



Chicago Metropolitan Agency for Planning

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Wastewater Committee

Agenda Item No 4.1

Date: March 14, 2012

CMAQ Water Quality Review #: 12-WQ-001

Applicant: Village of Lisbon

Re: The Village of Lisbon has requested to construct a new wastewater treatment facility (WWTF) to treat an average daily flow of 0.03 million gallons per day (mgd) of wastewater.

Based on the policies and recommendations of the *Areawide Water Quality Management Plan for Northeastern Illinois*, the *Illinois Water Quality Management Plan*, local government and agency comments, comments received from various interested and affected parties, and staff's analysis, staff recommends a recommendation of **"Support"** for the proposed amendment request.

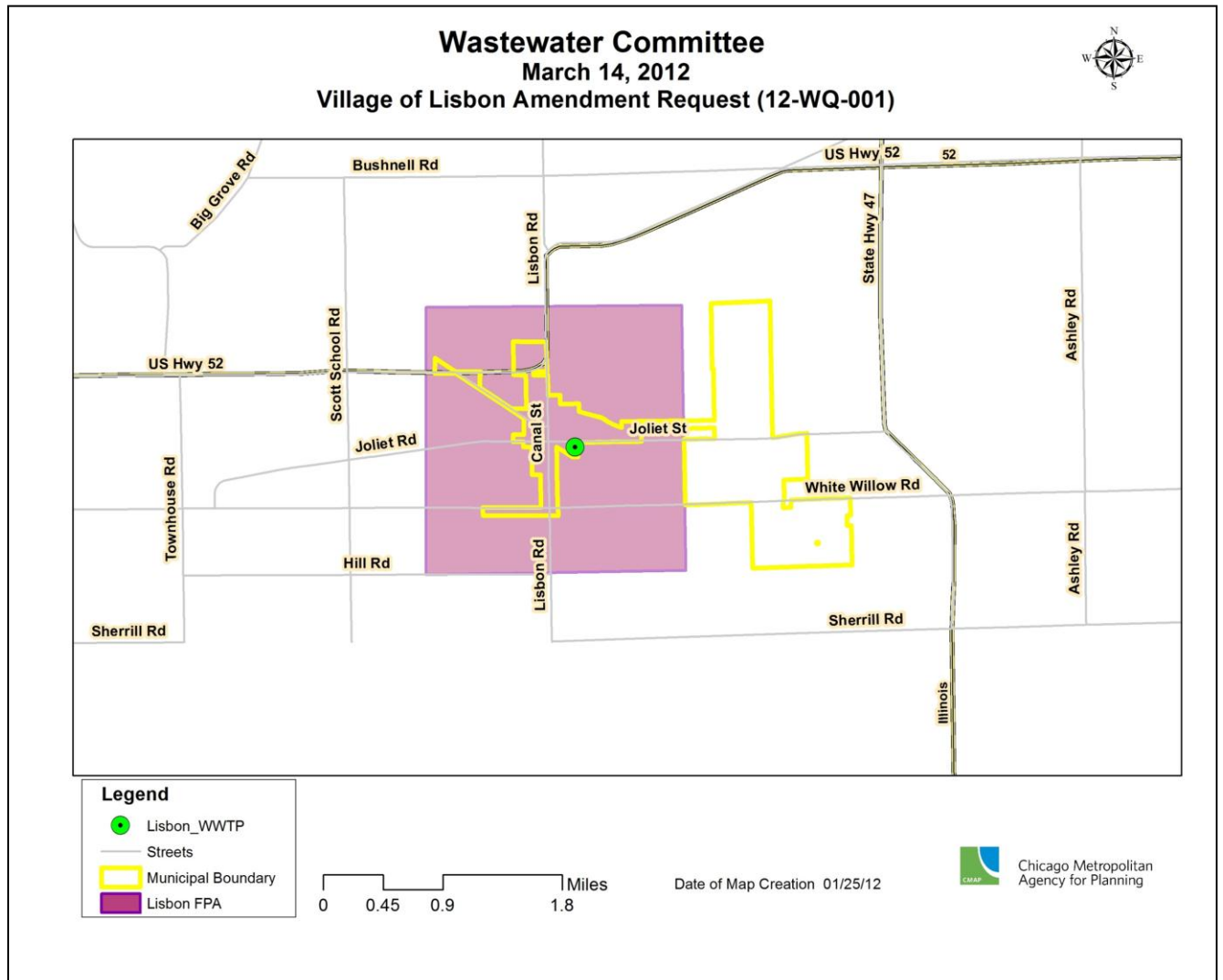
Important Note: CMAP is the designated areawide water quality planning agency and the advisory comprehensive regional planning agency for northeastern Illinois. Therefore, CMAP needs to act as a consensus builder by promoting sound planning principles and practices. Though not specifically required by the Illinois Environmental Protection Agency (IEPA), Criteria Nos. 6 – 9 specifically address CMAP's regional role and promote sound planning.



A. REQUEST SUMMARY

The Village of Lisbon has submitted a request to construct a new WWTF to eliminate domestic, untreated, wastewater discharges to surface water via failing septic systems. The proposed facility's design average flow (DAF) is 0.03 mgd. The maximum DAF is 0.122 mgd. The proposed area is located in Lisbon, IL, Kendall County.

Map of WWTF Site





RELATIONSHIP TO RECOMMENDED CRITERIA FOR FACILITY PLAN AMENDMENTS

The Village of Lisbon is currently an unsewered community. It does not have a dedicated municipal sanitary sewer collection or treatment system. Properties in the planning area use individual on-site septic systems, a small percentage is served by leach fields, while the remainder is served with various wildcat sewers^a that ultimately discharge into an unnamed tributary to Saratoga Creek.

Recently, Illinois Environmental Protection Agency (IEPA) performed an inspection and sampling of the unnamed tributary near the discharge point of the Village's storm water collection system. The inspection revealed high fecal coliform concentrations in the receiving stream. Consequently, IEPA issued a Notice of Violation (W-2010-30294) which stated that the Village should cease the discharge of untreated wastewater to the waters of the State. The Village's request to develop a new WWTF to serve these areas will abate the situation. The new WWTF will resolve pollution and health related issues.

^a Wildcat sewers traditionally dump sewage into receiving streams with no treatment.
<http://www.nuflowtech.com/LinkClick.aspx?fileticket=pGt4J8WjAHI%3D&tabid=89>



Review Criteria and Staff Analysis	Results										
<p>1. <i>“The proposed facility amendment must be designed to meet the State of Illinois water quality standards for the receiving waters and the appropriate discharge standards or must receive a variance from the Illinois Pollution Control Board.”</i></p> <p>The Village of Lisbon intends to construct a new wastewater treatment facility on an 8.25 acre parcel of land owned by the village. The facility’s design average flow is 30,000 gallons per day (gpd) of wastewater and its maximum flow is 122,000 gpd. The facility will eliminate wildcat sewer discharges to surface water that presently originate from a portion of village residents. Other village residents who reside outside of the facility planning area continue to use private septic systems.</p> <p>The wastewater treatment process includes a recirculating sand filter, ultraviolet disinfection, and re-aeration. The facility is designed to be 100% redundant for each part of the treatment process. In the event of power outages, the facility will include a stand-by generator.</p> <p>The WWTF will discharge into an unnamed tributary to Saratoga Creek. An antidegradation assessment was conducted in accordance with Illinois Title 35: Subtitle C: Part 301.105 of the Administrative Code for the request. According to the report, discharges from the Village’s wildcat sewers results in a daily discharge of 19,700 gallons per day of untreated wastewater into the receiving stream. The Report notes that this discharge currently consists of the following: estimates that the concentration of untreated wastewater in the stream is 200 ml/L in the stream and consists the following:</p> <table border="1" data-bbox="355 1299 1156 1488"> <thead> <tr> <th>Pollutant</th> <th>Total Pollutant Released Per Day</th> </tr> </thead> <tbody> <tr> <td>BOD</td> <td>33.5 lbs./day</td> </tr> <tr> <td>TSS</td> <td>44 lbs./day</td> </tr> <tr> <td>Ammonia Nitrogen</td> <td>5 lbs./day</td> </tr> <tr> <td>Fecal Coliform</td> <td>Too numerous to count per 100 mL</td> </tr> </tbody> </table> <p>Saratoga Creek is considered an intermittent stream with zero flow during dry weather. The Creek has not been assessed for designated use attainment and is also not included in the 2010 Illinois Integrated Water Quality Report^b. The Creek does not have an IDNR biologically</p>	Pollutant	Total Pollutant Released Per Day	BOD	33.5 lbs./day	TSS	44 lbs./day	Ammonia Nitrogen	5 lbs./day	Fecal Coliform	Too numerous to count per 100 mL	<p>Consistent</p>
Pollutant	Total Pollutant Released Per Day										
BOD	33.5 lbs./day										
TSS	44 lbs./day										
Ammonia Nitrogen	5 lbs./day										
Fecal Coliform	Too numerous to count per 100 mL										

^b The Report is not yet fully approved by USEPA.



significant stream classification according to IDNR's 2008 *Integrated Multiple TAXA in a Biological Stream Rating System* Report.^c

Collins Run Creek is a tributary to Saratoga Creek and flows into Aux Sable Creek, which eventually flows to the Illinois River near Channahon. Collins Creek has not been assessed and is not listed on recent IEPA Illinois Integrated Water Quality Reports. Aux Sable Creek (HUC 0712000501) is 303(d) listed since it is found to be not supporting the primary contact recreation designated use. Fecal coliform has been identified as the potential cause of designate use impairment.^d

The Village applied for a National Pollutant Discharge Elimination System (NPDES) in 2009 in anticipation of the wastewater treatment facility. Proposed NPDES effluent limits include:

Proposed WWTF Effluent Limits		
Constituent	Concentration (mg/L)	Average Daily Load (lb/day)
TSS	12 mg/L	3.0
Fecal Coliform	400 counts / 100 mL ^e	
CBOD	10mg/L	2.50
	Daily Concentration (mg/L)	Monthly Avg. (mg/L)
Dissolved Oxygen		
March to July	5.0 (Daily)	N/A
August To February	3.5 (Daily)	5.5
Ammonia Nitrogen		
Spring/Fall	6.7	1.7
Summer	7.1	1.5
Winter	6.0	3.1

The Village's Antidegradation Report found that the proposed WWTF will result in lower key pollutant loadings discharged into Saratoga Creek. These include total suspended solids, BOD, and ammonia loadings currently discharged to the tributary from either untreated or insufficiently treated sewage.

^c : Illinois Department of Natural Resources. *Integrating Multiple Taxa in a Biological Stream Rating System*, Illinois. <http://dnr.state.il.us/orc/biostrmratings/> (accessed December 8, 2011). IDNR's Biological Stream Classification rating system has been updated and enhanced. The present rating system is based a stream's diversity, integrity, and biological significance.

^d Aux Sable Creek was assessed for the aquatic life designated use and found to be fully supporting (2010 Draft Integrated Report).

^e The entire standard includes a 200 counts / 100/mL requirement.



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<p>The Village’s proposed WWTF has no provisions for nitrogen or phosphorus removal. The Illinois Pollution Control Board (IPCB) requires that new and expanding wastewater municipal wastewater treatment plants limit the discharge of phosphorus into receiving streams to a monthly average of 1 milligram per liter for expanding or new treatment facilities with a capacity of 1.0 million gallons per day or greater. Though not required, staff questioned whether the Village had considered nutrient removal as a part of its treatment process given that new numeric nutrient standards are likely in Illinois. The applicant responded that capital costs to incorporate phosphorus or nitrogen removal would place a financial burden on the Village. As such, nutrient removal was dismissed.</p> <p>While cost effectiveness is an important consideration, it may sometimes be preferable to implement a slightly more expensive alternative to avoid a predicated adverse water quality or stream use impact. In cases where it is demonstrated that there are no practical alternatives to a new or expanded discharge to a sensitive (low-flow) receiving stream, special facility designs or operational requirements should be implemented to ensure minimization of adverse impacts (pg. 25 – <i>Water Quality Management Plan (WQMP) Amendment Process and Procedures</i>). The applicant has provided 100% redundancy in each part of the facility’s treatment process to address recommendations of the WQMP.</p> <p>The proposed request will reduce the pollutant load to the receiving stream and improve water quality in Saratoga Creek and its tributaries since it will eliminate the discharge of raw sewage from failing septic tanks. The proposed project will meet General Use water quality standards.</p>	
<p>2. <i>“The population and employment for which the proposed amendment is designed must fall within the twenty year forecast most recently adopted by the Commission for the facility planning area or the Commission may agree to adjustments within the regional forecast total.”</i></p>	<p>Consistent</p>
<p>The Village of Lisbon experienced a 1.4% growth rate between 1990-2000, from 216 persons to 248 persons. The Village assumed a continued 1.4% growth trend for the next ten years when determining its 20 year population. However, the Village assumed a 3.0 population growth rate for the year 11 thru 20 in anticipation of the Prairie Park Interstate Highway. Based on this methodology, the Village projects a population equivalent of 426 persons by the Year 2029. CMAP’s 2040 household population equivalent forecast for the Village of Lisbon’s Village limits is 514. The Village’s population projections fall well within CMAP’s forecasts. As such, Staff issues a finding of consistent with this criterion based on CMAP’s 2040 population forecasts.</p>	
<p>3. <i>“The applicant must demonstrate that the unit of local government granting zoning to the project formally accept financial responsibility for the wastewater treatment system in the</i></p>	<p>Not Applicable</p>



<p><i>event of a system malfunction or failure. Such acceptance must be in the form of a resolution from the unit of government granting zoning."</i></p>	
<p>The requested amendment does not involve the construction, operation or modification of a privately-owned treatment facility.</p>	
<p>4. <i>"The proposed amendment should not reduce the effectiveness of the water quality improvement strategy contained in the original plan, either for point or nonpoint source control."</i></p>	<p>Inconsistent</p>
<p>Point Source Impacts (See analysis under Criterion #1) The Village's WWTF will eliminate the discharge of raw sewage from septic tanks and wildcat sewers into the receiving stream. Wastewater will be treated at a new facility that includes UV disinfection, re-aeration, and a recirculating sand filter.</p> <p>Appendix V of the <i>Water Quality Management Plan Amendment Process and Procedures</i> manual details the "Procedures for Determining Compliance with Point Source Management Policies." The considerations detailed in this appendix are applicable to the Village of Lisbon's amendment request.</p> <p>It is a well-known fact that development and urbanization have negative impacts on surface waters, either directly or indirectly. "There is particular concern regarding the addition or substantial expansion of wastewater discharges to high quality and/or low flow water bodies. These water bodies are relatively sensitive to even minor perturbations such as those often associated with a wastewater discharge." (page 24) While NPDES permit requirements help limit those impacts, "There is also evidence to indicate that even when a facility consistently meets its effluent standards it may still have adverse effects on the receiving stream."</p> <p>Because even minor or short-term disruptions in effluent quality can severely affect low-flow streams, it is argued that special consideration should be given to permitting wastewater discharges in these instances. In particular, it is recommended that new or substantially expanded discharges to small, high quality streams be avoided. If such discharges cannot be avoided, then special facility designs should be required to ensure effluent reliability.</p> <p>In evaluating this consideration, the Village of Lisbon has taken several steps to ensure that the quality of effluent discharged from its treatment plant improves water quality. The proposed WWTF effluent limits will significantly reduce the concentration and quantity of pollutants currently discharged into the receiving stream thereby attaining significant water quality improvements. However, as previously noted, the Village's facility does not include nutrient removal. Staff requested that the Village consider incorporating a streambed with wetland vegetation to uptake the discharge of additional nutrients. The applicant noted that the receiving stream is "heavily vegetated and will serve as a form of nutrient removal prior to any discharge to a larger capacity stream." (<i>email correspondence to Dawn Thompson from</i></p>	



Aaron Full, the Village's engineer). Of concern to staff is the Village provided no evidence to substantiate this claim. Although the Lisbon WWTP will improve water quality, constructing polishing wetlands to filter reclaimed wastewater further before discharge to the receiving stream would aid in nutrient uptake; a valuable protection of water quality since nutrient removal is not part of the WWTF design.

Nonpoint Source Impacts

The amendment area will not require or result in modification of any lake, stream, wetland or floodplain area.

The amendment request is subject to the Kendall County's nonpoint source protection ordinances which have provisions for storm water management, soil erosion and sediment control, and floodplain management. However, there are several discrepancies from the checklist in Section E of the application as noted below.

Floodplain Management

- Does not discourage onstream impoundments unless public interest and environmental mitigation criteria are met.
- Require protection of a minimum 25 foot native vegetation buffer along the channel.

Stream and Wetland Ordinance

- Does not prohibit the modification of high quality, irreplaceable wetlands, lakes, and stream corridors. However, it does highly discourage these activities.
- Does not designate a minimum 75 foot setback zone from the edge of identified wetlands and waterbodies in which development is limited to the following types of activities: minor improvements like walkways and signs, maintenance of highways and utilities, and park and recreational area development.
- Does not establish a minimum 25-foot wide protected native vegetation buffer strip along the edge of identified wetlands and waterbodies. It does, however, require a 15 foot minimum protected vegetated buffer.
- Does not prohibit watercourse relocation or modification except to remedy existing erosion problems, restore natural conditions, or to accommodate necessary utility crossings, and require mitigation of unavoidable adverse water quality and aquatic habitat impacts.
- Does not discourage the armoring of channels and banks unless natural vegetation and gradual bank sloping are inadequate to prevent severe erosion.



- Does not discourage culvert crossings of streams unless necessary for allowing access to a property.
- Does discourage onstream impoundments unless public interest and environmental mitigation criteria are met.
- Does require adequate mitigation measures for approved wetland and water body modifications, including 1.5 to 1 acreage replacement for destroyed wetlands, maintenance and monitoring for at least 5 years, and full restoration of natural wetland or waterbody functions.

In supplemental correspondences, the Village stated that it had not considered adopting a stream and wetland protection ordinance since it has only one stream and one wetland within the Village limits. The Village also concluded that the lack of growth within the Village limits would not warrant such actions in the Village's opinion. Given the existence of a stream and wetland and anticipated population growth in the future, the Village of Lisbon should consider adopting a stream and wetland protection ordinance.

The Illinois Department of Natural Resources (IDNR) conducted an Endangered Species Protection and Natural Areas Preservation Review for the project site. In a letter dated December 20, 2010, IDNR determined that protected resources may be in the vicinity of the proposed area but concluded that adverse effects are unlikely. However, IDNR noted that its assessment should not substitute for detailed site and field surveys required for environmental assessments. The National Wetlands Inventory shows wetlands within 250 feet of the project location.

The National Flood Insurance Rate Map reveals that the proposed WWTF will be constructed adjacent to a floodplain. However, portions of the collection system will be constructed in a floodplain. The applicant indicates that following project construction, the surface will be restored to the existing topographic elevations thereby eliminating impact to the floodplain.

The Illinois Historical Preservation Society determined that there are no significant known historical or cultural resources in the area.

STAFF RECOMMENDATION: Staff requests that the Village of Lisbon do the following:

- Staff recommends that the Village incorporate a polishing wetland to uptake the discharge of additional nutrients.
- The Village should adopt a stream and wetland protection ordinance.



<p>5. <i>“The proposed amendment should not adversely affect the cost-effectiveness of the Areawide Water Quality Management Plan for meeting water quality standards in the facility planning areas as a whole.”</i></p>	<p>Consistent</p>						
<p>Currently, there are no existing wastewater sewer/interceptors or treatment facilities within the Lisbon FPA. The applicant provided three treatment alternatives and cost evaluations associated with each. The alternatives evaluated included the following:</p> <ul style="list-style-type: none"> • <u>Alternative No. 1</u>: Land application at a nearby golf course or agricultural field • <u>Alternative 2</u>: Regionalization/Pumping to other publicly-owned treatment works • <u>Alternative 3</u>: Pumping effluent to another stream with greater assimilative capacity <p><u>Alternative 1</u> The Village conducted an evaluation of the land application alternative. The evaluation included costs to provide partial treatment by land application. The analysis considered a large pumping station with the largest unit of service required at the treatment facility to pump effluent to the land application site. This alternative also required a minimum 25-acre site to properly store effluent at a storage pond. Cost estimates to purchase the land totaled \$780,900 alone. Costs would be in addition to \$1,122,000, the costs to construct the wastewater facility. This alternative would also require additional annual operation and maintenance (O & M) costs for the effluent pumping station and irrigation equipment. This alternative was dismissed due to costs.</p> <p><u>Alternative 2</u> Under this alternative, a pumping station and 9.5 miles of forcemain to pump raw sewage into the City of Morris’s collection system would be constructed. Costs for this alternative totaled \$1,326,180 and exceeded the cost of the \$730,950 (<i>costs for wastewater facility only</i>) of the proposed WWTF. This alternative was dismissed due to costs.</p> <p><u>Alternative 3</u> Implementing this alternative would require discharge to a stream with a greater assimilative capacity, namely, the Aux Sable Creek which is approximately 9.4 miles away. This alternative would nearly double in costs from the previous alternatives, totaling \$2,448,180 and would require additional foremain. This alternative was dismissed due to costs.</p> <p>The applicant’s selected alternative was chosen because it is the most cost effective to the Village. The capital costs for the selected alternative totaled \$2,867,329 and includes:</p> <table border="0" style="width: 100%; margin-left: 40px;"> <tr> <td style="padding-right: 20px;">Wastewater Treatment Plant</td> <td>\$730,950</td> </tr> <tr> <td>Pump Stations</td> <td>\$415,800</td> </tr> <tr> <td>Collection Sewers</td> <td>\$1,352,439</td> </tr> </table>		Wastewater Treatment Plant	\$730,950	Pump Stations	\$415,800	Collection Sewers	\$1,352,439
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<p>6. <i>"The proposed amendment should have the endorsement of the designated management agency for wastewater treatment and substantial support by the municipalities within the affected facility planning area."</i></p>	<p>Consistent</p>																				
<p>The Village of Lisbon is the designated management agency for the Lisbon FPA and is the only municipality within the FPA. The Village passed a resolution (2011-11.21.000R) on November 21, 2011 endorsing support of the request and submittal of the amendment application.</p>																					
<p>7. <i>"The proposed amendment should not adversely affect adjoining units of government."</i></p>	<p>Consistent</p>																				
<p>There are no immediately adjoining municipalities. Staff has not received any letters from surrounding units of government objecting to the Village's amendment request.</p>																					
<p>8. <i>"The proposed amendment should be consistent with other county and regional or state policies, such as the Governor's Executive Order #4 on the preservation of agricultural land."</i></p>	<p>Consistent</p>																				



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<p><u>Lisbon Comprehensive Plan</u></p> <p>The proposed request includes providing wastewater treatment service to residents within the Village of Lisbon’s current corporate limits. Current landuse for the amendment request include agricultural, 1 acre city lots, and commercial, with some mixed use business. The improvements proposed are consistent with the Village’s Comprehensive Land Use Plan.</p>	
<p>9. <i>“Consideration will be given to evidence of municipal or county zoning approval and commencement of development activity prior to Area-wide Water Quality Management Plan adoption in January 1979.”</i></p>	<p><i>Not Applicable</i></p>