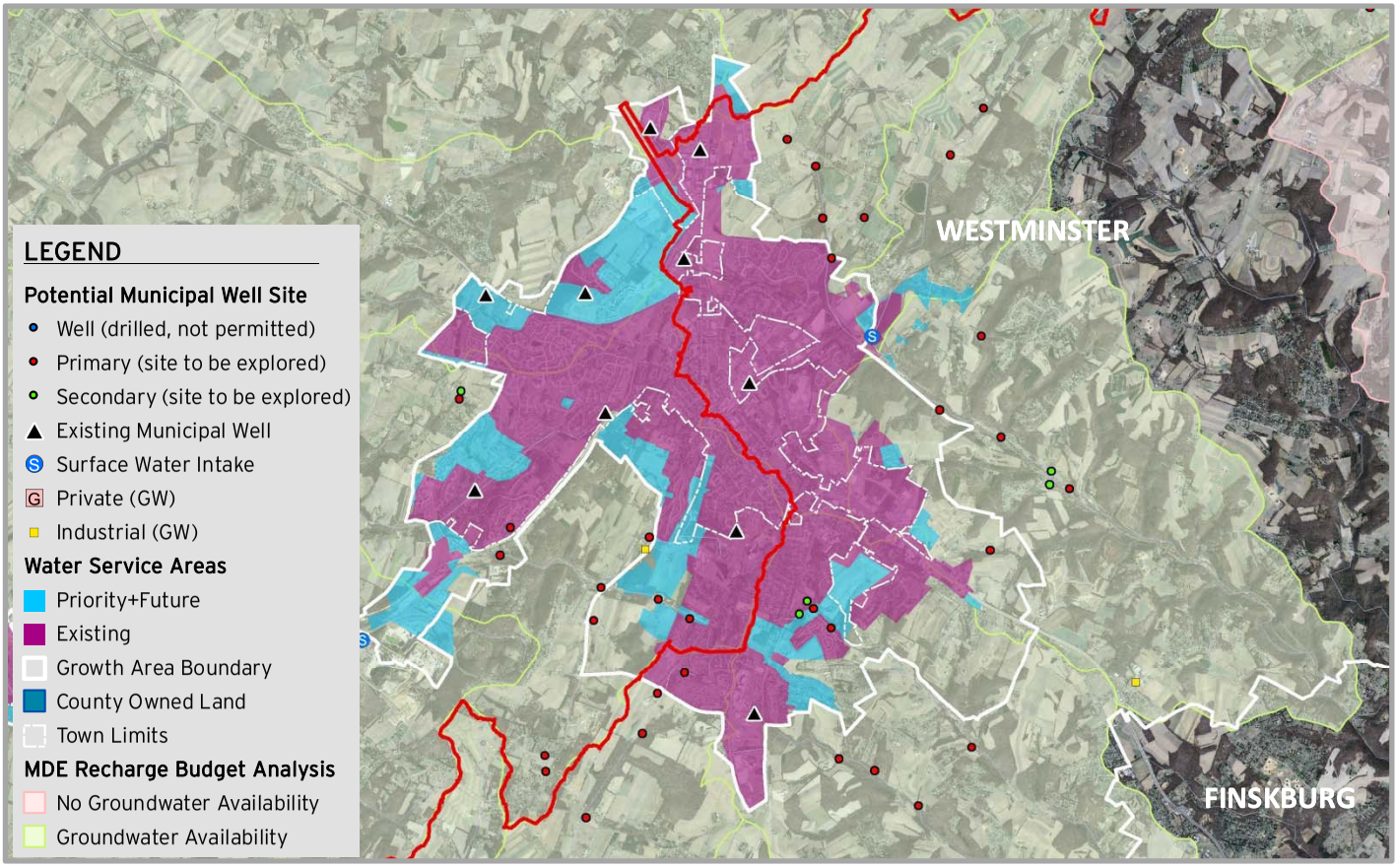
- Develop a sufficient number of additional groundwater wells in and around the Westminster Water Service Area to meet projected demands

Westminster Wells (G-6)		
Yield to offset future needs (mgd)	1.176	
# Wells (range)	2	19
# Wells (likely)	5	
# Wells (avg. MDE appropriation)	9	
# Well Exploration Sites†	--	
# Primary Well Sites Identified†	32	
# Secondary Well Sites Identified†	6	

Key Implementation Steps:

- Obtain own/control status of well site(s) and sufficient net recharge area by watershed, according to MDE methodology
- Begin MDE water appropriation permit process
- Drill and develop well site(s)
- Conduct pumping test(s) and source water quality analyses
- Finalize MDE water appropriation permit process
- Install permanent wellhead and fencing and construct treatment/transmission infrastructure necessary to connect wells to the WSA distribution system

† Sites explored in watersheds with groundwater availability given own/control of future service area acreages



Alternative G-7: Union Mills Area Wells

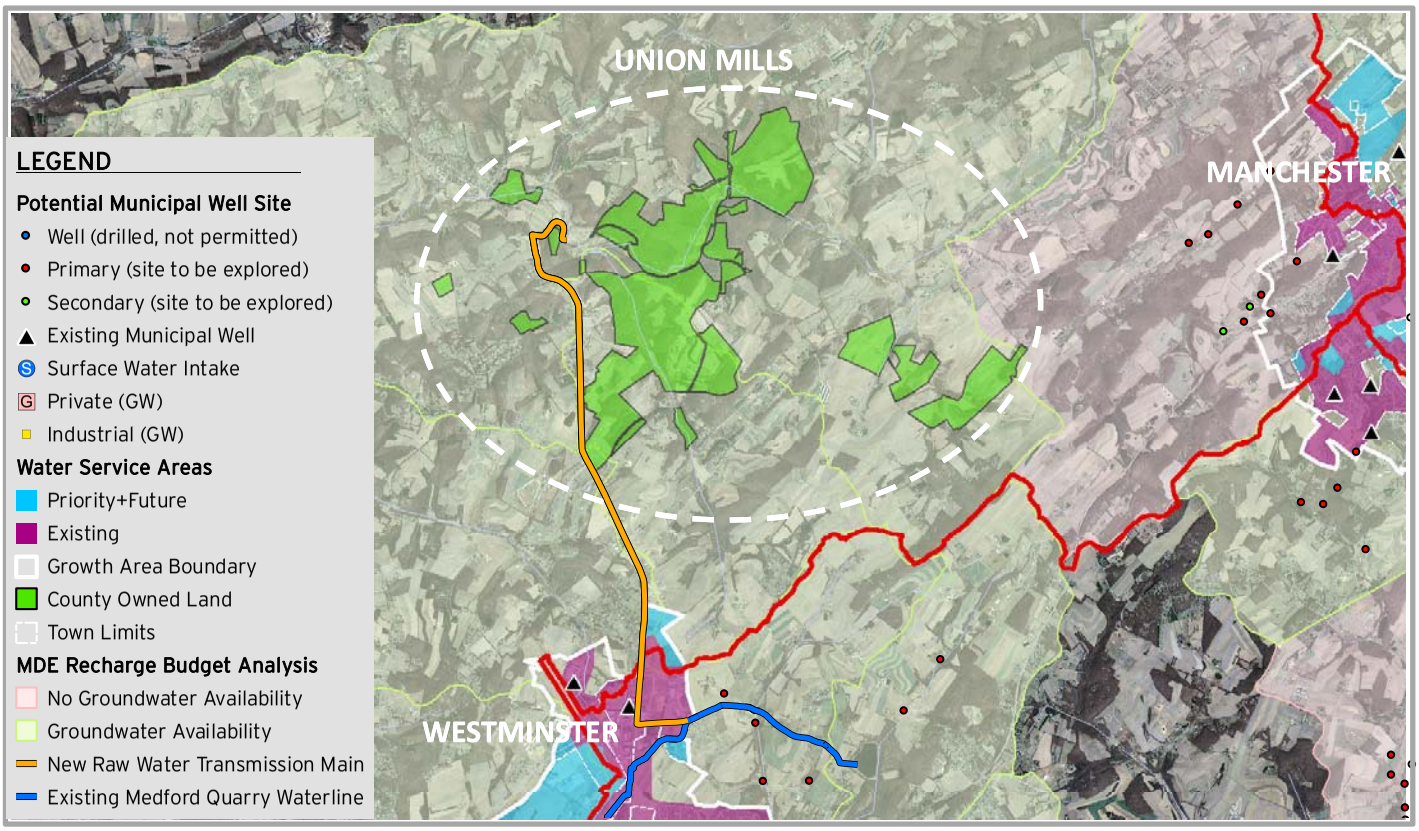
MALCOLM PIRNIE

Description of Alternative:

- Based on County-owned land, develop groundwater wells in and around the proposed Union Mills Reservoir area to meet a portion of the additional supply needed in the Westminster Water Service Area
- Construct 20-inch raw water transmission main to connect to Cranberry Reservoir

Union Mills Wells (G-7)		
Yield to offset future needs (mgd)	**0.56**	
# Wells (range)	**1**	**9**
# Wells (likely)	**2**	
# Wells (avg. MDE appropriation)	**10**	
# Well Exploration Sites†	**--**	
# Primary Well Sites Identified†	**--**	
# Secondary Well Sites Identified†	**--**	

Key Implementation Steps:

- Begin MDE water appropriation permit process
- Drill and develop well site(s)
- Conduct pumping test(s) and source water quality analyses
- Finalize MDE water appropriation permit process
- Install permanent wellhead and fencing and construct treatment/transmission infrastructure necessary to connect wells to the WSA distribution system

† Sites explored in watersheds with groundwater availability given own/control of future service area acreages