

## Memorandum

Date: October 24, 2011  
To: Martin Maner, PE, CAW Watershed Director  
From: Trevor Clements, Director of Water Resources  
Cc: Graham Rich, Jonathan Long  
Subject: Tt Review of Proposed Pulaski County Lake Maumelle Zoning Code – Supplemental Analysis and Discussion

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On October 12, 2011, I submitted a memo to Central Arkansas Water (CAW) summarizing our brief review of the document named “Pulaski County-Zoning Ordinance 9-20-11.pdf”, along with the revised version of the proposed Zoning Code for Pulaski County’s portion of the Lake Maumelle Watershed dated 10-4-11. That review focused on changes in Section 2.3 regarding the proposed Low Impact Planned Residential District (LIPR or LI District). In summary I stated in that memo that:

“...the adoption of the proposed zoning code would represent another milestone toward achieving the intent of the WMP [Watershed Management Plan]. The recent revision to add the minimum 25 percent undisturbed area requirement for designs with engineering BMPs regardless of SET or sliding scale option was an important change. Additionally, the incorporation of prohibited uses within the code is a significant accomplishment. Overall the new code, along with the Subdivision and Development Code (Chapter 8), the new Stormwater Design Manual, and the Site Evaluation Tool all combine to provide Pulaski County with management capacity for protecting water supply water quality that did not previously exist. That said, it will be important for CAW to continue with its other implementation activities. One highly relevant item is to fully implement Section 12 of the WMP, enhancing the components of the assessment capacity to fully evaluate land use changes and developments as they occur in the watershed. The information obtained via monitoring and modeling will be critical to tracking watershed protection performance under the proposed code, and would provide the technical foundation for seeking any adaptation of the code and the WMP down the road.”

Since that memo was written, CAW has received additional questions from stakeholders regarding potential water quality impacts in Lake Maumelle should the zoning code proposal move forward. The following additional information is provided to assist CAW in making its decision on whether to endorse the proposed ordinance.

It is true that the proposed terms of the zoning code would allow for a greater density in the watershed than envisioned at the time of WMP development and adoption in 2007. However, it remains to be seen what level of development will actually occur in the Pulaski County portion of the watershed. In our March 10, 2011 memo regarding impact analysis of the Pulaski County Subdivision and Development Code exclusionary clause we referenced that the annual growth rate in the County was 0.67 percent between 2000 and 2009 per the 2010 Census. At that rate, we calculated that it would take roughly 350 years to fill 3,850 new homes in the watershed. Growth rates certainly can vary over time, but in all likelihood CAW will have substantial time to track and evaluate development at relatively small scales such that strong technical information on local scale impacts can be developed and interpreted long before cumulative development reaches near build-out levels.

As you have heard me state before, watershed management is not a one-time planning exercise. Rather it is an ongoing and dynamic process and responsibility. Pulaski County's proposed zoning code is a step forward in the continuum of water supply watershed protection. Recommendations in the adopted WMP underscore the importance of CAW implementing the administrative features of the plan to continue the momentum and to support carrying out specific action items.

For example, while CAW has already implemented High Priority Action Item 2-A (Hire Watershed Administrator) under the goal (#2) of managing post-construction impacts (page 6 of the Implementation Strategy for the Lake Maumelle Watershed Plan, October 2007), it is equally important that CAW complete High Priority Action Item 2-B (Develop Standard Operating Procedures for Watershed Administration of Development Review). These procedures can address CAW's responsibility for reviewing design aspects that the Site Evaluation Tool (SET) is not able to analyze. For example, the Watershed Administrator can help check construction specifications for paved roads within the LI District and whether they reflect BMPs (e.g., water turnouts, check dams, etc.) for the drainage channels adjacent to the roads and driveways to prevent channel erosion and excess sediment delivery beyond what the SET would predict.

Other important Implementation Strategy Action Items for CAW to carry out related to development include:

- 2-F: Develop Landowners' Manual for Planning Development
- 2-G: Develop Stewardship Plan for Open Space
- 3-B: Form Responsible Management Entity (RME) for Managing Wastewater Impacts
- 5-A: Monitor Current Year Activities and Conditions in the Watershed
- 5-B: Monitor Proposed New Uses/Activities in the Watershed
- 6-A: Develop Strategic Plan for Improving Roads and Utility Rights-of-Way in the Watershed
- 7-B: Develop Strategic Plan for Mitigating Risks from Transportation Sources
- 8-A: Encourage Better Use of Road BMPs
- 14-A: Enhance Long-Term Watershed and Lake Monitoring Program
- 14-B: Develop Overall Assessment Program Including Stewardship Report

Collectively, these WMP implementation actions will serve multiple purposes related to protection of the region’s primary water supply including:

- Building greater public awareness of the relationship between land activities and water quality.
- Building capacity to administer and enforce Subdivision and Development Ordinance and Zoning Code requirements in the Pulaski County portion of the watershed.
- Collecting and interpreting data in the watershed to support checks on development pollutant loading and water quality impacts, and to provide technical basis for ordinance adjustment down the road should it be needed.
- Instituting best management practices and procedures that will help avoid new water quality impacts, reduce or mitigate existing impacts, and preserve and protect open space.

Implementation of the new zoning code also provides some opportunity for reducing existing impacts. For example, there are currently 192 miles of unpaved (dirt) roads in the Pulaski County portion of the watershed (personal communication from Vince Guillet, GIS Manager for CAW, October 12, 2011). From our previous watershed studies, we estimate that these roads on average deliver from 10 to over 20 tons/mile/year of sediment to streams draining to Lake Maumelle. Thus for 192 miles, we can estimate that unpaved roads in the Pulaski County portion of the watershed collectively contribute roughly 1,920 – 3,840 tons/year of sediment. For the land area covered by these unpaved roads, this corresponds to a sediment loading rate of approximately 4.2 to 8.4 tons/acre/year. For comparison sake, the performance standard for sediment for new development in the Pulaski County portion of the watershed is 0.110 tons/acre/year. Thus, for every acre of unpaved road replaced by low impact development, there is a potential to reduce sediment loading from that particular land area by as much as 4 tons/year to more than 8 tons/year. Since, phosphorus loads are proportional to sediment loads (most phosphorus is transported to the lake attached to sediment), there is also potential for phosphorus load reduction through replacement of unpaved roads with low impact development.

To take advantage of these opportunities, it will be important for CAW to carry out the implementation actions mentioned above so that CAW is well prepared to track, review, advise on, and monitor performance of new development. Ensuring good development design, construction, and maintenance of water quality management measures in the watershed will be critical to the long-term success of water supply protection efforts for Lake Maumelle.

Having worked in and studied communities across the country, I can say that what CAW, the County, and other stakeholders have accomplished to date including wastewater discharge prohibition, ordinances including pollutant loading performance standards for new development and a stormwater design manual, land conservation, development of spill response and forest management plans, maintenance of a watershed administration framework (staff and council), and public outreach is truly progressive source water protection compared to many other communities. It is also acknowledged that Lake Maumelle has exceptional water quality for lakes in the southern United States which CAW and the region work hard to protect. I believe that continuing with the action items referenced above will provide for the comprehensive source water protection needed and the basis for continuing to work with the County to adapt as needed over time.

Please let us know if you need further explanation or assistance in this matter.