



**Agenda # 4.1**

## Wastewater Committee

**Date:** April 7, 2010

**CMAP Water Quality Review #:** 10-WQ-004

**Applicant:** Village of Big Rock

Re: The Village of Big Rock submitted a request to create a new FPA and install a new 0.056 mgd wastewater reclamation facility (WRF). The facility will eliminate an existing drain tile system used to collect groundwater, storm water and septic tank effluent. The amendment area is 285 acres and located in Kane County, Big Rock Township, Sections 15, 16, 21, and 22.

### COMMITTEE ACTION REQUESTED

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 Committee recommendation of "*Support*" for the proposed amendment request. Staff also recommends the applicant consider the following recommendations:

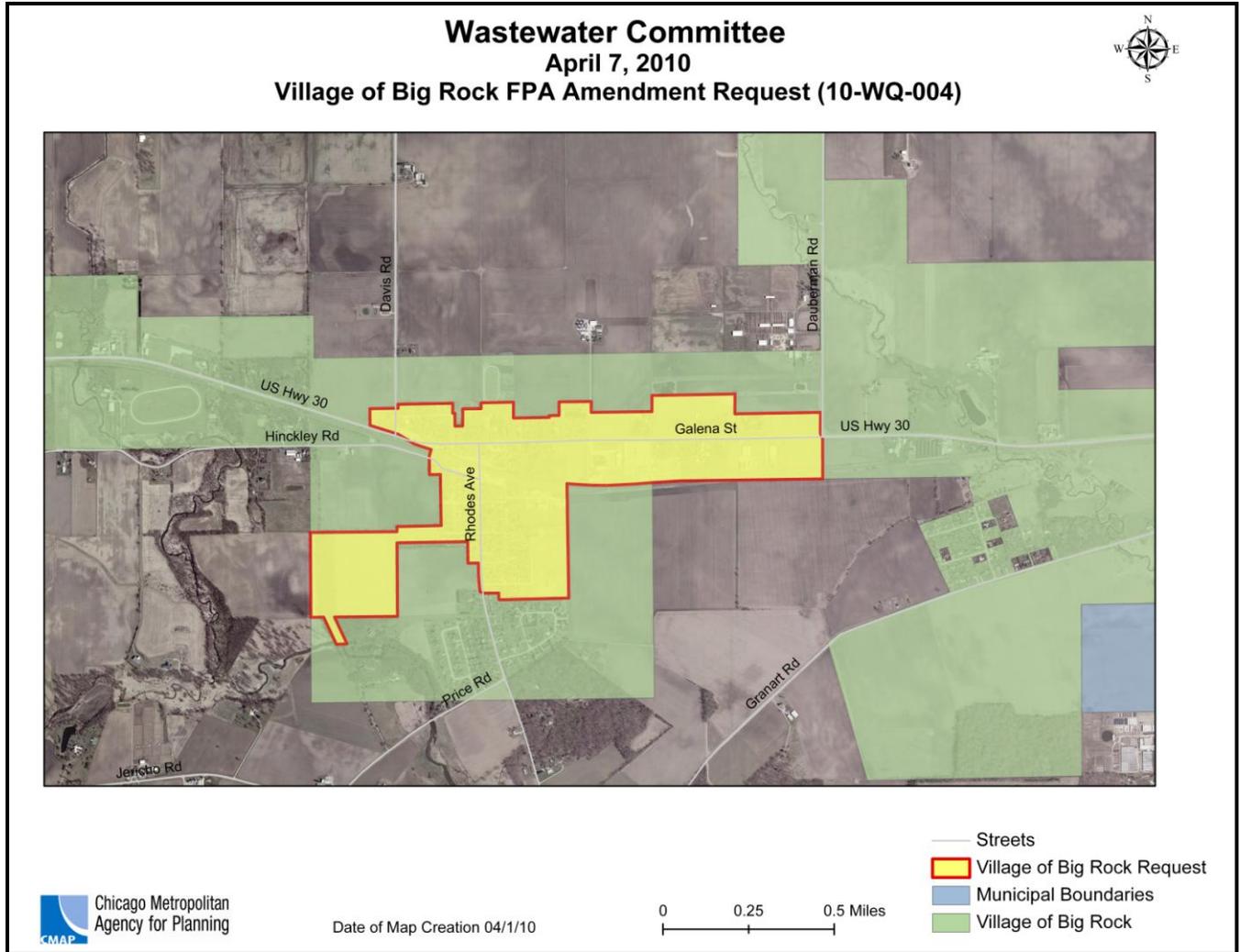
#### Recommendations

- Include phosphorus removal as a feature of the WRF treatment process.
- Revisit proposed ammonia limits to ensure they sufficiently protect mussels found in Big Rock Creek.

**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.



Map of FPA Boundary and WWTP Area





RELATIONSHIP TO RECOMMENDED CRITERIA FOR FACILITY PLAN AMENDMENTS

The Village of Big Rock is currently an unsewered community. Properties in the planning area use individual on-site septic systems with leach fields. A drain tile system was installed in the southern portion of the Village in the early 1950's to collect groundwater, storm water and septic tank effluent.

Recently, Illinois EPA and the Kane County Health Department received complaints that untreated wastewater with high levels of fecal coliform were being discharged from the Village into Big Rock Creek. The Village determined that failing septic tanks and untreated and partially treated wastewater flowed to the Village's drain tile system which discharges to Big Rock Creek and its tributary Welch Creek. This is a violation of State and County Codes. To abate the situation, the Village has requested creation of a new FPA to include areas of concern and a new treatment facility to serve these areas. The new WRF will resolve pollution and health related issues.

Below is a summary and analysis of the proposed amendment application with regards to these criteria.

<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><b>Consistent</b></p>
<p>The proposed wastewater collection system will use individual septic tanks and effluent pumps (STEP) with pressure sewers that will be installed in existing road right-of ways and easements. The systems design average flow is 56,300 gallons per day (gpd) of wastewater.</p> <p>The WRF treatment process includes a recirculating sand filter, a recirculation tank, UV light disinfection, and a meandering streambed with wetland vegetation to provide additional nutrient uptake and aeration prior to discharge into Big Rock Creek. The system's recirculating sand filter incorporates multiple filter zones producing higher quality effluent and some nitrogen removal through denitrification.</p> <p>The WRF will discharge to Big Rock Creek and its tributary Welch Creek. Big Rock Creek has an estimated average annual upstream flow and 7-day, 10-year low flow of 0.35 cubic feet per second (cfs) (56,300 gpd). Big Rock Creek is not on the 2006 Illinois Integrated Water Quality Report or the partially approved 2008 303(d) list for impaired waters and is classified as a "General Use" Waterway. The Creek does not have an IDNR biologically significant stream classification according to IDNR's 2008 <i>Integrating Multiple Taxa in a Biological Stream Rating System</i> Report. Welch Creek is a tributary to Big Rock Creek and is listed as a biologically significant stream by the Illinois Department of Natural Resources (IDNR). However, IDNR's EcoCAT report shows endangered spike mussels are located downstream from Big Rock Creek, the effluent discharge point.</p> <p>The Village will apply for a National Pollutant Discharge Elimination System (NPDES) permit this spring. Proposed NPDES effluent limits to Big Rock Creek include:</p>	



Effluent Parameter	Monthly Average Proposed Limits	Daily Maximum Proposed Limits
CBOD	10 mg/L	20 mg/L
Suspended Solids	12 mg/L	24 mg/L
Ammonia-N		
Spring/Fall	1.5 mg/L	--
Summer	1.5 mg/L	--
Winter	4.0 mg/L	--
Dissolved Oxygen	--	6.0 mg/L (daily minimum)
pH	--	9.0 s.u.
Fecal Coliform (May-Oct.)	--	400/100 ml

Illinois EPA does not have specific effluent limits for alternatives incorporating spray irrigation systems. However, the Illinois Administrative Code, Title 35, Subtitle C, Chapter II, Part 372 specifies the level of treatment that must be achieved with a sand filtration system. A system must “utilize as a minimum a two cell lagoon system with tertiary sand filtration and disinfection or a mechanical secondary treatment facility with disinfection.” (Section 372.400 Degree of Treatment Required Relative to Application Area) The Village’s request meets this requirement.

Information included as part of the Illinois EPA antidegradation analysis shows a significant reduction in the concentration and mass loading of pollutants to Big Rock Creek with the proposed WRF. The Facilities Plan notes the WRF will be below 5 mg/L for CBOD and suspended solids resulting in loadings to Big Rock Creek being less than permit requirements.

The proposed WRF will improve water quality of Big Rock Creek and its tributary Welch Creek since it will eliminate the discharge of raw sewage from failing septic tanks and an illegal drain tile system. The proposed project will meet water quality standards.

2. *“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.”*

**Consistent**

The proposed service area totals 285 acres and 189 parcels with a total population equivalent of 563 persons in 149 households (120 existing and 29 vacant lots). The proposed average daily flow of wastewater for the service area is 0.056 mgd. New developments will not be served by the WRF. CMAP’s population forecast for the projection Year 2030 is 324 households with a population of 859.

3. *“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 event of a system malfunction or failure. Such acceptance must be in the form of a resolution*

**Non Applicable**



<p><i>from the unit of government granting zoning."</i></p>																
<p>The proposed WRF will be publically owned and does not involve 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><b>Consistent</b></p>															
<p><b>Point Source Impacts</b> (See analysis under Criterion #1)</p> <p>The selected alternative will eliminate the discharge of raw sewage from septic tanks illegally connected directly or indirectly to the Village's drain tile system. Wastewater will flow through a meandering wetland vegetated streambed to provide additional nutrient uptake and aeration prior to discharge into Big Rock Creek</p> <p>An antidegradation assessment was conducted in accordance with Illinois Title 35: Subtitle C: Part 301.105 of the Administrative Code. Though wastewater flow to Big Rock Creek will increase, the assessment showed a reduction in the concentration and quantity of pollutants currently discharged thereby attaining significant water quality improvements. The following table compares future discharge versus the current discharge:</p> <table border="1" data-bbox="321 1031 1182 1570"> <thead> <tr> <th>Parameter</th> <th>Current Discharge from Septic Tanks/Drain Tile</th> <th>Proposed Discharge from New WRF</th> </tr> </thead> <tbody> <tr> <td><b>Average Flow Rate</b> (gpd)</td> <td>12,892 gpd</td> <td>56,300 gpd</td> </tr> <tr> <td><b>CBOD</b> Concentration (mg/L) Mass (lbs/day)</td> <td>140 mg/L 15.0 lbs/day</td> <td>10 mg/L 4.7 lbs/day</td> </tr> <tr> <td><b>Suspended Solids</b> Concentration (mg/L) Mass (lbs/day)</td> <td>75 mg/L 8.1 lbs/day</td> <td>12 mg/L 5.6 lbs/day</td> </tr> <tr> <td><b>Ammonia-N</b> Concentration (mg/L) Mass (lbs/day)</td> <td>38 mg/L 4.1 lbs/day</td> <td>1.5 mg/L 0.7 lbs/day</td> </tr> </tbody> </table> <p>Staff applauds the Village's efforts to improve water quality in Big Rock Creek, but questions whether the proposed ammonia limits sufficiently protect endangered spike mussels found downstream of the discharge point. Staff also requests that the Village incorporate phosphorus removal as a feature of its treatment process.</p>		Parameter	Current Discharge from Septic Tanks/Drain Tile	Proposed Discharge from New WRF	<b>Average Flow Rate</b> (gpd)	12,892 gpd	56,300 gpd	<b>CBOD</b> Concentration (mg/L) Mass (lbs/day)	140 mg/L 15.0 lbs/day	10 mg/L 4.7 lbs/day	<b>Suspended Solids</b> Concentration (mg/L) Mass (lbs/day)	75 mg/L 8.1 lbs/day	12 mg/L 5.6 lbs/day	<b>Ammonia-N</b> Concentration (mg/L) Mass (lbs/day)	38 mg/L 4.1 lbs/day	1.5 mg/L 0.7 lbs/day
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**Recommendations**

- Include phosphorus removal as a feature of the WRF treatment process.
- Revisit proposed ammonia limits to ensure they sufficiently protect mussels found in Big Rock Creek.

**Nonpoint Source Impacts**

The amendment request is subject to Kane 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.

**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.

Staff asked the Village to consider developing a Stream and Wetland Protection Ordinance that is more consistent with CMAP's model ordinance. The Village, in a supplemental letter, argued it would be burdensome to adopt its own ordinance since it requires becoming certified with the County and hiring staff or a contract entity to enforce the ordinance.

The Kane County Advanced Identification Study indicates the presence of wetlands within



<p>250 feet of the facilities planning area. There are no wetlands along the alleys or right-of-ways where the pressure system will be installed. There will be no negative impacts on existing wetlands, except for temporary disruption during construction of the effluent outfall discharging to Big Rock Creek.</p> <p>There is a limited amount of floodplain in the planning area along the sides of Big Rock Creek. Minimal temporary impact on the Creek and adjacent floodplain will occur during construction of the effluent outfall. Proper mitigation measures, such as erosion control and sediment barriers and no filling of the floodplain will be utilized per requirements from the Corps of Engineers and the County and State.</p> <p>The Illinois Historic Preservation Agency, in a letter dated December 28, 2009, noted no historic properties would be affected by the request and voiced no objection.</p> <p>The Illinois Department of Natural Resources notes there are no records of State-listed threatened or endangered species, Illinois Natural Area Inventory sites, dedicated Illinois nature preserves, or registered land and water reserves within the proposed FPA or WRF site. However, IDNR's EcoCAT report shows the presence of the endangered spike mussel located downstream from Big Rock Creek, the effluent discharge point.</p> <p>The Village's entire amendment request is located entirely within the Lower Fox Watershed.</p> <p>Soils within the area include silt loam and silty clam loam which have severe limitations for septic tank absorption fields due to ponding, wetness, and slow percolation. Shallow groundwater, typically within 6 inches to 2 feet of the ground surface, inhibits adequate treatment of effluent from septic tanks within the service area. As such, an adequate treatment system is necessary to eliminate potential contamination of groundwater, the Village's drinking water source. The proposed systems will use smaller elevated leach fields to provide more depth to achieve the level of treatment necessary before effluent enters the groundwater thereby protecting drinking water.</p>	
<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><b>Consistent</b></p>
<p>Alternatives considered by the Village included: taking no action, installing a land application system and receiving treatment from the Fox Metro Water Reclamation District (FMWRD) which discharges to the Fox River.</p> <p>A land application system would cost in excess and \$6,204,000 and land requirements included 72 acres. The Village dismissed this option and argued it would negatively impact groundwater quality since contaminants could enter the shallow groundwater table.</p> <p>Treatment from FMWRD would cost in excess of \$6,972,000. Dismissal of this option was based on cost-effectiveness and the Village's ability to provide a higher level of treatment since FRWRD systems has combined sewer overflows.</p>	



Other treatment alternatives included: on-site aerobic treatment costing in excess of \$6,205,000 and recirculating sand filters with either grinder or gravity pump sewers with costs ranging from \$4,452,000 to \$4,458,000.

The selected alternative considered environmental impacts including water and air quality and environmentally sensitive areas, social impacts and technical considerations and costs. Total anticipated costs are as follows:

Wastewater Treatment Plant	\$1,096,000
Collection Sewers	\$1,887,000
Land Acquisition	\$100,000
Inspection/Construction Management	\$237,000
Project Management/Design	\$210,000
<b>Estimated Total Construction Cost</b>	<b>\$3,530,000</b>

The WRF will be owned and maintained by the Village and financed through Illinois EPA's Revolving Loan, USEPA special appropriations, Illinois EPA's unsewered grant and other funding. Total estimated Annual O, M & R costs are \$36,960.

Connection fees are \$5,900, presumably for residential units. The Village did not provide non-residential connection fees. Per monthly costs are estimated to be \$73 if all capital costs were included in the user charge. The Village however anticipates including a \$5,900 Special Service Area (SSA) assessment which would lower the average monthly sewer bill to approximately \$39. Supplemental information states these costs include periodic inspections of the STEP system and pumping of the septic tanks every five years.

6. *"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."*

**Consistent**

The Village of Big Rock passed Resolution No. 2010-01 in support of its petition to amend the Illinois Water Quality Management Plan, create a new FPA and install a new WRF system.

7. *"The proposed amendment should not adversely affect adjoining units of government."*

**Consistent**

All land within the proposed FPA is located within the corporate boundaries of the Village and will have no impact on adjoining units of government.

8. *"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."*

**Consistent**



<p>The service area is zoned by the Village of Big Rock as mixed use, residential, commercial and agricultural.</p> <p><b><u>Illinois Department of Agricultural Protection</u></b></p> <p>The Illinois Department of Agriculture voiced no objection for the request in a letter dated February 10, 2010. The agency considers such action to be consistent with Illinois EPA’s Agricultural Land Preservation Policy and the Illinois Farmland Act.</p> <p><b><u>Village of Big Rock</u></b></p> <p>Designated landuse within the amendment area includes a mixture of agricultural, residential, commercial, industrial, vacant land, openspace and transportation. The Village’s comprehensive plan maintains these uses and preserves agricultural land for rural residential purposes and the current quality of life.</p> <p><b><u>Kane County</u></b></p> <p>Kane County Board Representative Andrew Frasz submitted a letter dated January 8, 2010 supporting the request.</p> <p>The Kane County Development Committee voiced approval for the request in a letter dated March 16, 2010. The amendment is consistent with the goals of the County’s 2030 Land Resource Management Plan and its standard for providing wastewater treatment in an environmentally sound manner.</p>	
<p>9. <i>“Consideration will be given to evidence of municipal or county zoning approval and commencement of development activity prior to Areawide Water Quality Management Plan adoption in January 1979.”</i></p>	<p><b><i>Not Applicable</i></b></p>