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VIA EMAIL

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RE: Comments on Preliminary Draft TMDL for Sediment in the Indian Creek Watershed, Montgomery County, PA Indian Creek

Mr. Capacasa and Mr. McDonnell:

On behalf of Telford Borough Authority and the Borough of Telford ("Telford"), please see the accompanying comments regarding the July 31, 2017 Preliminary Draft TMDL for Sediment in the Indian Creek Watershed, Montgomery County, PA Indian Creek ("Draft TMDL") issued by EPA Region 3..

Telford has identified several significant concerns regarding the Draft TMDL which would directly impact it under a final TMDL. These issues should be addressed at this preliminary stage to prevent the propagation of associated uncertainties, inaccuracies, and inappropriate assumptions into a final TMDL. These concerns are summarized below.

- Premise of Draft TMDL is Fundamentally Flawed

The Draft TMDL is premised on several critical assumptions – rather than demonstrated scientific facts – as required by the TMDL process. The first assumption is that the existing

sediment impairment is due to current sediment loading conditions as determined using the Generalized Watershed Loading Functions (GWLF) watershed model. (Draft TMDL at 10-11) The next assumption is that these current loads must be reduced to the loads determined for the reference watershed to restore designated uses. (Draft TMDL at 10) Finally, once the loads are reduced, designated uses will be restored. (Draft TMDL at 11)

> EPA used a reference watershed approach to estimate the *necessary sediment load reductions that are needed to restore a healthy aquatic community and allow Indian Creek to achieve its designated uses*. (Draft TMDL at 10) (Emphasis added)

> Achieving the sediment loadings set forth in the TMDLs will *ensure* that the *designated aquatic life use* of the impaired stream is *achieved*. (Draft TMDL at 11) (Emphasis added)

These premises are nowhere "demonstrated" in the document and therefore the TMDL is not scientifically defensible and fails to provide the required information necessary to justify the imposition of the stringent sediment reduction requirements. The use impairment observed in Indian Creek was determined from measurements of benthic macroinvertebrate index of biological integrity (IBI) scores. The threshold for impairment is an IBI score of 50. The score measured in Indian Creek was 30.3. The cause of this impairment was attributed to sediment load. Sediment load is related to this measure of impairment through the process of siltation.

> Siltation – aggradation of sediments or soils in excess of what the stream channel can transport. *Results in smothering of streambed habitat for macroinvertebrates and fishes* (PADEP, 2015). (Draft TMDL at 7) (Emphasis added)

The EPA analysis is based on an implicit assumption that the *existing* impairment is caused by the *existing* sediment load. This is not correct and, in any event is nowhere demonstrated to be accurate with the type of objective scientific information needed to reach this conclusion. Once excessive siltation occurs, aquatic life uses become impaired as discussed above. This condition does not disappear when sediment loads are reduced. Consequently, even if the current sediment loads are reduced to the reference watershed loads presented in the Draft TMDL, aquatic life uses will not be restored because the load reduction will not eliminate the existing smothered conditions present in Indian Creek. As discussed, once siltation occurs, it remains in place. The TMDL does nothing to address the existing smothered conditions. Consequently, the TMDL cannot restore aquatic life uses.

Moreover, the TMDL is expressed as annual load. (Draft TMDL at 11) No monitoring, documentation, or analyses show that the impaired conditions observed in Indian Creek are in response to annual sediment loads. The TMDL analysis based on annual sediment load implies that sediment loads throughout the year and from all the various sources identified in Table 5-4 (Draft TMDL at 36) contribute in a significant way to the embeddedness and

sediment deposition in the stream. Alternatively, all significant sediment deposition and embeddedness of the stream could have been caused by one or several large storm events. The response in Indian Creek could be attributed entirely to the fact that the stream is significantly incised in comparison with the reference stream. The deep channels in the Indian Creek watershed allow excessive streambank erosion to occur in response to large storm events. If this is the case, load limits on other sediment sources are unnecessary.

- Draft TMDL Evaluations Not Supported by Site-Specific Data

The Draft TMDL assumes that the observed use impairment is related to the current sediment load, as estimated using the GWLF watershed model, which presented sediment loads as annual averages. However, no data are presented to show that the observed smothered conditions were caused by the current loads or that the current annual average load is the appropriate metric for sediment-related impairments. No data are presented to show that the smothered conditions are related to annual loads as opposed to individual storm events that naturally cause stream bank scouring.

The analysis does not indicate the instream concentration of pollutants that is needed to protect the use – and therefore does not properly implement the applicable state narrative criteria which is based on concentration – not load.

The GWLF model was used to determine existing sediment loads for the Indian Creek and Birch Run watersheds as the basis for establishing load reduction requirements for Indian Creek. However, the model results were not compared against any site-specific data for model calibration or validation. This assumes that the model and model inputs are accurate while providing no objective means to assess the accuracy compared to actual conditions. As such, there is no assurance that the modeled sediment loads or Draft TMDL target are accurate, and accordingly, no claim can be made that the Draft TMDL target is necessary or able to restore uses, as required by law.

This concern regarding the lack of any site-specific data to validate the GWLF model predictions is further heightened by the fact that sediment reductions were based on the GWLF model instead of using the enhanced version of this model (GWLF-E), which is supported in EPA's BASINS framework. The GWLF-E model includes substantial enhancements in comparison with its predecessor, GWLF, with regard to evaluating pollutant loads from urban environments and streambank erosion. We understand that in other nearby watersheds, when the results from the GWLF model are compared with the results using GWLF-E, significantly lower sediment loads are estimated. Without any site-specific data we have no way of knowing which of these estimates is more accurate. Moreover, if the new and improved watershed model predicts lower sediment loads, EPA cannot claim that the sediment load reductions predicted using the GWLF model are necessary to restore designated uses.

The Draft TMDL relies upon the GWLF model to estimate runoff and sediment loads entering Indian Creek and Birch Run. The model uses landscape conditions, daily precipitation data and streamflow data as required inputs. (See, Draft TMDL at 22 et seq.) The accuracy of the model depends substantially on the accuracy of these data. As discussed in the TMDL, streamflow data are not available for either Indian Creek or Birch Run, so the TMDL used data from gauges on downstream waterways to calibrate the model. There is no discussion regarding how the gauge data were used. Presumably the measured flow was scaled by drainage area ratio to develop a surrogate stream flow to develop a water balance. Whether this approach is appropriate depends upon a comparison of the gauged watershed characteristics with the ungagged watershed characteristics. No comparison was presented, so there is no confidence that the calibration is appropriate. However, if the flow data from the USGS gauges are evaluated for the period of record (1997 – 2004), the overall average flow for the East Branch Perkiomen Creek near Schwenksville, PA (drainage area 58.7 square miles, representing Indian Creek) is 126.3 cfs. The corresponding overall average flow for Indian Creek near Phoenixville, PA (drainage area 59.1 square miles, representing Birch Run) is only 89.0 cfs. Thus, the stream flow in the Perkiomen Creek drainage area is 42% greater than the flow in the French Creek drainage area. This naturally higher flow has repercussions on the assimilative capacity of the stream that were not addressed in the Draft TMDL.

Rainfall data for the period from 1997 to 2004 were used as the basis for estimating annual average sediment load. This period included Hurricane Floyd (September 1999) which, at the time, broke Philadelphia's record for single calendar day precipitation total (6.63").[1] This catastrophic event must have been associated with extreme streambank erosion and extreme sedimentation which could not be avoided, even if appropriate stormwater controls were in place. We note that prior to this storm, Indian Creek was listed as impaired due to unknown causes and then subsequently identified as impaired due to siltation in 2004 (Draft TMDL at 2). Given the severity of Hurricane Floyd, it is likely that much of the observed siltation was caused by that one event. If this is the case, the TMDL cannot restore aquatic life uses because the impairment was caused by uncontrollable, natural conditions – which EPA is not authorized to regulate under the Act and does not constitute a violation of state narrative standards.

Finally, although EPA considers the variability in the flow calibration for the GWLF model to be reasonable (Draft TMDL at 30), a cursory review of Figure 4-5 suggests that the model is not sufficiently calibrated and the sediment loading estimates are unreliable. The model simulations tend to severely overestimate peak flows, even as monthly totals. Figure 4-5 shows that the model over-predicts flow in Indian Creek by a factor of two or more for

[1] NOAA National Hurricane Center. November 18, 1999. Updated September 9, 2014. Preliminary Report – Hurricane Floyd, 7-17 September, 1999. http://www.nhc.noaa.gov/data/tcr/AL081999_Floyd.pdf

September 1999 and July 2004. This over-prediction would include a substantial streambank erosion load which would not occur if the model was better calibrated.

- Reference Station Not Suitable for Comparison with Indian Creek Watershed

As described in the Draft TMDL, the purpose of this work is to establish a watershed-based TMDL for sediment to address the sediment impairments in Indian Creek. This Draft TMDL represents an effort to identify sources of sediment and quantify existing sediment loadings in the Indian Creek watershed. (Draft TMDL at 3) These loadings were then compared with sediment loadings from a reference watershed to develop the allowable loading rates to protect designated uses in Indian Creek. (Draft TMDL at 7, 10)

> A reference watershed approach is used to estimate the *necessary pollutant load* reductions that are *needed* in Indian Creek to restore a healthy aquatic community and allow the streams in the watershed *to achieve their designated uses*. The reference watershed approach analyzes the current loading rates for the pollutants of interest from a selected unimpaired watershed that has *similar physical and ecological characteristics* to those of the impaired watershed. (Draft TMDL at 10) (Emphasis added)

EPA selected Birch Run as the reference station and determined the sediment loadings for this watershed as the threshold for Indian Creek to achieve its designated use for aquatic life. The use of Birch Run, as the reference watershed upon which the Indian Creek Watershed TMDL is based, is inappropriate for a number of reasons. First, Birch Run is classified as an Exceptional Value stream that far exceeds the requirements <u>needed</u> to achieve designated uses in Indian Creek. In addition, Birch Run and its watershed is fundamentally different from Indian Creek and its watershed. These differences make the use of Birch Run as a reference watershed inappropriate. Moreover, the physical characteristics of Indian Creek suggest that implementation of this TMDL cannot restore designated uses.

Birch Run, the Draft TMDL reference watershed, is classified as a Special Protection Waters - Exceptional Value.[2] This designation is applied to the highest quality waters in Pennsylvania. This watershed was selected because of its similar physical and ecological characteristics, and because Birch Run is not impaired for its aquatic life designated use based on its benthic macroinvertebrate IBI score.

> On April 26, 2012, PADEP conducted benthic macroinvertebrate sampling and found that Birch Run had a benthic macroinvertebrate index of biological integrity score of 74.6 out of a possible 100, where the impairment threshold score is 50.

[2] Chester County, PA Waters - Protected Uses Map 1 - Special Protection Waters - March 13, 2015. http://www.chesco.org/DocumentCenter/View/17339

> This score of 74.6 indicates that Birch Run is attaining the aquatic life use. (Draft TMDL at 11)

Assuming, arguendo, that the Draft TMDL is correct and that the proposed reduction in sediment load will restore aquatic life designated uses, EPA has not demonstrated why a load reduction to achieve a sediment load equivalent to Birch Run is needed to achieve the designated use. The sediment loads in Birch Run support a benthic invertebrate IBI score of 74.6, but only a score above 50 is needed to achieve the aquatic life designated use. The use of Birch Run as a reference watershed results in load targets that match the State's highest quality waters, far exceeding the applicable TMDL regulations requiring the establishment of pollutant reductions "needed to restore a healthy aquatic community and allow Indian Creek to achieve its designated uses." (Draft TMDL at 10). EPA's selection of Birch Run as the reference water is arbitrary and capricious because the Agency has not shown that the significant reduction in sediment loads is necessary to achieve a benthic macroinvertebrate IBI score of 50, which demonstrates aquatic life use attainment.

In selecting Birch Run as the reference watershed for the Indian Creek Watershed Sediment TMDL, EPA claimed that both watersheds share similar characteristics. (Draft TMDL at 11) Then, EPA conducted modeling to estimate the annual loading rate of sediment using daily precipitation records to simulate runoff and calculate flow in the stream and its tributaries. (Draft TMDL at 21)

The calculated flows are the primary drivers of sediment load entering the streams. A comparison of the two watersheds, as presented in Appendix A of the Draft TMDL, shows that the Indian Creek watershed is elongated with numerous tributaries entering the main stem of Indian Creek (See, Draft TMDL Figure A at 46). The Birch Run watershed is broader, with fewer tributaries and more surface area contributing to the channels (See, Draft TMDL Figure B at 47). This difference in watershed configurations results in Indian Creek flows being flashier in response to a given storm event (naturally allowing higher stream bank erosion) as compared to flows in Birch Run because runoff and infiltration have less of a distance to travel before reaching the stream channel. This flashiness predisposes Indian Creek to greater sediment loads and makes the use of Birch Run as a reference watershed inappropriate. Moreover, as noted earlier, the average flow within the East Branch Perkiomen Creek drainage area is 42% greater than the corresponding flow within the French Creek drainage area. This difference in base flow indicates that Birch Run is not appropriate as a reference stream for determining the necessary sediment load in Indian Creek.

Channel and streambank erosion represent a substantial nonpoint source of sediment to Indian Creek. (Draft TMDL at 19) The estimated sediment load from streambank erosion for Indian Creek is estimated at 1,283 tons/year. (Draft TMDL Table 5-4 at 36) This amount of sediment is 30% of the entire annual sediment load predicted for Indian Creek and nearly 90% of the entire annual sediment load predicted for Birch Run. This source of sediment load

to the stream is associated with high flow conditions and is event driven – streambank erosion contributes very little load under lower flow conditions but contributes very high loads in response to periodic high flow conditions (which elevate depth of flow and contact with stream bank). Consequently, the effect of this sediment load is magnified because the majority of it is contributed over a very short period of time. Given the large amount of sediment contributed by streambank erosion to Indian Creek, the impairment observed could be entirely attributed to single storm events that transfer sediment from the bank to the channel, smothering it. These would be natural conditions that may not be regulated under the Act. Moreover, streambank erosion is not a point source that may be regulated in any event.

The factors that influence streambank erosion are discussed in the Draft TMDL and include total length of the natural stream channel and mean stream channel depth. (TMDL at 29) Although the Indian Creek and Birch Run watersheds are relatively similar in terms of the watershed characteristics summarized in Table 2-1 and 2-2 of the Draft TMDL (at 13), they are very different with respect to the factors that influence streambank erosion (Draft TMDL Table 5-1 at 34). A comparison of these factors is presented in Table 1.

Table 1 – Streambank Erosion Characteristics

Characteristic	Indian Creek Watershed	Birch Run Watershed
Area of Watershed	4,480 acres	4,187 acres
Length of Stream Channel	31,249 meters	15,400 meters
Mean Stream Channel Depth	1.50 meters	0.66 meters

As illustrated in Table 1, the Indian Creek watershed is characterized with double the length of stream channel within the same watershed area in comparison with Birch Run. Additionally, the mean stream channel depth for Indian Creek is nearly three times the depth of Birch Run. These physical factors magnify the natural contribution of streambank erosion sediment loads to Indian Creek and make Birch Run inappropriate as a reference stream.

Based on the issues identified in the comments above, EPA needs to reassess whether sediment load reductions are capable of restoring aquatic life uses to streams that have already experienced use impairment due to siltation. If EPA is able to confirm that the current approach is necessary, we urge EPA to re-evaluate the sediment load entering Indian Creek using the most up-to-date modeling approach and confirm that the results are reasonable by comparison with site-specific data. This evaluation should specifically include an evaluation showing the effect of large storms on sedimentation and the feasibility of mitigating such events. Finally, if EPA is able to confirm that the modeling analysis yields reasonable results in comparison with sit-specific data, and sediment control will restore aquatic life uses, the Agency must identify an

appropriate reference stream that is comparable to Indian Creek and achieves the macroinvertebrate IBI metric with a small probability of over-protection.

We appreciate your attention on this matter. If you have any questions or concerns regarding these comments, please contact us.

Respectfully,

/s/ *William T. Hall*
William T. Hall
Associate

cc: Mark Fournier
John Hall
Ben Kirby