

To P. Trenchell

WR-2

WATER QUALITY STANDARDS REVIEW FOR THE HEADWATERS OF THE LITTLE  
LACROSSE RIVER IN VERNON COUNTY NEAR THE DISCHARGE FROM CASHTON WWTP  
T15N, R4W, SECTIONS 24 & 25  
T15N, R3W, SECTION 30

Paul La Liberte

LAL

October 16, 1995

This stream was first evaluated and listed as a variance water in NR104 in 1975 as "non-continuous, capable of supporting marginal fish and aquatic life". The basis for the classification was:

1. The effluent creates a small amount of flow in a drainage channel which is otherwise dry under base flow conditions.
2. The effluent seeps into the groundwater within one mile of the outfall and does not reach the continuously flowing waterbody downstream (Little LaCrosse River).

A 1988 standards review report recommended continuing the same classification. Additional inspections since 1975 have confirmed that the conditions described in the original stream classification are still present. On all occasions where observations were made during base flow conditions, the effluent did not reach the continuously flowing portion of the Little LaCrosse River. Usually, the effluent seeped to groundwater. However, in the winter of 1994, particularly cold temperatures resulted in the effluent freezing into a large block of ice. The location of the ice block was only a few hundred feet upstream from the area where flow typically ends due to seepage. The seepage/freezing area is about 0.5 miles below the WWTP. The continuously flowing headwater of the Little LaCrosse River is 0.9 miles below the WWTP.

The limited flow in the drainage channel provided by the facility is insufficient to support a classification higher than Limited Aquatic Life (formerly called marginal aquatic life). Below its continuously flowing origin, the Little LaCrosse River is classified as a Class II trout stream. The half mile of dry channel that exists between the outfall and the continuously flowing origin of the Little LaCrosse River effectively isolates the facility's wastewater load under base flow conditions. Flow would reach the river only under conditions of significant stormwater flow or snow melt. Under these conditions, the wastewater would be diluted with a sufficient quantity of surface water to render the wastewater load insignificant. The isolated nature of the discharge removes it as a threat to downstream surface waters. It is therefore a candidate for an alternative effluent phosphorus limit.

In a 1980 report, the Department presented the results of an evaluation of stream water quality using an Amendola model. The report concluded that secondary treatment at the WWTP was adequate to maintain the water quality criteria associated with the recommended classification. The facility has operated under a WPDES permit with secondary effluent limits ever since.

The adequacy of this level of treatment was further evaluated biologically. Macroinvertebrate samples were collected in the continuously flowing reach of the LaCrosse River at locations 0.1 and 0.7 miles below its origin (1.0 and 1.6 miles below the WWTP, respectively). Data is available from before the WWTP was upgraded (1979), and after upgrading (1986 & 1994). The results of application of the Hilsenhoff Biotic index to these samples appear in Table 1.

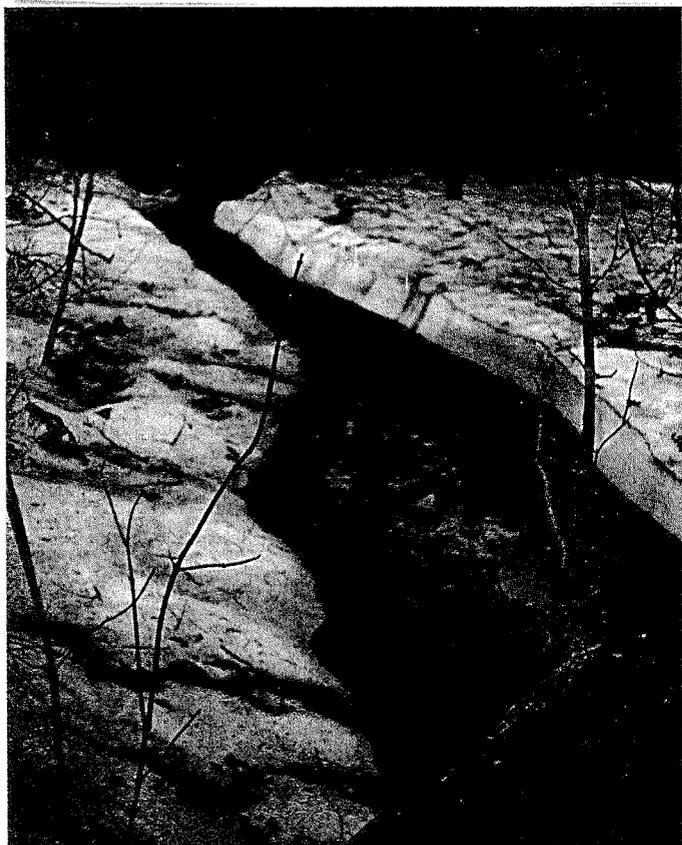
TABLE 1. MACROINVERTEBRATE STUDY RESULTS				
	1.0 MILE BELOW WWTP		1.6 MILES BELOW WWTP	
DATE	BIOTIC INDEX	RATING	BIOTIC INDEX	RATING
4/4/79	4.5	VERY GOOD	4.4	VERY GOOD
10/30/79	5.1	GOOD	4.7	GOOD
10/23/86	4.3, 4.1	VERY GOOD	3.3, 2.5	EXCELLENT
10/25/94	4.4	VERY GOOD	3.2, 3.3, 3.4	EXCELLENT

These results indicate that the Cashton WWTP is not adversely affecting the water quality of the Little LaCrosse River. The improvement in Biotic Index at the downstream site since 1979, is most likely the result of improvements in watershed nonpoint sources, since the WWTP has been shown to be hydrologically separated from the stream.

Because the effluent from this facility seeps to groundwater, compliance with groundwater standards must be considered, as well as surface water standards. The most recent WPDES permit issued to the facility includes measures to assess impacts on groundwater.

cashton.rpt

- c. T. Jablonski - LAX
- J. Boettcher
- J. Ball - WR/2
- B. Masnado - WR/2



Remnants of frozen sewage  
on 4-7-94



Seepage zone on 5-17-94

## CORRESPONDENCE/MEMORANDUM

STATE OF WISCONSIN

Date: June 8, 1988

File Ref:

To: → Cashton Facility File

From: Paul LaLiberte

*Paul*

Subject: Water Quality Standards Review for the Cashton POTW

*(Little La Crosse River)*

The receiving stream for the Cashton POTW was first classified on 10-4-75 and revised 4-4-79. A preoperative point source impact study in 1979 concluded that, most of the time, the effluent seeped to groundwater prior to reaching the continuous flowing natural origin of the Little La Crosse River (.9 miles below the outfall). However, effluent nearly reached the headwater during a winter survey. Habitat rating conducted in 1986 scored the first .9 mile reach as "poor" with a lack of flow being a significant factor.

Macroinvertebrate samples were collected in 1979 and again in 1986, after the POTW was upgraded. Sample locations were 1.0 miles and 1.6 miles from the outfall (below the natural origin of the stream). A marked improvement in water quality, as measured by the Hilsenhoff Biotic Index, was documented at 1.6 miles and a small improvement at one mile (below the POTW). It is not clear whether the change in water quality came as a result of upgrading the POTW or other watershed effects.

The additional data collected since 1979 support the existing aquatic life use classification.

Because the effluent does not reach a continuously flowing water body during the recreational use season and is confined to a steep, narrow, shallow channel, the receiving stream should be classified as partial body contact recreational use. It is the consensus of WD Water Resource Management (Art Bernhardt and Paul LaLiberte) and Wastewater Management (Jon Kling & John Paddock) that disinfection not be required at Cashton.

PL:sz

c: D. Schuettpelz - WR/2  
C. Schrank - WR/2  
T. Stibbe

PLT394

5/1/79

Cashton, Monroe County  
Wastewater Receiving Stream Classification - Addendum

The Cashton wastewater receiving stream (headwaters of Little La Crosse River) was reevaluated as the result of 201 Step I review by the Water Quality Planning Section. The observation made was that the effluent limits (especially  $\text{NH}_3\text{-N}$  limits) imposed by the non-continuous, intermediate aquatic life classification may indeed not result in any water quality benefit (protection or improvement). The only method available to the Department to remove the  $\text{NH}_3\text{-N}$  limit was to revise the stream classification to non-continuous, marginal. Therefore, a reevaluation was initiated which included chemical and biological sampling.

During dry, non-runoff weather, sewage effluent does not reach the continuous flowing portion of the Little La Crosse River. The most critical time for potential water quality degradation was believed to be during snow melt and especially during the beginning and end of snow melt runoff when sewage effluent would comprise a greater portion of flow due to less available dilution water.

At the time of this reevaluation (April 4, 1979) snow melt runoff was terminating and no flow existed above the sewage effluent. Sewage flow infiltrated about 500 feet before the start of the permanent spring pond discharge. It was apparent from remnant pools and high water flow indicators adjacent to the stream channel that runoff flow had reached the permanent flow prior to the reevaluation.

Several headwater drainage valleys converge near/at the sewage treatment plant. The area drained by these valleys includes greater than 50% of the Village of Cashton. When runoff water reaches the Little La Crosse River it includes, in addition to chlorinated sewage effluent, contributions from road salt (Highways 33, 27 and local streets), oil, silt, sand and seepage from at least five manure storage piles located in tributary valleys. One old dump site is also situated alongside a drainage way near the STP.

Attached to this report are tables presenting results of chemical and biological samples collected during the investigation. Perhaps the most important observation is that at Station 5 (the first station in the permanent stream), under present conditions, the biotic index value (2.8) indicates only fair water quality with moderate enrichment or disturbance and that organisms are present in less than expected numbers. The significance of this observation is twofold: 1) water quality degradation and apparent invertebrate population limitation is occurring as a result of conditions in addition to sewage effluent possibly including high velocity stream scouring. Cashton should not be penalized with more restrictive than necessary effluent limits when other factors are contributing to the problem. 2) water quality degradation is not severe, thus providing a prognosis of improved water quality when advance treatment of sewage (the major contributor), without ammonia reduction, is achieved.

Recommendation:

During this reevaluation, additional information gained on non-point sources of water pollution located upstream from the Cashton wastewater treatment plant provide basis for classifying the Little La Crosse River as non-continuous, marginal use from the Cashton WWTP downstream 0.9 mile to the continuous flow origin of the river.

Reevaluation Date: April 4, 1979

Personnel:

Harold J. Erickson - Environmental Engineer - WCD  
Terry A. Moe - Water Quality Assessment Unit Leader - WCD  
Steve Skavroneck - Environmental Engineer - Madison  
Russell W. Pope - Senior Water Quality Planner

April 4, 1979 - RECLASSIFICATION INSPECTION AND STREAM SAMPLING  
 HEADWATER TRIBUTARY OF LITTLE LA CROSSE RIVER - Basin 220

Station Number	Time	pH (SU)	TEMP (°C)	D.O. (Mg/l)	BOD (Mg/l)	NH <sub>3</sub> -N (Mg/l)	DESCRIPTION & COMMENTS
1	11.25	7.6	7.0	9.4	63	11	Cashton STP final effluent - chlorinated-no flow upstream - runoff just finished
2	11.45	7.9	7.5	9.5	>33	11	- 2000' - Little LaCrosse River (STP effluent) downstream from 1st Hwy 27 road crossing. No invertebrates observed in stream.
3	11.50	7.9	5.5	9.3	16	6.5	- 4000' - Little LaCrosse River (STP effluent) 100' upstream from 1st downstream private drive crossing end of large ice cover or shelf covering low gradient portion of stream from Hwy 27 to this point. No invertebrates observed in stream.
4	12.00	7.6	5.5	9.3	22	8.4	- 4700' - Little LaCrosse River (STP effluent) 500' upstream from spring pond discharge which is start of continuous flow in Little LaCrosse River. STP effluent stopped at this site. No invertebrates observed here nor in pools above pond discharge.
5	12.10	7.6	8.0	10.8	<1	.03	- 5700' - Little LaCrosse River below spring pond discharge - east side of Hwy 27 <u>Biotic Index = 2.8</u> Biological sample collected from rock and detritus 100' below hwy culvert. Algae on rocks. Fewer organisms than expected - picked ≈ 15, 2"² quadrants in pan to get 100 invertebrates. Effluent not reaching spring flow today stopped ≈500' above discharge. <u>Interpretation</u> - Fair water quality, moderate enrichment or disturbance.

Identification sheet for Biological Sample - Cashton 5

Taxa	n	Biotic Index Value (a)	nxa
Coleoptera			
<u>Helichus sp.</u>	1	2	2
Diptera			
<u>Conchapelopia spp.</u>	1	4	4
<u>Empididae</u>	2	4	8
<u>Ephydridae</u>	1	4	4
<u>Eukiefferiella sp.</u>	1	2	2
<u>Microspectra spp.</u>	2	0	0
<u>Orthocladus spp.</u>	3	4	12
<u>Parametricnemus sp.</u>	1	3	3
<u>Pericoma sp.</u>	1	-	-
<u>Simulium vittatum</u>	23	4	92
Ephemeroptera			
<u>Baetis vagans</u>	13	1	13
Trichoptera			
<u>Cheumatopsyche spp.</u>	15	-	-
<u>Hydropsyche betteni</u>	18	3	54
<u>Hydropsyche slossonae</u>	11	2	22
Gastropoda			
<u>Physa sp.</u>	1	-	-
Oligochaeta	6	-	-
Turbellaria	3	-	-
TOTALS	77 (N)		216

$$\text{BIOTIC INDEX} = \frac{\sum(nxa)}{N} = \frac{216}{77} = 2.8$$

# Identification Sheet for Biological Sample - Cash ton 6

Taxa	n	Biotic Index Value (a)	nxa
<u>Coleoptera</u>			
<u>Optioserrus Fastiditous (adult)</u>	1	2	2
<u>Diptera</u>			
<u>Eukiefferiella spp.</u>	3	2	6
<u>Orthocladius sp.</u>	1	4	4
<u>Simulium vittatum</u>	1	4	4
<u>Ephemeroptera</u>			
<u>Baetis vagans</u>	27	1	27
<u>Ephemerella catawba</u>	8	-	-
<u>Trichoptera</u>			
<u>Brachycentrus americanus</u>	1	0	0
<u>Cheumatopsyche spp</u>	2	-	-
<u>Glossisoma spp.</u>	4	1	4
<u>Hydropsyche betteni</u>	3	3	9
<u>Hydropsyche slossonae</u>	14	2	28
<u>Lepidostoma sp.</u>	1	1	1
<u>Limnephilis spp.</u>	2	2	4
<u>Amphipoda</u>			
<u>Gammarus pseudolimnaeus</u>	31	2	62
<u>Gammarus spp</u>	2	-	-
<u>Gastropoda</u>			
<u>Physa spp.</u>	2	-	-
<b>TOTAL</b>		<b>89 (N)</b>	<b>151</b>

$$\text{BIOTIC INDEX} = \frac{\sum(nxa)}{N} = \frac{151}{89} = 1.70$$

CASHTON, MONROE COUNTY

Wastewater Receiving Stream Classifications

The Cashton WWTP discharges to a ravine in the headwater area of the Little La Crosse River. The ravine is dry above the sewage effluent and would remain so for a distance of .9 mile downstream from the discharge except for the presence of spring snow melt, rainfall runoff and the treated sewage.

Under cool, dry weather conditions of November 5, 1975, the sewage effluent percolates and evaporates to no flow within .5 mile. Under hot, summer, dry weather conditions, the "dry-up" distance is probably much less.

A private spring pond .9 mile below the Cashton WWTP is the origin of the Little La Crosse River. From this point downstream, many springs emanate from granitic bedrock to create a substantial stream within the next one-half mile.

The stream course beginning above the sewage discharge and continuing through section 13 (about 3 miles), is undisturbed except for road crossings and is well buffered from agricultural land use.

Cashton WWTP effluent pipe

Little La Crosse River at downstream end of new HWY 27 road crossing near JCT with old 27 north of Cashton

Recommendations:

The Little La Crosse River upstream from a point .9 mile below the Cashton WWTP ( $\frac{1}{4}$  mile north of the section 24/25 section line) shall be classified as noncontinuous, intermediate aquatic life. Downstream from that point the classification shall be continuous flow, fish and aquatic life.

Re-evaluation Done 5/1/79

Evaluation Date: September 4, 1975

Personnel:

Lewis A. Seymour - Environmental Engineer - WCD  
Terry A. Moe - Water Pollution Division - WCD  
William R. Selbig - Staff Specialist & Chief, District Operations - WCD

NOTE:

Highway 27 reconstruction adjacent to the study area (Little La Crosse River) precluded detailed evaluation.

Re-evaluation Date: November 5, 1975

Personnel:

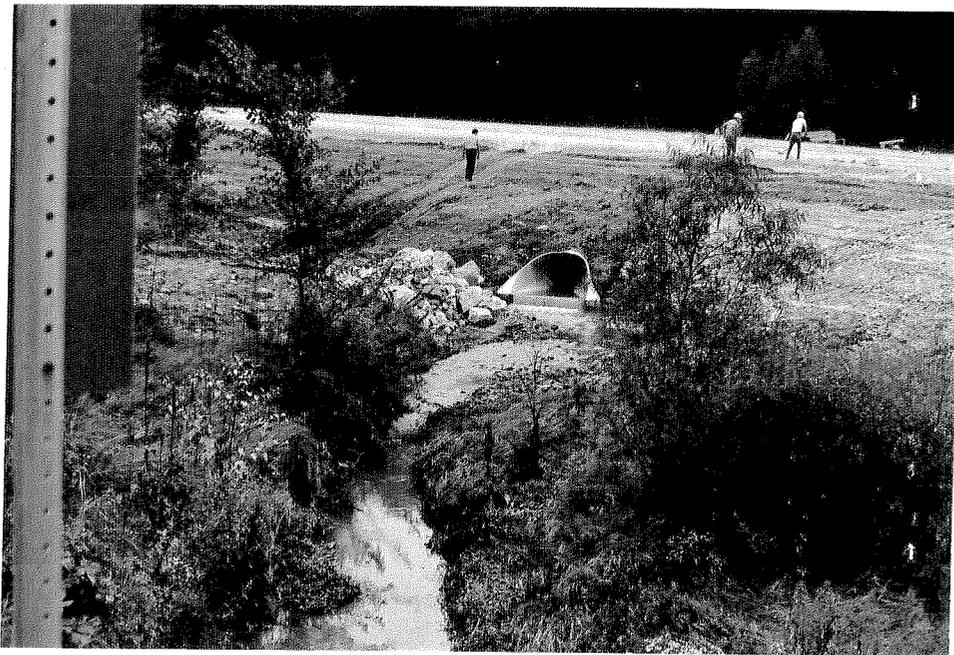
Terry A. Moe - Water Pollution Biologist - WCD

NOTE:

Highway 27 reconstructed complete. Provided excellent evaluation access and mileage measurement.



Cashton WWTP  
effluent Pipe



Little LaCrosse R. at  
downstream end of new STH 27  
near jct. with old 27 north  
of Cashton



L E O N

R T K A N

P O R T L A N D

J E F F E R S O N

M O N R O E C O

V E R N O N C O

4858  
4857  
50'  
4855  
4854  
T. 16. N.  
T. 15 N.  
4853  
4852  
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4850  
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4848  
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43°45'  
4846  
T 15 N  
630 000  
F E L T  
T 14 N.

Pleasant Valley Sch

Cannon Valley Sch

Russell Valley Sch

Melvina

Portland

SS Peter & Paul Sch

Cashton

Moen Cem

Pest Haven Cem

Sacred Heart Cem

Quarry

Parish

St. Croix

Leon

Pacific River

Hohn Sch

Cannon Valley

Valley

Russell

Valley

Pine Hollow

Portland

SS Peter & Paul Sch

Cashton

Moen Cem

Pest Haven Cem

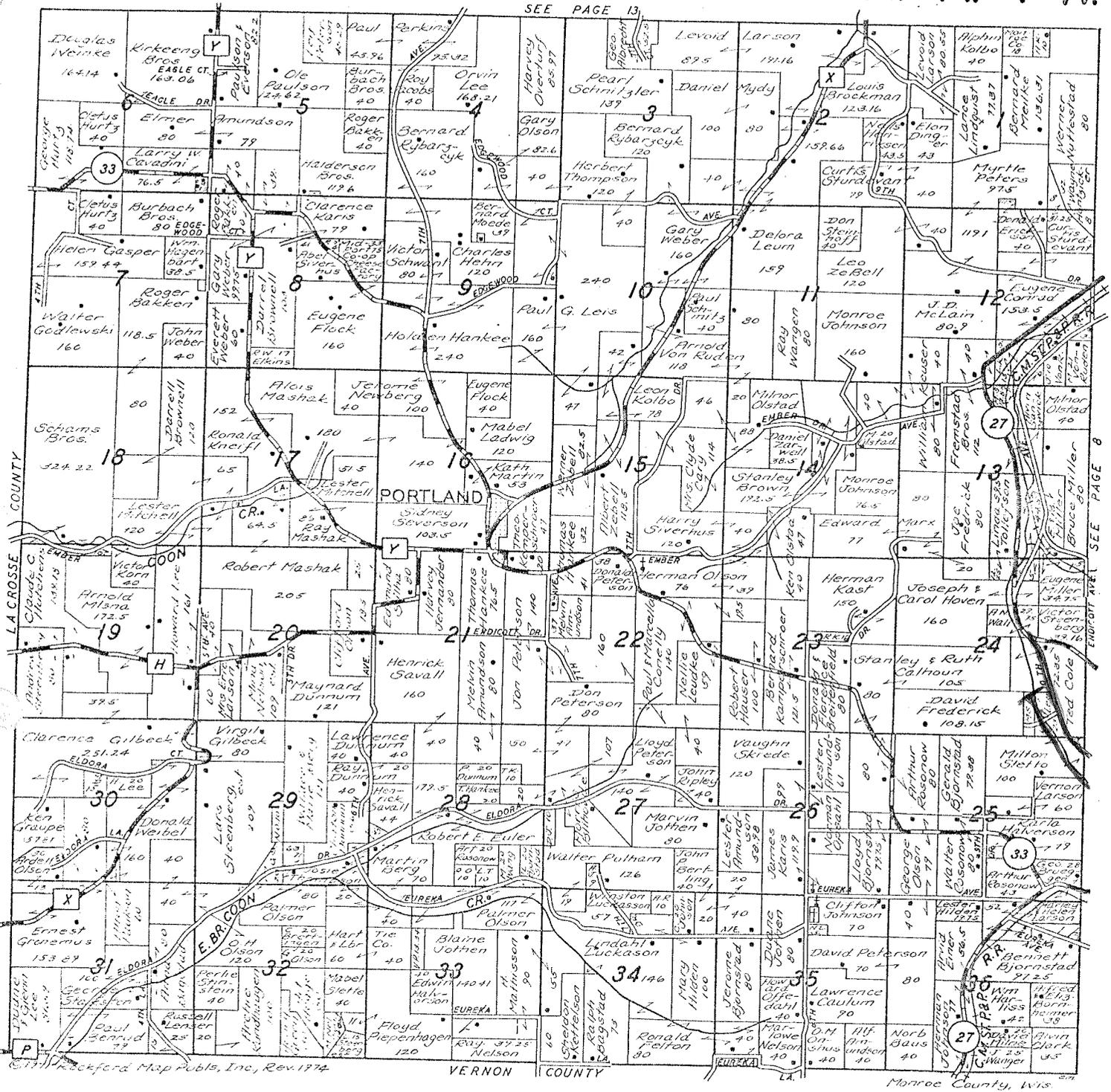
Sacred Heart Cem

Quarry

Parish



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