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ANNUAL CONSTRUCTION REPORT

1981 - 82

FIELD INVESTIGATIONS
CONSTRUCTION, UPGRADING
AND MAINTENANCE FOR
ONTARIO REGION

Direction
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intérieures

Region de
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DEPARTMENT OF THE ENVIRONMENT
INLAND WATERS DIRECTORATE
WATER RESOURCES BRANCH

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FIELD INVESTIGATIONS
CONSTRUCTION, UPGRADING
AND MAINTENANCE FOR
ONTARIO REGION

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INTRODUCTION

This annual construction report, prepared by the Ontario Region of the Water Resources Branch, is for the fiscal year 1981-1982.

The purpose of this report is to detail the construction activities associated with the installation of hydrometric stations required to compile and provide data for interested public and/or private agencies.

Funds for the construction activities, which include reconnaissance, construction, upgrading and maintenance, are provided under the Federal-Provincial Cost-Sharing Agreement.

Construction activities are divided into four categories:

1. FIELD INVESTIGATIONS (F)

Reconnaissance, surveys, preparation of plans, meetings and correspondence to obtain approval to construct hydrometric installations on private or public land.

2. CONSTRUCTION (C)

Installation of stilling wells, intakes, instrument shelters, artificial controls, cableways, access roads, and instrumentation.

3. UPGRADING (U)

Construction of controls, erection of larger shelters to house more sophisticated instruments, installation of electrical and telephone service at existing stations, installation of sediment sampling apparatus and other appurtenances.

4. MAINTENANCE (M)

General maintenance (except minor repairs done by hydrometric staff).

CONSTRUCTION METHODS AND PROCEDURES, MATERIAL AND EQUIPMENT

WELL CONSTRUCTION

STILLING WELLS FOR STREAMFLOW GAUGES

These are in-bank installations of 2.0 mm thickness, 800 mm diameter galvanized "Hel-Cor" pipe. Fabrication of the stilling well is done at Regional Headquarters at a local shop and consists of welding in a 4.2 mm steel bottom and a 50.8 mm galvanized tee and coupling for attachment of intake pipes, gate valve and stand-pipe. (See Figure 1).

At the job site, while the excavating is underway, the lower intake, valve, valve handle extension and heating cable are all attached to the well ready for installation. When the excavation is at the required depth this whole apparatus, with the intake supported by 2.9 mm wire, is picked up by the excavating machine and lowered into the hole. The well is held plumb by guylines while the machine places backfill equally around the well. When the backfill reaches the 50.8 mm coupling the upper intake is attached and supported by suitable timbers or posts to maintain a horizontal position while the rest of the fill is placed.

When the lower intake exceeds 20.1 M in length, additional sections of 6.7 M are connected from a boat or raft before the backfilling is started in order to lift the end of the 20.1 M length above the water surface to make these connections, after which normal backfilling takes place.

4.

If a concrete pad is to be poured for the erection of a walk-in shelter, all the backfill above the water line is compacted at 30 cm intervals with a mechanical tamper. (See Figure 2)

WALK-IN SHELTER FOR BUBBLE GAUGES

An "Armco" walk-in shelter mounted on a poured-in-place concrete pad is used for the installation of stacom servomanometer

The bubble tube is buried in the bank and supported in the river inside a length of steel conduit. This conduit is buried in the bank at one end and fastened securely to two steel fence posts driven into the river bottom. (See Figure 3)

STILLING WELLS FOR TIDES AND WATER LEVEL GAUGES

This type is fabricated by welding a 900 mm diameter, 2 mm thick galvanized "Hel-Cor" pipe and a 1600 mm diameter, 2 mm thick galvanized "Hel-Cor" pipe to a common 8 gauge steel bottom. A 1.5 M long 50.8 mm diameter intake pipe is attached to a 50.8 mm tee with a 50.8 mm gate valve and stand-pipe. (See Figure 4)

The stilling well is lowered over the side of the dock and while resting plumb and evenly on the bottom it is secured to the dock by a cable while the top is formed to accommodate an "Armco" house. Concrete is placed and fills the 30.5 cm space between the two pipes from the bottom of the well to the top of the formwork.

INLET SYSTEMS

LOWER INTAKE (ACTIVE)

The lower intake is a 50.8 mm diameter galvanized steel pipe screwed into a 50.8 mm galvanized steel tee that is welded onto the inside of the well 230 mm up from the bottom which allows room to screw the 50.8 mm bronze gate valve on the inside and also leaves a 230 mm sediment sump at the bottom of the well. A Pyrotenax heating cable of suitable length is installed from the end of this intake up the stand-pipe through a 50.8 mm X 12.7 mm X 12.7 mm double tapped bushing and connected to a number 4688 "Pyrotenax" thermostat (where electricity is available). The length of this lower intake is determined by the distance the stilling well is set back from the waters edge and may vary from 3 M to 36 M or longer.

UPPER INTAKE (AUXILIARY)

The upper intake is a 50.8 mm galvanized steel pipe screwed into a 50.8 mm galvanized coupling that is welded onto the outside of the stilling well at a distance above the lower intake to be about 15 cm above the winter ice cover level.

FLUSHING

Flushing of the active intake is accomplished by attaching the discharge hose of a gasoline driven pump to the 50.8 mm tee at the top of the stand-pipe and with the valve in the well closed forcing water under pressure through the intake system.

INSTRUMENT SHELTERS

LOOK-IN SHELTER

The standard Guelph-Type look-in shelter is installed at all sites using the 800 mm diameter stilling well and where the instrumentation consists of the Stevens A-71 analogue recorder only. Where electricity is available a 30 ampere service is installed with well heating cable and thermostat, light and outlets. Propane "Cata-Dyne" heaters are used at stations where electricity is not available.

WALK-IN SHELTERS

Armco metal buildings from 1626 mm X 1626 mm X 2438 mm to 4876 mm X 3658 mm X 2438 mm in size are used at all sites requiring room for several instruments and/or personnel accommodation. These buildings are insulated, panelled and, where electricity is available, provided with a 60 ampere service complete with well heaters, baseboard heaters, thermostats, lights and outlets. Propane heaters or wood stoves are used where power is not available.

SEDIMENT SHELTERS

Bridge mounted manual sediment sampling equipment is housed in the Guelph-Type sediment sampler shelter.

ARTIFICIAL CONTROLS AND WEIRS

STEEL

Most controls are made from Armco steel sheeting type M581, 690 mm in width, 4.2 mm thick available in lengths from 1.83 M to 4.88 M.

The sections are cut and pointed on the job and driven into the stream bed with a hand operated pneumatic pile driver. The top is trimmed by flame cutting to approximately a 5 percent grade from the centre to each side and rip-rapped on the downstream side to prevent erosion.

CONCRETE

Some concrete controls and weirs of various designs are constructed. They are formed and poured-in-place in the stream bed.

TIMBER

Some timber controls used on small streams are constructed of preservative treated planks and plywood.

CABLEWAYS

WIRE ROPE

6 X 19 Independent Wire Rope Core right regular lay, preformed, galvanized, improved plow steel wire rope of 19.1 mm or 22.2 mm diameter, depending on the span, is used on most installations. Spelter or swaged sockets are installed on the ends of the wire rope at the factory.

Tower backstays are of 9.5 mm or 12.7 mm guy strand and attached by means of preformed guy grips or cable clips.

TOWERS

The cable is supported on "A" towers made from 203 mm X 203 mm preservative treated timbers mounted on concrete pedestals or 101 mm X 101 mm galvanized "H" beams (19.35 kg/m wide flange) resting on a concrete footing or steel pad. Wooden or steel landing platforms are constructed where required.

ANCHORS

The cable is anchored at each end to a poured-in-place concrete block, rock anchor or steel deadman and equipped at one end with a turnbuckle for adjustment of sag.

CABLE CARS

Cable cars are two-man sit-down design constructed of plywood and galvanized steel and equipped with safety finger guards.

AIRCRAFT WARNING MARKERS

Where required, Department of Transport approved international orange coloured, spherical shaped aircraft warning markers are suspended on a separate 9.5 mm wire rope cable above the main cable. Cable towers are also painted international orange and white to Department of Transport specifications.

FITTINGS

Sockets, turnbuckles, thimbles, shackles, saddles, sheaves, wire rope clips and all other metal parts are hot-dipped galvanized.

EQUIPMENT

One standard full size station wagon equipped with 110 volt AC motor mounted electric generator, roof-top carrier, tailgate mounted vice, trailer hitch, heavy duty load lifters on rear suspension, and complete with safety screen for personnel protection, and one 3/4 ton crewcab pick-up equipped with fiberglass cap, 110 volt AC motor mounted electric generator, tailgate mounted vice and trailer hitch.

Two heavy duty boat trailers modified to carry wells, hydro poles, intake pipes and instrument shelters are used to transport equipment and material to the job site.

Tools include an air operated "Atlas Copco" pavement breaker equipped with a pile driving head, an electric "Skill" saw, electric 1/2 inch, 3/8 inch and 1/4 inch drills, electric hammer drill, 3 ton and 3/4 ton pullers, oxy-acetelene cutting torch and all other necessary hand tools.

PERSONNEL

All work was performed by the construction supervisor, construction foreman and assistant(s). Excavating equipment with operator, compressors, scuba divers, and other specialized services were rented on an hourly basis under service contract. Materials such as fill, concrete, rip-rap, and lumber, were purchased by service contract.

STATION COST BREAKDOWN

The following is an interpretation of the headings used in this report for station cost breakdown.

SALARIES

Engineers, Supervisor, Foreman, term employees and Hydrometric Personnel associated with field investigation, construction, upgrading and maintenance of the stations in this report.

MATERIALS/SUPPLIES

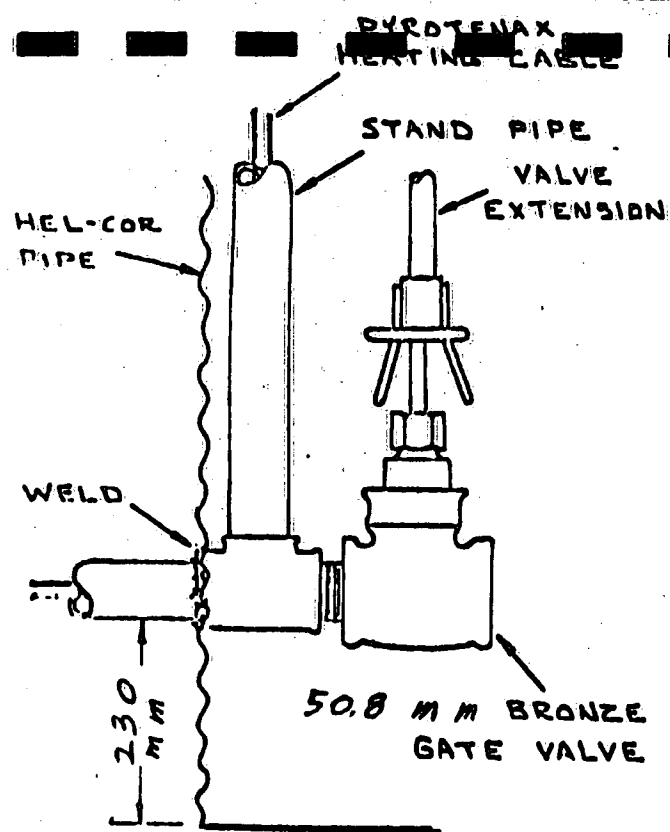
Stilling well, plumbing materials, electrical materials, concrete, instrument shelter, gravel, lumber, excavating machinery, rental equipment, steel, and contract services.

MEALS/ROOMS

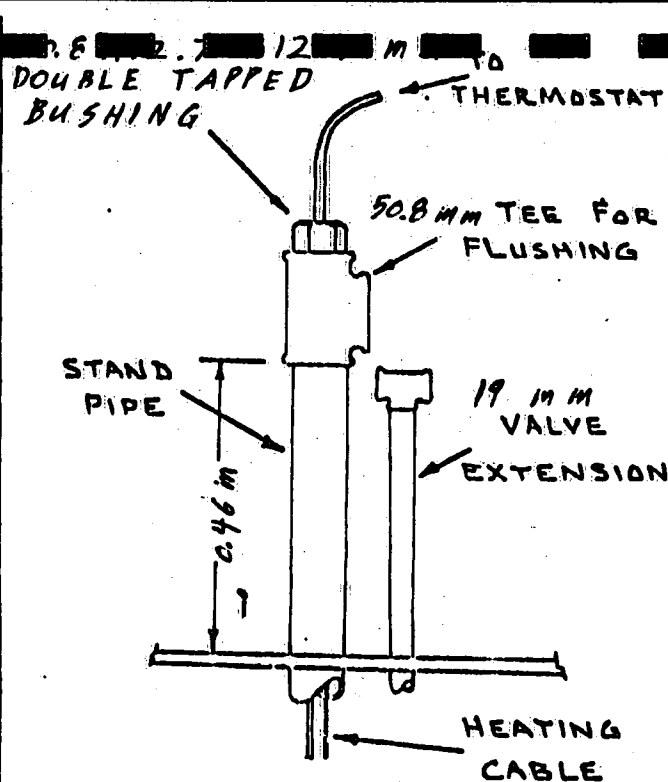
Living expenses for field personnel.

VEHICLES

Cost of operation and depreciation.



DETAIL 'A'



DETAIL 'B'

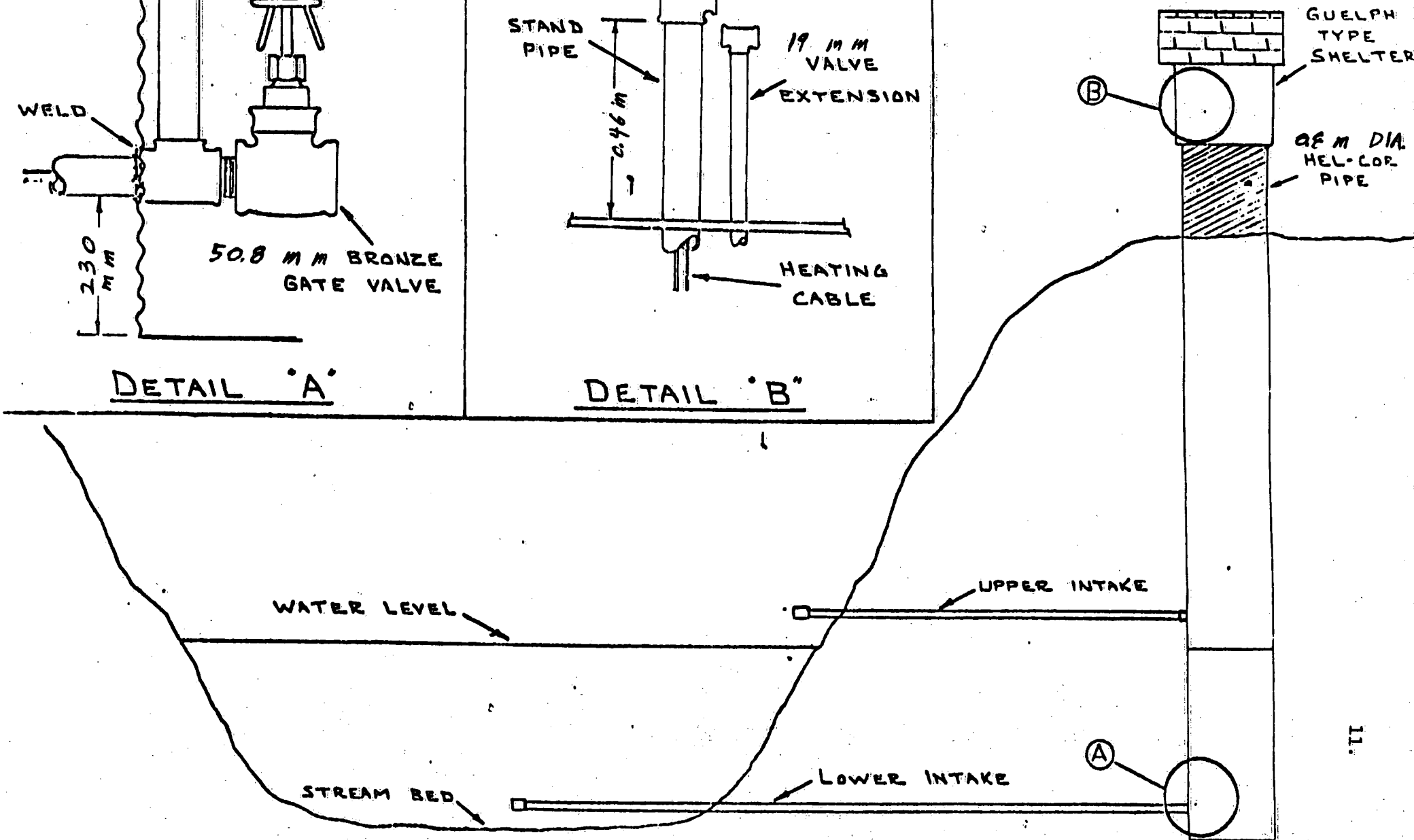


FIG. 1 INBANK STILLING WELL

FIG. 2

INBANK STILLING WELL
WITH ARMCO SHELTER

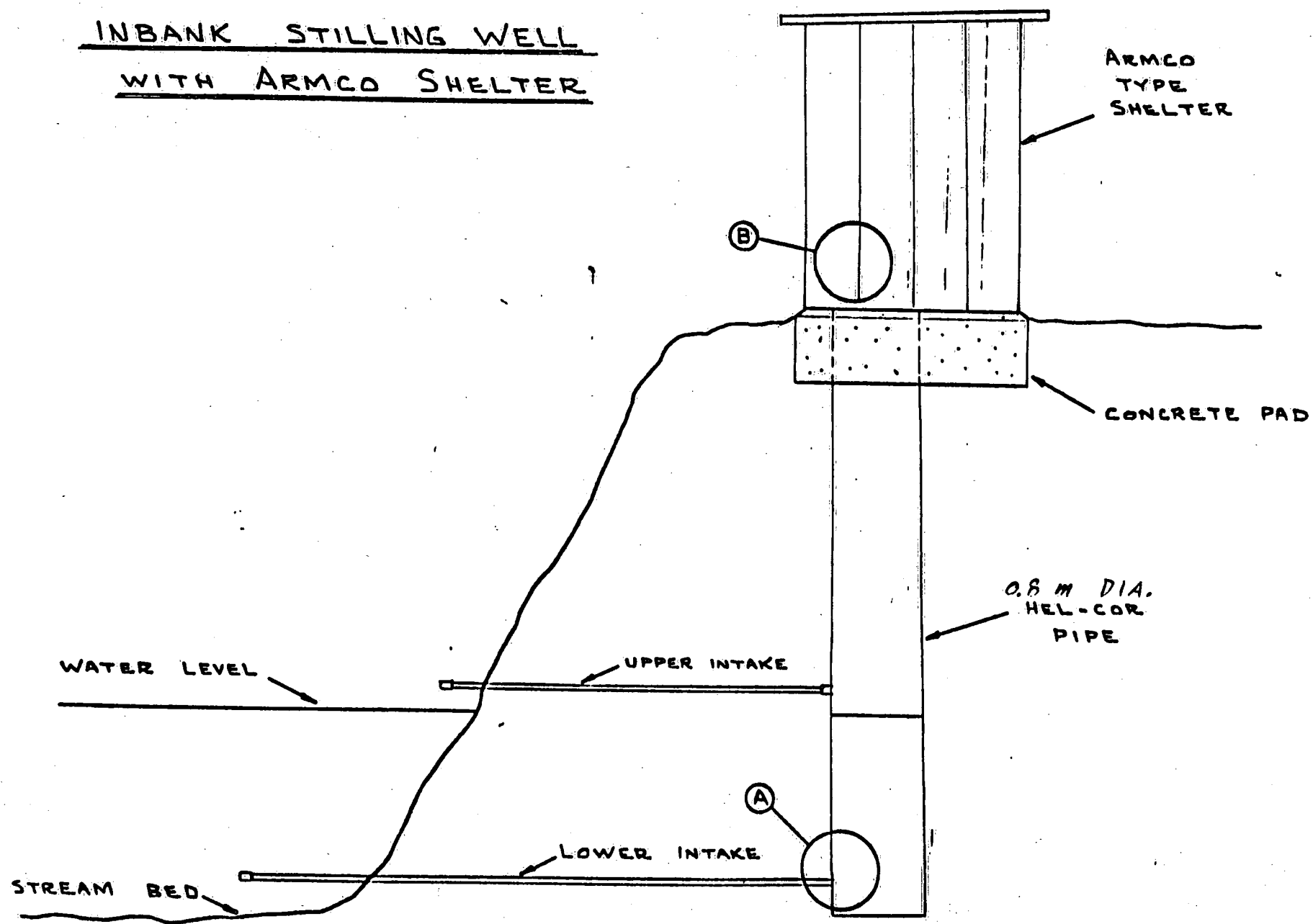
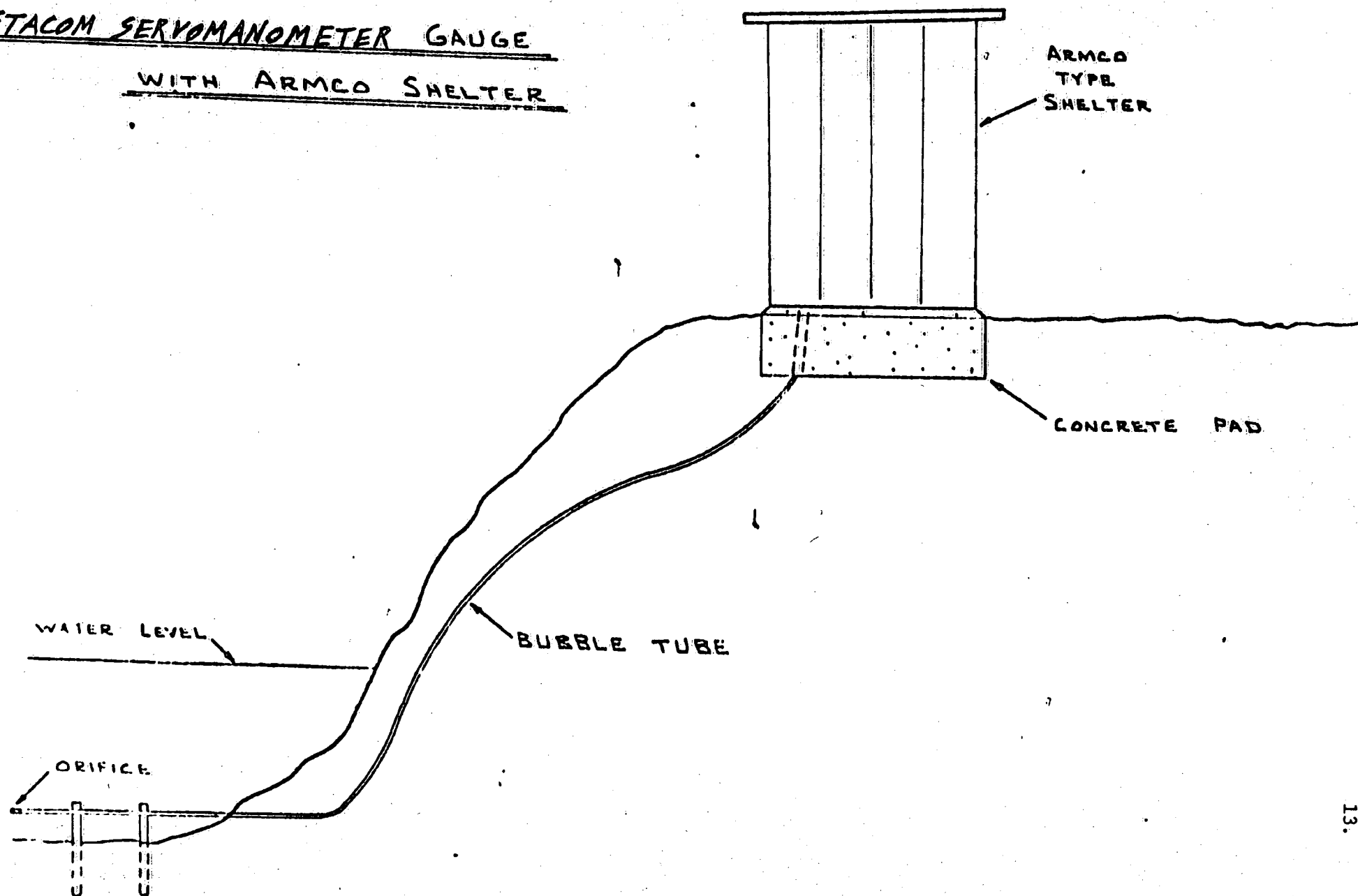


FIG. 3

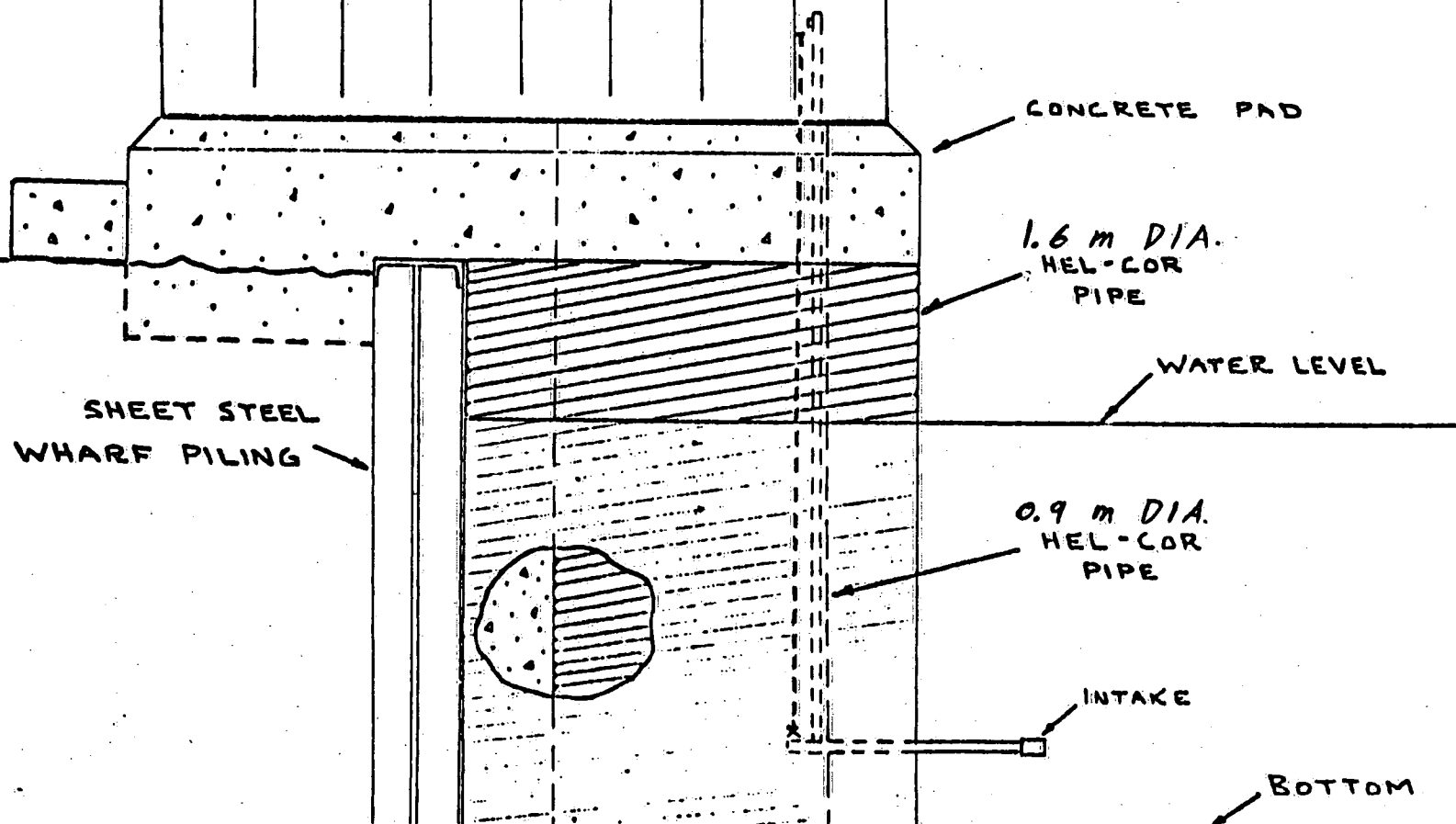
STACOM SERVOMANOMETER GAUGE
WITH ARMCO SHELTER

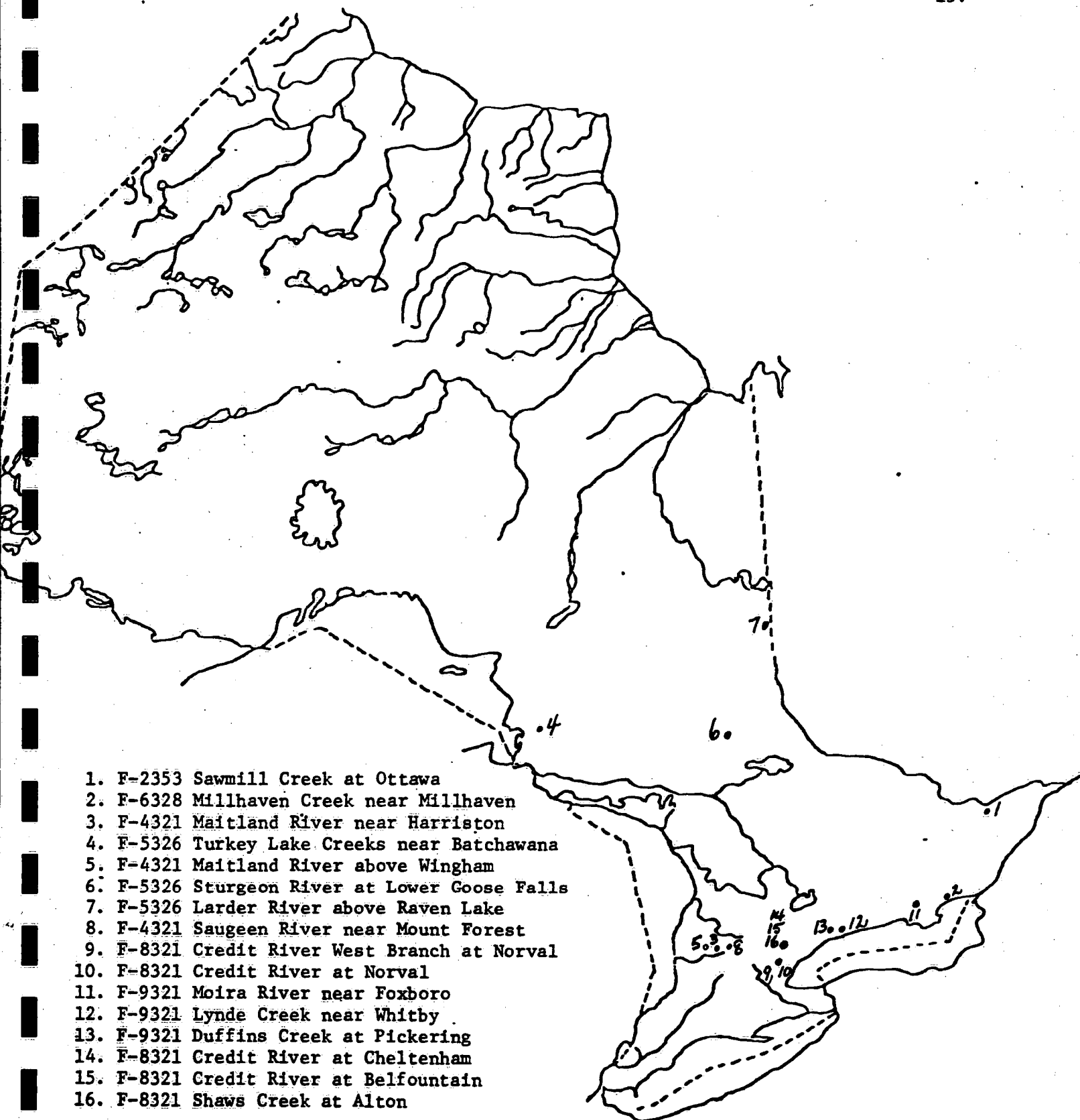


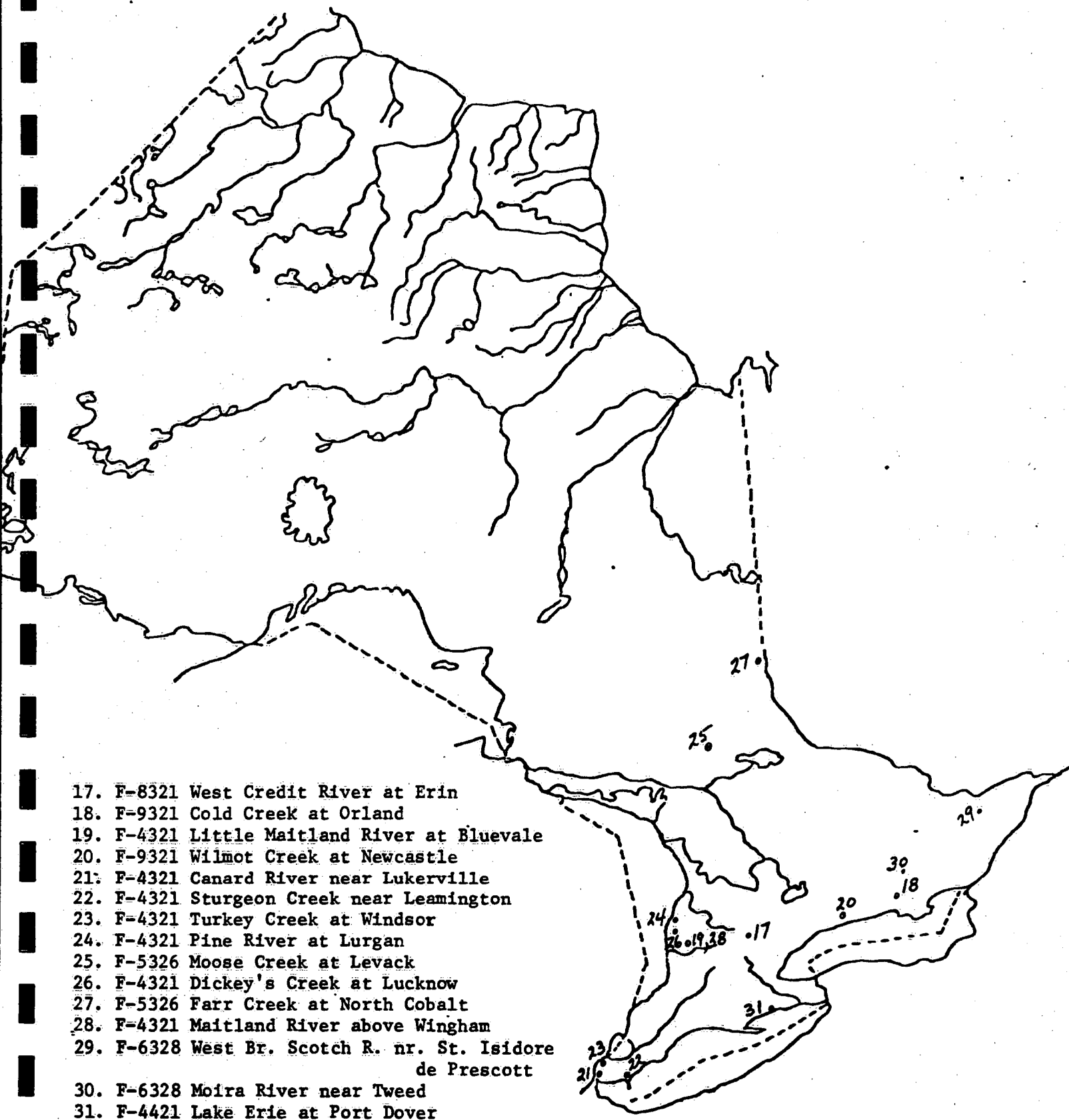
ARMCO
TYPE
SHELTER

FIG. 4

TIDES & WATER LEVEL GAUGE
WITH ARMCO SHELTER.







F - FIELD INVESTIGATIONS 1981-1982F-2353 Sawmill Creek at Ottawa

A field investigation and on-the-site meeting was held with representatives from the Ottawa Sub-Office, Robinson & Associates Consulting Engineers, and the City of Ottawa Works Department and a suitable site was selected for the installation of a hydrometric gauging station.

COST:

Salaries (1.20 Man-Weeks)	\$ 536.40
Meals/Rooms	235.90
Vehicles	<u>137.10</u>
Total	\$ 909.40

F-6328 Millhaven Creek near Millhaven

A field investigation was conducted to ascertain the cost of relocating this gauging station that was destroyed by ice during spring floods.

COST:

Salaries (0.05 Man-Weeks)	\$ 24.38
Meals/Rooms	-
Vehicles	<u>2.00</u>
Total	\$ 26.38

F - FIELD INVESTIGATIONS 1981-1982F-4321 Maitland River near Harriston

A field investigation and survey was conducted and a suitable site was selected for the installation of a hydrometric gauging station on this river.

COST:

Salaries (0.20 Man-Weeks)	\$ 110.00
Meals/Rooms	5.00
Vehicles	<u>23.90</u>
Total	\$ 138.90

F-5326 Turkey Lake Creeks near Batchawana Mountain

A field investigation was conducted at sites A, B, C, and D to ascertain cost of repairs and renovations to upgrade the accuracy of the stage-discharge relationship at these stations.

COST:

Salaries (1.20 Man-Weeks)	\$ 589.20
Meals/Rooms	241.65
Vehicles	<u>395.10</u>
Total	\$1,225.95

F - FIELD INVESTIGATIONS 1981-1982F-4321 Maitland River above Wingham

A field investigation was conducted with regard to the relocation of this gauging station because of new bridge construction. The Conservation Authority and the design engineers were visited and plans are to incorporate a gauging station beside the new bridge.

COST:

Salaries (0.02 Man-Weeks)	\$ 110.00
Meals/Rooms	5.00
Vehicles	<u>38.20</u>
Total	\$ 153.20

F-5326 Sturgeon River at Lower Goose Falls

A field investigation and survey was conducted with the Area Engineer and Officer-in-Charge of the North Bay office and a suitable site was chosen for the installation of a hydrometric and meteorological gauging station on this river.

COST:

Salaries (0.70 Man-Weeks)	\$ 338.25
Meals/Rooms	109.28
Vehicles (including aircraft)	<u>781.46</u>
Total	\$1,228.99

F - FIELD INVESTIGATIONS 1981-1982F-5326 Larder River above Raven Lake

A field investigation and survey was conducted with the Area Engineer and Officer-in-Charge of the North Bay office and a suitable site was chosen for the installation of a hydrometric and meteorological gauging station on this river.

COST:

Salaries (0.70 Man-Weeks)	\$ 338.25
Meals/Rooms	109.28
Vehicles (including aircraft)	<u>781.46</u>
Total	\$1,228.99

F-4321 Saugeen River near Mount Forest

A field investigation and survey was conducted with representatives of the Saugeen River Valley Conservation Authority and a suitable site was selected for the installation of a hydrometric gauging station. The work is to be done by the Authority.

COST:

Salaries (0.20 Man-Weeks)	\$ 110.00
Meals/Rooms	5.00
Vehicles	<u>24.00</u>
Total	\$ 139.00

F - FIELD INVESTIGATIONS 1981-1982F-8321 Credit River West Branch at Norval

A field investigation was carried out with the Area Engineer with regard to the proposed upgrading of this existing station to a walk-in shelter to accommodate additional telemetry equipment.

COST:

Salaries (0.08 Man-Weeks)	\$ 46.40
Meals/Rooms	6.04
Vehicles	<u>7.96</u>
Total	\$ 60.40

F-8321 Credit River at Norval

A field investigation was conducted with the Area Engineer and a suitable site was chosen for a hydrometric gauging station at this location proposed by the Credit Valley Conservation Authority.

COST:

Salaries (0.08 Man-Weeks)	\$ 46.40
Meals/Rooms	6.04
Vehicles	<u>7.96</u>
Total	\$ 60.40

F - FIELD INVESTIGATIONS 1981-1982F-9321 Moira River near Foxboro

An inspection was made by the Area Engineer and Construction Supervisor with regard to repairs and upgrading of this station.

COST:

Salaries (0.08 Man-Weeks)	\$ 46.40
Meals/Rooms	6.04
Vehicles	<u>7.96</u>
Total	\$ 60.40

F-9321 Lynde Creek near Whitby

An inspection was made by the Area Engineer and Construction Supervisor with regard to repairs and upgrading of this station.

COST;

Salaries (0.08 Man-Weeks)	\$ 46.40
Meals/Rooms	6.04
Vehicles	<u>7.96</u>
Total	\$ 60.40

F - FIELD INVESTIGATIONS 1981-1982F-9321 Duffins Creek at Pickering

An inspection was made by the Area Engineer and Construction Supervisor with regard to repairs and upgrading of this station.

COST:

Salaries (0.08 Man-Weeks)	\$ 46.40
Meals/Rooms	6.04
Vehicles	<u>7.96</u>
Total	\$ 60.40

F-8321 Credit River at Cheltenham

A field investigation was carried out with a representative of the Credit Valley Conservation Authority with regard to selecting a suitable site for a proposed future hydrometric gauging station at this location.

COST:

Salaries (0.04 Man-Weeks)	\$ 22.88
Meals/Rooms	1.00
Vehicles	<u>5.02</u>
Total	\$ 28.90

F - FIELD INVESTIGATIONS 1981-1982F-8321 Credit River at Belfountain

A field investigation was carried out with a representative of the Credit Valley Conservation Authority with regard to selecting a suitable site for a proposed future hydrometric gauging station at this location.

COST:

Salaries (0.04 Man-Weeks)	\$ 22.88
Meals/Rooms	1.00
Vehicles	<u>5.02</u>
Total	\$ 28.90

F-8321 Shaws Creek near Alton

A field investigation was carried out with a representative of the Credit Valley Conservation Authority with regard to selecting a suitable site for a proposed future hydrometric gauging station at this location.

COST:

Salaries (0.04 Man-Weeks)	\$ 22.88
Meals/Rooms	1.00
Vehicles	<u>5.02</u>
Total	\$ 28.90

F - FIELD INVESTIGATIONS 1981-1982F-8321 West Credit River at Erin

A field investigation was carried out with a representative of the Credit Valley Conservation Authority with regard to selecting a suitable site for a proposed future hydrometric gauging station at this location.

COST:

Salaries (0.04 Man-Weeks)	\$ 22.88
Meals/Rooms	1.00
Vehicles	<u>5.02</u>
Total	\$ 28.90

F-9321 Cold Creek at Orland

A field investigation was conducted with the Area Engineer and a representative of the Lower Trent Conservation Authority with regard to the proposed installation of this new location.

COST;

Salaries (0.40 Man-Weeks)	\$ 232.00
Meals/Rooms	83.86
Vehicles	<u>43.10</u>
Total	\$ 358.96

F - FIELD INVESTIGATIONS 1981-1982F-4321 Little Maitland River at Bluevale

A field investigation with representatives of the Maitland Valley Conservation Authority was carried out at this hydrometric gauging station with regard to upgrading to a walk-in shelter to accommodate additional instrumentation.

COST:

Salaries (0.20 Man-Weeks)	\$ 114.40
Meals/Rooms	5.00
Vehicles	<u>36.60</u>
Total	\$ 156.00

F-8321 Credit River at Norval

A field investigation was carried out with a representative of the Credit Valley Conservation Authority with regard to selecting a suitable site for a proposed future hydrometric gauging station at this location.

COST:

Salaries (0.04 Man-Weeks)	\$ 22.88
Meals/Rooms	1.00
Vehicles	<u>5.02</u>
Total	\$ 28.90

F - FIELD INVESTIGATIONS 1981-1982F-9321 Wilmot Creek near Newcastle

Quotations were requested from three local electrical contractors and the lowest bidder was retained to move the hydro meter up the service pole from ground level to eye level. The town of Newcastle widened the shoulder of the road in this area causing this problem.

A subsequent investigation was made to inspect this work and was found to be satisfactory.

COST:

Salaries (0.20 Man-Weeks)	\$ 171.60
Meals/Rooms	7.55
Vehicles	<u>58.50</u>
Total	\$ 237.65

F-4321 Canard River near Lukerville

A field investigation was conducted with the Area Engineer with regard to relocating this gauging station.

COST:

Salaries (0.27 Man-Weeks)	\$ 157.47
Meals/Rooms	44.77
Vehicles	<u>33.37</u>
Total	\$ 235.61

F - FIELD INVESTIGATIONS 1981-1982F-4321 Sturgeon Creek near Leamington

A field investigation was carried out with the Area Engineer with regard to re-establishing this station that has become inoperative due to the dredging of the creek by the Township.

COST:

Salaries (0.27 Man-Weeks)	\$ 157.47
Meals/Rooms	44.77
Vehicles	<u>33.37</u>
Total	\$ 235.61

F-4321 Turkey Creek at Windsor

A field investigation and on-the-site meeting was conducted with the Area Engineer and a representative from the Essex Region Conservation Authority with regard to establishing a hydrometric gauging station at this location.

COST:

Salaries (0.27 Man-Weeks)	\$ 157.47
Meals/Rooms	44.77
Vehicles	<u>33.37</u>
Total	\$ 235.61

F - FIELD INVESTIGATIONS 1981-1982F-4321 Pine River at Lurgan

A field investigation was conducted and a suitable site located about 1/4 mile upstream for the relocation of this gauging station that has become inoperative due to dredging downstream of the present location.

COST:

Salaries (0.10 Man-Weeks)	\$ 57.20
Meals/Rooms	2.50
Vehicles	<u>17.20</u>
Total	\$ 76.90

F-5326 Moose Creek at Levack

A field investigation was made with regard to location and permission to cross private property to construct and maintain this proposed hydrometric gauging station.

COST:

Salaries (0.20 Man-Weeks)	\$ 114.40
Meals/Rooms	45.45
Vehicles	<u>52.80</u>
Total	\$ 212.65

F - FIELD INVESTIGATIONS 1981-1982F-4321 Dickeys Creek at Lucknow

A field investigation was conducted with a representative of the Maitland Valley Conservation Authority and a suitable site was selected for the installation of a hydrometric gauging station.

COST;

Salaries (0.20 Man-Weeks)	\$ 114.40
Meals/Rooms	5.10
Vehicles	<u>29.70</u>
Total	\$ 149.20

F-5326 Farr Creek at North Cobalt

A field investigation was carried out to ascertain if a more suitable site could be found for relocation of this gauging station that is affected by a beaver dam as well as placement of gabion baskets by the municipality.

COST:

Salaries (0.10 Man-Weeks)	\$ 57.20
Meals/Rooms	13.67
Vehicles	<u>17.30</u>
Total	\$ 88.17

F - FIELD INVESTIGATIONS 1981-1982F-4321 Maitland River above Wingham

An on-the-site meeting was held with the bridge contractor with regard to scheduling of gauge relocation during new bridge construction.

COST:

Salaries (0.05 Man-Weeks)	\$ 28.60
Meals/Rooms	1.27
Vehicles	<u>8.80</u>
Total	\$ 38.67

F-6328 West Branch Scotch River near St. Isidore de Prescott

A field investigation was carried out with the construction foreman with regard to placement of gabion baskets to prevent further bank erosion.

COST:

NIL

F - FIELD INVESTIGATIONS 1981-1982F-6328 Moir River near Tweed

A field investigation was conducted with regard to the relocation of this station.

COST:

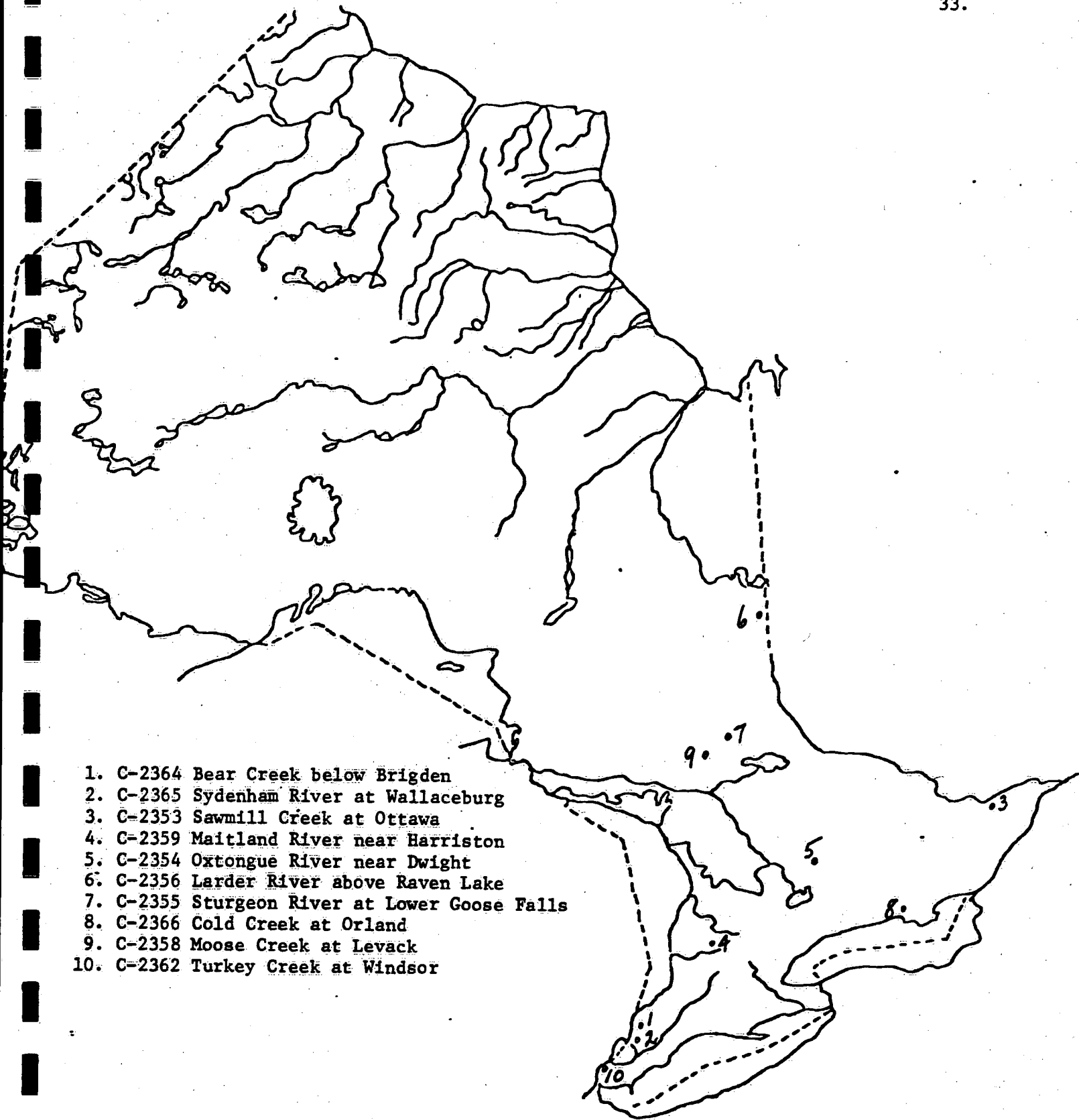
Salaries (0.40 Man-Weeks)	\$ 215.82
Meals/Rooms	30.80
Vehicles	<u>72.45</u>
Total	\$ 319.07

F-4421 Lake Erie at Port Dover

A field investigation was made to ascertain the materials necessary to replace the door of the instrument shelter.

COST:

Salaries (0.40 Man-Weeks)	\$ 215.44
Meals/Rooms	10.20
Vehicles	<u>38.40</u>
Total	\$ 264.04



C - CONSTRUCTION 1981-1982C-2364 Bear Creek below Brigden

Erected an insulated steel "Armco" walk-in shelter on a poured-in-place concrete pad. Installed a 110/220 volt 60 ampere electric service. Installed a bubble tube underground from the shelter to the river.

COST:

Salaries (2.00 Man-Weeks)	\$ 846.16
Materials/Supplies	1,689.55
Meals/Rooms	433.85
Vehicles	267.78
Instrumentation	<u>5,441.60</u>
Total	\$8,678.94

C-2365 Sydenham River at Wallaceburg

Installed a galvanized steel "Hel-Cor" stilling well and intakes. Erected an insulated steel "Armco" walk-in shelter on a poured-in-place concrete pad. Installed a 110/220 volt 60 ampere electrical service.

COST:

Salaries (2.50 Man-Weeks)	\$1,123.48
Materials/Supplies	2,545.95
Meals/Rooms	472.75
Vehicles	247.45
Instrumentation	<u>2,284.85</u>
Total	\$6,674.48

C - CONSTRUCTION 1981-1982C-2353 Sawmill Creek at Ottawa

Installed a galvanized steel "Hel-Cor" stilling well and intakes. Erected an insulated steel "Armco" walk-in shelter on a poured-in-place concrete pad. Installed a 110/220 volt 60 ampere electrical service.

COST:

Salaries (5.80 Man-Weeks)	\$2,494.48
Materials/Supplies	2,847.06
Meals/Rooms	1,082.30
Vehicles	487.81
Instrumentation	<u>2,284.85</u>
Total	\$9,196.50

C-2359 Maitland River near Harriston

Erected an insulated steel "Armco" walk-in shelter on a poured-in-place concrete pad. Installed a 110/220 volt 60 ampere electrical service. Installed a bubble tube underground from the shelter to the river.

COST:

Salaries (2.40 Man-Weeks)	\$1,072.80
Materials/Supplies	1,820.86
Meals/Rooms	232.55
Vehicles	243.50
Instrumentation	<u>5,441.60</u>
Total	\$8,811.31

C - CONSTRUCTION 1981-1982C-2354 Oxtongue River near Dwight

Installed a galvanized steel "Hel-Cor" stilling well and intakes. Erected an insulated steel "Armco" walk-in shelter on a poured-in-place concrete pad. Installed a 110/220 volt 60 ampere electrical service.

COST:

Salaries (3.00 Man-Weeks)	\$1,290.89
Materials/Supplies	3,195.97
Meals/Rooms	802.80
Vehicles	292.50
Instrumentation	<u>2,284.85</u>
Total	\$7,867.01

C-2356 Larder River above Raven Lake

Erected a steel "Armco" walk-in shelter on a bedrock and masonry foundation. Installed a bubble tube in protective metal conduit attached to bedrock from the instrument shelter to the river.

COST:

Salaries (3.20 Man-Weeks)	\$1,291.24
Materials /Supplies	1,150.39
Meals/Rooms	639.30
Vehicles	209.25
Instrumentation	<u>5,441.60</u>
Total	\$8,731.78

C - CONSTRUCTION 1981-1982C-2355 Sturgeon River at Lower Goose Falls

Erected a steel "Armco" walk-in shelter on a preservative-treated wooden platform. Installed a bubble tube underground from instrument shelter to the river.

COST:

Salaries (2.80 Man-Weeks)	\$1,158.32
Materials/Supplies	1,129.29
Meals/Rooms	603.80
Vehicles	171.60
Instrumentation	<u>5,441.60</u>
Total	\$8,504.61

C-2366 Cold Creek at Orland

Installed a galvanized steel "Hel-Cor" stilling well and intakes. Erected an insulated steel "Armco" walk-in shelter on a poured-in-place concrete pad. Installed a 110/220 volt 60 ampere electrical service.

COST:

Salaries (4.60 Man-Weeks)	\$1,773.28
Materials/Supplies	3,525.19
Meals/Rooms	1,046.13
Vehicles	427.90
Instrumentation	<u>2,284.85</u>
	\$9,057.35

C - CONSTRUCTION 1981-1982C-2358 Moose Creek at Levack

Erected a steel "Armco" walk-in shelter on a poured-in-place concrete pad. Installed a bubble tube in protective metal conduit underground from the instrument shelter to the river.

COST:

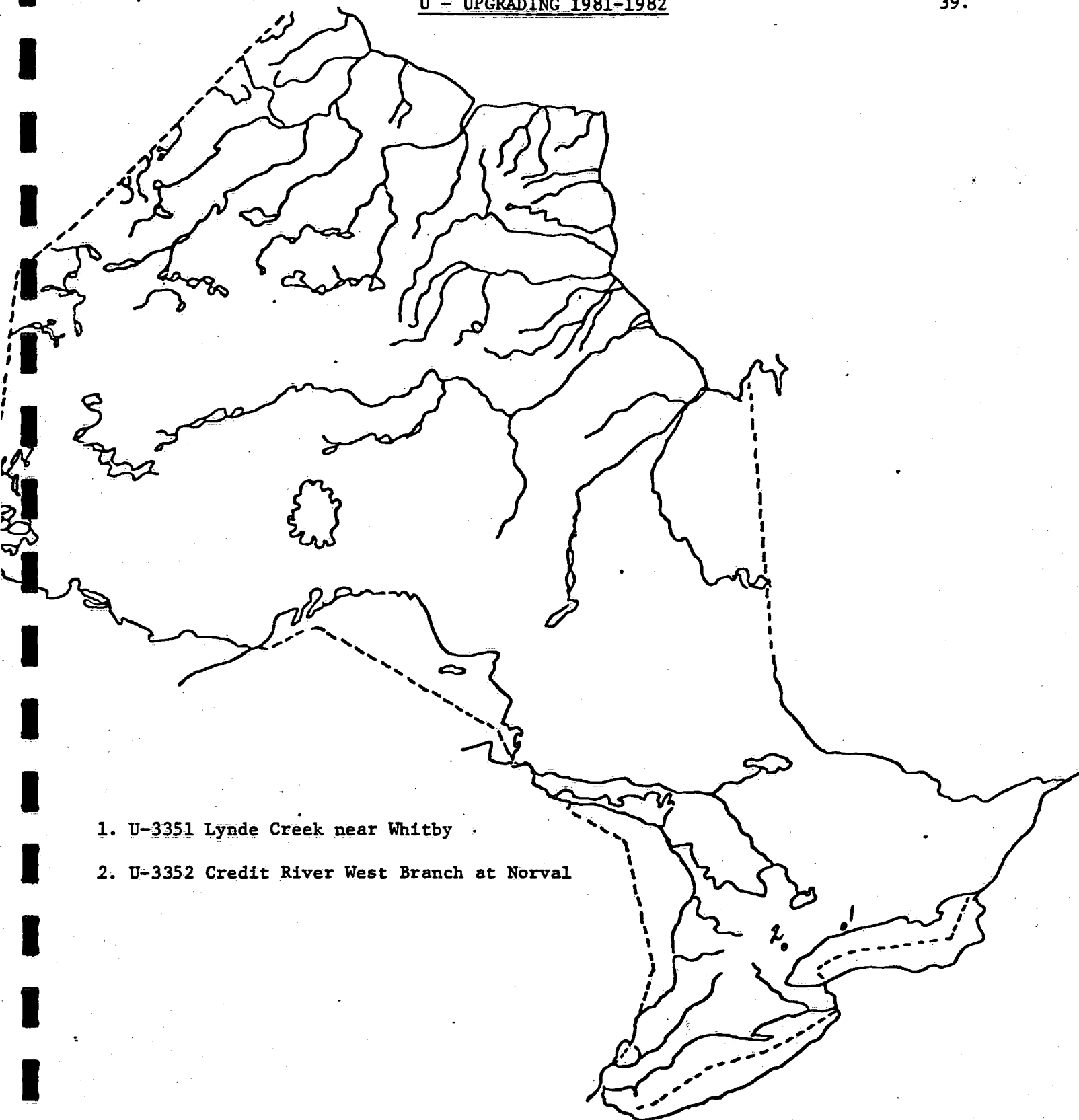
Salaries (1.60 Man-Weeks)	\$ 746.51
Materials/Supplies	1,058.65
Meals/Rooms	383.20
Vehicles	201.00
Instrumentation	<u>5,441.60</u>
Total	\$7,830.96

C-2362 Turkey Creek at Windsor

Erected an insulated steel "Armco" walk-in shelter on a poured-in-place concrete pad. Installed a 110/220 volt electrical service and intermediate 30' hydro pole. Installed bubble tube underground from the instrument shelter to the river.

COST:

Salaries (3.20 Man-Weeks)	\$ 1,580.00
Materials/Supplies	3,098.28
Meals/Rooms	757.85
Vehicles	511.80
Instrumentation	<u>5,441.60</u>
Total	\$11,389.53



1. U-3351 Lynde Creek near Whitby .
2. U-3352 Credit River West Branch at Norval

U - UPGRADING 1981-1982U-3351 Lynde Creek near Whitby

Erected an insulated steel "Armco" walk-in shelter on a poured-in-place concrete pad around the existing stilling well, replacing the existing Guelph-Type instrument shelter.

Installed a 110/220 volt 30 ampere electrical service.

COST:

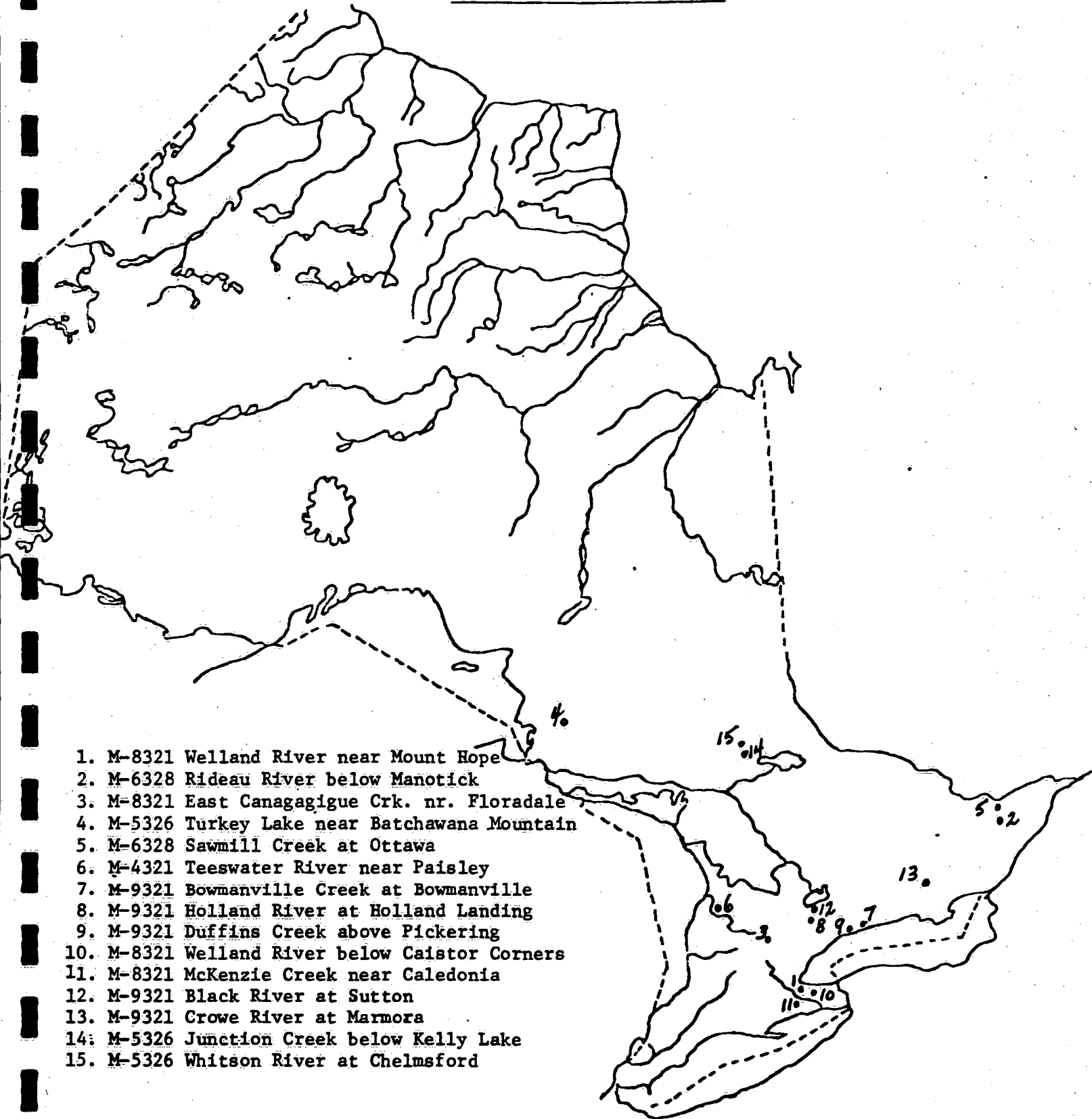
Salaries (3.00 Man-Weeks)	\$1,222.07
Materials/Supplies	1,415.44
Meals/Rooms	456.45
Vehicles	<u>224.50</u>
Total	\$3,318.46

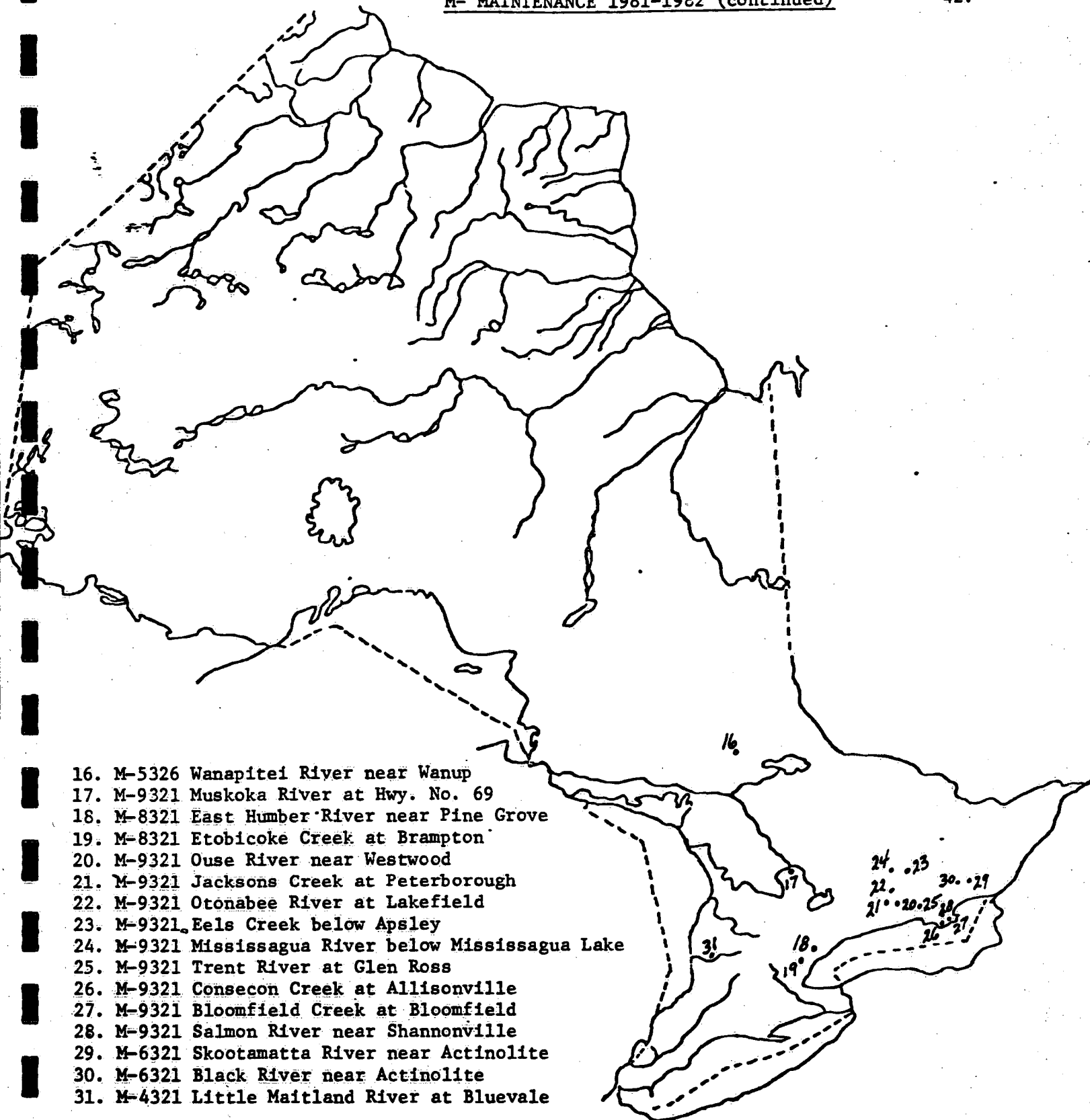
U-3352 Credit River West Branch at Norval

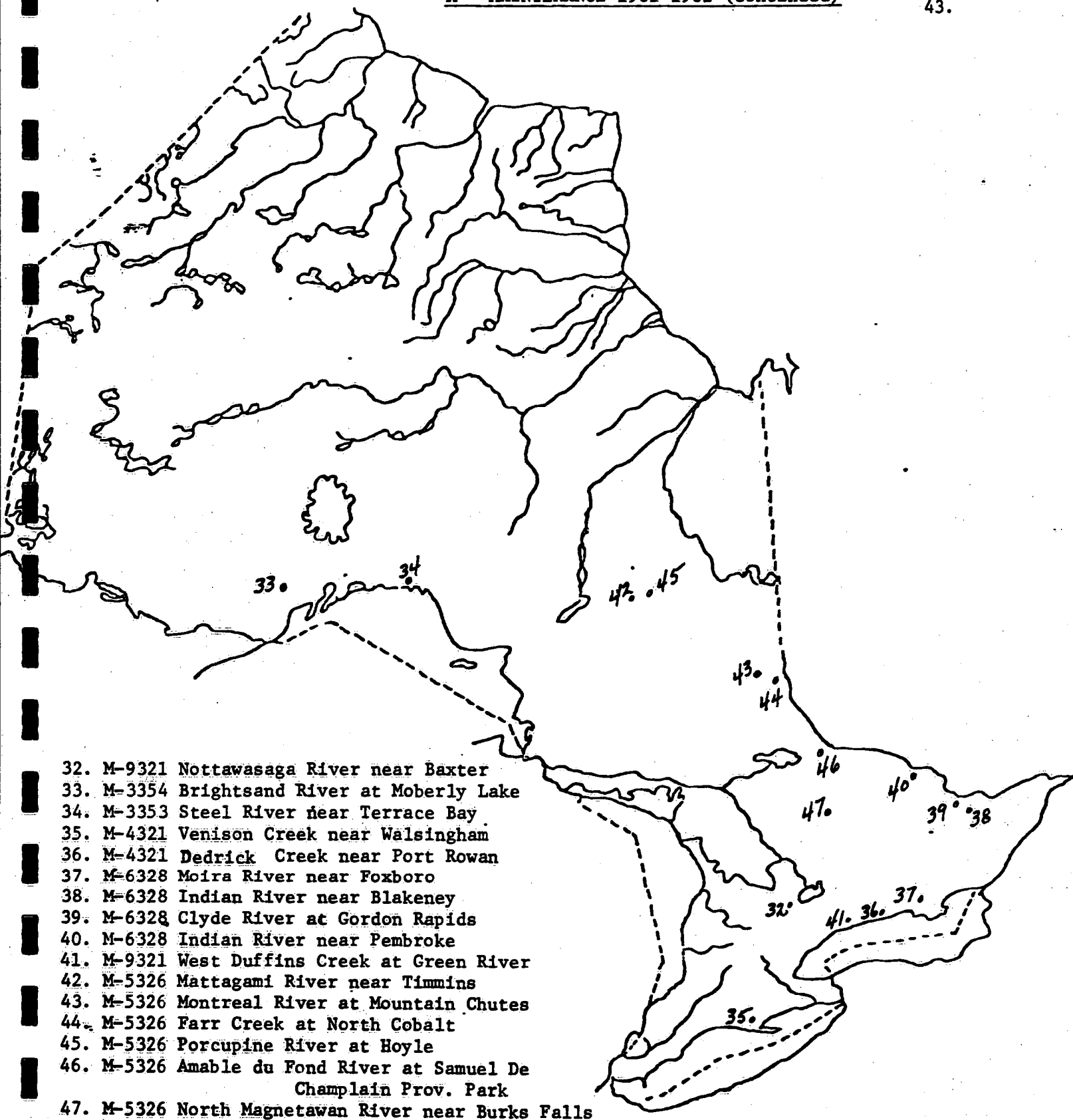
Erected an insulated steel "Armco" walk-in shelter on a poured-in-place concrete pad around the existing well, replacing the existing Guelph-Type instrument shelter. Installed a 110/220 volt 60 ampere electrical service.

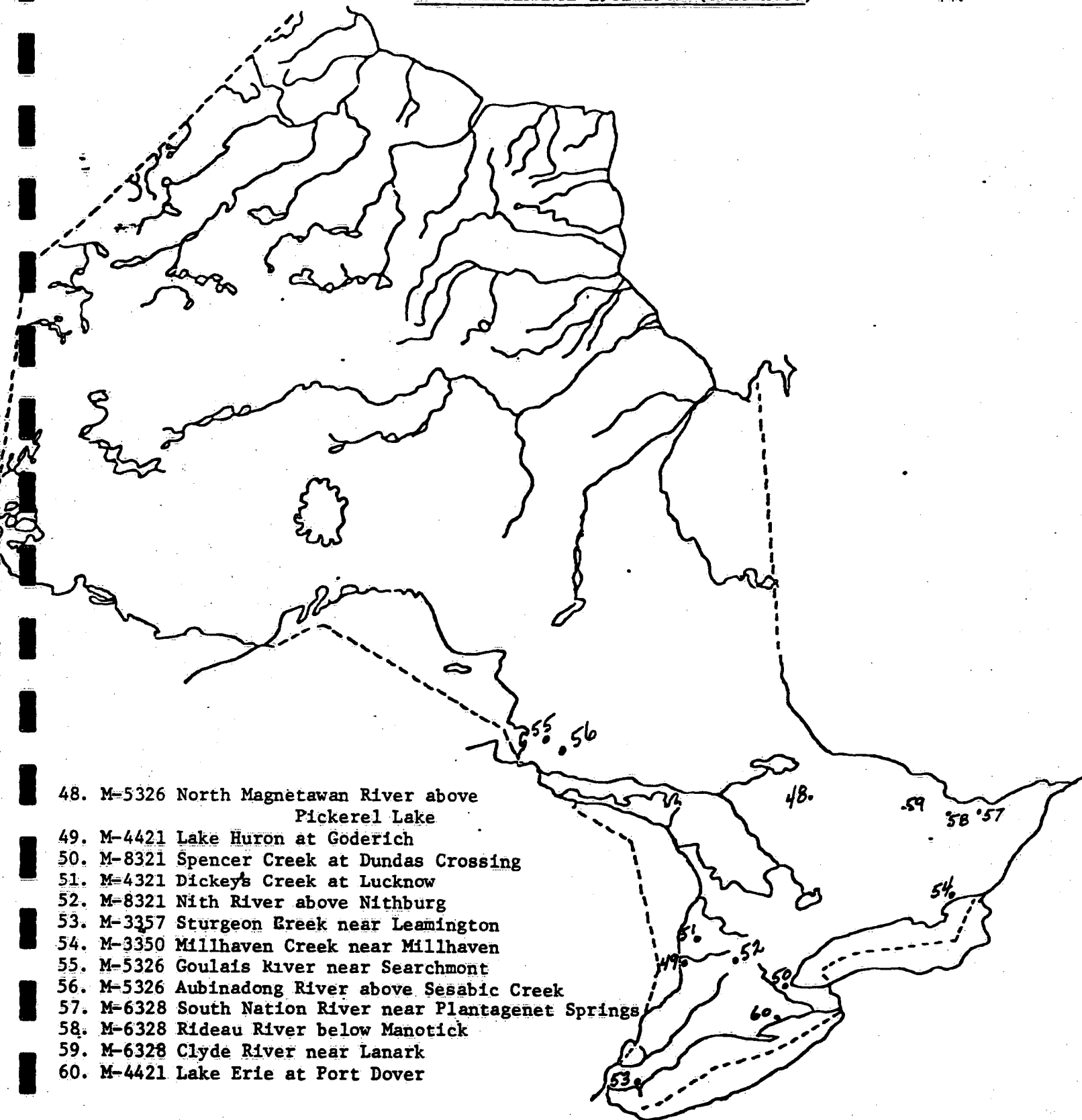
COST:

Salaries (3.80 Man-Weeks)	\$1,854.00
Materials/Supplies	1,932.79
Meals/Rooms	96.90
Vehicles	<u>256.90</u>
Total	\$4,140.59









M - MAINTENANCE 1981-1982M-8321 Welland River near Mount Hope

Silt was removed, intake pipe extended and flushed to correct blocked intake condition.

COST:

Salaries (0.40 Man-Weeks)	\$ 236.20
Materials/Supplies	4.38
Meals/Rooms	10.00
Vehicles	<u>16.60</u>
Total	\$ 267.18

M-6328 Rideau River below Manotick

The sag in the cableway was adjusted and safety rivets were installed in the turnbuckle.

COST:

Salaries (0.20 Man-Weeks)	\$ 98.20
Materials/Supplies	2.00
Meals/Rooms	10.00
Vehicles	<u>3.00</u>
Total	\$ 113.20

M - MAINTENANCE 1981-1982M-8321 East Canagagigue Creek near Floradale

A thermostat was installed to control the well heaters.

COST:

Salaries (0.10 Man-Weeks)	\$ 55.00
Materials/Supplies	53.75
Meals/Rooms	5.00
Vehicles	<u>6.60</u>
Total	\$ 120.35

M-5326 Turkey Lake Creeks near Batchawana Mountain

Repairs and renovations were made to the hydrometric gauging stations at sites A, B, C & D, to improve the accuracy of the stage-discharge curve.

COST:

Salaries (3.40 Man-Weeks)	\$1,407.76
Materials/Supplies	4,184.31
Meals/Rooms	729.15
Vehicles	<u>292.05</u>
Total	\$6,613.27

M - MAINTENANCE 1981-1982M-6328 Sawmill Creek at Ottawa

Replaced intake pipe and placed concrete to repair damage caused to intake pipe by tree carried down river by flash flood.

COST:

Salaries (1.20 Man-Weeks)	\$ 531.60
Materials/Supplies	406.00
Meals/Rooms	205.05
Vehicles	<u>181.65</u>
Total	\$1,324.30

M-4321 Teeswater River near Paisley

The broken valve handle extension was repaired.

COST:

Salaries (0.40 Man-Weeks)	\$ 142.24
Materials/Supplies	-
Meals/Rooms	10.00
Vehicles	<u>46.20</u>
Total	\$ 198.44

M - MAINTENANCE 1981-1982M-9321 Bowmanville Creek at Bowmanville

A thermostat was installed to control the well heaters.

COST:

Salaries (0.05 Man-Weeks)	\$ 26.80
Materials/Supplies	53.75
Meals/Rooms	1.25
Vehicles	<u>6.10</u>
Total	\$ 87.90

M-9321 Holland River at Holland Landing

A thermostat was installed to control the well heaters.

COST:

Salaries (0.10 Man-Weeks)	\$ 57.20
Materials/Supplies	53.75
Meals/Rooms	2.50
Vehicles	<u>19.80</u>
Total	\$ 133.25

M - MAINTENANCE 1981-1982M-9321 Duffins Creek above Pickering

A thermostat was installed to control the well heaters.

COST:

Salaries (0.05 Man-Weeks)	\$ 26.80
Materials/Supplies	53.75
Meals/Rooms	1.25
Vehicles	<u>6.10</u>
Total	\$ 87.90

M-8321 Welland River below Caistor Corners

A thermostat was installed to control the well heaters.

COST:

Salaries (0.10 Man-Weeks)	\$ 57.20
Materials/Supplies	53.75
Meals/Rooms	2.50
Vehicles	<u>12.40</u>
Total	\$ 125.85

M - MAINTENANCE 1981-1982M-8321 McKenzie Creek near Caledonia

A thermostat was installed to control the well heaters.

COST:

Salaries (0.10 Man-Weeks)	\$ 57.20
Materials/Supplies	53.75
Meals/Rooms	2.50
Vehicles	<u>12.40</u>
Total	\$ 125.85

M-9321 Black River at Sutton

A thermostat was installed to control the well heaters.

COST:

Salaries (0.10 Man-Weeks)	\$ 57.20
Materials/Supplies	53.75
Meals/Rooms	2.50
Vehicles	<u>19.80</u>
Total	\$ 133.25

M - MAINTENANCE 1981-1982M-9321 Crowe River at Marmora

Replaced corroded line connectors at the top of the service mast, that caused malfunction of the electrical system.

Installed outlet and thermostat to control well heaters.

COST:

Salaries (0.07 Man-Weeks)	\$ 38.13
Materials/Supplies	61.50
Meals/Rooms	5.13
Vehicles	<u>10.70</u>
Total	\$ 115.46

M-5326 Junction Creek below Kelley Lake

A thermostat was installed to control the well heaters.

COST:

Salaries (0.11 Man-Weeks)	\$ 28.13
Materials/Supplies	61.50
Meals/Rooms	17.60
Vehicles	<u>9.50</u>
	\$ 116.73

M - MAINTENANCE 1981-1982M-5326 Whitson River at Chelmsford

A thermostat was installed to control the well heaters.

COST:

Salaries (0.11 Man-Weeks)	\$ 28.13
Materials/Supplies	61.50
Meals/Rooms	17.60
Vehicles	<u>9.50</u>
Total	\$ 116.73

M-5326 Wanapitei River near Wanup

A thermostat was installed to control the well heaters.

COST:

Salaries (0.11 Man-Weeks)	\$ 28.13
Materials/Supplies	61.50
Meals/Rooms	17.60
Vehicles	<u>9.50</u>
Total	\$ 116.73

M - MAINTENANCE 1981-1982M-9321 Muskoka River at Highway No. 69

A thermostat was installed to control the well heaters.

COST:

Salaries (0.05 Man-Weeks)	\$ 28.60
Materials/Supplies	54.20
Meals/Rooms	3.78
Vehicles	<u>8.30</u>
Total	\$ 94.88

M-8321 East Humber River near Pine Grove

A thermostat was installed to control the well heaters.

COST:

Salaries (0.05 Man-Weeks)	\$ 28.60
Materials/Supplies	61.50
Meals/Rooms	3.78
Vehicles	<u>8.30</u>
Total	\$ 102.18

M - MAINTENANCE 1981-1982M-8321 Etobicoke Creek at Brampton

A thermostat was installed to control the well heaters.

COST:

Salaries (0.05 Man-Weeks)	\$ 28.60
Materials/Supplies	54.50
Meals/Rooms	3.78
Vehicles	<u>8.30</u>
Total	\$ 95.18

M-9321 Ouse River near Westwood

A thermostat was installed to control the well heaters.

COST:

Salaries (0.04 Man-Weeks)	\$ 22.88
Materials/Supplies	54.50
Meals/Rooms	3.02
Vehicles	<u>7.02</u>
Total	\$ 87.42

M - MAINTENANCE 1981-1982M-9321 Jacksons Creek at Peterborough

A thermostat was installed to control the well heaters.

COST:

Salaries (0.04 Man-Weeks)	\$ 22.88
Materials/Supplies	54.50
Meals/Rooms	3.02
Vehicles	<u>7.02</u>
Total	\$ 87.42

M-9321 Otonabee River at Lakefield

A thermostat was installed to control the well heaters.

COST:

Salaries (0.04 Man-Weeks)	\$ 22.88
Materials/Supplies	70.50
Meals/Rooms	3.02
Vehicles	<u>7.02</u>
Total	\$ 103.42

M - MAINTENANCE 1981-1982M-9321 Eels Creek below Apsley

A thermostat was installed to control the well heaters.

COST:

Salaries (0.04 Man-Weeks)	\$ 22.88
Materials/Supplies	54.50
Meals/Rooms	3.02
Vehicles	<u>7.02</u>
Total	\$ 87.42

M-9321 Mississagua River below Mississagua Lake

A thermostat was installed to control the well heaters.

COST:

Salaries (0.04 Man-Weeks)	\$ 22.88
Materials/Supplies	54.50
Meals/Rooms	3.02
Vehicles	<u>7.02</u>
Total	\$ 87.42

M - MAINTENANCE 1981-1982M-9321 Trent River at Glen Ross

A thermostat was installed to control the well heaters.

COST:

Salaries (0.40 Man-Weeks)	\$ 57.20
Materials/Supplies	61.50
Meals/Rooms	23.21
Vehicles	<u>25.75</u>
Total	\$ 167.66

M-9321 Consecon Creek at Allisonville

A thermostat was installed to control the well heaters.

COST:

Salaries (0.40 Man-Weeks)	\$ 57.20
Materials/Supplies	54.50
Meals/Rooms	23.21
Vehicles	<u>25.75</u>
Total	\$ 160.66

M - MAINTENANCE 1981-1982M-9321 Bloomfield Creek at Bloomfield

A thermostat was installed to control the well heaters.

COST:

Salaries (0.40 Man-Weeks)	\$ 57.20
Materials/Supplies	54.50
Meals/Rooms	23.21
Vehicles	<u>25.75</u>
Total	\$ 160.66

M-9321 Salmon River near Shannonville

A thermostat was installed to control the well heaters.

COST:

Salaries (0.40 Man-Weeks)	\$ 57.20
Materials/Supplies	61.50
Meals/Rooms	23.21
Vehicles	<u>25.75</u>
Total	\$ 167.66

M - MAINTENANCE 1981-1982M-6321 Skootamatta River near Actinolite

A thermostat was installed to control the well heaters.

COST:

Salaries (0.07 Man-Weeks)	\$ 38.13
Materials/Supplies	61.50
Meals/Rooms	5.13
Vehicles	<u>10.70</u>
Total	\$ 115.46

M-6321 Black River near Actinolite

A thermostat was installed to control the well heaters.

COST:

Salaries (0.07 Man-Weeks)	\$ 38.13
Materials/Supplies	61.50
Meals/Rooms	5.13
Vehicles	<u>10.70</u>
Total	\$ 115.46

M - MAINTENANCE 1981-1982M-4321 Little Maitland River at Bluevale

A deadlock set was supplied and installed on this new
"Armco" walk-in shelter erected by the Conservation Authority.

COST:

Salaries (0.10 Man-Weeks)	\$ 57.20
Materials/Supplies	50.22
Meals/Rooms	17.20
Vehicles	-
Total	<hr/> \$ 124.62

M-9321 Nottawasaga River near Baxter

Installed a new lock set to replace the one damaged
by vandals.

COST:

Salaries (0.05 Man-Weeks)	\$ 28.60
Materials/Supplies	30.50
Meals/Rooms	3.78
Vehicles	<hr/> 8.30
Total	\$ 71.18

M - MAINTENANCE 1981-1982M-3354 Brightsand River at Moberly Lake

Erected a steel "Armco" walk-in shelter on a preservative-treated wooden platform. Installed a bubble tube underground from the instrument shelter to the river.

COST:

Salaries (2.80 Man-Weeks)	\$ 995.40
Materials/Supplies	1,054.93
Meals/Rooms	918.40
Vehicles	<u>1,908.85</u>
Total	\$4,877.58

M-3353 Steel River near Terrace Bay

Erected a steel "Armco" walk-in shelter on a preservative-treated wooden platform. Installed a bubble tube underground from the instrument shelter to the river.

COST:

Salaries (2.80 Man-Weeks)	\$1,279.80
Materials/Supplies	1,280.24
Meals/Rooms	1,008.50
Vehicles	<u>295.35</u>
Total	\$3,863.89

M - MAINTENANCE 1981-1982M-4321 Venison Creek near Walsingham

A thermostat was installed to control the well heaters.

COST:

Salaries (0.10 Man-Weeks)	\$ 57.20
Materials/Supplies	61.50
Meals/Rooms	2.55
Vehicles	<u>19.10</u>
Total	\$ 140.35

M-4321 Dedrick Creek near Port Rowan

A thermostat was installed to control the well heaters.

COST:

Salaries (0.10 Man-Weeks)	\$ 57.20
Materials/Supplies	61.50
Meals/Rooms	2.55
Vehicles	<u>19.10</u>
Total	\$ 140.35

M - MAINTENANCE 1981-1982M-6328 Moira River near Foxboro

A thermostat was installed to control the well heaters.

COST:

Salaries (0.20 Man-Weeks)	\$ 114.40
Materials/Supplies	68.50
Meals/Rooms	44.38
Vehicles	<u>40.40</u>
Total	\$ 267.68

M-6328 Indian River near Blakeney

A thermostat was installed to control the well heaters.

COST:

Salaries (0.07 Man-Weeks)	\$ 38.13
Materials/Supplies	54.50
Meals/Rooms	18.45
Vehicles	<u>42.00</u>
Total	\$ 153.08

M - MAINTENANCE 1981-1982M-6328 Clyde River at Gordon Rapids

A thermostat was installed to control the well heaters.

COST:

Salaries (0.07 Man-Weeks)	\$ 38.13
Materials/Supplies	54.50
Meals/Rooms	18.45
Vehicles	<u>42.00</u>
Total	\$ 153.08

M-6328 Indian River near Pembroke

A thermostat was installed to control the well heaters.

COST:

Salaries (0.70 Man-Weeks)	\$ 38.13
Materials/Supplies	60.00
Meals/Rooms	18.45
Vehicles	<u>42.00</u>
Total	\$ 158.58

M - MAINTENANCE 1981-1982M-9321 West Duffins Creek at Green River

The electrical system reported to be malfunctioning was checked out and found to be A-OK.

COST:

Salaries (0.10 Man-Weeks)	\$ 57.20
Materials/Supplies	-
Meals/Rooms	2.55
Vehicles	<u>19.30</u>
Total	\$ 79.05

M-5326 Mattagami River near Timmins

Installed a shorter turnbuckle and tightened the main cable.

Installed a supporting cable and aircraft warning markers.

COST:

Salaries (1.60 Man-Weeks)	\$ 803.20
Materials/Supplies	712.50
Meals/Rooms	444.51
Vehicles	<u>244.90</u>
Total	\$2,205.11

M - MAINTENANCE 1981-1982M-5326 Montreal River at Mountain Chutes

Installed a shorter turnbuckle and tightened the main cable. Installed a new turnbuckle and tightened aircraft warning marker cable. Repaired the 220 volt outlet for well heaters.

COST:

Salaries (0.70 Man-Weeks)	\$ 344.40
Materials/Supplies	234.37
Meals/Rooms	229.65
Vehicles	<u>147.70</u>
Total	\$ 956.12

M-5326 Farr Creek at North Cobalt

Installed a thermostat to control the well heaters.

COST:

Salaries (0.10 Man-Weeks)	\$ 57.20
Materials/Supplies	54.50
Meals/Rooms	13.67
Vehicles	<u>17.30</u>
Total	\$ 142.67

M - MAINTENANCE 1981-1982M-5326 Porcupine River at Hoyle

Installed a controlled outlet for well heaters.

COST:

Salaries (0.10 Man-Weeks)	\$ 57.20
Materials/Supplies	61.50
Meals/Rooms	5.10
Vehicles	-
Total	\$ 123.80

M-5326 Amable du Fond River at Samuel de Champlain Provincial Park

The well was extended by two feet and fill was placed
and graded around well.

COST:

Salaries (1.20 Man-Weeks)	\$ 574.40
Materials/Supplies	74.05
Meals/Rooms	343.42
Vehicles	246.40
Total	\$1,238.27

M-5326 North Magnetawan River near Burks Falls

A thermostat was installed to control the well heaters.

COST:

Salaries (0.10 Man-Weeks)	\$ 57.20
Materials/Supplies	54.50
Meals/Rooms	13.68
Vehicles	<u>15.70</u>
Total	\$ 141.08

M-5326 North Magnetawan River above Pickerel Lake

A thermostat was installed to control the well heaters.

COST:

Salaries (0.10 Man-Weeks)	\$ 57.20
Materials/Supplies	54.50
Meals/Rooms	13.68
Vehicles	<u>15.70</u>
Total	\$ 141.08

M - MAINTENANCE 1981-1982M-4421 Lake Huron at Goderich

Replaced corroded line connectors at the top of the service mast that caused malfunction of the electrical system.

Installed larger baseboard heater.

COST:

Salaries (0.10 Man-Weeks)	\$ 57.20
Materials/Supplies	32.70
Meals/Rooms	5.10
Vehicles	<u>17.60</u>
Total	\$ 112.60

M-8321 Spencer Creek at Dundas Crossing

Fished heating cable through stand pipe and intake pipe and connected to electrical system.

COST:

Salaries (0.80 Man-Weeks)	\$ 401.60
Materials/Supplies	93.47
Meals/Rooms	20.40
Vehicles	<u>40.90</u>
Total	\$ 556.37

M - MAINTENANCE 1981-1982M-4321 Dickey's Creek at Lucknow

The Construction Foreman directed and instructed Conservation Authority personnel in the installation of a stilling well and intakes, as requested.

COST:

Salaries (0.20 Man-Weeks)	\$ 86.40
Materials /Supplies	14.64
Meals/Rooms	5.10
Vehicles	<u>47.10</u>
Total	\$ 153.24

M-4321 Little Maitland River at Bluevale

Installed a thermostat to control well heaters.

COST:

Salaries (0.05 Man-Weeks)	\$ 28.60
Materials/Supplies	51.75
Meals/Rooms	-
Vehicles	<u>8.80</u>
Total	\$ 89.15

M - MAINTENANCE 1981-1982M-8321 Nith River above Nithburg

Installed a thermostatically controlled outlet for well heaters.

COST:

Salaries (0.10 Man-Weeks)	\$ 57.20
Materials/Supplies	6.00
Meals/Rooms	5.10
Vehicles	<u>16.90</u>
Total	\$ 85.20

M-3357 Sturgeon Creek near Leamington

Removed existing instrument shelter, stilling well, intakes and underground electrical entrance service, left inoperative by dredging of creek. Reinstalled a new galvanized steel "Hel-Cor" stilling well, intakes and Guelph type shelter and a 110/220 volt, 30 ampere electrical service.

COST:

Salaries (2.6 Man-Weeks)	\$1,318.48
Materials/Supplies	755.65
Meals/Rooms	611.65
Vehicles	<u>287.05</u>
Total	\$2,972.83

M - MAINTENANCE 1981-1982M-3350 Millhaven Creek near Millhaven

Installed a galvanized steel "Hel-Cor" stilling well, intakes and Guelph-type instrument shelter. Formed and poured a concrete buttress to protect structure from future damage by ice runs. Installed a 110/220 volt 30 ampere electrical service.

COST:

Salaries (2.20 Man-Weeks)	\$ 956.84
Materials/Supplies	1,237.84
Meals/Rooms	437.89
Vehicles	<u>256.40</u>
Total	\$2,888.97

M-5326 Goulais River near Searchmont

Louver Vents were installed in the door to rectify condensation accumulation in the instrument shelter.

COST:

Salaries (0.20 Man-Weeks)	\$ 86.40
Materials/Supplies	54.00
Meals/Rooms	48.80
Vehicles	<u>22.80</u>
Total	\$ 212.00

M - MAINTENANCE 1981 - 1982M-5326 Aubinadong River above Sesabic Creek

Louver vents were installed in the door to rectify
condensation accumulation in the instrument shelter.

COST:

Salaries (0.20 Man-Weeks)	\$ 86.40
Materials/Supplies	54.00
Meals/Rooms	57.30
Vehicles	<u>31.50</u>
Total	\$ 229.20

M-6328 South Nation River near Plantagenet Springs

Installed new spherical aircraft warning markers and
strengthened the cable car.

COST:

Salaries (0.80 Man-Weeks)	\$ 430.88
Materials/Supplies	302.96
Meals/Rooms	218.20
Vehicles	<u>114.90</u>
Total	\$1,066.94

M - MAINTENANCE 1981-1982M-6328 Rideau River below Manotick

Strengthened cable car and installed new foot rest
to replace the one damaged by vandals.

COST:

Salaries (0.20 Man-Weeks)	\$ 107.72
Materials/Supplies	52.96
Meals/Rooms	59.35
Vehicles	<u>18.75</u>
Total	\$ 238.78

M-6328 Clyde River near Lanark

Repaired metal walk-in shelter damaged by motor
vehicle.

COST:

Salaries (0.20 Man-Weeks)	\$ 107.72
Materials/Supplies	5.00
Meals/Rooms	59.35
Vehicles	<u>18.60</u>
Total	\$ 190.67

M - MAINTENANCE 1981-1982M-4421 Lake Erie at Port Dover

A new door was installed, complete with a new dead lock to replace the door that had rusted away from prolonged exposure to dampness. The well heater was also repaired.

COST:

Salaries (0.80 Man-Weeks)	\$ 430.88
Materials/Supplies	166.79
Meals/Rooms	119.80
Vehicles	<u>34.80</u>
Total	\$ 752.27

CONSTRUCTION COSTS FOR 1981-1982

<u>FIELD INVESTIGATIONS</u>		<u>COST</u>
1.	F-2353 Sawmill Creek at Ottawa	\$ 909.40
2.	F-6328 Millhaven Creek near Millhaven	- 26.38
3.	F-4321 Maitland River near Harriston	138.90
4.	F-5326 Turkey Lake Creeks near Batchawana Mountain	1,225.95
5.	F-4321 Maitland River above Wingham	153.20
6.	F-5326 Sturgeon River at Lower Goose Falls	1,228.99
7.	F-5326 Larder River above Raven Lake	1,228.99
8.	F-4321 Saugeen River near Mount Forest	139.00
9.	F-8321 Credit River West Branch at Norval	60.40
10.	F-8321 Credit River at Norval	60.40
	F-8321 Credit River at Norval	28.90
11.	F-9321 Moira River near Foxboro	60.40
12.	F-9321 Lynde Creek near Whitby	60.40
13.	F-9321 Duffins Creek at Pickering	60.40
14.	F-8321 Credit River at Cheltenham	28.90
15.	F-8321 Credit River at Belfountain	28.90
16.	F-8321 Shaws Creek near Alton	28.90
17.	F-8321 West Credit River at Erin	28.90
18.	F-9321 Cold Creek at Orland	358.96
19.	F-4321 Little Maitland River at Bluevale	156.00
20.	F-9321 Wilmot Creek near Newcastle	237.65
21.	F-4321 Canard River near Lukerville	235.61
22.	F-4321 Sturgeon Creek near Leamington	235.61

CONSTRUCTION COSTS FOR 1981-1982

	<u>FIELD INVESTIGATIONS (continued)</u>	<u>COST</u>
23.	F-4321 Turkey Creek at Windsor	\$ 235.61
24.	F-4321 Pine River at Lurgan	- 76.90
25.	F-5326 Moose Creek at Levack	212.65
26.	F-4321 Dickey's Creek at Lucknow	149.20
27.	F-5326 Farr Creek at North Cobalt	88.17
28.	F-4321 Maitland River above Wingham	38.67
29.	F-6328 West Branch Scotch River near St. Isidore de Prescott	Nil
30.	F-6328 Moira River near Tweed	319.07
31.	F-4421 Lake Erie at Port Dover	264.04
	<u>TOTAL</u>	<u>\$ 8,105.45</u>

CONSTRUCTION COSTS FOR 1981-1982

<u>NEW CONSTRUCTION</u>	<u>COST</u>
1. C-2364 Bear Creek below Brigden	\$8,678.94
2. C-2365 Sydenham River at Wallaceburg	6,674.48
3. C-2353 Sawmill Creek at Ottawa	9,196.50
4. C-2359 Maitland River near Harriston	8,811.31
5. C-2354 Oxtongue River near Dwight	7,867.01
6. C-2356 Larder River above Raven Lake	8,731.78
7. C-2355 Sturgeon River at Lower Goose Falls	8,504.61
8. C-2366 Cold Creek at Orland	9,057.35
9. C-2358 Moose Creek at Levack	7,830.96
10. C-2362 Turkey Creek at Windsor	11,389.53
	<hr/>
TOTAL	\$ 86,742.47

<u>UPGRADING</u>	<u>COST</u>
1. U-3351 Lynde Creek near Whitby	3,318.46
2. U-3352 Credit River West Branch at Norval	4,140.59
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TOTAL	\$ 7,459.05

CONSTRUCTION COSTS FOR 1981-1982

<u>MAINTENANCE</u>		<u>COST</u>
1.	M-8321 Welland River near Mount Hope	\$ 267.18
2.	M-6328 Rideau River below Manotick	113.20
3.	M-8321 East Canagagigue Creek near Floradale	120.35
4.	M-5326 Turkey Lake Creeks near Batchawana Mountain	6,613.27
5.	M-6328 Sawmill Creek at Ottawa	1,324.30
6.	M-4321 Teeswater River near Paisley	198.44
7.	M-9321 Bowmanville Creek at Bowmanville	87.90
8.	M-9321 Holland River at Holland Landing	133.25
9.	M-9321 Duffins Creek above Pickering	87.90
10.	M-8321 Welland River below Caistor Corners	125.85
11.	M-8321 McKenzie Creek near Caledonia	125.85
12.	M-9321 Black River at Sutton	133.25
13.	M-9321 Crowe River at Marmora	115.46
14.	M-5326 Junction Creek below Kelley Lake	116.73
15.	M-5326 Whitson River at Chelmsford	116.73
16.	M-5326 Wanapitei River near Wanup	116.73
17.	M-9321 Muskoka River at Highway No. 69	94.88
18.	M-8321 East Humber River near Pine Grove	102.18
19.	M-8321 Etobicoke Creek at Brampton	95.18
20.	M-9321 Ouse River near Westwood	87.42
21.	M-9321 Jacksons Creek at Peterborough	87.42
22.	M-9321 Otonabee River at Lakefield	103.42

CONSTRUCTION COSTS FOR 1981-1982

<u>MAINTENANCE</u>		<u>COST</u>
23.	M-9321 Eels Creek below Apsley	\$ 87.42
24.	M-9321 Mississagua River below Mississagua Lake	87.42
25.	M-9321 Trent River at Glen Ross	167.66
26.	M-9321 Consecon Creek at Allisonville	160.66
27.	M-9321 Bloomfield Creek at Bloomfield	160.66
28.	M-9321 Salmon River near Shannonville	167.66
29.	M-6321 Skootamatta River near Actinolite	115.46
30.	M-6321 Black River near Actinolite	115.46
31.	M-4321 Little Maitland River at Bluevale	124.62
	M-4321 Little Maitland River at Bluevale	89.15
32.	M-9321 Nottawasaga River near Baxter	71.18
33.	M-3354 Brightsand River at Moberly Lake	4,877.58
34.	M-3353 Steel River near Terrace Bay	3,863.89
35.	M-4321 Venison Creek near Walsingham	140.35
36.	M-4321 Dedrick Creek near Port Rowan	140.35
37.	M-6328 Moira River near Foxboro	267.68
38.	M-6328 Indian River near Blakeney	153.08
39.	M-6328 Clyde River at Gordon Rapids	153.08
40.	M-6328 Indian River near Pembroke	158.58
41.	M-9321 West Duffins Creek at Green River	79.05
42.	M-5326 Mattagami River near Timmins	2,205.11
43.	M-5326 Montreal River at Mountain Chutes	956.12
44.	M-5326 Farr Creek at North Cobalt	142.67

CONSTRUCTION COSTS FOR 1981-1982

<u>MAINTENANCE</u>		<u>COST</u>
45.	M-5326 Porcupine River at Hoyle	\$ 123.80
46.	M-5326 Amable du Fond River at Samuel de Champlain Provincial Park	1,238.27
47.	M-5326 North Magnetawan River near Burks Falls	141.08
48.	M-5326 North Magnetawan River above Pickerel Lake	141.08
49.	M-4421 Lake Huron at Goderich	112.60
50.	M-8321 Spencer Creek at Dundas Crossing	556.37
51.	M-4321 Dickey's Creek at Lucknow	153.24
52.	M-8321 Nith River above Nithburg	85.20
53.	M-3357 Sturgeon Creek near Leamington	2,972.83
54.	M-3350 Millhaven Creek near Millhaven	2,888.97
55.	M-5326 Goulais River near Searchmont	212.00
56.	M-5326 Aubinadong River above Sesabic Creek	229.20
57.	M-6328 South Nation River near Plantagenet Springs	1,066.94
58.	M-6328 Rideau River below Manotick	238.78
59.	M-6328 Clyde River near Lanark	190.67
60.	M-4421 Lake Erie at Port Dover	752.27
TOTAL		<u>\$35,955.08</u>

SUMMARY OF CONSTRUCTION COSTS

FIELD INVESTIGATIONS	\$ 8,105.45
NEW CONSTRUCTION	86,742.47
UPGRADING	7,459.05
MAINTENANCE	<u>35,955.08</u>
GRAND TOTAL	<u>\$ 138,262.05</u>

SUMMARY

CONSTRUCTION COSTS FOR 1981-1982

ITEM	SALARY	OPERATION & MAINTENANCE	CAPITAL	INSTRUMENTATION	TOTAL
FIELD INVESTIGATIONS	\$ 4,296.35	\$ 3,809.10	\$ -	\$ -	\$ 8,105.45
NEW CONSTRUCTION	\$ 13,377.16	\$ -	\$ 31,576.31	\$ 41,789.00	\$ 86,742.47
UPGRADING	\$ 3,076.07	\$ 4,382.98	\$ -	\$ -	\$ 7,459.05
MAINTENANCE	\$ 12,249.69	\$ 23,705.39	\$ -	\$ -	\$ 35,955.08
TOTALS	\$ 32,999.27	\$ 31,897.47	\$ 31,576.31	\$ 41,789.00	\$138,262.05

Typical conversion from a Guelph-Type shelter to an Armco walk-in shelter.

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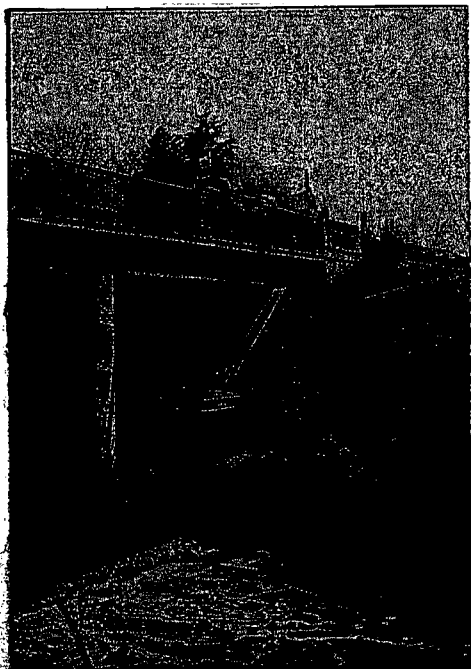
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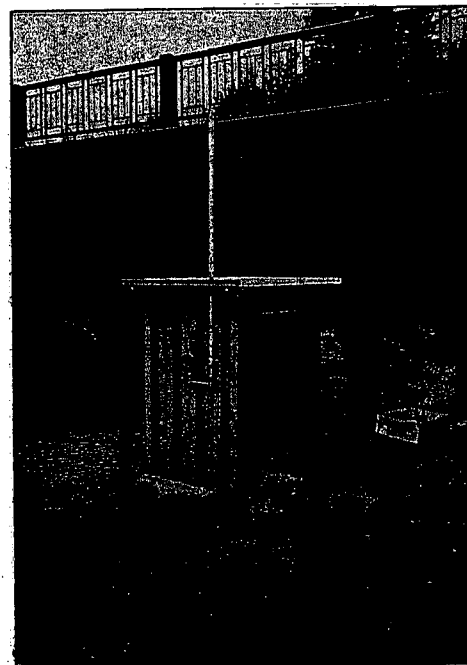
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