

## **APPENDIX B**

### **Justification for Use of Category 4b Alternative(s) Pickerington Waste Water Treatment Plant**

### **Problem causing the impairment.<sup>1</sup>**

The Ohio Environmental Protection Agency (Ohio EPA) measured the water quality in the Walnut Creek watershed in 2005, collecting biological, chemical and physical data. Impairment of biological water quality standards (OAC 3745-1-07) was measured at six sites on Sycamore Creek, a tributary to Walnut Creek.

Three sites in Sycamore Creek met the biological criteria and three did not. The most upstream site (river miles (RM) 12.2) was impaired due to organic enrichment (probably due to septic systems), then two sites (RMs 9.6 and 4.7) met the criteria. The next two sites (RM 4.18 (Hill Road) and 2.6 (Busey Road) partially met the criteria. The stream recovered to fully meet the criteria at the most downstream site (RM 0.2).

The City of Pickerington wastewater treatment plant (WWTP) discharges to Sycamore Creek at RM 4.35. No impairment to Sycamore Creek immediately upstream of Pickerington or downstream of RM 2.6 was measured. The biological impairment is resulting from the Pickerington WWTP effluent discharge.

The site at RM 4.18 only partially met the WWH biological criteria. The fish community was in very good condition while qualitative invertebrate sampling revealed a low-fair community. This is likely caused by the proximity of the Pickerington WWTP to this sampling station and documented chronic toxicity of effluent to *Ceriodaphnia* (Ohio EPA, 2006, Bioassay Report 06-3447-C). Both fish and invertebrate communities improved at Sycamore Creek sites downstream of RM 4.18.

The chemical water quality criterion for total dissolved solids (1500 mg/l) was exceeded in Sycamore Creek downstream of the Pickerington WWTP (2110, 1950, 1710 mg/l).

### **Link between the source of the problem and the specific listed impairments**

High total dissolved solids (TDS) concentrations result from the Pickerington WWTP discharge. The WWTP accepts a waste stream from the Pickerington water treatment facility which uses a Zeolite process to treat drinking water. This process creates a wastewater high in dissolved solids which the WWTP does not effectively treat. This high dissolved solids waste gets passed through the WWTP and into Sycamore Creek.

Bioassay testing results on the Pickerington effluent and mixing zone have confirmed TDS-related impairment to the invertebrate community as well by demonstrating negative effects (immotility, death) to *Ceriodaphnia*. Mayfly populations found downstream of the WWTP are impaired revealing only 2 mayfly taxa (compared with 8 found upstream of the discharge point) plus a variety of TDS tolerant and facultative invertebrates as well. The two sites upstream and the site at the mouth were in full attainment of WWH biological standards with moderately good (qualitative assessments at RM 9.6 and 4.7) to exceptional (ICI=50 at RM 0.2) communities of invertebrates.

Low fish MIWB scores found at RM 2.6 provide further evidence of a problem with excessive TDS instream contributing to reduced numbers of fish.

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<sup>1</sup> The City of Pickerington disputes these results and has retained a consultant to resample the area; results of the study have not been submitted to Ohio EPA for review as of February 1, 2010.

Further information regarding the 2005 findings is available in the Biological and Water Quality Study of Walnut Creek and Select Tributaries 2005, available on Ohio EPA web site (<http://www.epa.ohio.gov/portals/35/documents/WalnutCreek2005TSD.pdf>).

Ohio EPA included total dissolved solids for this assessment unit in the 2008 Integrated Report (303(d) list), available at (<http://www.epa.ohio.gov/dsw/tmdl/2008IntReport/2008OhioIntegratedReport.aspx>).

**Description of pollution controls and how they will achieve water quality standards**

The City of Pickerington operates a sewer collection system and a wastewater treatment facility and is regulated under a National Pollutant Discharge Elimination System (NPDES) permit (4PB00017\*LD).

The existing Pickerington wastewater plant has an average daily design flow of 1.6 MGD (million gallons per day). Pickerington is expanding its wastewater plant to an average design flow of 3.2 MGD to accommodate new development within its service area. Along with other improvements, for solids handling the City will construct two new aerobic digesters and new sludge drying beds for storage.

The permit requires the development of a method to control discharges of elevated dissolved solids. Both interim and final effluent concentrations of dissolved solids are present in the permit (calculated by wasteload allocation) which should serve to ameliorate the violations of the WQS in Sycamore Creek (see NPDES permit Fact Sheet for the Pickerington WWTP, attached)

**Point and nonpoint source loadings that will achieve water quality standards.**

The allowable loading is based on the beneficial uses assigned to the receiving waterbody in OAC 3745-1. Dischargers are allocated pollutant loadings/concentrations based on the Ohio Water Quality Standards (OAC 3745-1). TDS was allocated using the mass-balance method, using the following general equation:

$$\text{Discharger WLA} = \frac{[(\text{downstream flow} \times \text{WQS}) - (\text{upstream flow} \times \text{background concentration})]}{\text{discharge flow}}$$

See the attached permit fact sheet for details.

The continuous discharge from the WWTP into Sycamore Creek at low stream flows during the summer represent the critical condition for the aquatic ecosystem. The WLA calculation accounts for the nonpoint source load in the equation. See the attached permit fact sheet for details.

<i>All loads in kg/d</i>	Existing WWTP Flow	Expanded WWTP Flow
TMDL	11,022	20,433
LA	666	666
WLA	10,356	19,767

**An estimate or projection of the time when WQS will be met**

The NPDES permit requires the City of Pickerington to meet the final effluent limitations in the permit within 25 months of the effective date of the permit (in 2010). WQS should be met soon after as macroinvertebrates can recover quickly (6 months to a year) once the stressor is removed.

**Schedule for implementing pollution controls**

Reference the NPDES permit for scheduling information (attached).

**Monitoring plan to track effectiveness of pollution controls**

The City of Pickerington WWTP is required to submit monthly Discharge Monitoring Reports for effluent quality from the WWTP and upstream and downstream of their discharge point.

The permit requires 24-hour composite sampling for TDS of the WWTP effluent, to be completed three times per week year-round. In addition, the WWTP will collect an ambient grab sample for TDS is collected at sites both upstream and downstream of the discharge into Sycamore Creek (they will use a laboratory of their choice).

The facility's monthly discharge monitoring reports are reviewed by permit staff in Ohio EPA's Central District Office. Ohio EPA staff will also conduct unannounced facility inspections until all identified operational and process changes have been completed.

Water chemistry and macroinvertebrate community health will be monitored following the construction and new plant start up. After the Pickerington WWTP improvements have been in place for at least one year, Ohio EPA will return to monitor Sycamore Creek to determine if progress toward meeting the Aquatic Life Use is being made. This work would follow Ohio EPA's protocol for sampling the aquatic biology and chemistry. If sufficient progress is not being made, Ohio EPA will evaluate the options available under NPDES authority, including operations assistance and enforcement.

Ohio EPA will report progress in its Integrated Report until the impairment has been eliminated.

**Future monitoring**

City of Pickerington (far field monitoring for TDS in the NPDES permit, analysis by a laboratory of their choice) and Ohio EPA DSW, CDO WQ (chemistry, with analysis by Ohio EPA DES) and EAS (macroinvertebrates).

**Cost estimates**

Five work days for two people to sample chemistry, 1 work day for two people to do qualitative macroinvertebrate monitoring, and the associated standard lab costs for TDS samples.

**Analysis of the results and annual reporting**

Ohio EPA, CDO, DSW WQ staff will examine both data from Ohio EPA sampling and that generated by Pickerington. EAS macroinvertebrate staff will analyze their own data. Ohio EPA CDO staff will all of the reporting necessary for this 4B.

**Revising the implementation strategy and corresponding pollution controls**

The CDO surface water manager will initiate a reexamination of the implementation strategy if significant progress is not being made by the end of the next NPDES permit cycle for Pickerington.