

**SUMMARY OF CONDITIONS  
DURING SPRING RUNOFF SAMPLING  
AT RURAL DEMONSTRATION SITES,  
AVON RIVER BASIN**

**1982**

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**STRATFORD / AVON RIVER  
ENVIRONMENTAL MANAGEMENT PROJECT**

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## INTRODUCTION

Ecologistics Limited, Waterloo was contracted by MOE and the UTRCA to sample runoff during the 1982 spring melt in the upstream areas of the Avon River. This report documents weather conditions and the sampling program that took place.

The objective of the work was to obtain water samples upstream and downstream of a number of demonstration plots, from various locations on the Avon Municipal Drain and from several underground tile drains.

A field orientation meeting was held on March 12, 1982 at which time UTRCA staff pointed out the location of sample sites. A team of water samplers was shown these sites by the Ecologistics Project Manager on March 15, 1982. At this time there was much ice and snow in the upper Avon Basin but melting was occurring slowly and water was observed at several stations.

### Report Contents

Maps are presented which show the location of sample stations. A description of sample sites is also given. A table summarizes the dates when sampling occurred and the number of samples collected each day. A day-by-day description of weather and flow conditions, and details of sampling is presented. These day-by-day descriptions will be valuable when interpreting the analytical results.

### Summary of Sampling Schedule Which Evolved

Sampling of the snowmelt which was occurring took place between March 16 and 23 inclusive. Since temperatures were cool and melting was quite slow, after discussions with MOE, sampling was suspended until March 30th. Warmer temperatures and rainfall prompted sampling during the period March 30 - April 3. It was during this interval that the true spring melt occurred. In the afternoon of April 3 temperatures dropped dramatically and snow began to fall, and for this reason sampling was suspended. Between April 4<sup>th</sup> and 12<sup>th</sup> there was no rainfall to generate runoff so sampling was not carried out. Rainfall on April 12 and 13 although relatively light (4 mm) generated some runoff so one set of samples was collected at the end of the rainfall event on April 13.

Between April 13 and 1700 hrs April 16 the weather was warm and dry, there was no rain event to sample. Between 1800 hrs and 2100 hrs on April 16 there were showers. At 5:00 April 17 there was no rain but several times during the morning and early afternoon light showers occurred. Rainfall at Waterloo-Wellington Airport was 9.4 mm on April 16, and 17 2.6 mm on April. Rain stopped by 15:00 hrs on the 17<sup>th</sup>. The 18<sup>th</sup> was cool and windy with no rain - no sampling was conducted.

A small amount of rain fell before midnight April 19<sup>th</sup> 1.2mm. During April 20 13.9 mm of rain fell, ending by 1730 hrs. Water sampling was conducted during the rain event beginning at 0750 hrs by which time a considerable amount of rain had fallen. Sampling continued through the day as did the rainfall. Sampling and rainfall stopped at approximately the same time - 1700 hrs. Overnight and into April 21 temperatures dropped below 0°C. This caused puddles to freeze and runoff to slow. No sampling was conducted on April 21 because there was no rain and the cold reduced runoff.

## Station Locations

Figure 1 shows the location of stations associated with the demonstration plot studies.

The sampling location descriptions are as follows:

### Station

- 1 North side of 4-5 Concession road of North Easthope Twp.
- 2 Central School Drain passing through Lot 28, Con IV of North Easthope Twp. owned by J. Hyde (sample at property boundary approximately 500 feet downstream of Station 1).
- 3 North side of 2-3 Concession road of North Easthope Twp. at outlet of Control Sub-Watershed. This station is included in the M.O.E. bi-weekly sampling run, but will be repeated to correspond with these other sample collections.
- 4 West side of 30-31 Sideroad, Concession II of North Easthope Twp., upstream of cattle access demonstration of K. Sheerer in Avon Municipal Drain.
5. Approximately 100 feet downstream of Station 4 in Avon Drain. This sample will only be taken when visible manure runoff from farm operation is entering the Drain via surface runoff.
- 6 East side of County Rd. 14 at Avon Municipal Drain just north of the town of Shakespeare. This station is included in the bi-weekly M.O.E. sampling run, but will be repeated to correspond with these other sample collections.
- 7 East side of County Rd. 14 on H. Wyllie property before surface runoff enters grassed waterway from road culvert.
- 8 Lower end of H. Wyllie grassed waterway at property line. Surface runoff to be sampled if present.
- 9 Surface flow on B. Misener property channeling over unprotected waterway approximately 1000 feet in length.
- 10 Surface flow at outlet of unprotected waterway before runoff enters road culvert.
- 11 Downstream of culvert draining from Station 10 on B. Walker property to take in runoff contributions from road.

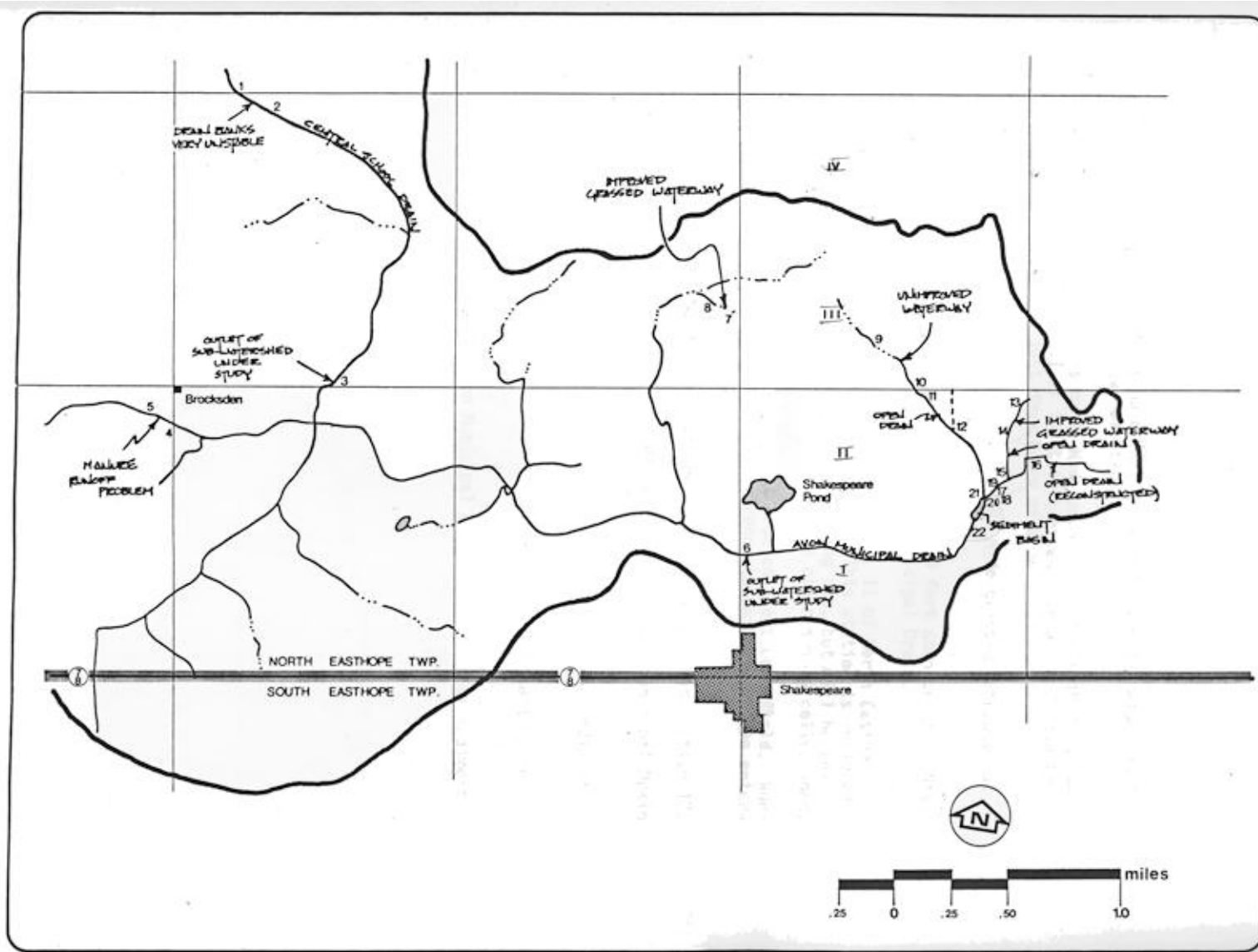


FIGURE 1 . Location of Stations Sampled During Spring Runoff 1982, Avon River Basin

- 12 Private drain on B. Walker property approximately 1400 feet downstream of Station 10.
- 13 Surface flows on R. Hyde property just off 15-16 Side-road, Con. II at inlet to grassed waterway. Sample to be taken just downstream of drop inlet structure.
- 14 Surface flow at outlet of R. Hyde grassed waterway (at rock chute).
- 15 Private drain to be sampled 1000 feet downstream of Sta. 14 before flow enters Avon Municipal Drain.
- 16 West side of Sideroad 15-16 Con. II of North Easthope Twp. on Avon Municipal Drain. This station is included in the M.O.E. bi-weekly sampling run, but will be repeated to correspond with these other sample collections.
- 17 Surface runoff if present from adjacent corn field. Runoff will concentrate over concrete spillway before entering Avon Drain.
- 18 Subsurface tile draining the same field as in Station 17.
- 19 East side of farm lane crossing over Avon Municipal Drain. Sample to be taken from drain.
- 20 Sample from Avon Drain immediately before the sediment basin.
- 21 Sample from private drain entering the sediment basin from the north.
- 22 Sample from Avon Municipal Drain downstream of sediment basin.

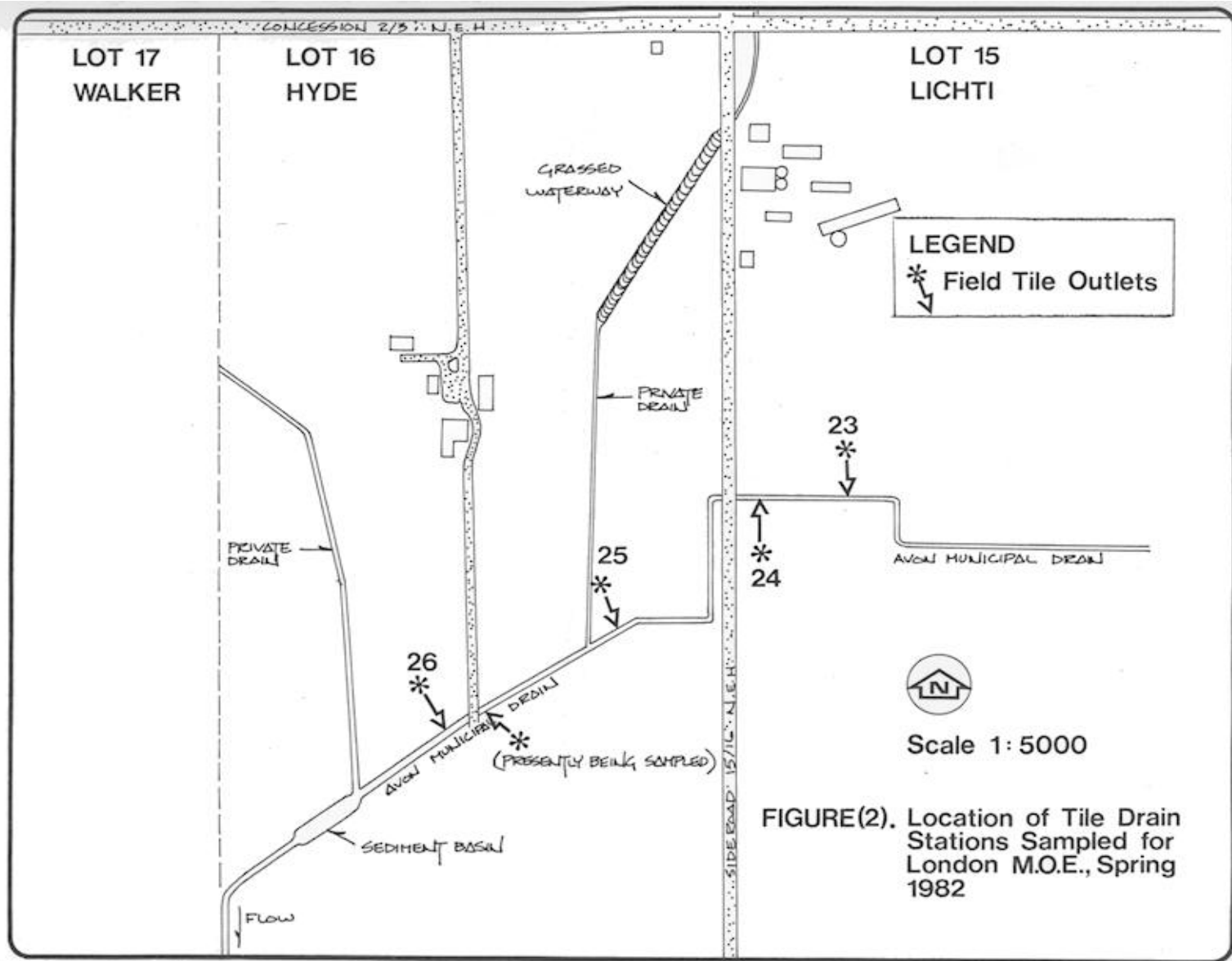


Figure 2 shows the location of four tile drains (stations 23 to 26 inclusive) which were sampled from April 1 onward at the request of M.O.E. at London. Cropping in 1981 on the lands which drain into each tile was as follows:

- 23 - fall ploughed corn field
- 24 - strip cropped: corn and grain
- 25 - clover and grass
- and 26 - fall ploughed corn

#### Parameters Analyzed

The water samples were tested for 6 parameters:

1. Total Phosphorus as P
2. Dissolved Reactive Phosphorus as P
3. Free Ammonia
4. Total Kjeldahl Nitrogen
5. Nitrate plus Nitrite (as one parameter)
6. Suspended Solids

#### Summary of Sample Dates and Number of Samples Obtained

Table 1 indicates the number of samples obtained at stations sampled on each sample date. The total number of samples obtained each day is also shown.

**Table 1.** Number of Samples Obtained at each Station on Sample Date and Total Number of Samples for the Day

Sample Date and Number of Samples at Each Station

Station Number	March										April					
	16	17	18	19	20	21	22	23	30	31	1	2	3	13	17	20
1	4	4	4	4	4	4	4	1	1	2	3	2	2	1	2	2
2			4		4		4	1		2	3	2	2	1	2	2
3								1	1	2	3	2	2	1	2	2
4	4	4	4	4	4	4	4	1	1	1	3	2	1	1	2	2
5	4	3		4		4	4	1	1		3	2	1	1	2	2
6										1	3	3	2	2	1	2
7											3	2	2	1	2	2
8											3	2	2	1	2	2
9										2	3	1	2	1	2	1
10										1	3	2	2	1	2	2
11										2	3	2	2	1	2	2
12						3	4	1	1	2	3	2	2	1	2	2
13										1	3	2	2	1	2	2
14										1	3	2	2	1	2	2
15										1	3	2	2	1	2	2
16										2	3	2	2	1	2	2
17																
18															2	2
19										1	3	2	2	1	2	2
20	4	2	2	4	4	4	4	1	1	2	3	2	2	1	2	2
21	4	3	2	4	4	4	4	1	1	2	3	2	2	1	2	2
22	4	3	4	4	4	4	4	1	1	2	3	2	2	1	2	2
23											2	1		1	1	1
24											2	1	1	1	1	1
25												1		1	1	1
26											2	1	1	1	1	1
Total samples for day	24	19	20	24	24	31	31	9	10	28	66	43	40	24	46	45

Day-by-Day Description of Conditions

Conditions in the field and descriptions of sampling times and methods are provided on a separate page for each date when sampling occurred. Precipitation data was obtained from Environment Canada. Amounts of precipitation are for Waterloo-Wellington Airport, Breslau.

Date: Monday March 15/82

Summary: A meeting was held at 0900 hrs. to briefly discuss the Avon River Spring Runoff Project, arrange approximate sampling times, organize field and lab crews and distribute materials required for sampling. A visit was then made to the sampling sites to observe locations and thawing conditions. No water samples were collected.

Field Conditions: Weather

- Sunny, Clear, Cold
- Extremely windy
  
- Very little melting observed

Air Temp. - 0°C (approx.)

Sample Site Conditions

- Spring Melt had occurred sufficiently to open the stream at Site #'s 1, 4, 5, 20, 21 & 22.
  
- All other sites remained covered in snow and/or ice.

Date: Tuesday, March 16/82

Field Observation Times: 0900 hrs. - 1810 hrs.

Sample Run 1 - 0900 - 1100 hrs.  
2 - 1212 - 1300 hrs.  
3 - 1500 - 1618 hrs.  
4 - 1700 - 1810 hrs.

Field Conditions: Weather - Overcast, Cool, Light Wind

Air Temp. - High: +1°C to +3°C  
Low: 0°C

Precipitation - Rain (Drizzle) - 9 mm  
- Began at approx. 1100 hrs.

Ice Melt - Little to none; culverts covered by snow.

Water Flow Rates

Site No.	Rate of Flow
1	slow
4	slow
5	slow
20	slow
21	slow
22	still

Summary: Sampling Method: A total of 4 samples/sample site were taken over a 9 hr. period. Generally, samples were taken by immersing a sample bottle in the stream. A bucket was used to obtain water samples at less accessible stream sites.

Water samples for March 16/82 were kept on ice and delivered to the M.O.E. London lab. Thursday, March 18/82 (A.M.).

Date: Wednesday, March 17, 1982

Field Observation Times: 0820 hrs. - 1725 hrs.

Sampling Run # 1 - 0820 - 1115 hrs.  
2 - 1230 - 1530 hrs.  
3 - 1505 - 1725 hrs.  
4 - 1700 - 1715 hrs.

Field Conditions: Weather - Overcast, Cool, Foggy until 1035 hrs.

Air Temp. - High: +2°C to +4°C

Precipitation - Rain (Drizzle) in A.M. - 12mm

Ice Melt - Some spring melt visible, i.e. Site #6, Culverts at Site #7 & 19 not visible - 1 to 1.5 m snow banks at Site #20

Water Flow Rates

Site No.	Rate of Flow
1	slow (a.m.), moderate (p.m.)
4	slow
5	slow
20	slow
21	slow (a.m.), moderate (p.m.)
22	slow (a.m.), moderate (p.m.)

Summary: Sampling Method: Sampling was conducted over a 9 hr. period. Sites 5, 20, 21 & 22 were not sampled 4 times due to car trouble experienced by one of the crew. A bucket was used to obtain samples at less accessible stream sites. Water samples were kept on ice and delivered to the M.O.E. lab in London on Thursday, March 18/82 (a.m.).

Date: Thursday, March 18, 1982

Field Sampling and Observation Times      0915 - 1826

Sampling Run #    1 - 0915 - 1110  
                          2 - 1315 - 1415  
                          3 - 1442 - 1600  
                          4 - 1713 - 1826

Field Conditions:

Air Temp:      +2°C - +3°C (am), cooler temp. (pm)  
General Weather Conditions - Foggy  
Ice Melt - Station 2  
                  Note: Station 5 - no overland flow

Station #	Rate of Flow	Snow Conditions
1	6", clear, moderate, gravel bottom	6" snowdepth - lots mud
2	6", moderate, muddy bottom	1'snowbanks
4	moderate, turbid flow	1' to 2' snowbanks
20	slow	
21	slow	
22	deep, moderate, turbid flow	banks snow covered
3,5	no overland flow	snow covered
6 - 19	no flow	1'- 2'snow covered

Summary Sampling Method:

Station #4                    - sampled with bucket from bridge.  
Station #20, #21         - samples collected at upstream end sediment basin on March 16<sup>th</sup> & 17<sup>th</sup>.  
                                  - now in each separate stream.  
                                  - only afternoon samples due to mixing sediment n stream flow.

Water samples for March 18<sup>th</sup>/82 were kept on ice and delivered to M.O.E. in boxes on March 19/82 (am).



Date: Saturday, March 20th, 1982

Field Sampling and Observation Times: 0845 - 1730

Sample Runs # 1 - 0845 - 1000  
2 - 1245 - 1355  
3 - 1430 - 1530  
4 - 1630 - 1730

Field Conditions:

Air Temp: +4°C - +6°C  
Precipitation: None  
Winds: Slightly Windy  
General: Overcast  
Ice Melt: Very Little

Station #	Rate of Flow	Snow Conditions
1	6", good clear flow (am) -fast (pm)	banks snow covered
2	6", good clear flow (am)	most ditch snow covered
4	fast, turbid	banks, snow covered
20	6", clear flow	" " "
21	1", clear flow	" " "
22	deep, turbid to top of gabion basket	" " "

Notes on Sampling Techniques:

Station # 1 - cedar clump  
# 2 - 66m downstream from fence  
# 4 - Bridge with bucket  
#20, #21 - Outlet  
#22 - At constriction

Water samples for March 20th/82 were kept on ice and taken in boxes to M.O.E. on March 22/82 (am).

Date: Sunday, March 21, 1982

Field Sampling and Observation Times: 0900 - 1825

Sample Run # 1 - 0900 - 1050  
2 - 1215 - 1350  
3 - 1445 - 1650  
4 - 1700 - 1825

Field Conditions:

Air Temp: 0°C - +1°C  
Precipitation: Foggy, drizzle(am) freeze rain, snow (pm)  
Total 1mm rain and 0.4cm snow on March 21/82.  
Winds: 50 km (pm)  
General: Overcast  
Ice melt: Very Little  
Station 12 - no water flow at 1015 am

Station #	Rate of Flow
1	slow
2	slow
4	slow
5	slow
12	fast
20	slow(am)-fast(pm)
21	fast(am)-slow(pm)
22	slow

Sampling Techniques Station # 2 - 50m D.S. from fence  
4 - bridge  
5 - 16m below fence  
12 - 50m below bridge

Water samples for March 21<sup>st</sup> /82 were kept on ice and taken in boxes to M.O.E. on March 22<sup>nd</sup> /82 (am).

Date: Monday, March 22nd, 1982

Field Sampling and Observation Times: 0730 - 1840

Sample Run # 1 - 0730 - 0910  
2 - 1040 - 1215  
3 - 1450 - 1630  
4 - 1730 - 1840

Field Conditions:

Air Temp: 1° - 2°C (am) only temp recorded  
Precipitation: Winds: None  
General: Windy (am) - breezy (pm)  
Ice Melt: sunny, clear (am)  
sunny, cold-cool (pm)  
very little  
Station # 3 - water beginning to show  
- drain on s. side road 1/3 full of water.

Station #	Rate of Flow	
	am	pm
1	moderate	fast-slowng
2	slow	mod-slowng sampled 50m downstream from site
4	moderate	mod-slowng no visible runoff
5	moderate	mod-slowng no visible runoff
12	fast	fast-slowng sampled 50m downstream from site
20	moderate	moderate
21	fast	moderate
22	moderate	moderate-gauge reads 3.2

Sampling Techniques:

Water samples for March 22<sup>nd</sup> /82 were kept on ice and delivered to M.O.E. in boxes on March 24<sup>th</sup> /82 (am).

Date: Tuesday, March 23, 1982

Field Sampling and Observation Times: 1325 - 1525

Sample Run: 1325 - 1525

Field Conditions:

Air Temp: 4°C - 5°C (pm)

Precipitation: None

General: Sunny (pm) - sunny with clouds (pm)

Ice Melt: Very little except at Station #3. A lot of water draining from farm fields.

Station #	Rate of Flow
1	slow
2	slow
3	slow
4	slow
5	slow
12	fast
20	slow -water level increasing
21	fast -water level increasing
22	fast-water level up by 1¼"

Sampling Technique: Station #12 - 16m downstream from lane.

Water samples for March 23rd/82 were kept on ice and delivered in boxes to M.O.E. on March 24/82 (am).

Date: Tuesday, March 30, 1982

Field Sampling and Observation Times: 1250 - 1500

Field Conditions:

Air Temp: -4°C to +11°C

Precipitation: 20.6mm rain

Winds: —

General: —

Ice Melt: Very little snow melt except at 4, 5, 20, 21, 22

Station #	Rate of Flow
1,2	shallow, slow
3	slow
4,5	moderate
6	moderate
12	moderate
20, 21, 22	moderate

Sampling suspended from March 24<sup>th</sup> - 29<sup>th</sup>.

Water samples for March 30<sup>th</sup> were kept on ice and delivered to M.O.E. on March 31/82 (am).

Date: Wednesday, March 31st, 1982

Field Sampling and Observation Times: 1224 - 2100

Sample Run # 1 1224 - 1515  
2 1900 - 2100

Field Conditions:

Air Temp:- 4°C to +14°C  
Precipitation: 5.0mm (am, early pm)  
Winds: windy  
General: Light rain, sunny intervals  
Ice & Snow Melt: Well underway, snow gone from many fields, most drains open some still with ice & snow cover and water beneath, some field valleys runoff overtop of snow.

Water samples for March 31st/82 were kept on ice and delivered in boxes to M.O.E. on April 1<sup>st</sup> /82 (am).

Station#	Flow	Notes
1	fast	- road damming water upstream - banks overflowed - culvert 40% full
2	fast	- water level 2cm below top of bank - sample site - downstream from road
3		- flooding of streambank upstream from road into field. - sample from side of road.
4	fast	- whole valley flooded up to manure pile - no sample taken second set(would not be meaningful to assess manure runoff).
5	fast	- as for 4 - no samples taken.
6	fast	- water level to bank top.
7,8		- some melting
9,10,11	fast	- lots water in field upstream of road. - culvert 25% full at 10.
12	fast	- ice & snow overtop most of channel - much water in drain - bucket (2005)
13		- water running on top of snow in channel. - muddy
14		- water 45cm wide x 3cm deep.

Date: Wednesday, March 31st, 1982

Station #	Rate of Flow	Notes
15	fast	
16	moderate	- snow along bank margins in stream, water within banks. - bucket(2030)
19		- sample from a crack in ice & snow
20,21	fast	
22	fast	- water well over sediment basin tile.

Date: Thursday, April 1, 1982

Field Sampling & Observation Times: 0900 - 1800

Sample Run #            1 - 0900 - 1145  
                                 2 - 1250 - 1545  
                                 3 - 1445 - 1800

Field Conditions:

Air Temp:                -4°C to -6°C  
Precipitation:         Trace snow  
Winds:                    25km - 40km  
General:                Overcast with sunny intervals  
Ice & Snow Melt:      In progress

Station #	Rate of Flow	Notes
1	fast	- flooding over banks
2	fast	- flooding over banks
3	moderate	- culvert 40% full- water level above summer bank
4	moderate	- water level to top of rock retainer walls
5	moderate	- no effluent apparent- water level above summer bank
6	slow	- water level culvert 50% full- no flooding
7	moderate	- culvert not visible - very turbid
8 (fence)	slow	- clearer than 7 - stream flow covered with snow at fence
9	fast	- shallow, no definite channel
10	fast	- no definite channel - turbid
11	fast	- culvert not visible - more defined channel - water up bank - turbid
12	fast	- culvert 20% full
13	fast	- shallow
14	fast	- shallow
15	fast	- shallow
16	moderate	- culvert <50% full

Date: Thursday, April 1, 1982

Station #	Rate of Flow	Notes
19	moderate	- culvert 20% full
20	fast	
21	fast	- contrib. more water to basin
22		- flow over gabion baskets
23	slow	
24	moderate	- tile 50% full
26		- tile 50% full

Note : The water samples were kept on ice and delivered in boxes to M.O.E. on April 2/82 (am).

Date: Friday, April 2, 1982

Field Sampling and Observation Times: 0940 to 1710

Sample Run # 1 - 0940 - 1300  
2 - 1345 - 1710

Field Conditions:

Air Temp: pm during field work +4°C to +7°C

No rain.

Sunny and cold in am, cloudy in pm.

Some melting of snow and ice in pm.

Station by Station Description of Conditions

Station #	Rate of Flow	Comments
1	mod. to fast	- culvert 50% full, just below top of bank pm.
2	mod. to fast	- good flow from field tiles.
3	moderate	- culvert 20% full, 6" below top of staff gauge.
4	deep, swift	- 0.3m below rock retaining walls.
5	moderate	- no overland flow.
6	moderate	- culvert 40% full, 8" below staff gauge.
7	shallow, swift	- flow confined to channel.
8	shallow, slow	- turbid, grassway snow covered.
9	shallow, fast	- turbid.
10	slow to fast	- culvert snow covered.
11	slow to fast	- turbid well below top of banks.
12	slow to fast	- culvert 20% full.
13	slow to fast	- clear water.
14	slow to fast	- shallow depth, sampled end of pipe in pm.
15	mod. to fast	- shallow, clear, banks still snow covered.
16	slow to mod.	- culvert 10% full
17		- no water on cement
18		- no water

Date: Friday, April 2, 1982

Station #	Rate of Flow	Comments
19	slow to fast	- slightly turbid, banks snow covered.
20	mod. to fast	- level well below top of banks
21	moderate	- turbid
22	moderate	- above level of gabion basket.
23	slow	- from tile.
24	slow	- from tile.
25	slow	- from tile.
26	slow	- from tile.

Samples were kept on ice and delivered to London M.O.E. lab at noon April 5/82.

Date: Saturday, April 3, 1982

Field Sampling and Observation Times: 0920 to 1700

Sample Run # 1 0920 - 1225  
# 2 1440 - 1700

Field Conditions:

Air Temp: +1°C to +9°C during field work.

Precipitation: 14mm (light) rain 6 to 8:00 hrs. turned to snow by 1600 hrs. 0.6cm of snow. Overcast, cool and windy day. Most of winters snow had melted, water was sitting in fields.

Station by Station Description of Conditions

Station #	Rate of Flow	Comments
1	quickly	- little water dammed upstream, culvert 30% full.
2	quickly	- all of flow is within stream banks.
3	slow	- culvert 50% full, water .6m below top of bank.
4	swift	
5	swift	
6	moderate	- water within 0.6m of top of cement box culvert under road.
7	moderate	- water very turbid, sheet of water 2m wide-shallow
8	moderate	- water very turbid, sheet of water 2m wide-shallow
9	swift	- very turbid, temperature dropping
10	swift	- very turbid
11	very swift	- culvert 20% full
12	swift	-
13	swift	- snow falling, cold wind pm
14	moderate	
15	swift	
16	slow	- sampled east side of road, river water up to steel tile outlet
19	moderate	- water in river 50 cm deep.
20	moderate	- bucket sample
21	very swift	- bucket sample
22	moderate	- ice forming on pools in fields 1700 hrs

Date: Saturday, April 3, 1982

Station by Station Description of Conditions

Station #	Rate of Flow	Comments
24	slow	
26	swift	- tile 33% full

Samples were kept on ice and delivered to London M.O.E. Lab at noon April 5, 1982.

Date: Tuesday, April 13, 1982

Field Sampling and Observation Times: 1055 to 1505 - 1 set of samples just as rain event ended.

Field Conditions: Air Temp. during sampling +3°C to +11°C. Cooler in pm than in the am. Overcast and windy.

Precipitation: light showers late pm April 12/82, heavier 0900 to 1100 on April 13<sup>th</sup>, stopped by 1230, 4 mm at London.

Station by Station Description of Conditions

Station #	Rate of Flow	Comments
1	fast	- culvert 50% full, turbid, temp +11°C
2	fast	- water level well below tops of banks
3		- water level at top of staff gauge, culvert 30% full
4	fast	- turbid, flow only 30cm below top of retaining wall, temp. dropped by 6°C.
5		- deep turbid flow, some water in fields.
6	moderate	- box culvert 50% full, turbid, rainy
7	fast	- turbid, rainy
8	fast	- no defined channel
9	fast	- no defined channel, shallow, windy
10	fast	- culvert 10% full
11	fast	- culvert 10% full
12	fast	- culvert at road 20% full, turbid
13		- pool overflowing at sides, clear, temp. dropped to 3°C in the pm
14	fast	- water flowing around pipe
15	fast	- banks still snow packed
16	moderate	- culvert 20% full
19	moderate	- turbid, deep
20	moderate	- turbid, deep
21	fast	- shallow, turbid
22		- water flowing over gabion baskets
23		- tile outlet 50% full, clear
24		- tile outlet 10% full, clear
25		- tile outlet 10% full, clear
26		- tile outlet 30% full, clear

Samples were kept on ice and were delivered to M.O.E. London lab on the morning of April 14/82.

Date: Saturday, April 17, 1982

Field Sampling and Observation Times: 0955 to 1530

Sample Run # 1 - 0955 to 1300  
# 2 - 1340 to 1530

Sampling at and during the end of a 21 hour rainfall period - two sets of samples.

Field Conditions: Air temp. during sampling 15-17°C.  
Precipitation: light rain during sampling and off and on since 1800 on April 16. Rain stopped before sampling ended. Rain on April 26 - 9.4mm, April 17 - 2.6mm.

Station by Station Description of Conditions

Station #	Rate of Flow	Comments
1	swift	- muddy, culvert 30% full, not raining at 1000
2	swift	- light rain 1545 hrs.
3	slow	- muddy input from field tile
4,5	moderate	- some manure runoff
6	moderate	- turbid
7,8	slow	- turbid
9	moderate	- shallow water fairly clear
10	moderate	- water becoming murky 1120
11	moderate	
12	swift	- water at normal level
13	moderate	- water fairly clear, ice chunks in water
14	swift	- water fairly clear
15		- cloudy, windy, drizzling 1300 hrs.
16	moderate	- culvert 25% full
18 to 22	moderate	- turbid
23,24	moderate	- clear
25,26		- clear

Samples were kept on ice and were delivered to the M.O.E. London lab on morning of April 19, 1982.

Date: Tuesday, April 20, 1982

Field Sampling and Observation Times: 0750 to 1710

Sampling Run # 1 - 0750 to 1105  
# 2 - 1350 to 1710

Sampling during end of an 18 hour rain event - 2 sets of samples.

Field Conditions: 9°C, rain & drizzle (am), 10-12°C, rain & light breeze (pm).  
Precipitation: rain during night April 19 1.2mm; rain during much of day April 20 until 1730, 13.9mm.

Station by Station Description of Conditions

Station #	Rate of Flow	Comments
1	fast	- culvert 15% full am, 50% full pm
2	fast	- stream 2m wide, 30cm deep in centre, rain in am & pm
3		- culvert 10% full am, 20% full pm
4		- sampled east side of bridge, water level 60cm below top of retainer wall
5		- plume of manure runoff along south bank entered stream via roadside ditch, sampled from south bank at cattle crossing
6	moderate	- water level 1m below top of box culvert
7& 8		- water turbid, flow 2m wide x 3-5 cm deep
9		- shallow only sampled in pm
10		- culvert 10% full am, water primarily from underground drain
11	fast	- water in stream 1.5m wide x 10cm deep
12	fast	- culvert 10% full am, 15% full pm
13		- water ponded around drop inlet sample there, no water in grass waterway
14	fast	- flow from drop inlet
15	fast	- shallow flow
16		- culvert 5% full am, 10% full pm
19	moderate	- in channel water 2m wide x 10cm deep
20	moderate	- flow 3m wide x 10cm deep
21	swift	- very turbid, flow 2m wide x 10cm deep

Date: Tuesday, April 20, 1982

Station by Station Description of Conditions

Station #	Rate of Flow	Comments
22	moderate	- turbid, water to level of gabion that crosses the sediment basin
23		- turbid, tile 25% full
24		- tile 10% full
25		- clear, tile 3% full
26		- clear, tile 20% full

Samples were kept on ice and were delivered to the M.O.E. London lab on the morning of April 21, 1982.