
Please see the attached. By the way, a number of citizens filed comments as well. You will probably want to review them. They can be found on the TDEC dataviewer for the Cartwright Creek permit.

Thanks in advance for you consideration. If you have any questions or want to discuss any of these comments, please call me.

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HARPETH CONSERVANCY

December 17, 2019

BY EMAIL, INCL. TO *Water.Permits@tn.gov*

Tennessee Department of Environment & Conservation
312 Rosa L. Parks Avenue, 11th Floor
Nashville, TN 37243-1102
Attn: Public Notice Coordinator,
Messrs. Vojin Janjić, Wade Murphy

Re: NPDES Permit No. TN0027278 (the "Draft Permit")
Cartwright Creek, LLC
Franklin, Williamson County, Tennessee
Public Notice Number: MMXIX-045

Gentlepersons:

Harpeth Conservancy ("HC") appreciates the opportunity to comment on the Draft Permit. HC has three (3) principal comments on the Draft Permit:

1) The proposed discharge limits for nitrogen and phosphorus are excessive and prohibited by the federal Clean Water Act ("CWA") and the Tennessee Water Quality Control Act ("TNWQCA"), including because the limits add additional pollutants of the same kinds for which the relevant sections of the Harpeth River are impaired under Tennessee's "Section 303(d) list."

2) Cartwright Creek, LLC (the "Plant") continues to experience significant operational problems, in terms of overflows, nitrogen discharges, and infiltration and inflow ("I&I"), and the like.

3) The Tennessee Department of Environment & Conservation ("TDEC") and the Tennessee Public Utilities Commission must be able to find solutions to the significant problems this Plant faces, whether through enforcement, consolidation, or financial assistance. TDEC gave assistance within the last two years of over $100 million in low interest loans through its State Revolving Loan Fund ("SRF") to a nearby sewer plant to expand its facility, and TDEC should be able to find, or find another method to fund, the relatively modest sums the Plant needs.

We will discuss each of these issues in turn.

I. The Proposed Draft Permit Nutrient Limits are Excessive and Prohibited by Law.

Both nutrient limits under the Draft Permit are excessive, inappropriate, and prohibited by law.

Phosphorus

The proposed phosphorus limit of five (5) pounds per day equates to a limit of 2.4 mg/L.[1] However, the Plant is only discharging 0.93 mg/L (less than 1 mg/L) on a monthly average. Thus, without justification, what TDEC proposes to require as a limit is well over twice (2x) what the Plant is currently discharging into the Harpeth River.

The proposed phosphorus limit is prohibited for several reasons.

A. The Proposed Phosphorus Limit Violates Section 303 of the CWA.

First, the proposed discharge limit for phosphorus is excessive and prohibited by the CWA and the TNWQCA because the limit adds an additional pollutant of the same kind for which the relevant sections of the Harpeth River are impaired under Tennessee's "Section 303(d) list."

Tennessee's Draft 2020 list of impaired waters under Section 303(d) of the CWA[2] provides that the relevant segment of the Harpeth River (TN05130204009_3000)[3] is impaired by total phosphorus ("TP") and DO, as follows:

Waterbody	Water Size (miles)	Cause -- Name	Source -- Name
Harpeth River	16.8	PHOSPHORUS, TOTAL	MUNICIPAL (URBANIZED HIGH DENSITY AREA)
Harpeth River	16.8	PHOSPHORUS, TOTAL	MUNICIPAL POINT SOURCE DISCHARGES
Harpeth River	16.8	DISSOLVED OXYGEN	MUNICIPAL POINT SOURCE DISCHARGES
Harpeth River	16.8	DISSOLVED OXYGEN	MUNICIPAL (URBANIZED HIGH DENSITY AREA)

The Draft Permit[4] proposes a discharge limit for TP of five (5) pounds per day. For a 250,000 gallon per day (0.25 MGD) facility such as the Plant, this translates to 2.4 mg/L. This is excessive in comparison to the discharge limits for other nearby facilities as such as the Franklin sewer plant as well as what is achievable and required recently by TDEC itself.

TDEC has noted in recent permit actions that TP concentrations should not exceed 1.0 mg/L.[5] Clearly, the proposed 2.4 mg/L standard for the Permit is excessive.

Further, substantially lower TP discharge limits have been achievable at modest cost for many years.[6]

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[1] Draft Permit, Appendix 3, p. R-15.
[2] Available at https://www.tn.gov/environment/program-areas/wr-water-resources/water-quality/water-quality-reports---publications.html (accessed Dec. 17, 2019).
[3] Permit, Rationale, section 8, p. R-10.
[4] Section 1.1, code 0065, page 2.
[5] *See*, e.g., TN0020885, Page R-15 (citing Water Environment Research Foundation work)
[6] *See*, e.g., Report of Dr. JoAnn Burkholder, Ph.D. dated November 21, 2016 re TN0028827 (in TDEC's possession).

TDEC's rules simply and unambiguously have long stated that when a water is impaired by a particular pollutant (it has an "unavailable parameter") new or increased discharges are NOT allowed:

> In waters with unavailable parameters, new or increased discharges that would cause measurable degradation of the parameter that is unavailable shall not be authorized….[14]

Not only do TDEC's own rules unambiguously state that obligation, but TDEC has long interpreted this statement consistently in its public pronouncements and interpretations. For example, TDEC's 2016 final 303(d) list, which lists the Harpeth River as impaired as noted above, states that:

> Water quality limited streams [such as the Harpeth River] are those that have one or more properties that violate water quality standards. They are considered impaired by pollution and not fully meeting designated uses.
>
> If a stream is impaired, regardless of whether or not it appears on the 303(d) List, the Division cannot authorize additional loadings of the same pollutant(s). It may mean that dischargers will not be allowed to expand or locate on 303(d) listed streams until the sources of pollution have been controlled.[7]

Moreover, under the CWA and the TN WQCA, TDEC must look beyond conditions currently prevailing in a waterbody and consider where water quality standards are likely to be violated in the near term. For example, TDEC's Final 2016 303(d) list states that:

> Section 303(d) of the federal Clean Water Act requires that states develop a compilation of the streams and lakes that are "water quality limited" or are expected to exceed water quality standards in the next two years and need additional pollution controls.[8]

The current dissolved oxygen issues in the river and the potential for green and toxic blue-green algae blooms under a potential doubling of current phosphorus levels, as clearly demonstrated by the comments and expert reports submitted in HC's comments on the Franklin sewer permit[9], clearly indicate that water quality standards are expected to be exceeded in the next two years and, therefore, that additional controls are needed. Further, federal and Tennessee rules clearly state that a permit cannot be issued when to do so would cause or contribute to a violation of water quality standards,[10] such as would be the case if the Draft Permit is finalized without

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[7] *See* https://www.tn.gov/content/dam/tn/environment/water/documents/wr_wq_303d-2016-final.pdf, p. 1 (page 5 of the pdf) (accessed Dec. 17, 2019)
[8] Id.
[9] TN0028827, Comments by HC, dated November 21, 2016 (in TDEC's possession
[10] *See, e.g.,* 40 CFR § 122.44(d), TN Comp. R. & Regs., Rule § 0400-40-03-.05(6), 0400-40-05-.07(1).

substantial revisions.

Because the Harpeth River is on the State's 303(d) list as an impaired waterbody, the permittee should be required to follow an instream monitoring plan for the Harpeth River focused on chemical sampling similar to the chemical sampling plan outlined in the Franklin Water Reclamation Facility Permit (TN0028827). Grab samples should be collected monthly at the USGS gage station in Bellevue, TN (USGS 03433500 HARPETH RIVER AT BELLEVUE, TN) to continue and maintain long term monitoring at that location for future assessment of water quality, particularly in regard to total maximum daily load (TMDLs) development by TDEC. Regular monitoring for chemical parameters is critical to assess TMDL progress and future management practices.

> **Proposed Chemical Analyzes for Monthly Grab Samples:** Ammonia, Nitrite-Nitrate as N, TKN, Orthophosphate, Total Phosphorus, Total Nitrogen, CBOD5, TSS, pH, Temperature, *E. coli*, Turbidity, Conductivity, chlorophyll a, phycocyanin

The permittee and Berry's Chapel[11] have each contributed $40,000 from Nov. 2014 through Oct. 2019 to instream monitoring within the Harpeth River as a part of HC settlement agreements[12]. We propose that this financial commitment (approx. $10,000/year) be maintained for instream monitoring in the form of monthly grab samples at the USGS site in Bellevue as outlined above.

B. TDEC Uses Impermissible Methods for Calculating the Draft Permit's Loading Requirements.

Second, TDEC impermissibly bases the Draft Permit's TP loading levels on the 95th percentile of the Plant's discharges since 2016.[13]

As we have noted previously,[14] TDEC mis-uses the EPA Technical Support Document for Water-Quality Based Toxics Control (the "Toxics Guidance")[15] when it employs it, as it does here, to set a discharge level on the 95th percentile of prior performance. To do so is to excuse operator performance. The Toxics Guidance was not intended to be used to allow more pollution. Rather, it states that it is to be used to set limits that are "toxicologically protective."[16] Most importantly, the Toxics Guidance notes that:

> In effect then, the limits must "force" treatment plant performance, which, after

[11] dba. Harpeth WW Cooperative, NPDES Permit No. TN0029718.
[12] *See, e.g.*, Consent Decree, dated Nov. 4, 2014, *Harpeth River Watershed Association v. Berry's Chapel Utility, Inc. dba Harpeth Waste Water Cooperative,* U.S. District Court, Middle District of Tennessee, Case No. 3:14-cv-01771, ¶ 13. *See* similar provision re Cartwright Creek, LLC at note 25*, infra*.
[13] Draft Permit, Appendix 3, p. R-15.
[14] See HC's comments on Permit TN0028827 (Franklin STP) dated November 21, 2016, including the comments of the Tennessee Clean Water Network of the same date on that permit, which discuss further the impropriety of the use of 95th percentile calculations to set discharge limits, both of which comments are incorporated herein by reference.
[15] https://www3.epa.gov/npdes/pubs/owm0264.pdf.
[16] Toxics Guidance, at pps, 99, 101, for example.

considering acceptable effluent variability, will only have a low statistical probability of exceeding the WLA and will achieve the desired loadings.[17]

Nitrogen

C. The Draft Permit's TN Limits Violate Anti-backsliding Rules.

The proposed discharge limit for nitrogen (TN) is also problematic.

The fundamental problem with the TN limit is that it violates both the CWA[18] and TNWQCA prohibitions on backsliding. The Draft Permit proposes a TN limit of 15 lbs/day.[19] This is equivalent to a concentration of 7.19 mg/L. This is considerably higher than the 1.9 mg/L[20] in the permit that expired on November 30, 2011, under which the Plant has continued to operate.

Tennessee's anti-backsliding rule provides that:

> When a permit is renewed or reissued, effluent limitations, standards or conditions shall be at least as stringent as the effluent limitations, standards, or conditions in the previous permit unless … [under certain limited circumstances not present here].[21]

Other Issues

D. TDEC Must, But Has Not, Included Concentration Limits.

The Draft Permit sets its discharge limits for TN of 15 lbs / day and for TP of 5 lbs/day. TDEC's regulations require that discharge limits be set in concentrations, i.e., in milligrams per liter or similar measurement.

Tennessee's water quality criteria for Fish and Aquatic Life[22] provide that:

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[17] Id., at 97.

[18] 33 U.S. Code § 1342(o).

[19] Draft Permit, section 1.1, Code 00600.

[20] TN00272278, expired November 30, 2011, Section 1.1 (text at note (b); Draft Permit, Rationale, Section 8, pages R-10, -11.

[21] TN Comp. R. & Regs. Rule § 0400-40-05-.08(1)(j) et seq. The Draft Permit also appears to violate Rule **0400-40-05-.08 EFFLUENT LIMITATIONS AND STANDARDS"**

> (1) Effluent standards and limitations shall be formulated in accordance with the following guidelines:
> (a) For existing sources, other than publicly owned treatment works, effluent limitations shall be designed to require application of the best practicable control technology currently available and application of the best available technology economically achievable in accordance with requirements of Section 301(b)(2)(A), Federal Water Pollution Control Act, PL 92-500.

[22] TN Comp. R & Regs, Rule 0400-40-03-.03(3) (k). The criteria for Recreation, TN Comp. R & Regs, Rule 0400-40-03-.03 (4)(h), are substantially identical.

(k) Nutrients - The waters shall not contain nutrients in concentrations that stimulate aquatic plant and/or algae growth to the extent that aquatic habitat is substantially reduced and/or the biological integrity fails to meet regional goals. Additionally, the quality of downstream waters shall not be detrimentally affected….

In the case of the Draft Permit, both concentration and poundage limitations are appropriate and necessary to avoid "swamping" a stream with excessive amounts of contaminants at one time.

E. TDEC Cannot Rely on the 2004 TMDL or the Much Delayed Currently-in-Progress Harpeth River TMDL to Set Compliant Permit Limits.

TDEC improperly relies on the 2004 Harpeth River TMDL. The Draft Permit states that:

R7.2. CONTROL REQUIREMENTS/MONITORING FOR CBOD5, DISSOLVED OXYGEN, NH3-N, AND CBOD5 PERCENT REMOVAL

a. The EPA completed extensive computer modeling for developing its 2004 TMDL for addressing organic enrichment and low dissolved oxygen conditions within the receiving stream. Based on the TMDL requirements, the current permit's Outfall 001 discharge CBOD5, NH3-N and dissolved oxygen limits will be used for the new permit.

However, the 2004 TMDL has been rightly criticized[23] and thus cannot be used to set limits for any permit on the Harpeth River.

TDEC also cannot rely on the currently-in-progress TMDL for the Harpeth River. TDEC must NOW set a water quality based effluent limit for the Plant that is designed to bring the Harpeth River into compliance with water quality standards.

The law does not allow TDEC to put off putting a water quality-based effluent limit into the permit based on the fact that it is preparing a TMDL. *Upper Blackstone Water Pollution Abatement District v. U.S. EPA*, 690 F.3d 9, n 8. (1st Cir. 2012); *City of Taunton Dept. of Public Works*, 17 EAB (Env. Appeals Board 5/3/2016), *aff'd*, *City of Taunton v. United States Environmental Protection Agency*, 895 F.3d 120 (1st Cir. 2018). TDEC must now, on a scientific basis, set phosphorus limits that will prevent discharges from the Plant from causing or contributing to violations of water quality standards. 40 CFR § 122.44(d); *American Paper Institute v. U.S. EPA*, 996 F.2d 346, 350 (D.C. Cir. 1993). Because downstream waters are listed as impaired it is clear that there is reasonable potential that the discharges are causing or contributing to a violation and that protective water quality based effluent limits are required. *Upper Blackstone Water Pollution Abatement District, supra*; *Prairie Rivers Network v. Illinois Pollution Control Board*, 2016 IL App (1st) 150971 ¶¶29-33, 38 (Ill. App. Ct. 2016); *Ala. Dept. of Env. Mgt. v. Ala. Rivers Alliance, Inc*. 14 So. 3d 853, 866-68 (Ala. Civ. App. 2007).

[23] *See, e.g.,* HC comments dated June 4, 2002 (copy attached).

II. The Plant Continues to Experience Significant Operational Problems.

The Plant continues to experience significant operational problems, in terms of overflows, nitrogen discharges, and infiltration and inflow ("I&I"), and the like.

The problems at the Plant have been long-standing. Many have centered around overflows and releases and numerous other permit violations. The issues were so prevalent that in 2014, Harpeth Conservancy was forced to bring a citizen suit under the CWA, which promptly settled.[24]

The issues continue to this day. Numerous examples persist. In June 2018 the Plant commissioned a Collection System Review to try to control its I&I problems. On February 27, 2019, the Plant experienced a 20,000 gallon overflow and an estimated release of 100,000 gallons of rainwater infiltration.

As TDEC noted in its July 17, 2019 Notice of Violation,

> Corrosion, I/I, lack of maintenance, and effluent violations, are ongoing issues at the treatment plant. The treatment units have surpassed their useful lifetime. Failure to provide proper operation and maintenance of the wastewater treatment plant, and exceeding effluent limits are violations of the permit and the TN Water Quality Control Act….. Proper operation and maintenance of the facility must improve. There is no influent screening at plant headworks and the clarifier does not have a surface skimmer. Due to the severity of corrosion, some basin walkways are unsafe to access.

Under the circumstances, the voluntary moratorium on new residential connections, while appreciated, is inadequate. (We wish to thank Mr. Bruce Meyer and his staff for their cooperation and valiant efforts to operate this outdated plant, particularly under these difficult circumstances.)

We note that the Draft Permit (section 2.3.3 d.) provides for no new flows upstream of any point in the connection system that experiences 5 or more overflows or releases per year. Again, while this is appreciated, it is insufficient. The Plant should be subject to a complete moratorium on new residential connections until the problems at the Plant are resolved.

III. TDEC Must Find Solutions to the Plant's Problems, Regardless of the Plant's Ownership Status.

As noted above, the Cartwright Creek Plant faces significant challenges. We very much appreciate the efforts of the Plant's manager, Mr. Bruce Meyer, and his staff, to address the issues it faces. But, without significant assistance from TDEC and the State, there does not appear to be viable way to fix all these issues, TDEC cannot allow a sewer plant, even if

[24] *See* Consent Decree, dated Nov. 4, 2014, *Harpeth River Watershed Association v. Cartwright Creek, LLC*, U.S. District Court, Middle District of Tennessee, Case 3:14-cv-01772.

privately owned, to continue to experience these kinds of problems while it finances the expansion of a nearby publicly owned treatment works.

Cartwright Creek, LLC and Plant personnel have tried a number of techniques to try to find the resources to fix its problems, but huge challenges remain unaddressable without assistance. The Plant has been put up for sale[25], but the prospective buyer has backed out of the deal, and no new buyer has yet been found.

Although the Plant's manager is commendably proceeding with attempts to fix some of the I&I problems the Plant faces,[26] and has raised tap (house connection) fees and rates[27], apparently the only solution to all of the issues is to rebuild the Plant, which might cost upwards of $3 million, and likely more.

Some of the methods that have been proposed to raise the necessary funds is to increase the number of residential hookups and increase the Plant's service area.[28] Such methods would allow for an increase in residential development in the area -- and change it forever -- without compliance with all the usual procedures and safeguards that land use and zoning laws require, including comprehensive land use planning, notice and an opportunity to be heard, and appeal rights, on such matters.

Additionally, inasmuch as the equity owners of the Plant have profited from the Plant's operation over the years, they should be forced to saddle at least some of the burden of bringing the Plant into compliance with statutory requirements-- not all this burden should be pushed onto existing and future ratepayers through fee and tap increases.

We are also concerned that increasing the number of taps could, in particular, increase the amount of pollutants discharged into the Harpeth River, both directly through increased discharges from the Plant as well as increased stormwater from the impervious surfaces that new development would generate.

We note that to expand the Franklin sewer plant, the State Revolving Loan Fund, administered by TDEC, was able to make a loan of approximately $100 million. According to our calculations, the total amount of loans given to the state of Tennessee in the Clean Water State Revolving Fund of 2017 was $365,261,160. Almost one-third of that total, $100 million, was solely given to Franklin for its wastewater treatment plant expansion and improvements. Franklin's loan was by far the largest of 2017. Shelby County received the second largest loan with only one-third of Franklin's total loan amount, $49,300,000. Shelby county's population is 646,889 while Franklin's is only 62,487. The next closest loan amount given is only approximately one-quarter of Franklin's amount, with $27,500,000 given to Smyrna, Tennessee. The remainder of the loans are $15,000,000 or less, most of them being $1,000,000 or below.

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[25] The earlier agreement for sale of Cartwright Creek can be found here, beginning on page 36 of this pdf: http://share.tn.gov/tra/orders/2019/1900035.pdf (other proceedings are at that same docket number) (accessed Dec. 17, 2019).

[26] *See* petition for approval of capital improvements, http://share.tn.gov/tra/dockets/1900049.htm) (accessed Dec. 17, 2019).

[27] *See* http://share.tn.gov/tra/dockets/1900034.htm (accessed Dec. 17, 2019).

[28] *See* pleadings in petition to expand service area: http://share.tn.gov/tra/orders/2019/1900042.pdf & http://share.tn.gov/tra/orders/2019/1900042b.pdf, and petition to serve the Wilson parcel: http://share.tn.gov/tra/orders/2019/1900061.pdf) (accessed Dec. 17, 2019).

Although the Cartwright Creek Plant is privately owned and thus ineligible to receive SRF monies, which are reserved for publicly-owned treatment works,[29] TDEC and the Tennessee Public Utilities Commission ("PUC") must be able to find a way, whether through enforcement,[30] consolidation, or financial assistance, to allow plants such as the Cartwright Creek facility, which needs far less than the Franklin sewer plant, to comply with the CWA and TNWQCA.[31] It seems that somewhere TDEC could find the authority and the relatively modest sums needed to assist the Cartwright Creek Plant.

The PUC also has authority and remedies that should be considered in this case,[32] among them, the ability to deny or revoke a certificate of public convenience and necessity,[33] the issuance of a show cause order, [34] and the ability to issue fines and penalties.[35]

Conclusion

The Plant is clearly troubled. It has experienced financial difficulties for years. These difficulties have resulted in numerous violations, including overflows that potentially endanger public health, as well as discharges of excessive nutrient pollution in to the Harpeth River. TDEC must hold all sewer plant operators –public and private – to comply with the CWA and

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[29] 33 U.S. Code § 1281(g). **BUT NOTE THAT GRANTS ARE AVAILABLE TO PRIVATELY-OWNED TREATMENT WORKS UNDER CERTAIN CONDITIONS, 33 U.S. Code § 1281 (h).**

[30] *See, e.g.*, 69-3-109 (Complaint or order for corrective action), 69-3-115 (fines and penalties).

[31] A further example of the unequal treatment of the private Cartwright Creek facility, and the favoritism shown the Franklin plant, is in the discharge limit imposed on the two plants. Cartwright Creek's facility is required to measure its discharges in pounds per day, per TN Comp. R. & Regs. Rule 0400-40-10-.03(d), while the Franklin plant was allowed to measure its discharge in pounds per year (63,000+ pounds) per year. Rule 0400-40-10-.03(d) provides that:

> (d) Continuous discharges. For continuous discharges all permit effluent limitations, standards, and prohibitions, including those necessary to achieve water quality standards, shall unless impracticable be stated as:
>
> > (1) Maximum daily and average monthly discharge limitations for all dischargers other than publicly owned treatment works; and
> >
> > (2) Average weekly and average monthly discharge limitations for POTWs.

[32] Including under TN Code Ann. § 65-4-115.

[33] TN Code Ann. § 65-4-201.

[34] TN Code Ann. § 65-2-106.

[35] TN Code Ann. § 65-4-116.

the TNWQCA. TDEC has recently loaned a vast sum to the nearby Franklin sewer plant, when other communities state-wide had significant claims on the use of those funds. TDEC must find a way to resolve these and similar issues expeditiously, fairly to all stakeholders, and short of making, *sub rosa*, land use and zoning decisions without compliance with the protections available under those laws.

Sincerely yours,

HARPETH CONSERVANCY

By:_____
James M. Redwine, Esq.,
VP & COO

cc: Tennessee Public Utilities Commission

Mr. Bruce Meyer
Operations Manager
Sheaffer Wastewater Solutions, LLC
bmeyer@sheafferwws.com

HARPETH RIVER
WATERSHED ASSOCIATION

June 4, 2002

Dr. Sherry Wang
TDEC
7th Floor, L & C Annex
401 Church Street
Nashville, TN 37243

Tom McGill and Stephanie Fulton
EPA, Region IV
61 Forsyth Street, SW
Atlanta, GA 30303

Dear Sherry Wang, Tom McGill, and Stephanie Fulton,

At the recent AWRA conference held at Montgomery State Park, Tom McGill, Stephanie Fulton, Mike Corn of Aquaeter, Dr. Dave Wilson of Brown Caldwell who coordinates the Harpeth River volunteer sediment study, and I met afterwards to continue to discuss the TMDL modeling work on nutrient enrichment/DO for the Harpeth. We were interested in discussing how EPA was going to approach the TMDL model, some points regarding the EPA field data gathered in 2000 and 2001, and ways that the HRWA could work with EPA on the design of the TMDL model.

After that meeting, Mike Corn reviewed the draft EPA field data that Tom and Mark Koenig provided to us in January. Attached are Mike Corn's comments. We wish to provide them to you so that they may be of use to TDEC and EPA in guiding the model preparation for the TMDL.

In essence, Mike Corn's comments raise the concern that the data EPA gathered is not sufficient as of yet to calibrate the WASP model for the Harpeth. Based on the review, there are serious reservations that a model can be developed that can be used to accurately project nutrient allocations. This is important since during low flow conditions in the summer the largest source of nutrients to the river is the Franklin sewage treatment plant. In addition, two smaller sewage processing plants discharge into the Harpeth not far downstream. All three point sources will be affected by the TMDL allocation. During rain events, significant non-point sources of nutrients are contributors as well.

One of many important issues for the model is to somewhat accurately describe the role of algae in the system. The EPA field data to date only includes chlorophyll a so the model will underpredict the effect of algae on the DO. We believe that it is

important to collect other chlorophyll data to capture the role of both suspended and attached algae in the system. In addition, the BOD data were not collected to capture in stream decay rates. Without these rates, the model can not be calibrated to the Harpeth. Mike Corn's comments that are attached provide more detail.

As we explored with you in April, the HRWA is very willing to work with the EPA to gather more field data this summer season so that the TMDL model can be calibrated. Mike Corn of Aquaeter and other members of our Science and Policy committee with appropriate expertise and qualifications can design and/or conduct the studies. Because the summer field season is coming up, we would like to hold a conference call or meet at the EPA offices to discuss how we can work with the EPA and TDEC to gather important field data for the TMDL model and identify the sources of funds to do this.

As with the sediment TMDL, the HRWA views the opportunity to work with TDEC and the EPA on TMDLs as an important component to developing effective watershed restoration and management approaches. We believe that working on the nutrient enrichment/DO and the sediment TMDLs in the Harpeth would also provide approaches that can be used in other watersheds with similar ecoregional characteristics in Tennessee.

Please don't hesitate to contact me with dates that would work for you to discuss the attached comments and how to proceed with a data collection project for this summer on the Harpeth.

Sincerely,

Dorene Bolze
Executive Director
Dorie@DorieBolze.com
615-591-9095

Cc via email:

Paul Davis, TDEC
Saya Qualls, TDEC
Jim Greenfield, EPA
Bill Melville, EPA
Jay Johnson, city of Franklin

HARPETH RIVER
WATERSHED ASSOCIATION

SPECIFIC COMMENTS ON THE USEPA HARPETH RIVER MODELING DATA REPORT DECEMBER 2001

Prepared by
Mike Corn, President, Aquaeter, Brentwood, TN
May 2002

1. Time-series BOD tests were not done in accordance with standard published protocols. The standard approach is to do duplicate samples for each station for a period of 90 days. It is unclear why USEPA did not follow standard procedures on this important test procedure.

2. It was also not clear how USEPA set the time-series BOD bottles up in the field. It is important that the samples were not iced before the time-series bottles were set-up. The accepted protocol is to basically set-up the BOD bottles (typically 2-L BOD bottles for time-series tests) at the time of collection or soon afterwards without abruptly changing the temperature of the sample. If the samples were iced, then the test results are questionable.

3. The standard procedure calls for a DO measurement at time = ½ day to determine algal respiration and/or any immediate oxygen demand. Although this does not appear to have occurred, it would be invisible if the samples were iced and the time-series tests were not set-up within a short time from sample collection (i.e., if the samples were iced, sent to the laboratory and then set-up 24 hrs later).

4. The BOD samples taken in the downstream reaches of the Harpeth River after the wastewater treatment facilities had calculated lower $CBOD_u$'s than the upstream reaches. It was also noted that there appeared to be substantial inhibition and fluctuation in data quality in these downstream reaches with concentrations of both DO and nitrogen series varying up and down over the 120 day test series. It is unlikely that these data are of sufficient quality to be used in any modeling effort (See specifically HRM 62.4).

5. It appears that almost all samples were nitrifying from the time they were set-up in the bottle. It is also interesting that the CBOD curves apparently follow a second-order relationship, which is typical for most streams. The first-stage CBOD apparently occurred within the first 2 days with the second-stage CBOD occurring around 5 to 6 days.

6. Since the BOD time-series samples were not obtained sequentially with time of travel, there are no $CBOD_u$ data from which to determine the stream $CBOD_u$ k_1 rate. The bottle rates are not appropriate for the uptake rate in the River itself. This is a very fundamental point in modeling and this is a serious and fatal flaw in this dataset.

7. Likewise, it does not appear that the dataset included data with time of travel for TKN and ammonia-nitrogen. Again, there cannot be a calibration of this stream without knowing the instream decay rates for these parameters. The only way to calculate these rates for organic nitrogen decay and for ammnonia-nitrogen decay is through tracking the same water slug (i.e., with dye time of travel) and collecting simultaneously organic nitrogen and ammonia nitrogen samples along with the BOD time-series samples. There is no other way to determine stream decay rates.

8. Since this is a eutrophication model, nitrogen removal in the stream is fundamental to modeling the DO impacts from algal productivity and respiration. USEPA does not have the data to accurately predict this in the dataset that they have collected. Again this is a fatal flaw in the dataset and defeats the purpose of the modeling exercise, i.e., eutrophication.

9. USEPA collected chlorophyll a, but not total chlorophyll (a, b and c). Additionally, no algae identification was attempted nor algae abundance. Many of us in the stream allocation monitoring and modeling arena have found that algae can play a very important role in the DO balance in the stream. It appears from the nitrogen data that were collected that the Harpeth is nitrogen limited (TKN's on the order of 0.5 mg/L or less). With the dataset collected by USEPA and based on recent stream data collection efforts we have conducted, chlorophyll a is at best a gross estimate from which to model algal effects on DO in the River.

10. No attached algae impacts on the DO in the River were made. This may also be a critical component of the DO balance and eutrophication analysis that needs to be established for this stream.

11. Reaeration measurements were made using a stable krypton tracer technique. On a similar river system where a radiotracer reaeration test and stable krypton tracer reaeration test were made on similar reaches with low reaeration rates, the stable krypton reaeration tracer test resulted in reaeration test results that were about twice the accepted radiotracer reaeration test results. Granted this is still better than the wide range of results using

reaeration formulas without data, it still means that the algal analysis may be biased low due to the reaeration rate being higher than actual. This will again potentially cause the eutrophication analysis to be less than accurate.

12. The USEPA has selected the WASP model for modeling the Harpeth River. This model is very data-intensive and is a one-time simulation. That is, the simulation is good for the dynamic event that is modeled, but it is very unlikely that the same dynamic conditions will occur again. Although this detail will be lost in our overall ability to predict for this system, it would be prudent to begin with a steady-state model, such as, QUAL2e, that will allow validation under pseudo steady-state conditions that typically occur on this river system. The WASP model could then be built from the QUAL2e dataset, including properly collected and calibrated deoxygenation rates, reaeration rates and algal productivity determinations. WASP could then be used to refine some of the dynamic conditions that occur on the River including stormwater flows that potentially have a big impact on nutrient loadings to the River. The original calibration of the WASP model that we performed for the USEPA, Athens used this exact procedure and it laid a strong foundation for this model use.

13. USEPA collected a good diurnal dataset from which to determine the diurnal DO cycle. These data were not collected simultaneously with a dataset for DO, water temperature, $CBOD_u$, organic nitrogen, ammonia nitrogen, total and dissolved phosphorous and total chlorophyll collected with dye time of travel, and it will be difficult to tie the diurnal data in with true impacts from the physical/chemical data (not) collected on the River.

14. The dataset collected by USEPA is a good baseline set of data, but it is not the dataset necessary to calibrate either QUAL2e or WASP. The data will require the same interpretative skills that have been used in the current TDEC water quality model for the River. It is unlikely that a model can be constructed from this dataset that can be effectively used to make prudent decisions on the Harpeth River Basin and its longterm health.