

Rejustification of the Stream Classification for the Unnamed Tributary  
to Schoolhouse Creek

The continuous intermediate aquatic life classification of the spring flowing into Schoolhouse Creek at Fairchild encompasses a distance of about 150 feet. This classification was conducted during a time of low flow when the spring might more accurately be described as a seep. A fill and draw study conducted in November 1978 documented the spring flow to be 0.036 cfs. While in fact, the quantity of water would limit biological development, the classification is based upon the quality of the water present. The stream has a naturally high iron content. The growth of iron bacteria has flourished to an extent that the flow in the channel has been limited to a small trickle of water that passes through the bacterial filaments. This is not a condition conducive to high quality fish and aquatic life.

drop  
delete

## Stream Classification Worksheet

Receiving Watercourse: Unnamed Tributary to Schoolhouse Creek.

District: West Central.

Location: Section 2, T24N, R5W.

Drainage Basin: Lower Chippewa River.

Discharger: Fairchild STP.

Classification Recommendation: It is recommended that the unnamed tributary to Schoolhouse Creek be classified as follows:

- 1) Effluent ditch - from the Fairchild outfall pipe to the marsh at the railroad grade.
- 2) Wetlands - marsh area.
- 3) Noncontinuous, intermediate - water along the railroad grade from the wetland to the point of spring emergence.
- 4) Continuous, intermediate - from the spring to Schoolhouse Creek.

### Physical Characteristics:

Land Use: Agriculture and forest.

Q<sub>7,10</sub>: 0 cfs.

Design Flow: 0.06 mgd.

Biological Features: No information available.

CHEMICAL DATA FOR THE SCHOOLHOUSE TRIBUTARY

<u>Site Description and Date</u>	<u>Temp. (°C)</u>	<u>D.O. (mg/l)</u>	<u>pH (s.u.)</u>	<u>BOD<sub>5</sub> (mg/l)</u>	<u>Fecal Coliform (MFFCC 100 ml)</u>	<u>Total Org.-N (mg/l)</u>	<u>NH<sub>3</sub>-N (mg/l)</u>	<u>Total Alkalinity (mg/l)</u>
Above pothole (marsh)- 4/18/77	20.2	6.7	6.7			4.4	7.0	36
Below pothole (marsh)- 4/18/77	22.7	12.4	7.2			5.7	3.5	20
Spring Discharge 11/8/78	7.5	8.6	6.4	2.1			0.03	
At STH "10/12" (R.M. 0)								
1/14/74	-	9.1	6.4	3.4		20		
6/3/74	13	6.4	6.9	11.0		920		
7/8/74	16	7.6	6.1	0.6		10		
8/7/74	21	7.3	6.5	0.9		10		

WATER QUALITY STANDARDS REVIEW FOR  
AN INTERMITTENT TRIBUTARY TO  
SCHOOLHOUSE CREEK NEAR  
FAIRCHILD WISCONSIN

January 13, 1993

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This stream was originally classified by for effluent limits development in 1977. At the time, the Fairchild stabilization lagoons discharged to the tributary. The effluent was subsequently routed to seepage cells. There has not been a discharge to the tributary for many years. The tributary was inspected again on 11-10-92 in response to a request for effluent limits for facility planning.

#### DESCRIPTION

Currently the tributary has intermittent flow during runoff events only. The 1977 evaluation reported a seep providing continuous flow (0.036 cfs) in the last 150 feet of the tributary. During the 1992 evaluation, runoff from a rain event was sustaining a small flow in the entire tributary so that the seep identified in 1977 could not be readily found. However, a clay seam in the stream bank near the stream bed was located in the spot identified as the seep location in 1977.

The small grass and shrub wetland (about one half acre in size) west of the railroad tracks reported in 1977 is still present. At the time of the inspection, it was about 1/3 open water. The topography suggests that the small wetland was once part of a wetland drainage that began south of the WWTP and flowed north to Schoolhouse Creek. The railroad tracks appear to have been laid on top of the wetland, eliminating the middle portion and cutting the northern end into a small western portion and a larger eastern portion. Drainage from the south was routed along the west side of the tracks via a constructed drainage ditch through the western wetland to Schoolhouse Creek. The wetland east of the railroad bed drains to Schoolhouse Creek via a separate route. The dominant vegetation in the western wetland was reed canary grass with some alder shrubs. The eastern wetland was predominately a wet sedge meadow near the railroad tracks.

The land between the WWTP and the grass and shrub wetland west of the railroad tracks is a maple forest wetland with birch, popple and oak in high spots. Portions of the flow channel from the former stabilization lagoon outfall through this forest wetland has been lost to vegetative encroachment.

#### BIOLOGY

Aquatic habitat in the drainage way adjacent to the railroad bed was rated as poor due primarily to the lack of continuous flow. An attempt to find macroinvertebrates in the tributary was made at two spots. No invertebrates were found in the a riffle in the drainage east of the WWTP at the base of the railroad bed. Inspection of the tributary near the mouth, below the reported seep, found one Odonata and one Dipteran. It was concluded that the tributary supported no significant aquatic community due to lack of flow. If the seep

reported to exist near the tributary mouth still flows, it is apparently insufficient to support a significant aquatic community.

#### RECOMMENDED Ch. NR 104 CLASSIFICATION

Under existing conditions, the tributary and wetland should be classified limited aquatic life (marginal surface water). This is a lower classification than that given in 1977. The 1977 classification was apparently based on a Department policy that any stream with continuously flowing water, no matter how small, was considered suitable for sustaining an intermediate aquatic life classification. Since that time, new Department procedures have been developed which have more flexibility on minimum flow and stream classifications. The biology of the stream indicates that the current flow regime supports essentially no aquatic life, and therefore the limited aquatic life classification is warranted.

#### EFFECT OF ADDITIONAL FLOW

In 1977 the effluent was discharged at a rate of 0.1 mgd. During dry conditions it was observed to seep to groundwater prior to reaching the grass and shrub wetland west of the railroad bed. The proposed dry weather design flow for the Fairchild facility plan is 0.086 mgd. The reason for the flow reduction between 1977 and 1992 is improvements in exclusion of infiltration and inflow in the collection system, which is in a high groundwater area. The current design flow still includes a substantial infiltration and inflow component. It is reasonable to assume that a discharge of 0.086 mgd to the intermittent streams north or east of the existing WWTP would likely continue to seep to groundwater quickly under low flow conditions. The stream classification for the tributary should therefore not change with the addition of 0.086 mgd of wastewater.

The effluent could reach Schoolhouse Creek under runoff conditions, such as existed on 11-10-92. Due to the prevalence of riparian wetlands in the watershed, the stream hydrograph for a runoff event would likely include an extended period of increased flow. This additional flow would increase the assimilative capacity of Schoolhouse Creek. An indication of the magnitude of this effect can be gained by examining the sample results from a discharge on 4/18/77. A decrease in ammonia nitrogen from 7 to 3.5 mg/l was documented as the effluent flowed through the wetland west of the railroad bed. Alkalinity decreased from 36 to 20 mg/l, which is the concentration reported in the groundwater at the Fairchild village well. Dissolved oxygen also improved in the reach.

#### APPLICABLE STANDARDS FOR A CONTINUOUS DISCHARGE

Discharge to any of the wetlands or channels near the existing lagoons. The appropriate surface water standards for a discharge at this location would be those associated with a classification of limited aquatic life. A discharge near the lagoons would seep to groundwater during low flow periods. The requirements of Ch. NR 140, Wisconsin Administrative Code, would therefore have to be met as well as surface water standards. During high flow some of the wastewater would reach Schoolhouse Creek along with substantial additional surface runoff water. At the proposed discharge rate and level of treatment

associated with a limited aquatic life stream classification, this should not cause a problem with compliance with surface water standards in the creek with the possible exception of fecal coliforms.

Discharge to Schoolhouse Creek above Fairchild Pond. Schoolhouse Creek is listed as a Class II trout stream above Fairchild Pond. *Wisconsin Trout Streams (DNR 1980)* lists the creek as Schoolhouse Creek in Eau Claire County and as Creek 2-5A in Jackson County. Discharges to Schoolhouse Creek above Fairchild Pond should therefore meet surface water standards associated with a classification of a cold water community. Ch. NR 140 need not be applied since groundwater will not be affected.

Discharge to Schoolhouse Creek immediately below Fairchild Pond. The appropriate classification for this location is warmwater sport fish community. Ch. NR 140 standards need not be applied to discharges at this site.

NR 103 Wetlands Standards. Discharge from the lagoons near the former outfall location would route the effluent through wetlands. The discharge will have, at a minimum, a hydrologic impact on the wetlands. Effluent nitrogen and phosphorus may further alter the nature of the wetlands. These alterations will be similar to past impacts experienced by the wetlands. The discharge to the wetlands is not a "water dependant" activity for the purposes of applying Ch. NR 103 and alternatives exist. Pursuant to Ch. NR 103, a discharge to the wetlands near the existing lagoons cannot be allowed until it is determined that no practical alternative discharge locations exist. The facility plan will provide a basis for evaluating the practicality of the alternatives. If the Department-approved facility plan selects a discharge to the wetlands as the only practical alternative, the Department should specify the placement of the outfall structure and routing of the effluent to minimize impact on the wetlands.

#### NEED FOR DISINFECTION

Full body contact recreational use is not expected to occur in the wetland near the existing WWTP. It would be possible in Schoolhouse Creek and would be likely in Fairchild Pond. During runoff periods, the effluent would be expected to reach Schoolhouse Creek. While the additional flow during these times would likely be adequate to assimilate the BOD<sub>5</sub> and ammonia in the wastewater, it may not be adequate to prevent the effluent from causing State guidelines for fecal coliform bacteria to be exceeded in Schoolhouse Creek and Fairchild Pond unless effluent disinfection is provided. Therefore, effluent disinfection should be required for discharge to the wetlands. Due to the potential for full body contact recreational use in Schoolhouse Creek and Fairchild Pond, discharges to the creek would also need to be disinfected.

M:WP\fairchil.rpt

Fairchil  
(BM 1080)

AND

Park

(H)

House  
135900  
1060

1062

1047

1050

Remains of  
Drainage Ditches

Inverts

Spring?

West  
wetland

Maple wetland  
forest with birch,  
poplar oak on high spots

old cutfall line in  
raised dike

NORTH WESTERN

East  
wetland

Waste Disposal  
Ponds

1067

no  
inverts

136400



Stream Trib to Schoolhouse Creek Reach Location Vic of Fairchild WWTP Lagoons Reach Score/Rating POOR  
 County Jackson Date 11-10-92 Evaluator Laliberte Classification \_\_\_\_\_

Rating Item	Category			
	Excellent	Good	Fair	Poor
Watershed Erosion	No evidence of significant erosion. Stable forest or grass land. Little potential for future erosion. <u>8</u>	Some erosion evident. No significant "raw" areas. Good land mgmt. practices in area. Low potential for significant erosion. 10	Moderate erosion evident. Erosion from heavy storm events obvious. Some "raw" areas. Potential for significant erosion. 14	Heavy erosion evident. Probable erosion from any run off. 16
Watershed Nonpoint Source	No evidence of significant source. Little potential for future problem. 8	Some potential sources (roads, urban area, farm fields). <u>10</u>	Moderate sources (small wetlands, tile fields, urban area, intense agriculture). 14	Obvious sources (major wetland drainage, high use urban or industrial area, feed lots, impoundment). 16
Bank Erosion, Failure	No evidence of significant erosion or bank failure. Little potential for future problem. <u>4</u>	Infrequent, small areas, mostly healed over. Some potential in extreme floods. 8	Moderate frequency and size. Some "raw" spots. Erosion potential during high flow. 16	Many eroded areas. "Raw" areas frequent along straight sections and bends. 20
Bank Vegetative Protection	90% plant density. Diverse trees, shrubs, grass. Plants healthy with apparently good root system. <u>6</u>	70-90% density. Fewer plant species. A few barren or thin areas. Vegetation appears generally healthy. 9	50-70% density. Dominated by grass, sparse trees and shrubs. Plant types and conditions suggest poorer soil binding. 15	<50% density. Many raw areas. Thin grass, few if any trees and shrubs. 18
Lower Bank Channel Capacity <i>Channelized</i>	Ample for present peak flow plus some increase. Peak flow contained. W/D ratio <7. 8	Adequate. Overbank flows rare. W/D ratio 8-15. 10	Barely contains present peaks. Occasional overbank flow. W/D ratio 15-25. <u>12</u>	Inadequate, overbank flow common. W/D ratio >25. 14
Lower Bank Deposition	Little or no enlargement of channel or point bars. 6	Some new increase in bar formation, mostly from coarse gravel. 9	Moderate deposition of new gravel and coarse sand on old and some new bars. <u>15</u>	Heavy deposits of fine material, increased bar development. 18
Bottom Scouring and Deposition	Less than 5% of the bottom affected by scouring and deposition. 4	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools. 8	30-50% affected. Deposits and scour at obstructions, constrictions and bends. Some filling of pools. 16	More than 50% of the bottom changing nearly year long. Pools almost absent due to deposition. <u>20</u>
Bottom Substrate/ Available Cover	Greater than 50% rubble, gravel or other stable habitat. 2	30-50% rubble, gravel or other stable habitat. Adequate habitat. 7	10-30% rubble, gravel or other stable habitat. Habitat availability less than desirable. 17	Less than 10% rubble gravel or other stable habitat. Lack of habitat is obvious. <u>22</u>
Avg. Depth Riffles and Runs	Cold >1' 0 Warm >1.5' 0	6" to 1' 6 10" to 1.5' 6	3" to 6" 18 6" to 10" 18	<3" 24 <6" 24
Avg. Depth of Pools	Cold >4' 0 Warm >5' 0	3' to 4' 6 4' to 5' 6	2' to 3' 18 3' to 4' 18	<2' 24 <3' 24
Flow, at Rep. Low Flow	Cold >2 cfs 0 Warm >5 cfs 0	1-2 cfs 6 2-5 cfs 6	.5-1 cfs 18 1-2 cfs 18	<.5 cfs 24 <1 cfs 24
Pool/Riffle, Run/Bend Ratio (distance between riffles ÷ stream width)	5-7. Variety of habitat. Deep riffles and pools. 4	7-15. Adequate depth in pools and riffles. Bends provide habitat. 8	15-25. Occasional riffle or bend. Bottom contours provide some habitat. 16	>25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat. <u>20</u>
Aesthetics	Wilderness characteristics, outstanding natural beauty. Usually wooded or un-pastured corridor. 8	High natural beauty. Trees, historic site. Some development may be visible. 10	Common setting, not offensive. Developed but uncluttered area. <u>14</u>	Stream does not enhance aesthetics. Condition of stream is offensive. 16

Column Totals: \_\_\_\_\_

Column Scores E \_\_\_\_\_ + G \_\_\_\_\_ + F \_\_\_\_\_ + P \_\_\_\_\_ = 203 = Score

<70 = Excellent, 71-129 = Good, 130-200 = Fair, >200 = Poor



## Wisconsin Department of Natural Resources

RAPID ASSESSMENT METHODOLOGY FOR EVALUATING  
WETLAND FUNCTIONAL VALUES

## GENERAL INFORMATION

Name of Wetland/Owner:	Project: Fairchild WWTP
Location: ¼, ¼, Section, Township, Range	11W, 11N, 52, 24N, 5W
Evaluator(s)	P. LaLiberte
Date(s)	11-10-92

Description of seasonality limitations of this inspection due to time of year of the evaluation and/or current hydrologic and climatologic conditions (e.g. after heavy rains, snow or ice cover, during drought year, during spring flood, during bird migration):

Wet Season Inspection - conditions likely different during dry season

## SUMMARY OF FUNCTIONAL VALUES

Based on the results of the attached functional assessment, rate the significance of each of the functional values for the subject wetland and check the appropriate box.

Function	Significance				
	Low	Medium	High	Exceptional	N/A
Flood Storage	X				
Water Quality			X		
Groundwater	X	seasonal X			
Shoreline Protection					X
Habitat		X			
Floral Diversity	X				
Aesthetics/Recreation	X				

List any Special Features/ Red Flags:

Filters water to a trout stream

# SITE DESCRIPTION

## I. GENERAL DESCRIPTION

- A. Wisconsin Wetlands Inventory delineation: \_\_\_\_\_
- B. Wetland Type (shallow marsh, sedge meadow, etc.): shallow marsh / grass / shrub meadow
- C. Estimated size of wetland in acres: 12 acres
- D. Estimated size of wetland watershed in acres: 80 acres

## II. HYDROLOGIC CONDITIONS

A. Hydrologic Setting (primary water source). Check all that apply:

Surface Water Depression  
(input=overland flow and precipitation)

Surface Water Slope/Riverine or Lacustrine perched  
(input=overland flow and flood)

Groundwater Depression  
(input=groundwater discharge)

Groundwater Slope/Flow Through  
(input=groundwater flow through)

B. Y N Does the wetland have standing water, and if so what is the average depth? 1' Approximately how much of the wetland is inundated? 33%

C. Y N Is there any field evidence of wetland hydrology such as buttressed tree trunks, adventitious roots, drift lines, water stained leaves, soil mottling/gleying, organic soils, histic epipedon (circle those that apply)?

D.  N Has the wetland hydrology been altered by ditching, tiles, dams, culverts, well pumping, diversion of surface flow, or changes to runoff within the watershed (circle those that apply)?

E.  N Does the wetland have an inlet, outlet, or both (circle those that apply)?

F. How is the hydroperiod (seasonal water level pattern) of the wetland classified?

- 1. Flooded
  - permanently
  - intermittently exposed (only dry in drought years) unknown
  - semi-permanently (through growing season)
  - seasonally (water absent at end of growing season)
  - temporarily (brief periods during growing season)
  - intermittently (no seasonal pattern to flooding)

2. Saturated (surface water seldom present)

- 3. Artificial Conditions
  - artificially flooded
  - artificially drained

G. Y N Is the wetland a navigable body of water? List any surface waters associated with the wetland or in proximity to the wetland (note approximate distance from the wetland and navigability determination). Note if there is a surface water connection to other wetlands.

III. VEGETATION

A. Describe the vegetation communities present and the dominant species.

- floating leaved community dominated by: \_\_\_\_\_
- submerged aquatic community dominated by: \_\_\_\_\_
- emergent community dominated by: reed canary grass
- shrub community dominated by: alder
- deciduous broad-leaved tree community dominated by: \_\_\_\_\_
- Tamarack dominated
- needle-leaved evergreen tree community dominated by: \_\_\_\_\_
- sphagnum mat
- other (explain) \_\_\_\_\_

B. Other plant species identified during site visit:

IV. SOILS

A. SCS Soil Map Classification: \_\_\_\_\_

B. Field description:

- Organic (histosol)? If so, is it a muck or a peat?
- Mineral soil? If so, is mottling or gleying present?  
 Soil Description: \_\_\_\_\_  
 Depth of mottling/gleying: \_\_\_\_\_  
 Munsell color (matrix/mottles): \_\_\_\_\_

V. SURROUNDING LAND USES

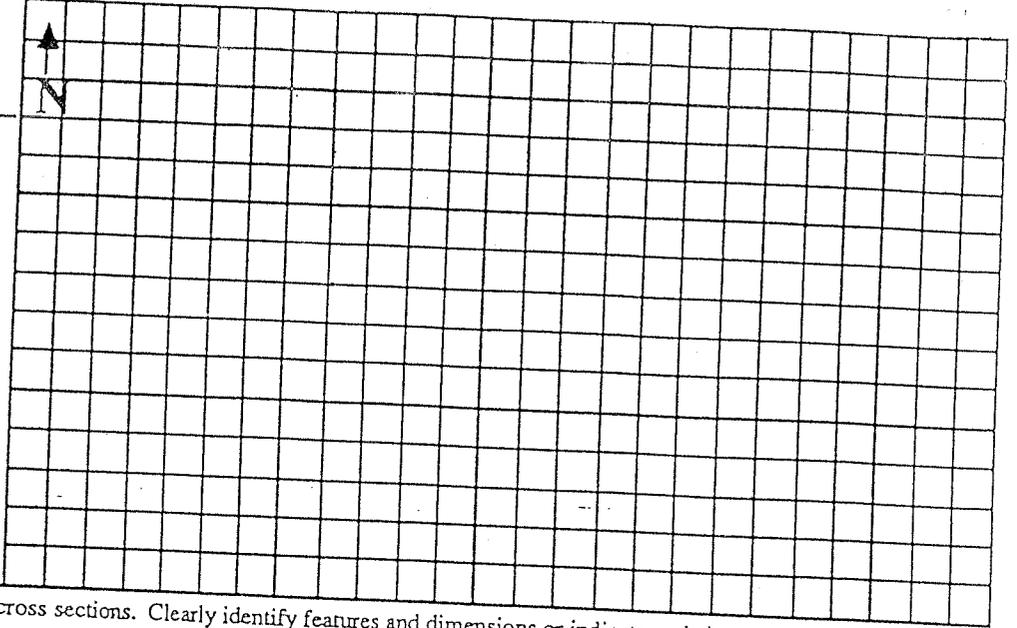
<u>Land-Use</u>	<u>Estimated % of wetland watershed</u>
Industrial.....	
Commercial.....	
Residential.....	
Agricultural/cropland.....	60
Agricultural/grazing.....	
Forested.....	30
Grassed recreation areas/parks.....	
Old Field.....	
Highways/roads.....	
Other..... <u>WWTP</u>	10

DRAWINGS OF PROPOSED  
ACTIVITY SHOULD BE PREPARED  
IN ACCORDANCE WITH SAMPLE  
DRAWING SHEET.

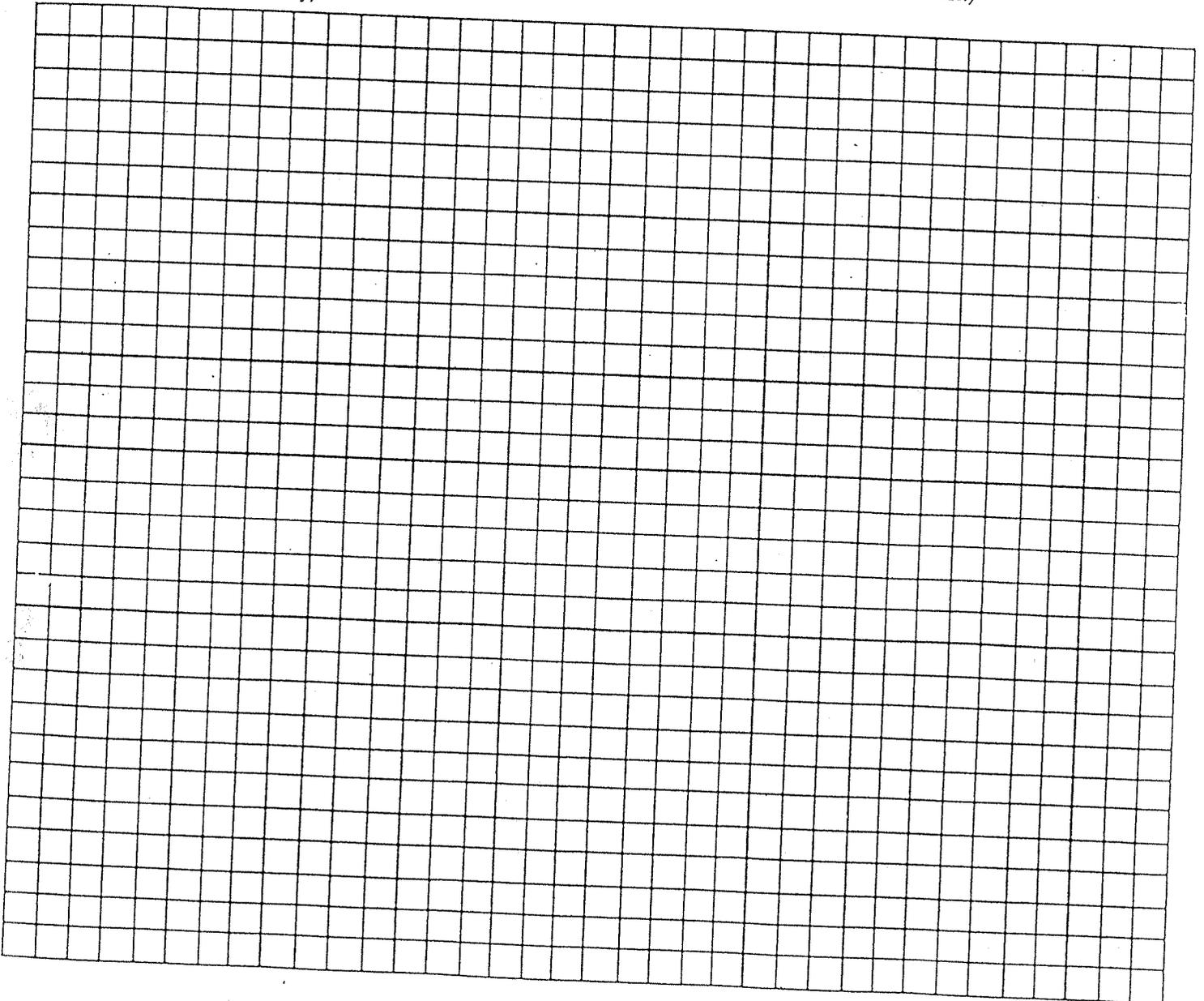
Proposed Materials:

see attached map

Location Sketch (indicate scale). Show route to project site; include nearest mainroad and crossroad.



Project Plans (Include top view and typical cross sections. Clearly identify features and dimensions or indicate scale.)  
(Use additional sheets if necessary)



## FUNCTIONAL ASSESSMENT

The following assessment requires the evaluator to examine site conditions that provide evidence that a given functional value is present and to assess the significance of the wetland to perform those functions. Positive answers to questions indicate the presence of factors important for the function. The questions are not definitive and are only provided to guide the evaluation. After completing each section, the evaluator should consider the factors observed and use best professional judgement to rate the significance. The ratings should be recorded on page 1 of the assessment.

### Special Features/ RED FLAGS

1. Is the wetland in or adjacent to an area of special natural resource interest (NR 103.04, Wis. Adm. Code):

- a. Cold water community as defined in NR 102.04(3)(b) (including trout streams or trout lakes)?
- b. Lakes Michigan and Superior and the Mississippi River?
- c. State or federal designated wild and scenic river?
- d. Designated State riverway?
- e. Designated State scenic urban waterway?
- f. Environmentally sensitive area or environmental corridor identified in an area-wide water quality management plan, special area management plan, Special wetland inventory study, or an advanced delineation and identification study?
- g. Calcareous fen?
- h. State park, forest, trail or recreation area?
- i. State or federal designated wilderness area?
- j. Designated or dedicated state natural area?
- k. Wild rice water listed in NR 19.09?
- l. Surface water identified as an outstanding or exceptional resource water in NR 102.

2. Y N According to the Natural Heritage Inventory (Bureau of Endangered Resources) or direct observations, are there any rare, endangered, or threatened plant or animal species in, near, or using the wetland? If so, what species?

### Flood storage/attenuation

1.  Y  N Is the wetland a surface water slope/riverine or lacustrine or surface water depression type wetland? If NO, STOP and enter LOW for this function. If YES, then continue.
2. Y  N Are there steep slopes, large impervious areas, moderate slopes with row cropping, or areas with severe overgrazing within the watershed (circle those that apply)?
3. Y  N Does the wetland significantly reduce run-off velocity due to its size, configuration, or vegetation type and density?
4. Y N Does the wetland show evidence of flashy water level responses to storm events (debris marks, erosion lines, stormwater inputs, channelized inflow)?
5. Y  N Is there a natural feature or human-made structure impeding drainage from the wetland that causes backwater conditions?

- 6. Y  N Considering the location of the wetland in relation to the associated surface water watershed, is the wetland important for attenuating floods or storing flood peaks (i.e. is the wetland located in the mid or lower reaches of the watershed)?
- 7.  Y N Considering the size of the wetland area in relation to the size of its watershed, at any time during the year is water likely to reach the wetland's storage capacity (i.e. the level of easily observable wetland vegetation)? [For some cases where greater documentation is required, one should determine if the wetland has capacity to hold 25% of the run-off from a 2 year-24 hour storm event.]

Water quality protection

- 1.  Y N Does the wetland receive overland flow as the primary source of water (i.e Surface Water Slope or Surface Water Depression type wetland)?
- 2.  Y N Do the surrounding land uses have the potential to deliver significant nutrient and/or sediment loads to the wetland?
- 3.  Y N Is the position of the wetland in the landscape such that run-off is held or filtered before entering a surface water?
- 4. Y  N Based on your answers to the previous section, does the wetland perform significant flood attenuation (residence time to allow settling)?
- 5.  Y N Does the wetland have significant vegetative density to decrease water energy and allow settling of suspended materials?
- 6. Y  N Are algal blooms, heavy macrophyte growth, or other signs of excess nutrient loading to the wetland apparent (or historically reported)?
- 7. Y N Is the wetland constantly saturated thus providing a condition that promotes trapping of nutrients in peat (i.e. limited flushing of the wetland)?

Groundwater recharge and discharge

- 1.  Y N *seasonally maybe* Is the wetland a Groundwater Slope/Flow Through or Groundwater Depression type wetland? If NO, STOP and enter LOW for this function. If YES, then continue.
- 2. Y N Related to discharge, are there observable (or reported) springs located in the wetland, physical indicators of springs such as marl soil, or vegetation indicators such as watercress or marsh marigold present that tend to indicate the presence of groundwater springs? (NOTE: If area is a calcareous fen, see RED FLAGS section).
- 3. Y  N Related to discharge, is the wetland important for maintaining base flow in a stream?
- 4. Y  N Related to recharge, is the wetland located on or near a groundwater divide (e.g. a topographic high)?

## Shoreline Protection

1. Y  N Does the wetland front on open water? If NO, STOP and enter "not applicable" for this function. If YES, then continue.
2. Y N Is the bank or shoreline exposed to constant wave action caused by boats?
3. Y N Is the bank or shoreline exposed to wave action due to a long wind fetch?
4. Y N Is the shoreline vegetated with perennial wetland species that form dense root mats and/or species that have strong stems that are resistant to erosive forces?

## Floral Diversity

1. Y  N Does the wetland support a variety of native plant species (i.e. not a monotypic stand of cattail or giant reed grass and/or not dominated by exotic species such as reed canary grass, brome grass, buckthorn, purple loosestrife, etc.)?
2. Y  N Is the wetland plant community regionally scarce or rare?

## Fish and Wildlife Habitat

1. List any animal species observed or evidenced: *duck*
2. Y  N Does the wetland contain a number of diverse vegetative cover types and a high degree of interspersed of those vegetation types?
3.  Y N Is the estimated ratio of open water to cover between 30 and 70%?
4.  Y N Does the surrounding upland habitat support a variety of animal species?
5. Y  N Is the wetland part of or associated with a wildlife corridor or designated environmental corridor?
6. Y  N Is the surrounding habitat and/or the wetland itself a large tract of undeveloped land important for wildlife in the area?
7.  Y N Are there other wetland areas near the subject wetland that are important to wildlife?
8. Y  N Is the wetland contiguous with a permanent waterbody or periodically inundated for sufficient periods of time to provide spawning/nursery habitat for fish?
9.  Y N Does the wetland provide significant food base for fish and wildlife (e.g. insects, crustaceans, voles, shrews, wild rice, wild celery, duckweed, pondweeds, watermeal, bulrushes, bur reeds, arrowhead, smartweeds, millets...)?
10. Y  N Is the wetland providing habitat that is scarce to the region?

Aesthetics/Recreation/Education and Science

- 1.  Y  N Is pollution (i.e. litter, oil residue, hyper-eutrophication, odors) not obvious within the wetland?
- 2. Y  N Is the wetland located within a predominantly urbanized area?
- 3. Y  N Is the wetland accessible and/or frequently seen by the public?
- 4. Y  N Is more than half of the wetland not observable from any easily accessible vantage point?
- 5.  Y  N Is the wetland diverse in plant communities or interspersed with open water?
- 6. Y  N Is the wetland, or could it be, used for recreation, and if so, which activities? Is there any documented recreational uses?

too small

- nature observation
- hiking
- biking
- skiing
- photography
- fishing
- hunting
- boating/canoeing
- wild ricing
- other

7. Y  N Is the wetland being used for education or scientific study purposes?

REPORT OF A FILL AND DRAW POTENTIAL STUDY  
ON SCHOOLHOUSE CREEK NEAR THE FAIRCHILD  
WASTEWATER TREATMENT PLANT

Performed as Part of the 1978 West Central District  
Basin Assessment Survey Program

January, 1980

GENERAL INFORMATION

Drainage Basin: Lower Chippewa - 262

Location: Schoolhouse Creek above and below the drainage area from  
the Fairchild WWTP, Jackson County, Wisconsin. (T24N,  
R5W, Section 2)

Investigation Date: November 8, 1978

Personnel: Kathy Bartilson and Michael Reif, Environmental Specialists

## PURPOSE

Fill and draw operation was proposed for the Fairchild wastewater stabilization ponds. This study was performed to assess the water quality of Schoolhouse Creek and the adjacent drainage area to determine if spring and fall discharges would be feasible.

## BACKGROUND INFORMATION AND CONCLUSIONS

Fairchild operates two wastewater stabilization ponds which discharge intermittently to a constructed effluent ditch. The present WPDES effluent limits for this facility are 30 mg/l BOD<sub>5</sub> and 30 mg/l Suspended Solids. With the heavy growths of algae in the ponds in summer, the effluent does not meet this suspended solids limit. Fill and draw operation with spring and fall discharges would allow storage during the summer.

The effluent is piped 200 feet northeast of the lagoons to the ditch. This ditch is approximately 600 feet long and has the classification of "effluent ditch" as specified in NR 104, Wisconsin Administrative Code, Rules of the Department of Natural Resources. Below the ditch, a small marsh extends 50 feet along a railroad grade. Runoff from the marsh flows north for 900 feet. This section of the drainage area is classified non-continuous, intermediate aquatic life.

A spring approximately 150 feet south of State Highways 10 and 12 discharges continuous flow to Schoolhouse Creek. Runoff from the marsh joins that from the spring during high flow conditions. The spring effluent is classified continuous, intermediate aquatic life. Schoolhouse Creek is classified continuous, fish and aquatic life. Schoolhouse Creek is also a Class II trout stream.

The WWTP effluent usually dries up before reaching the wetland. However, during periods of high flow, heavy rainfall, or sustained discharge, it could reach the marsh and eventually enter the spring and Schoolhouse Creek.

An abbreviated wasteload assimilation study was conducted by DNR Central Office and West Central District Water Quality evaluation staff on April 18, 1977. The survey was performed because of concern over the short distance between the outfall and Schoolhouse Creek. Within less than 2,000 feet, the classification changes four times (effluent ditch; wetland; non-continuous, intermediate; continuous intermediate; and finally continuous, fish and aquatic life). With these rapidly improving conditions over a short distance, the effluent might not be converted to intermediate aquatic life standards before it reaches the spring. The results of the wasteload assimilation study confirmed this assumption. Effluent limits associated with intermediate aquatic life were recommended for Fairchild.

Davy Engineering, Fairchild's consulting firm, was evaluating the fill and draw alternative for the wastewater stabilization ponds. They requested a statement of feasibility from the DNR Central Office. This request mandated the performance of a fill and draw potential study on Schoolhouse Creek. A study of fall conditions was conducted on November 8, 1978. The data is presented in another section.

With a fill and draw operation, the effluent volume would be much greater during the shorter discharge period than with the present intermittent discharge and would reach Schoolhouse Creek. Fall is the critical season, as less dilution water is typically available than in the spring. If dry weather conditions prevailed so that the fall flow was near the summer low flow ( $Q_{7,10} = 1.1$  cfs) the stabilization pond discharge could cause toxic ammonia conditions in Schoolhouse Creek.

A dilution ratio was calculated for the fall using 180 day storage with a 14-day discharge period. Based on a design flow of 0.06 mgd, the volume discharged daily during the two-week period would be 1.2 cfs.

$$\frac{(0.06 \text{ mgd} \times 180 \text{ days} \times 1.55 \text{ cfs/mgd})}{14 \text{ days}} = 1.2 \text{ cfs.}$$

During the study, the flow measured in the spring discharge channel was 0.036 cfs. Adding this to the discharge flow yields 1.24 cfs entering Schoolhouse Creek. A flow of 2.52 cfs was measured on November 8, 1978, in Schoolhouse Creek at a site above the spring confluence. Using this value as an example, the fall dilution ratio of stream water to effluent would be only 2.03 to 1.

Because of the low dilution volume in Schoolhouse Creek in the fall, a discharge in this season is not feasible. There is usually much less dilution water in the fall than in the spring. Another critical factor at Fairchild is that brook trout spawn in the fall and have been observed spawning in the vicinity of the spring discharge in the past.

For a single discharge in the spring, a 365-day storage capacity would be required. This option was not considered cost effective. At the present time, Fairchild is investigating methods of land application of effluent rather than discharging to a surface water.

#### METHODS, RESULTS AND DISCUSSION

The November 8, 1979 study included flow measurement along with chemical and macroinvertebrate sampling. The results of the chemistry sampling are listed in Table 1 at the end of this report. A small flow (0.153 cfs) was coming from the WWTP discharge pipe. It was sampled for BOD<sub>5</sub>, suspended solids and NH<sub>3</sub>-N (CS<sub>2</sub>). The discharge dried up in the effluent ditch portion of the drainage area.

The reach of Schoolhouse Creek used in this study began 100 feet north of State Highways 10 and 12. Chemical and macroinvertebrate samples were taken here (CS1 and MS1). The stream flows east under the highway and a railroad tressle, where it is joined by the spring and effluent receiving tributary. Chemistry samples were taken in the spring channel and in the mix point (CS3 and CS4 respectively). Below this site the stream runs southeast until it is joined by a tributary from the south (approximately 1,000 feet southeast of the railroad tressle). A macroinvertebrate sample (MS2) was taken approximately 600 feet below the highway. A flow measurement and a chemistry sample (CS5) were taken at the mix point below the tributary. Schoolhouse Creek turns north downstream from this site. It flows through Fairchild and eventually joins Black Creek.

The D.O. was quite high at the three sampling sites on Schoolhouse Creek. The BOD<sub>5</sub> and Suspended Solids concentrations were low as expected. The NH<sub>3</sub>-N concentrations were well below the levels at which the instream unionized NH<sub>3</sub> exceeds the 0.02 mg/l guideline set in the 1976 EPA Water Quality Criteria Handbook.

Interpretation of the fecal coliform to fecal strep ratio as an indication of the source of pollution was not possible. The concentrations of both organisms were too low for reliable evaluation, most likely due to clean stream conditions.

Macroinvertebrates were sampled at two locations on Schoolhouse Creek. MS1 was 100 feet north of the highway and MS2 was approximately 600 feet below the railroad tressle. Both sites consisted of a 100 foot stretch of stream. Macroinvertebrates were collected from the substrate with a D-frame net. Organisms were then picked from the collected material for a period of 30 minutes. An effort was made to pick no more than 25 individuals of a single species. The macroinvertebrates were preserved in 95% ethanol and identified to the lowest possible taxonomic level in the lab. Biotic index values were assigned to indicative organisms as specified by Dr. Hilsenhoff in the Department of Natural Resources Technical Bulletin #100.

The biotic index was calculated using formula  $\frac{\sum (nxa)}{N}$  where "n" is the number of individuals in a taxon and "a" is the biotic index value assigned to that taxon. "N" represents the sum of all "n" which have assigned biotic index values.

Biotic indices range from 0 (indicating undisturbed streams) to 5 (severely disturbed streams). Water quality determinations from biotic indices as listed by Hilsenhoff are given in Table #2.

TABLE 2

## Water Quality Determinations from Biotic Indices

Biotic Index	Water Quality	State of Stream
<1.75	Excellent	Clean, undisturbed
1.75 - 2.25	Good	Some enrichment or disturbance
2.25 - 3.00	Fair	Moderate enrichment or disturbance
3.00 - 3.75	Poor	Significant enrichment or disturbance
>3.75	Very poor	Gross enrichment or disturbance

The biotic index for MS1 was 1.32. This indicates excellent water quality. This site was mostly open and shaded, with partially undercut, grassy banks. Trichoptera were the predominant organisms, followed by Ephemeroptera and Plecoptera. Upstream of the site, the stream was shaded by thick growths of tag alders.

MS2 had a biotic index of 1.43 (excellent water quality). This site was almost 100% shaded. The banks were undercut and grass covered. A dense row of tag alders and some hardwoods were growing on each side of the stream. This site had a large log jam in the upstream half. Trichoptera were again the predominant organisms.

The land use in the study reach was mostly woodland although there was a large open field extending south and west of the railroad tressle.

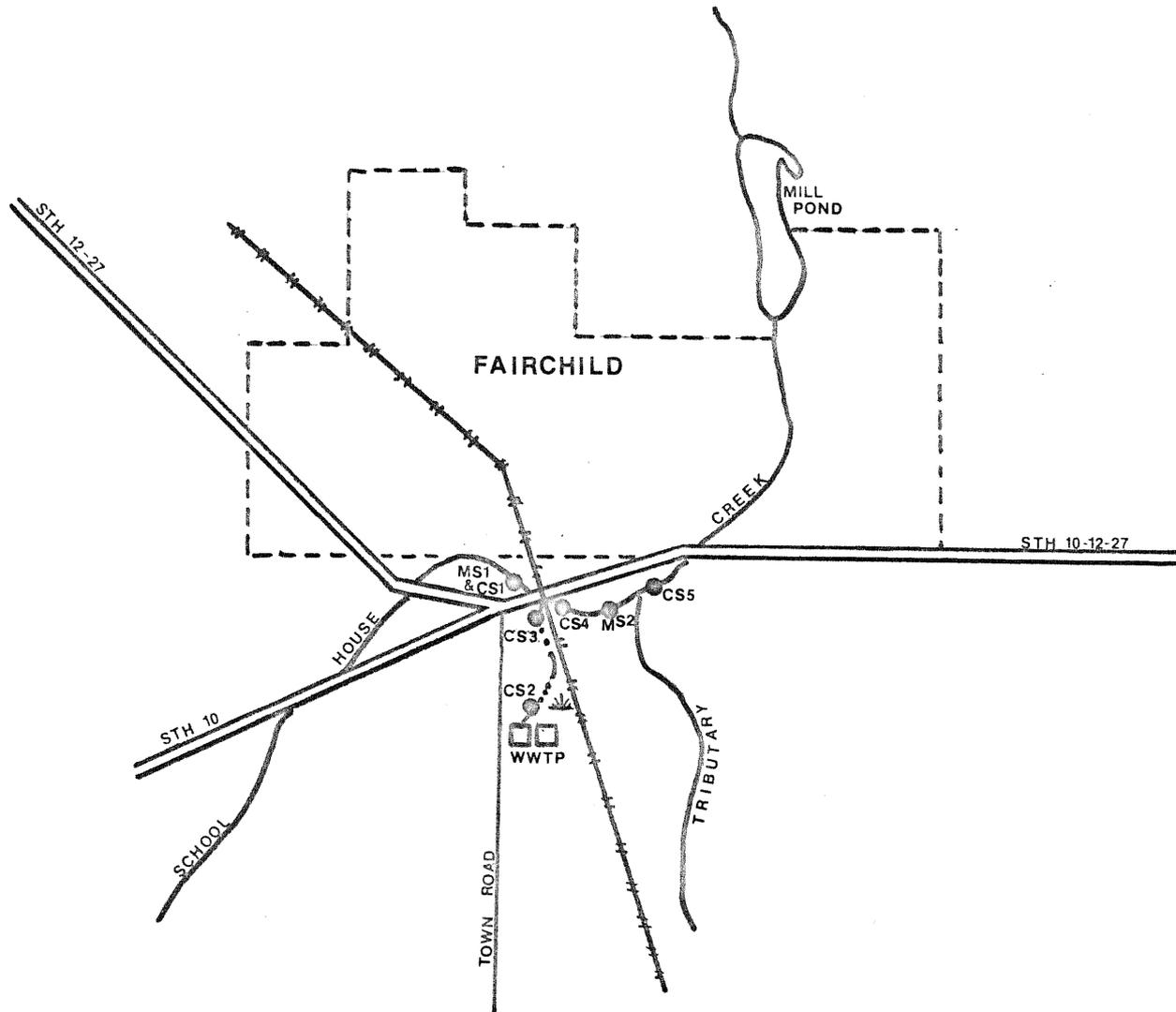
Taxonomic lists of the identified organisms are given at the end of the report.

This data shows that the water quality of Schoolhouse Creek is excellent. However, adequate dilution water is not available for a fall fill and draw discharge.

A pre-operational study prior to improvements to the Fairchild WWTP may not be necessary because of the excellent conditions found in this study.

MAP OF STUDY AREA

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KEY

- SCALE: 2½ inches = 1 mile
- CS = Chemistry Site
- MS = Macroinvertebrate Site
- 🌿 = Wetland
- ⚡ = Railroad