Union Bridge

Water Supply

Source Water Assessment

The unconfined fractured rock aquifer in the Wakefield Marble is the source of water for the Town of Union Bridge. The system currently uses two wells to obtain its drinking water. All water supply sources for Union Bridge are susceptible to contamination by nitrates and protozoans. The water supply is not susceptible to organic compounds, radionuclides, or other inorganic compounds.

Water Supply Demand

The total future water demand assumes that everything within the GAB builds out according to the adopted land use plan. If this were to occur, the total future water supply demand for the Union Bridge system would be 879,643 gpd. The numbers in the "Union Bridge 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 capacity management plan (CMP) worksheet calculations and figures presented in the next table, "Union Bridge Water Supply Capacity *Currently* Available for Existing and Future Growth."

Union Bridge 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		
Union Bridge	199,123	46,700	592,840	40,980	879,643
Community	**Current Demand[1]**	**Additional Demand by Land Use**			**Total Demand**
		Residential	**Commercial**	**Industrial**	
Union Bridge	199,123	345,750	11,970	327,300	879,643

[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 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 Union Bridge were to build out according to the planned land uses adopted within the 2008 GAB, the Town would need to expand its system beyond its current capacity to make available another 849,709 gpd. The information in the following table is based on the December 2008 capacity management plan worksheets.

Union Bridge 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	No Planned Service	
Union Bridge	208,300	49,846	219,035	(169,189)	639,540	40,980	(849,709)

[1] Average Day Drought Demand here includes an additional 10% for drought demand

Source: Carroll County Department of Planning, December 2008

Water Supply Limitations

According to the *Carroll County Water Demands and Availability* report (July 30, 2009) prepared by Malcolm Pirnie, the present level of analysis indicated that **water resources in the Double Pipe Creek watershed are available in sufficient quantities to be able to be developed to meet projected buildout demands**. Well #1 alone has a maximum safe yield of 576,000 gpd and an average daily use of 133,000 gpd (per the *Carroll County Master Plan for Water & Sewerage*).

Groundwater availability is not a limiting factor; however, the Town still faces other limitations with respect to water supply. The Town budget and user-pay (rate) limitations for funding the operation and improvement of the public water systems and the public sewer system impose a significant limiting factor for the Town of Union Bridge. Competing State-imposed policies and laws regarding land use, e.g. smart growth priority funding areas and future municipal growth area planning on one hand, and substantial water appropriation permit limitations to accommodate worst-case severe drought conditions on the other hand, cause the former to be impeded by the latter. The Town currently does not need to secure recharge areas, obtain appropriation permits, and finance the construction of additional groundwater wells for the system, given the abundance of available water resources noted above, unless increasing the appropriation of water from existing and available sources (e.g. well #1) would require securing recharge areas under the current State water appropriation process. In that event, the Town currently does not have the financial capacity to secure such recharge areas. Even with developer funding as new development projects are proposed, the wastewater plant would also be a limiting factor. Until capacity limitations associated with the WWTP are increased, the capacity of the water supply system would be limited to the current design WWTP capacity of 200,000 gpd (without water reuse measures in place).

Wastewater

The plant discharges to Little Pipe Creek, which flows into Double Pipe Creek. The Town currently has no immediate plans to expand the WWTP, nor upgrade to ENR.

Wastewater Demand

The total future wastewater demand assumes that everything within the 2008 GAB builds out according to the adopted land use plan. If this were to occur, the total future wastewater demand for the Union Bridge WWTP would be 930,487 gpd. The numbers in the "Union Bridge 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 CMP worksheet calculations and figures presented in the next table, "Union Bridge Wastewater Capacity *Currently* Available for Existing and Future Growth."

Union Bridge 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		
Union Bridge	177,967	101,900	609,640	40,980	930,487
Community	**Current Demand**	**Additional Demand by Land Use**			**Total Demand**
		Residential	**Commercial**	**Industrial**	
Union Bridge	177,967	409,750	11,970	330,800	930,487

[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

Wastewater Capacity

If Union Bridge were to build out according to the planned land uses adopted within the 2008 GAB, the Town would need to expand the system beyond its current capacity to make available an additional 730,487 gpd in wastewater flows. The information in the following table is based on the December 2008 CMP worksheets.

Union Bridge 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	Future	No Planned Service	
Union Bridge	200,000	50,600	149,400	127,367	101,900	609,640	40,980	(730,487)

Source: Carroll County Department of Planning, December 2008

Limitations Based on Design Capacity

The 0.2-mgd facility would have to more than quadruple the current design capacity to accommodate the projected infill+future and No Planned Service area (buildout of balance of DGA) wastewater demands. Given the age of the current plant and its location in the Little Pipe Creek floodplain, preliminary engineering studies have indicated that it would be more cost-effective to build a new plant at another nearby location rather than expand the current plant. According to the CMP worksheets, I&I flows averaged about 0.050 mgd in 2003, or about a third of the total average plant flows at that time.

Limitations Based on Local Water Quality

Because the Union Bridge WWTP can readily comply with fecal coliform and TSS limits, the TMDLs for Double Pipe Creek for fecal coliform and TSS will not represent the controlling limitations to discharge. Similarly, the future TMDL for biological impairments in the Double Pipe Creek watershed is also not expected to impose the controlling limitation on discharge rates. The future phosphorus TMDL for Double Pipe Creek is unlikely to impose phosphorus limits that are more stringent than the Bay-related nutrient caps, but could result in a phosphorus limit in the NPDES permit. The Union Bridge WWTP is not upstream of a Tier II stream segment.

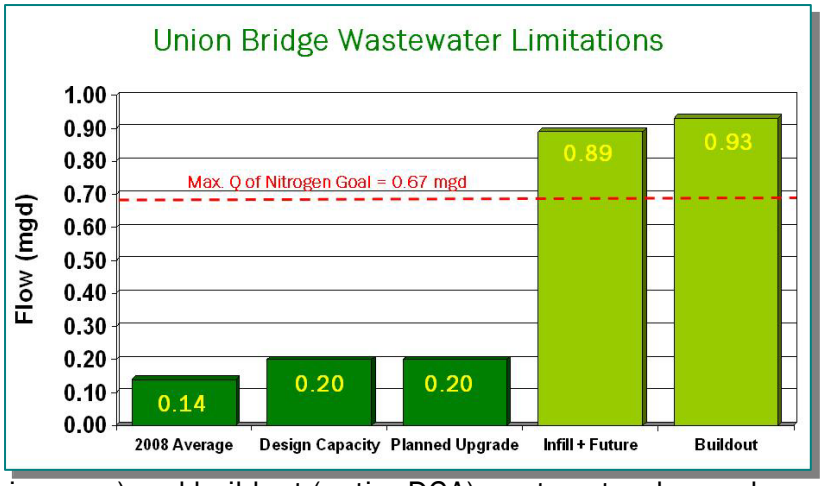
Limitations Based on Bay Nutrient Caps

The Union Bridge WWTP's NPDES permit does not have limits for total nitrogen or total phosphorus. However, the WWTP has been assigned nutrient loading caps for both total nitrogen and total phosphorus under Maryland's Tributary Strategy Statewide Implementation Plan. The nutrient caps were based on a projected 2020 flow of 0.112 mgd, a total nitrogen concentration of 18.0 mg/L, and a total phosphorus concentration of 3.0 mg/L. As with most other minor facilities, these nutrient caps will remain as goals rather than permit limits, until/unless the WWTP expands or elects to trade nutrient credits to another point source facility.

If the Union Bridge WWTP expanded and upgraded to ENR, the total nitrogen cap would represent a controlling limitation to the maximum discharge rate. At 3.0 mg/L total nitrogen, the Union Bridge WWTP would be limited to discharging approximately 0.67 mgd, which is

less than the infill+future (entire planned service area, shown as "priority+future" in the Malcolm Pirnie reports) and buildout wastewater demands.

Summary of Wastewater Limitations



The existing design capacity (0.2 mgd) of the Union Bridge WWTP represents the controlling limitation under current conditions. Longer-term, the Bay-related nitrogen loading cap represents a 0.67-mgd limit to surface water discharges. This is less than the projected infill+future (entire planned service area) and buildout (entire DGA) wastewater demands.

System-Specific Strategies: Union Bridge

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.

1. Protect and sustain existing water supplies serving existing development

System-Specific "To Do" Action Items:

- ❑ Rezone 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 the desired future buildout scenario for Union Bridge [County]
- ❑ Amend the Municipal Growth Element of the *Union Bridge Community Comprehensive Plan* and associated annexation areas, as needed, to reflect the changes recommended in this plan
- ❑ 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

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 Strategy/ies

- ❑ Explore additional sources for future water supply to prepare for policy changes or other changes that would result in the need for additional available water capacity
- ❑ Investigate the administrative feasibility in developing access to quarry discharge water for direct use or reuse

Short-term Water Supply Solutions

- ❑ Groundwater Wells: Drill and develop 6 groundwater wells (based on the average MDE appropriation of existing Union Bridge wells) to meet projected additional demand requirements of approximately 594,000 gpd
  - ❑ 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
- ❑ Bowman Property Well: Anticipated appropriation 0.065 mgd; still under developer control
- ❑ Phillips Property (Jackson Ridge) Well: Appropriation 0.0423 mgd; available for connection and final treatment through an existing, annually renewed bond from Woodhaven

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.

- ❑ Lehigh Portland Cement Company Quarry: Use of Lehigh Quarry in Union Bridge as a raw water reservoir to supply approximately 0.6 mgd to Union Bridge; due to contamination concerns, this option is more feasible once quarry options cease

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: Pamphlets regarding water use available at Town office
- ✓ Water Loss Management: Locate and repair leaks in distribution system; all meters were replaced about 5 years ago

✓ Billing Cycle: Quarterly billing cycle

5. Sustain existing wastewater treatment capacity

System-Specific Action Items Already in Place:

✓ Completed a WWTP expansion study

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

❑ Evaluate areas that may be removed from the GAB with the next update of the Town's comprehensive plan to help reduce projected demand to correlate with the Town's caps and to the wastewater capacity that the Town is able to provide

❑ Study the upgrades needed to remain in compliance at existing flows

❑ Conduct an I&I study to determine current level of inflows from I&I to potentially regain some capacity; make system improvements to reduce I&I; adjust the capacity on the WWCMP worksheets to update available capacity

Long-term

❑ Undertake an engineering study to determine a new (relocated) location and design for a new WWTP and evaluate funding alternatives

❑ Identify potential areas for spray irrigation to gain additional wastewater capacity at the WWTP and evaluate whether spray irrigation is a feasible option for the Town

❑ Evaluate the feasibility of developing a water reuse system between the Town and Lehigh; investigate potential to use WWTP gray water for Lehigh cooling operations and subsequent withdrawal by the Town from the existing Lehigh pond to treat and use as potable water