Manchester

The Capacity Management Plan (CMP) worksheets were developed well before the update to the Manchester Comprehensive Plan (adopted in January 2009). The plan reflects changes to planned water and sewer service. These changes were made, in part, to balance the capacity and demand calculated in the CMPs for public water and wastewater. Information provided in this section is based on data in the CMP worksheets and planned development projected for the adopted land use plan in effect at the time the CMP worksheets were developed – the 1998 Manchester and Environs Comprehensive Plan.

Water Supply

Source Water Assessment

The unconfined fractured rock aquifer in the Marburg Formation is the source of water supply for the Town of Manchester. The system currently uses 14 wells and 1 spring to obtain its drinking water. All of Manchester's wells are susceptible to contamination by nitrates, VOCs, and radon, but not to SOCs, other radionuclides, or inorganic compounds. None of Manchester's water supply sources are susceptible to protozoan contamination except for the Walnut Street well and Crossroads Well 1. In addition, the Bachman Road, Patricia Court, and Walnut Street wells are susceptible to total coliform.

Water Supply Demand

The total future water demand assumes that everything within the 1998 GAB builds out according to the adopted land use plan. If this were to occur, the total future water supply demand for the Manchester system would be 802,523 gpd. The numbers in the "Manchester Future Water Supply Demand" table are based strictly on BLI calculations. They do not reflect factors unique to this municipal system that may have been considered in the CMP worksheet calculations and figures presented in the next table, "Manchester Water Supply Capacity *Currently* Available for Existing and Future Growth."

For example, the projected demand for two new schools – Ebb Valley Elementary School and Manchester Valley High School – was included in the Infill demand number in the wastewater capacity table. However, since the demand based on BLI was calculated strictly from zoning, the estimates did not include the addition of the schools. Likewise, the future demand at the high school site was estimated using the BLI. The zoning at the time was for industrial use, and, therefore, the demand was calculated based on an industrial use. However, in actuality, the demand for a high school is much lower, which reduces the number used in the wastewater capacity table (and on the CMP worksheets).

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Manchester Future Water Supply Demand
(Gallons per Day)

Community	Current Demand[1]	Planned Future Demand[2]		Other Potential Demand[3]	Total Demand
		Infill Demand	Future Demand		
Manchester	299,693	74,600	108,710	319,520	802,523
Community	**Current Demand[1]**	**Additional Demand by Land Use**			**Total Demand**
		Residential	**Commercial**	**Industrial**	
Manchester	299,693	452,500	50,330	0	802,523

[1] These data are the greatest annual average daily demand for the five-year period from 2003 through 2007.
[2] These data relate to areas located within the designated planned water service area. Infill demand is calculated for areas classified in the "Existing/Final Planning" service category; Future demand is calculated for the combined area classified in the "Priority" or "Future" service category.
[3] These data relate to areas designated in the "No Planned Water Service Area" but located within the Community Growth Area Boundary.

Source: Carroll County Department of Planning, December 2008

Calculations for future water demand used the CMP data. This demand is reflected under "Infill + Future." However, the CMP data do not account for additional demand that would occur within the balance of the planned water service area, or the additional demand within the balance of the growth area that is designated in the "No Planned Water Service Area." To factor in this further demand, future development potential and existing development that would be served were estimated and calculated for water demand and are reported under "Other Potential Demand."

Water Supply Capacity

If Manchester were to build out according to the planned land uses adopted within the 1998 GAB, the Town would need to expand beyond its current capacity to make available another 453,992 gpd. The information in the following table is based on the December 2008 CMP worksheets.

Manchester Water Supply Capacity *Currently* Available for Existing and Future Growth
(in Gallons per Day)

Community	Current			Remaining Capacity	Unserved Demand		Net Avg Day Capacity Available at Buildout
	Permitted	Avg Day Capacity Limitation	Avg Day Drought Demand[1]		Infill + Future[2]	No Planned Service	
Manchester	581,000	388,800	329,662	59,138	193,610	319,520	(453,992)

[1] Average Day Drought Demand here includes an additional 10% for drought demand
[2] This datum includes an additional 10,300 gpd estimated for two new school facilities

Source: Carroll County Department of Planning, December 2008

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Water Supply Limitations

The total water appropriation for the Town of Manchester Water Supply System is 581,000 gallons per day (gpd). While the Town is permitted to use 581,000 gallons of water per day, the current pump capacity is 388,800 gpd. The need for new sources and accompanying infrastructure, therefore, becomes a limiting factor in determining how much water is available *today* to serve existing and planned growth.

State policy requires that an additional 10 percent be added to the current average amount of water used on any given day to accommodate potential drought conditions. When the current daily usage, including the drought factor, was subtracted from the pump capacity, 59,138 gpd remained to serve infill and future demand.

The figures for infill demand indicate that the Town will fall 27,132 gpd short of being able to pump enough water to meet unserved infill demand (the areas within the Existing/Final Planning Service Area). Since the Town is permitted to use 581,000 gpd, increasing pump capacity would address the pump capacity limitation, and adding wells to the Town system would access the water the Town has appropriated. This would give the Town the ability to meet this demand within their current appropriation.

The estimates for future demand (Priority and Future Planned Service Areas) also indicate that the Town will need to increase pump capacity and water withdrawal to serve that need. At this point, however, the Town becomes further constrained by the capacity of the wastewater system to treat flows. The wastewater treatment system is capped at 500,000 gpd. Therefore, the Town should not plan to accommodate water demand above 500,000 gpd.

Although enough water is appropriated to meet the demand, the wastewater system constraint results in 12,682 gpd of water demand that could not be served, even with additional pump capacity. In response, with the Town's recent update of its comprehensive plan, areas were removed from the planned service area and some land use designations revised to reduce demand.

Despite the current groundwater appropriation, additional water sources should be explored. Changing policies at the state and federal level for water supply and environmental protections, effects of climate change, and need for system redundancy will eventually dictate the need for at least additional backup sources. Identifying and planning for those sources should begin now.

Wastewater

From December to February, the effluent is discharged to George's Run, a tributary of Prettyboy Reservoir. Manchester's NPDES permit allows discharge to George's Run in March as well, but this would normally only be done if the soil conditions were unsuitable for

spray irrigation from March to November. The effluent is irrigated to approximately 70 acres of farmland growing reed canary grass.

Wastewater Demand

The total future wastewater demand assumes that everything within the 1998 GAB builds out according to the adopted land use plan. If this were to occur, the total future wastewater demand for the Manchester WWTP would be 871,729 gpd.

The numbers in the "Manchester Future Wastewater Demand" table are based strictly on BLI calculations. They do not reflect factors unique to this municipal system that may have been considered in the capacity management plan worksheet calculations and figures presented in the next table, "Manchester Wastewater Capacity *Currently* Available for Existing and Future Growth."

For example, the projected demand for two new schools – Ebb Valley Elementary School and Manchester Valley High School – was included in the infill demand number in the wastewater capacity table. However, since the demand based on BLI was calculated strictly from zoning, the estimates did not include the addition of the schools. Likewise, the future demand at the high school site was estimated using the BLI. The zoning at the time was for industrial use, and, therefore, the demand was calculated based on an industrial use. However, in actuality, the demand for a high school is much lower, which reduces the number used in the wastewater capacity table (and on the CMP worksheets).

Manchester Future Wastewater Demand
(in Gallons per Day)

Community	Current Demand[1]	Planned Future Demand[2]		Other Potential Demand[3]	Total Demand
		Infill Demand	Future Demand		
Manchester	292,519	69,650	139,040	370,520	871,729

Community	Current Demand	Additional Demand by Land Use			Total Demand
		Residential	Commercial	Industrial	
Manchester	292,519	530,000	49,210	0	871,729

[1] These data represent, in general, the annual average daily demand over the three-year period 2005-2007, and include I&I.
[2] These data relate to areas located within the designated planned sewer service area. Infill demand is calculated for areas classified in the "Existing/Final Planning" service category; Future demand is calculated for the combined area classified in the "Priority" or "Future" service category.
[3] These data relate to areas designated in the "No Planned Sewer Service Area" but located within the Community Growth Area Boundary.

Source: Carroll County Department of Planning, December 2008

With the January 2009 adoption of a comprehensive plan update, the sewer service area and annexation areas in the No Planned Service area were drawn in to help balance demand with capacity.

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Wastewater Capacity

If Manchester were to build out according to the planned land uses adopted within the 1998 GAB, the Town would need to expand beyond its current capacity to make available an additional 337,809 gpd in wastewater flows. The information in the following table is based on the December 2008 CMP worksheets.

Manchester Wastewater Capacity *Currently* Available for Existing and Future Growth (in Gallons per Day)

Community	Current			Existing Flows	Capacity Needed			Capacity Available at Buildout
	Permitted	I&I	Remaining Capacity		Infill[1]	Future	No Planned Service	
Manchester	500,000	22,250	477,750	270,269	80,520	94,250	370,520	(337,809)

[1] This datum includes an additional 10,300 gpd estimated for two new school facilities

Source: Carroll County Department of Planning, December 2008

Limitations Based on Design Capacity

The total projected wastewater demands for all areas within the current planned sewer service area (shown as "priority+future" in the Malcolm Pirnie reports) would be approximately 0.47 mgd, which could be met by the current plant. However, the plant would need to be expanded in order to meet the projected buildout wastewater demand of 0.84 mgd. The buildout wastewater demand is unlikely to exceed 0.5 mgd as the Town has capped their plant capacity at 0.5 mgd. There is limited land area to expand the plant, and regardless, the Town reports that the land area available for spray irrigation would not allow treatment of more than about 0.6 mgd. Previous studies by the Town have indicated that low soil infiltration capacities prevent most other nearby parcels in the region from being suitable for spray irrigation of effluent.

Limitations Based on Local Water Quality

The plant can successfully comply with a 1.0 mg/L total phosphorus limit related to the Prettyboy Reservoir phosphorus TMDL. The Manchester WWTP is not upstream of a Tier II stream segment.

Limitations Based on Bay Nutrient Caps

The Manchester WWTP is considered a 'minor' facility under *Maryland's Tributary Strategies Statewide Implementation Plan*. As a minor facility, the nutrient loading caps are assigned as goals. These nutrient caps were based on a projected 2020 flow of 0.384 mgd for 120 days/year, a total nitrogen concentration of 18.0 mg/L, and a total phosphorus concentration of 0.5 mg/L. These caps will remain as goals rather than permit limits until/unless the WWTP expands or elects to trade nutrient credits with another point source facility.

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At the design capacity flow of 0.5 mgd and assuming discharge for 120 days/year, the Manchester WWTP could meet its nutrient loading goals by attaining effluent concentrations of approximately 13.8 mg/L total nitrogen and 0.38 mg/L total phosphorus. Meeting these concentrations would require the plant to increase nutrient removal relative to the existing operation. Although the phosphorus goal could probably be achieved by increasing chemical addition, achieving the nitrogen goal at full design capacity would probably require additional nitrification/denitrification capability. However, if March discharges to surface water were relatively rare, most of the time the facility could achieve the annual loading goals without a major technology upgrade.

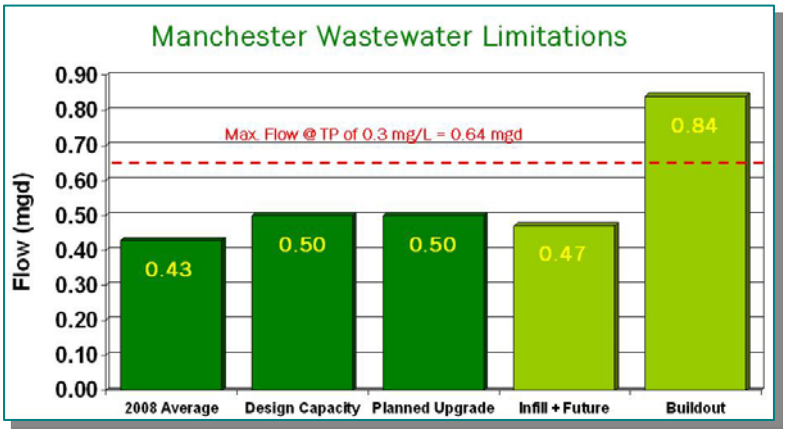
If the Manchester WWTP plant expanded, the nutrient caps would become enforceable permit limits. The buildout wastewater demand listed in the CMP worksheet (0.84 mgd) would require that the Manchester WWTP meet effluent concentrations of approximately 8 mg/L total nitrogen and 0.23 mg/L total phosphorus. These limits would be achievable with the installation of biological nutrient removal (BNR) or ENR technology. However, unless MDE would allow year-round discharge to Prettyboy Reservoir, treating this amount of flow would also require that sufficient land area be identified to spray irrigate the projected buildout wastewater demand during March-November.

Limitations Based on 2005 Reservoir Watershed Management Agreement (WMA)

Point source management provisions pertaining to the Manchester WWTP are currently tied to limitations set through the plant's NPDES permit and existing MDE programs, including limiting total phosphorus loads using the TMDL for Prettyboy Reservoir. The WMA by itself is not a limiting factor on the operation of the Manchester WWTP. Manchester is not currently a signatory to the Agreement.

Summary of Wastewater Limitations

Given the limited land area to expand the plant and to spray irrigate, the existing design capacity (0.5 mgd) of the Manchester WWTP represents the effective wastewater limitation.



System-Specific Strategies: Manchester

Note: Numbers for each objective correspond to the relevant objective in the countywide strategies section of this plan. Objectives included below are those that apply specifically and uniquely to this system. Strategies that apply to the County and all of the municipal systems are included in the Countywide Strategies section of this plan.

Draft for Official 60-Day Review by State Agencies and for Adjoining Jurisdictions, & Public

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1. *Protect and sustain existing water supplies serving existing development*

System-Specific Action Items Already in Place:

✓ Amended the *Manchester Community Comprehensive Plan* to reduce the size of the Manchester GAB to more closely reflect a balance between future demand and potential water supply capacity [January 2009]
  - Land use designation and GAB changes adopted in the Manchester comprehensive plan reduced unserved demand by 12,000 gpd from 513,130 gpd to about 501,130 mgd, which does not exceed the Town's water appropriation

✓ Adopted the Carroll County Water Resource Management Code, Chapter 218, which provides source water projection regulations

System-Specific "To Do" Action Items:

Short-term

❑ Support rezoning by the County of areas outside the Town's future annexation line (Growth Area Boundary) to be consistent with other areas of the county that are not within a DGA to reflect desired future buildout scenario for Manchester

❑ Update the WSCMP worksheets developed as background data for this plan document to reflect the most current information, then complete and submit a full WSCMP to MDE for review

❑ Amend the Municipal Growth Element of the *Manchester Community Comprehensive Plan* and associated annexation areas, as needed, to reflect the changes recommended in this plan

2. *Identify and develop, as needed, new water supplies adequate to support planned future growth without over-allocating available sources*

System-Specific "To Do" Action Items:

Long-term Water Supply Options

Note: These are options that will be considered for long-term supply. However, inclusion here does not imply that there is a definite plan to move forward with an option. Exploring additional sources, even for those systems that currently project enough capacity to meet demand, is included in order to be prepared for policy changes or other changes that would result in the need for additional available water capacity.

❑ Groundwater Wells: Drill and develop 6 groundwater wells to meet potential appropriated water demand deficit of approximately 124,000 gpd (buildout demand less 2007 avg day w/d)
  - ❑ Obtain control (annex, purchase, or designate as planned WSA) over sufficient acreage in the appropriate watershed(s) to meet the MDE-required amount of recharge
  - ❑ Begin MDE water appropriation permitting process
  - ❑ Acquire ownership or easement of well site(s)
  - ❑ Drill and develop well site(s)
  - ❑ Conduct pumping test(s) and source water quality analyses
  - ❑ Finalize MDE water appropriation permit process

- ❑ Install permanent wellhead(s) and fencing and constructing treatment/transmission infrastructure necessary to connect wells to the WSA distribution system

❑ Union Mills Reservoir: Safe yield 3.76 mgd with normal pool elevation of 610 ft.; planned reservoir; to serve as regional source of supply for Westminster, Hampstead, Taneytown, and Manchester Service Areas

❑ York Water Company: Interconnection with York Water Company to provide approximately 0.90 mgd of finished water to Manchester and Hampstead. Requires a purchase agreement among all parties. Continue discussions with York Water Company to identify potential, cost, and timing of connecting with the York County water lines that currently end at Pleasant Hill.

4. *Promote water conservation measures and manage demand for potable water to ensure adequate supplies are available for planned development*

System-Specific Action Items Already in Place:

✓ Public Education: Website postings; public service announcements (PSAs); newspapers; brochures/flyers; e-newsletters
✓ Water Loss Management: Current UAW at 7 percent; meter replacement program; Town owns its own leak detection equipment
✓ Drought Management: Three-staged drought management plan adopted
✓ Low-Flow Devices: Promote the use of low-flow devices by customers
✓ Water use Rate Schedule: Progressive water rate schedule
✓ Billing Cycle: Quarterly billing cycle

5. *Sustain existing wastewater treatment capacity*

System-Specific Action Items Already in Place:

✓ Conducted an I&I study to determine level of inflows from I&I; made system improvements to reduce I&I; periodically check I&I by using Town's own inspection cameras to identify and control any problems
✓ Amended the *Manchester Community Comprehensive Plan* to reduce the size of the Manchester GAB to more closely reflect a balance between future demand and potential water supply capacity [January 2009]
  - Land use designation and GAB changes adopted in the Manchester comprehensive plan reduced unserved demand by 13,500 gpd from 513,130 gpd to about 499,630 mgd, thereby eliminating the projected capacity deficit

System-Specific "To Do" Action Items:

Short-term

❑ Update the WWCMP worksheets developed as background data for this plan document to reflect the most current data, then complete and submit a full WWCMP to MDE for review

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