



Wastewater Committee

Agenda Item No 4.0

Date: February 13, 2013

CMAP Water Quality Review #: 12-WQ-106

Applicant: Lakes Region Sanitary District

Re: The Lakes Region Sanitary District (LRSD) has requested a transfer of 987 acres from the Northwest Lake (NW) Facility Planning Area (FPA) to the Lakes Region Sanitary District (LRSD) 3 Sub-FPA of the NW FPA.

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.



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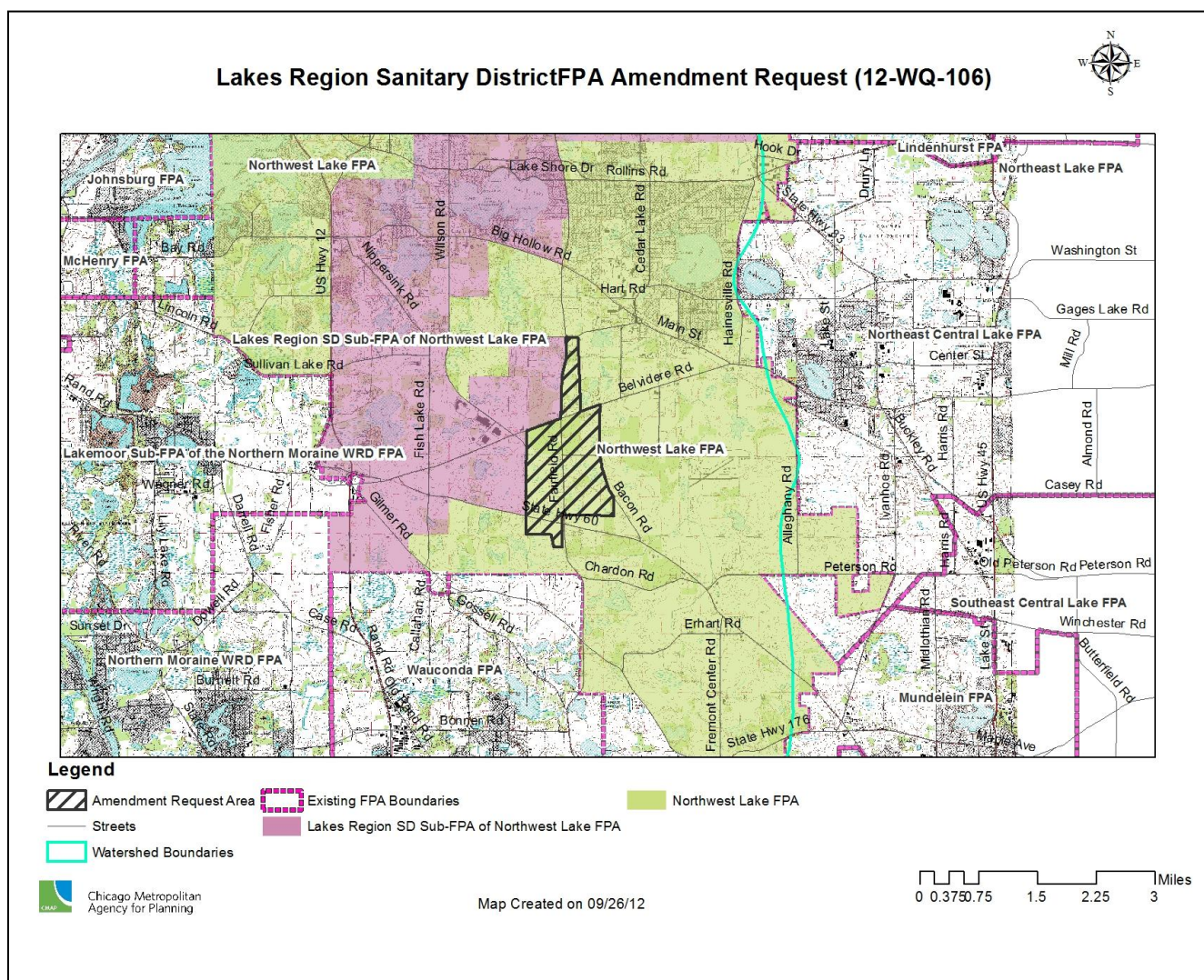
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A. REQUEST SUMMARY

The LRSD has requested a transfer of 987 acres from the NW Facility Planning Area (FPA) to the LRSD Sub-FPA of the NW FPA (Figure 1). The request will allow the LRSD to provide sewer service within the proposed amendment area. The amendment is located in Lake County, Avon and Freemont Townships, Sections 30 and 31 (Avon) and Sections 5, 6, and 7 (Freemont).

Map of FPA Boundary Amendment Site

Figure 1. Parcel transfer for WQ Amendment # 12-WQ-106





RELATIONSHIP TO RECOMMENDED CRITERIA FOR FACILITY PLAN AMENDMENTS

In the mid 1970's, the NW Lake FPA was located in the northwest corner of Lake County and included in the Chain of Lakes recreational area. It encompassed approximately 1 square mile. The NW FPA is a prime recreational area where regional citizens come for water-based recreation which the Chain of Lakes offers. As of 1970, the principal wastewater treatment agencies in the FPA were: the Village of Antioch, Lake Villa and Fox Lake, and the Round Lake Sanitary District.

The Northeastern Illinois Planning Commission's Regional Wastewater Plan called for the construction of an interceptor sewer system designed to phase out the Antioch, Lake Villa, and Round Lake Sanitary District existing treatment plants and to provide service to unsewered areas. Also, the plan called for the Village of Fox Lake to construct a new plant where all FPA wastes would be treated.

Today, the NW FPA is located in northwest Lake County and encompasses approximately 75 square miles. The County of Lake contracts directly with various municipalities and sanitary districts, including the Lakes Region Sanitary District, Fox Lake, Round Lake, Round Lake Beach, Round Lake Park, Round Lake Heights, Hainesville, and portions of unincorporated Lake County to accept and convey waste water for ultimate treatment at the Northwest Regional Water Reclamation Facility (NWRWRF). This facility is owned and operated by the Village of Fox Lake.



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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 LRSD is requesting an FPA amendment to modify its Sub-FPA, which is contiguous to the proposed amendment area. The amendment is in accordance with intergovernmental agreements between Lake County, the Village of Round Lake, and the LRSD. The expansion will allow the LRSD to provide sewer service within the proposed amendment area.</p> <p>Wastewater flows will be collected and transported by the LRSD's interceptor system and ultimately treated at the NWRWRF in Fox Lake. The NWRWRF facility was constructed to a design average flow (DAF) of 9.0 million gallons per day (MGD) and a DAF maximum flow of 22.5 MGD. Recent flow data from the NWRWRF indicates the monthly average flow to the facility from July 2011 to June 2012 ranged from 5.78 MGD to 8.43 MGD. The average daily flow reported during this time was 7.21 MGD, or 80% of the existing DAF of the existing plant capacity. Monthly daily maximum flows (DMF) during the same time period ranged from 7.06 MGD to 16.65 MGD.</p> <p>The NWRWRF facility's treatment process includes: grit removal; primary and secondary treatment; tertiary filtration; UV disinfection; sludge thickening; anaerobic sludge digestion; and sludge dewatering and storage.</p> <p>The facility is currently undergoing a plant expansion that will increase the DAF and DMF rated capacity of the facility to 12 MGD and 30 MGD, respectively, and reduce nutrient loading to the Fox River Watershed. The expanded facility will incorporate the Modified Ludzak-Ettinger (MLE) process^a for nitrogen removal. It will also include chemical phosphorus removal within the treatment train. The expansion is expected to be completed in the near future.</p> <p>The NWRWRF operates under NPDES Permit No. IL0020958, which expires on August 31, 2013. Until the start of operation of the expanded plant, the permit has typical effluent concentration limits (see table below). Once the expanded facility is operational, wastewater flows from the wastewater treatment facility (WWTF) will be held to the same effluent concentration limits as the 9.0 MGD facility with one addition of a 1.0 mg/L monthly average phosphorus effluent limit.</p>	<p>Consistent</p>

^a For more information about this process please visit: <http://water.epa.gov/scitech/wastetech/upload/mnrt-volume1.pdf>



NPDES Permit Concentration Limits mg/L		
	Monthly Average	Daily Maximum
CBOD ₅	10	20
Suspended Solids	12	24
DO		
March-July		5.0
August-February	5.5	3.5
Chlorine Residual		1.25
pH	Shall be in the range of 6 to 9 Standard Units	
Fecal Coliform	Daily Maximum Shall not exceed 400 per 100 mL	
Phosphorus	Monitor Only	
Total Nitrogen	Monitor Only	
<u>Ammonia Nitrogen</u>		
Apr- -Oct	1.0	2.5
Nov. – Feb.	3.1	4.7
March	1.5	3.9

Based on the flow and effluent data summary provided for the period of June 2011 through June 2012, it appears the NWRWRF met all effluent standards with the exception of a daily maximum ammonia nitrogen excursion in July of 2011. All other daily maximum ammonia nitrogen levels were well below the effluent standards. It is reasonable to conclude the expansion of the plant and integration of the MLE process will provide an additional level of treatment for ammonia nitrogen removal. Therefore, future ammonia nitrogen excursions are not expected.

The NWRWRF currently discharges treated wastewater into the Fox River. During high river flows, treated wastewater discharges to Pistakee Lake. The Fox River, in the location where the NWRWRF discharges, has a 78 cfs 7Q10 low flow. The 7Q10 low flow for Pistakee Lake is 0 cfs. The stream segments of both the Fox River and Pistakee Lake receiving discharge are classified as impaired waterbodies and both are included on the draft 2012 Illinois Section 303(d) list of impaired waters. The Fox River impairments are for fish consumption and aquatic life. The potential cause of the fish consumption impairment is polychlorinated biphenyls. The causes for the aquatic life impairment are unknown. Pistakee Lake impairments are for fish consumption and aesthetic quality. The causes for fish consumption are mercury and polychlorinated biphenols. The potential causes for aesthetic quality are total phosphorus and total suspended solids. A Total Maximum Daily Load study for Pistakee Lake is currently underway. Given the fact that a cause for impairment of Pistakee Lake is total phosphorus, it is quite possible a reduction in total phosphorus load to Pistakee Lake by the NWRWRF could



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be expected. Downstream, Fox River dissolved oxygen levels, as well as current discussions relative to potentially lowering phosphorus discharge standards on a statewide basis could also affect the NWRWRF in the future. Given the potential, reducing phosphorus loads to the NWRWRF, where appropriate should be a water quality management strategy.	
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>	Consistent
<p>The applicant projects the amendment area (which is presumed to be annexed to the Village of Round Lake) will one day contain 1,139 residential (PE), including 410 homes at 2.775 PE per household and 970 employment population equivalents. The total PE forecasted is 2,109 generating an average daily flow of 210,900 gpd of wastewater upon full buildout (Year 2040). The projected density of 410 homes over 1,000 acres of land suggests a build out density of 0.41 dwelling units per acre.</p> <p>CMA's 2040 household population equivalent forecast for the Village of Round Lake's municipal limits is 9,493. The Village's population projections fall well within CMA's forecasts 2040 population forecasts.</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 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>	Not Applicable
The requested amendment does not involve the construction, operation or modification of a privately-owned treatment facility.	
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>	Consistent
<p><u>Point Source Impacts</u> (See analysis under Criterion #1)</p> <p>As summarized in Criterion #1, the receiving water bodies for the current and expanding WWTF, namely the Fox River and Pistakee Lake, are both listed as impaired waterbodies. Diversion of additional treated wastewater flows from these water bodies should be strongly considered where feasible. For the reasons described in Criterion # 1, the applicant should continue to consider the viability of constructing a land application system in this low development density area in the future.</p> <p><u>Nonpoint Source Impacts</u></p> <p>The expansion area is subject to the Lake County Watershed Development Ordinance. The ordinance has provisions for storm water management, soil erosion and sediment control, floodplain management, and stream and wetland protections. The ordinance is generally</p>	



consistent with CMAP's model ordinances. However, there are several discrepancies including:

- The ordinance does not prohibit detention in the floodway. However, while detention is not explicitly prohibited it is not specifically listed as an appropriate use in the floodway.
- The ordinance does not have a provision to prohibit on-stream detention unless it provides regional stormwater storage. However, it does provide requirements that on-stream detention provide a water quality benefit and a Volume Safety Factor.
- The ordinance does not restrict modifications in the floodway to the following appropriate uses: public flood control projects, public recreation and open space uses, water dependent activities, and crossing roadways and bridges. However, the ordinance list of appropriate uses is consistent with the IDNR regulatory floodway requirements which would not prohibit new treatment plants and pumping facilities, detached garages, shed and other non-habitable structures, parking lots and airplane parking aprons, and roadways which run longitudinally along a watercourse.
- The ordinance does not prohibit the modification of high quality, irreplaceable wetlands, lakes and stream corridors. It does, however, require documentation of avoidance and minimization of impacts and mitigation requirements (3 to 1 for high quality aquatic resources and 6 to 1 for high quality forested wetlands).
- The ordinance does not designate a minimum 75 foot setback zone from the edge of identified wetlands and water bodies in which development is limited to the following activities: minor improvements like walkways and signs, maintenance of highways and utilities, and park and recreational area development. However, the ordinance does have buffer requirements ranging from 30 to 100 feet depending on quality criteria in which development is limited to those activities.
- The ordinance does not prohibit watercourse relocation or modification except to remedy existing erosion problems, restore natural conditions, or to accommodate necessary utility crossings. However, the ordinance does discourage channel modification and require documentation of minimization efforts and mitigation.

There are wetlands and floodplains within the amendment area. It is presumed the applicant will manage the wetlands and floodplains in accordance with the pertinent local, county and federal regulations.

The applicant requested an Illinois Department of Natural Resources (IDNR) Endangered



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<p>Species Protection and Natural Areas Preservation Review for the project site. IDNR's Ecocat Ecological Compliance Assessment Tool suggests that seven protected resources may be present in the vicinity of the amendment area including the Round Lake March INAI Site, the Sargent Marsh INAI Site; the Black Tern; the Black-Crowned Nigh Heron; the Common Moorhen; the Least Bittern; and, the Yellow-Headed Blackbird. For any projects or developments within the area, the applicant will have to coordinate with and submit to IDNR for a specific assessment of protect resources for the project. As such, Staff recommends that the applicant receive signoff from IDNR to ensure negative impacts to endangered species will not occur.</p> <p>The Illinois Historical Preservation Society determined that there are no significant known historical or cultural resources in the area.</p> <p>STAFF RECOMMENDATIONS: The LRSD should obtain a signoff letter from the IDNR as part of the IDNR Endangered Species consultation.</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>	Consistent
<p>The applicant provided two treatment alternatives including the following:</p> <ul style="list-style-type: none">• <u>Alternative No. 1:</u> Connection to the Lakes Region Sanitary District• <u>Alternative No. 2:</u> Land Treatment <p>As part of Alternative No. 1, wastewater treatment service from the site would be conveyed through the existing LRSD 20-inch interceptor sewer located immediately west of the amendment area. The 20-inch interceptor sewer is tributary to other downstream interceptors and lift stations owned and operated by the Village of Round Lake and the Lake County Public Works Department. Under this alternative, wastewater is ultimately conveyed to the NWRWRF for treatment and disposal. The applicant reports that the existing interceptor sewer has sufficient capacity to accommodate wastewater flows generated from the area. Presumably, the downstream interceptors and lift stations as well expansion of the NWRWRF to 12.0 MGD have sufficient capacity to treat flows from the amendment area. Costs included connection fees to the LRSD, the NWRWRF, and the Lake County Public Works Department. The cost estimate also includes a recapture fee to be paid to the Village of Round Lake for connection to a downstream interceptor sewer. The total estimated construction costs are \$147,300 whereas the connection and recapture fees are estimated to be \$4,263,605. The estimated total costs to provide service for this alternative totaled \$4,410,905.</p> <p>Alternative No. 2 evaluated the use of a lagoon wastewater treatment system coupled with a</p>	



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spray irrigation system. The treatment system would consist of screening, aerated lagoon treatment, winter storage lagoons, filtration disinfection, and a land application distribution system. The estimated construction cost for the WWTF is \$2,440,000. The applicant concluded 69 acres of land are needed for the WWTF and the land application area. At \$55,000 per acre for land acquisition, the applicant estimates the cost for the land alone to be \$3,795,000. It should be noted that the applicant provided supplemental information documenting a number of properties which sold for more than \$55,000 per acre. Therefore, the \$55,000 per acre projected cost to purchase property for a land application seems reasonable. After including \$370,000 for engineering and legal services, the total cost for Alternate No. 2 is estimated to be \$6,605,000.

The LRSD ruled out implementation of a non-discharging system because it is not a cost-effective option. However, given the low proposed development density (410 homes on over 1,000 acres of land computes to a density of 0.41 dwelling units per acre) and presumed significant amount of open space within the developed area, it seems logical to conclude 69 acres of property suitable for land application treatment could be identified within the amendment area at a lower cost. If the per acre cost for the purchase of the 69 acres and construction of a spray irrigation system were \$28,500 or lower, then Alternate No. 2 would have a lower capital cost than Alternate No. 1. An alternative to purchasing the property would be to consider existing land uses that would benefit from wastewater reuse in the area. For instance, the Stonewall Orchard Golf Course is just south of the proposed FPA amendment area. Wastewater reuse with spray irrigation on a golf course would not only eliminate the additional wastewater to be treated and released at the existing NWRWRF point sources, it also would significantly reduce and possibly eliminate the stress on the existing sources of irrigation water the golf course currently utilizes.

In conclusion, the proposed approach to provide sanitary sewer service to the amendment area by conveying the wastewater to the NWRWRF appears to meet the current State of Illinois water quality standards. However, near future changes in standards, namely more stringent nutrient standards could require the area served by NWRWF to consider reducing nutrient loads to the facility. Given the reasonably good potential that land application of wastewater could be secured in the amendment area at a reasonable cost, the applicant should continue to consider implementing land application of wastewater in this area into the future.

STAFF RECOMMENDATIONS: The LRSD should continue to evaluate options for land application for the treated wastewater to reduce the point source loads into the Fox River and Pistakee Lake. Additionally, when development proposals for the amendment area are brought forward in the future, the applicant should work with the zoning authorities to determine if water reuse options can be cost-effectively integrated into the development plan.



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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>	Consistent
On June 14, 2012, the Lakes Region Sanitary Board endorsed submittal of the amendment application.		
7.	<i>"The proposed amendment should not adversely affect adjoining units of government."</i>	Consistent
The amendment request is part of an Intergovernmental Agreement between Lake County, the Village of Round Lake, and the LRSD. Staff did not receive letters in support or in opposition to the LRSD's request.		
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> The Illinois Department of Agriculture submitted a letter of no objection for the amendment request.	Consistent
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>	Not Applicable