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ANNUAL CONSTRUCTION REPORT 1985 - 86

FIELD INVESTIGATIONS
CONSTRUCTION, UPGRADING
AND MAINTENANCE FOR
ONTARIO REGION

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DEPARTMENT OF THE ENVIRONMENT
INLAND WATERS DIRECTORATE
WATER RESOURCES BRANCH

ANNUAL CONSTRUCTION REPORT 1985 - 86

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 1985 - 1986.

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 (14 gauge), 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 5 mm steel bottom and a 51 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, the complete well assembly, with the intake supported by 3 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 51 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 M in length, additional sections of 6 M are connected from a boat or raft before the backfilling is started in order to lift the end of the 20 M length above the water surface to make these connections, after which normal backfilling takes place.

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 and a 1600 mm diameter galvanized "Hel-Cor" pipe to a common 5 mm steel bottom. A 1.5 M long 51 mm diameter intake pipe is attached to a 51 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 35 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 51 mm diameter galvanized steel pipe screwed into a 51 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 51 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 51 mm x 13 mm x 13 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 water's edge and may vary from 3 M to 36 M or longer.

UPPER INTAKE (AUXILIARY)

The upper intake is a 51 mm galvanized steel pipe screwed into a 51 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 51 mm tee at the top of the stand-pipe and with the valve in the well closed forcing water under pressure through intake system.

INSTRUMENT SHELTERS

LOOK-IN SHELTER

The standard Guelph-type look-in shelter is installed at all sites where the instrumentation consists of the Stevens A-71 analogue recorder only. An aluminum look-in shelter has been designed and fabricated for installation that requires an analogue recorder and a data logger. The shelter is constructed of 6 mm high strength aluminum which provided good protection from vandalism. The interior is insulated with rigid insulation and a wooden floor is installed over the well to facilitate instrument placement.

Both shelters are mounted on an 800 mm diameter stilling well.

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 1,626 mm X 1,626 mm X 2,438 mm to 4,876 mm X 3,658 mm X 2,438 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, 5 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 design are constructed. They may be formed or free-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 mm or 22 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 10 mm or 13 mm guy strand and attached by means of preformed guy strips 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 aluminum or galvanized steel and plywood 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 separate 10 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 Suburban equipped with power tailgate, roof-top carrier, tailgate mounted vice, trailer hitch, heavy duty 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, electric "Skill" saws, 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, or Field Purchase Authority.

STATION COST BREAKDOWN

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

SALARIES

Engineers, Supervisors, Foreman, Term Employees and Hydrometric Personnel associated with field investigations, 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.

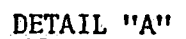


FIG. 2

INBANK STILLING WELL

WITH ARMCO SHELTER

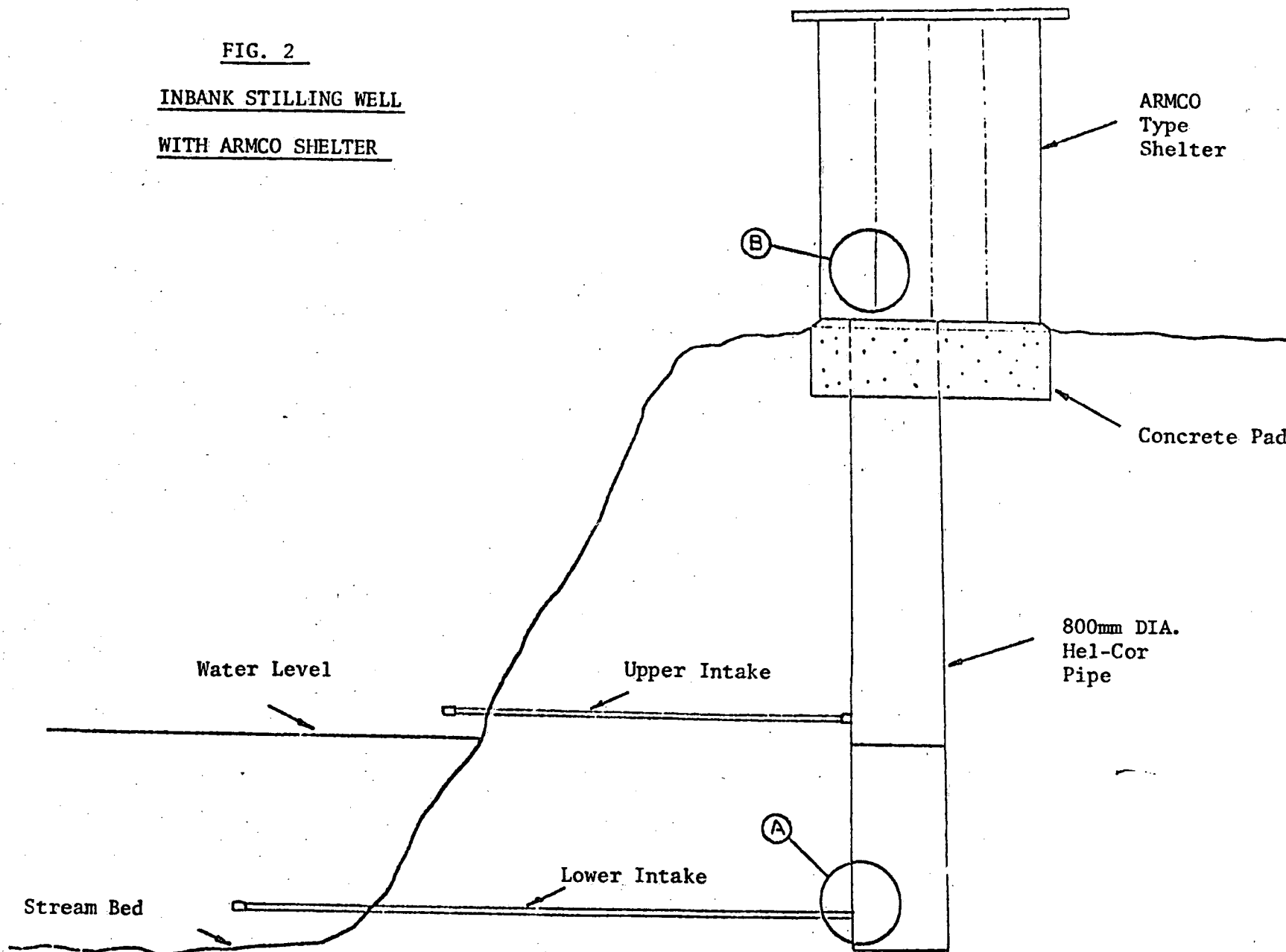
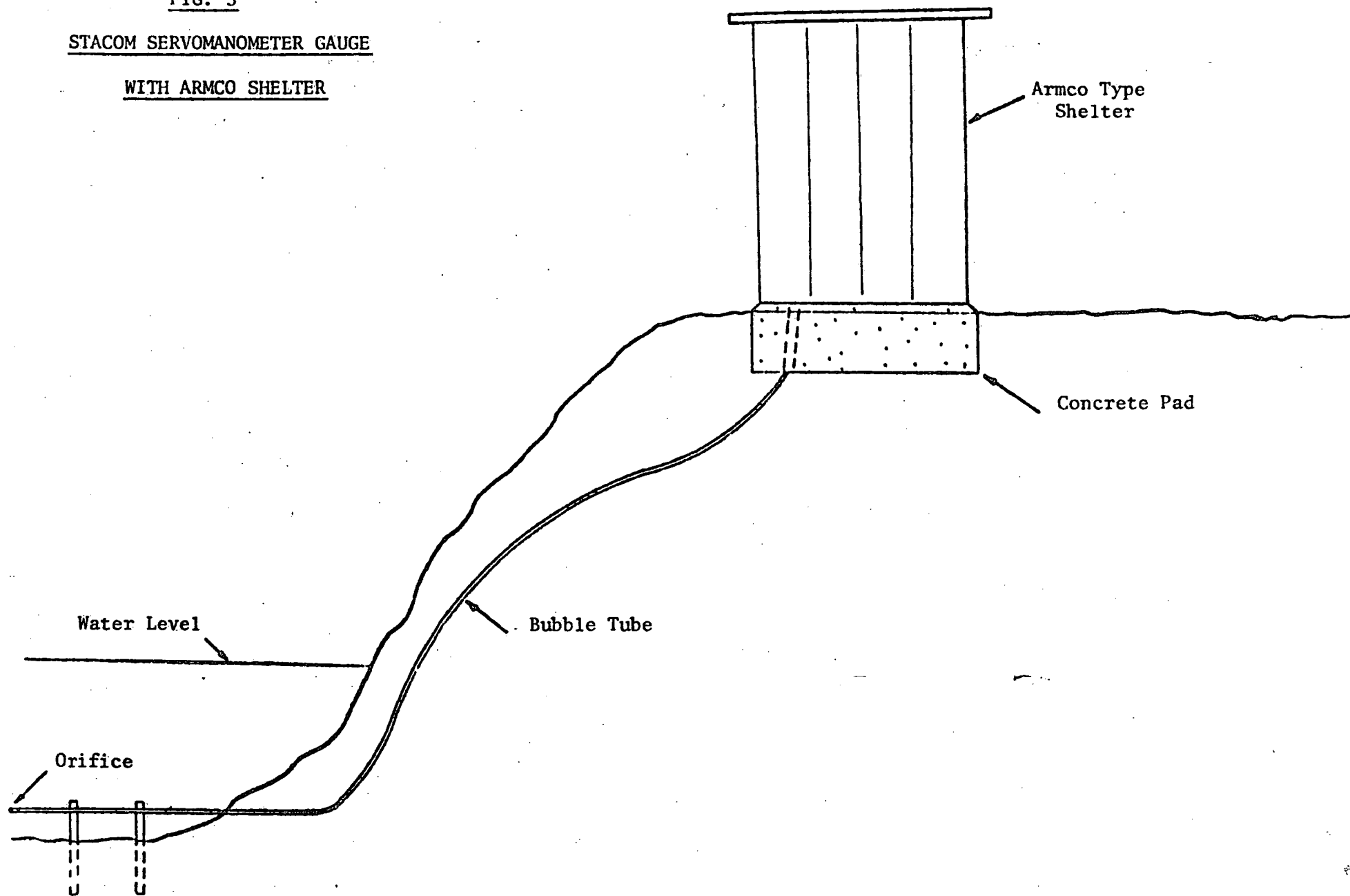


FIG. 3

STACOM SERVOMANOMETER GAUGE

WITH ARMCO SHELTER



ARMCO
Type
Shelter

FIG. 4

TIDES & WATER LEVEL GAUGE
with ARMCO SHELTER

Concrete Pad

1600mm DIA.
Hel-Cor
Pipe

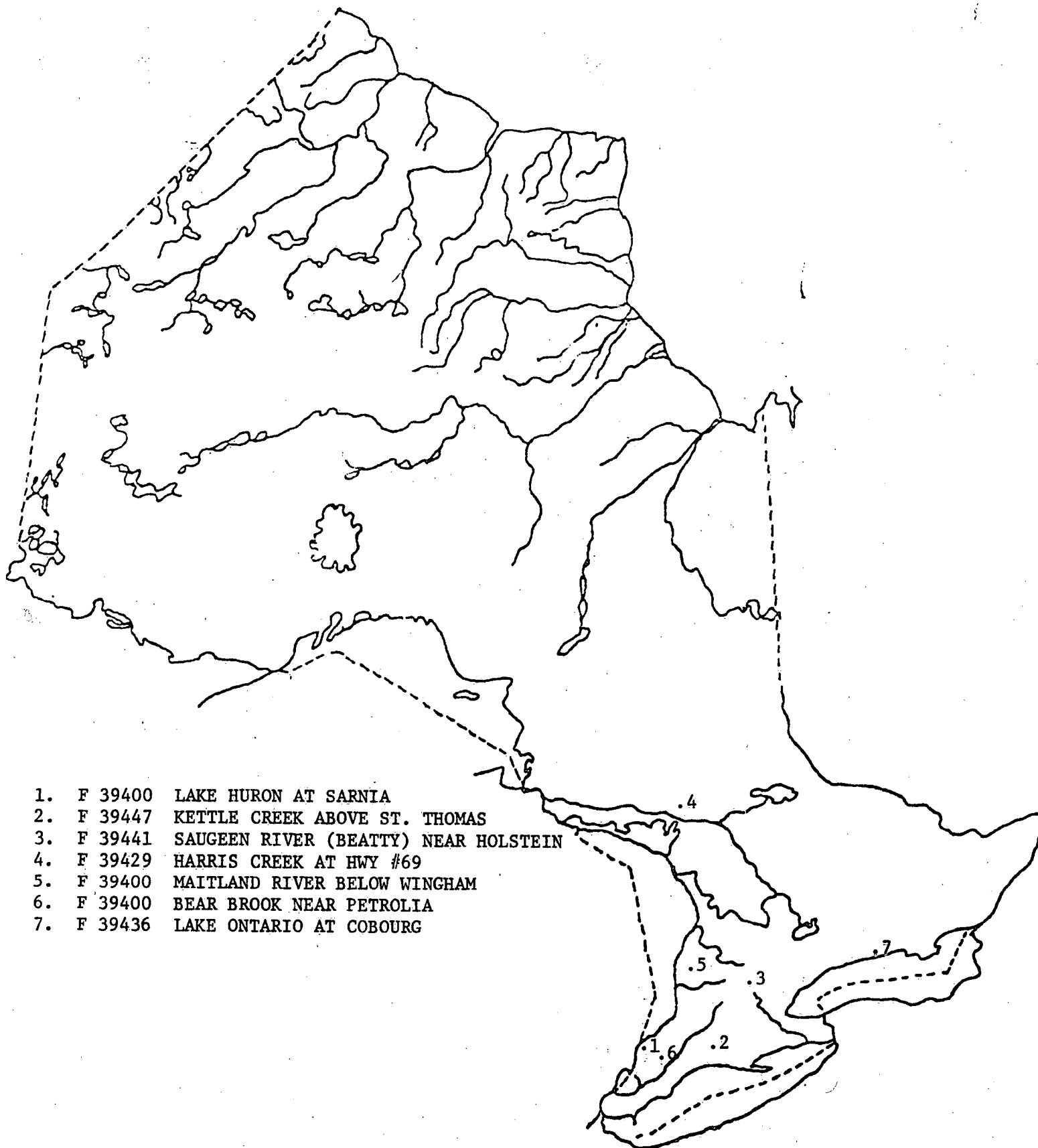
Water Level

Sheet Steel
Wharf Piling

900mm DIA.
Hel-Cor
Pipe

Intake

Bottom



1. F 39400 LAKE HURON AT SARNIA
2. F 39447 KETTLE CREEK ABOVE ST. THOMAS
3. F 39441 SAUGEEN RIVER (BEATTY) NEAR HOLSTEIN
4. F 39429 HARRIS CREEK AT HWY #69
5. F 39400 MAITLAND RIVER BELOW WINGHAM
6. F 39400 BEAR BROOK NEAR PETROLIA
7. F 39436 LAKE ONTARIO AT COBOURG

FIELD INVESTIGATIONS

1. LAKE HURON AT SARNIA

F-39400

Three field investigations and on-site meetings were held with representatives from the City of Sarnia, Sarnia Yacht Club, and WRB staff to select a site for a lake level gauge.

Cost: Salaries (1.4 man weeks)	\$ 764.40
Meals/Lodging	189.85
Vehicles	<u>264.00</u>
TOTAL	\$ 1128.25

2. KETTLE CREEK ABOVE ST. THOMAS

F-39447

The Assistant Regional Engineer met with Conservation Authority staff to select a site for a hydrometric gauge.

Cost: Salaries (0.2 man weeks)	\$ 150.00
Meals/Lodging	8.30
Vehicles	<u>37.50</u>
TOTAL	\$ 195.80

3. SAUGEEEN RIVER (BEATTY) NEAR HOLSTEIN

F-39441

The Assistant Regional Engineer met with Conservation Authority staff on two occasions to discuss and select a hydrometric gauging site.

Cost: Salaries (0.3 man weeks)	\$ 225.00
Meals/Lodging	16.60
Vehicle	<u>60.00</u>
TOTAL	\$ 301.60

4. HARRIS CREEK AT H.W.Y #69

Construction section staff carried out a reconnaissance for the installation of a concrete weir/control structure.

Cost: Salaries (0.6 man weeks)	\$ 261.12
Meals/Lodging	159.46
Vehicle	<u>145.20</u>
TOTAL	\$ 565.78

5. MAITLAND RIVER BELOW WINGHAM

F-39400

The erosion of the river banks adjacent to the gauge shelter and well were assessed by the Construction Foreman.

Cost: Salaries (0.1 man weeks)	\$ 53.12
Meals/Lodging	8.30
Vehicle	<u>42.50</u>
TOTAL	\$ 103.92

6. BEAR BROOK AT PETROLIA

F-39400

A reconnaissance was carried out to determine the extent and type of repair necessary to improve the sheet steel control.

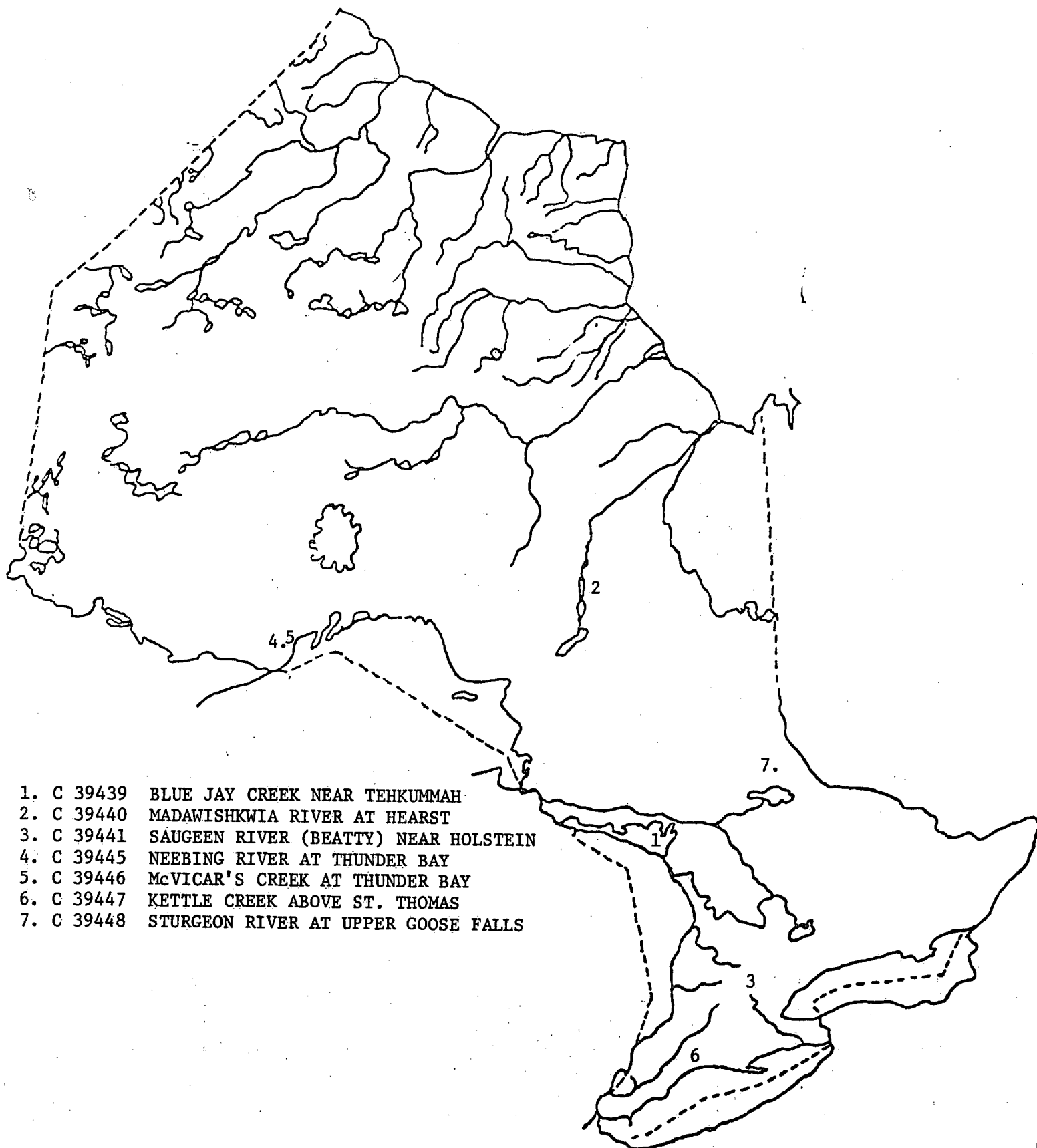
Cost: Salaries (0.2 man weeks)	\$ 106.24
Meals/Lodging	8.30
Vehicle	<u>49.30</u>
TOTAL	\$ 163.84

7. LAKE ONTARIO AT COBOURG

F-39436

A field investigation was carried out to ascertain the extent of damage caused by a fire in the gauge shelter.

Cost: Salaries (0.2 man weeks)	\$ 122.17
Meals/Lodging	8.30
Vehicle	<u>67.20</u>
TOTAL	\$ 197.67



1. C 39439 BLUE JAY CREEK NEAR TEHKUMMAH
2. C 39440 MADAWISHKWIA RIVER AT HEARST
3. C 39441 SAUGEEN RIVER (BEATTY) NEAR HOLSTEIN
4. C 39445 NEEBING RIVER AT THUNDER BAY
5. C 39446 McVICAR'S CREEK AT THUNDER BAY
6. C 39447 KETTLE CREEK ABOVE ST. THOMAS
7. C 39448 STURGEON RIVER AT UPPER GOOSE FALLS

NEW CONSTRUCTION

1. BLUE JAY CREEK NEAR TEHKUMMAH C-39439

A galvanized steel "Hel-Cor" stilling well, complete with intake was installed. A "Guelph Type" look-in shelter with a 30 ampere electrical service, was secured to the well.

Cost: Salaries (2.2 man weeks)	\$ 966.24
Materials/Supplies	1287.17
Meals/Lodging	616.27
Vehicles	250.84
Instrumentation	<u>4245.00</u>
TOTAL	\$ 7365.52

2. MADAWISHKWIA RIVER AT HEARST C-39440

A galvanized steel "Hel-Cor" stilling well and intakes were installed. A concrete pad was poured in place and an insulated Armco walk-in shelter, complete with a 60 ampere electrical service, was erected.

Cost: Salaries (5.3 man weeks)	\$ 3069.50
Materials/Supplies	3300.82
Meals/Lodging	1199.35
Vehicles	524.04
Instrumentation	<u>4245.00</u>
TOTAL	\$12338.71

3. SAUGEEEN RIVER (BEATTY) NEAR HOLSTEIN C-39441

A galvanized steel "Hel-Cor" stilling well, complete with intake was installed. A "Guelph Type" look-in shelter with a 30 ampere electrical service, was secured to the well.

Cost: Salaries (1.8 man weeks)	\$ 1004.32
Materials/Supplies	1644.89
Meals/Lodging	330.65
Vehicles	171.40
Instrumentation	<u>4245.00</u>
TOTAL	\$ 7396.26

4. NEEBING RIVER AT THUNDER BAY C-39445

The existing wooden well was replaced with a galvanized steel "Hel-Cor" stilling well and intakes. A concrete pad was poured in place and the Armco walk-in shelter, was replaced over the well. The shelter was insulated, panelled, and equipped with a 60 ampere electrical service.

Cost: Salaries (3.5 man weeks)	\$ 1909.00
Materials/Supplies	2697.91
Meals/Lodging	882.31
Vehicles	<u>420.86</u>
TOTAL	\$ 5910.08

5. MCVICAR'S CREEK AT THUNDER BAY C-39446

A galvanized steel "Hel-Cor" stilling well and intakes were installed. A concrete pad was poured in place and a masonry walk-in shelter was erected. The shelter was insulated, panelled and equipped with a 60 ampere electrical service.

Cost: Salaries (3.5 man weeks)	\$ 1909.00
Materials/Supplies	5470.80
Meals/Lodging	882.31
Vehicles	420.86
Instrumentation	<u>4245.00</u>
TOTAL	\$12927.97

6. KETTLE CREEK ABOVE ST. THOMAS C-39447

A galvanized steel "Hel-Cor" stilling well and intakes were installed. A concrete pad was poured in place and an insulated Armco walk-in shelter, complete with a 60 ampere electrical service, was erected.

Cost: Salaries (3.4 man weeks)	\$ 2189.56
Materials/Supplies	6121.41
Meals/Lodging	835.68
Vehicles	144.54
Instrumentation	<u>4245.00</u>
TOTAL	\$13536.19

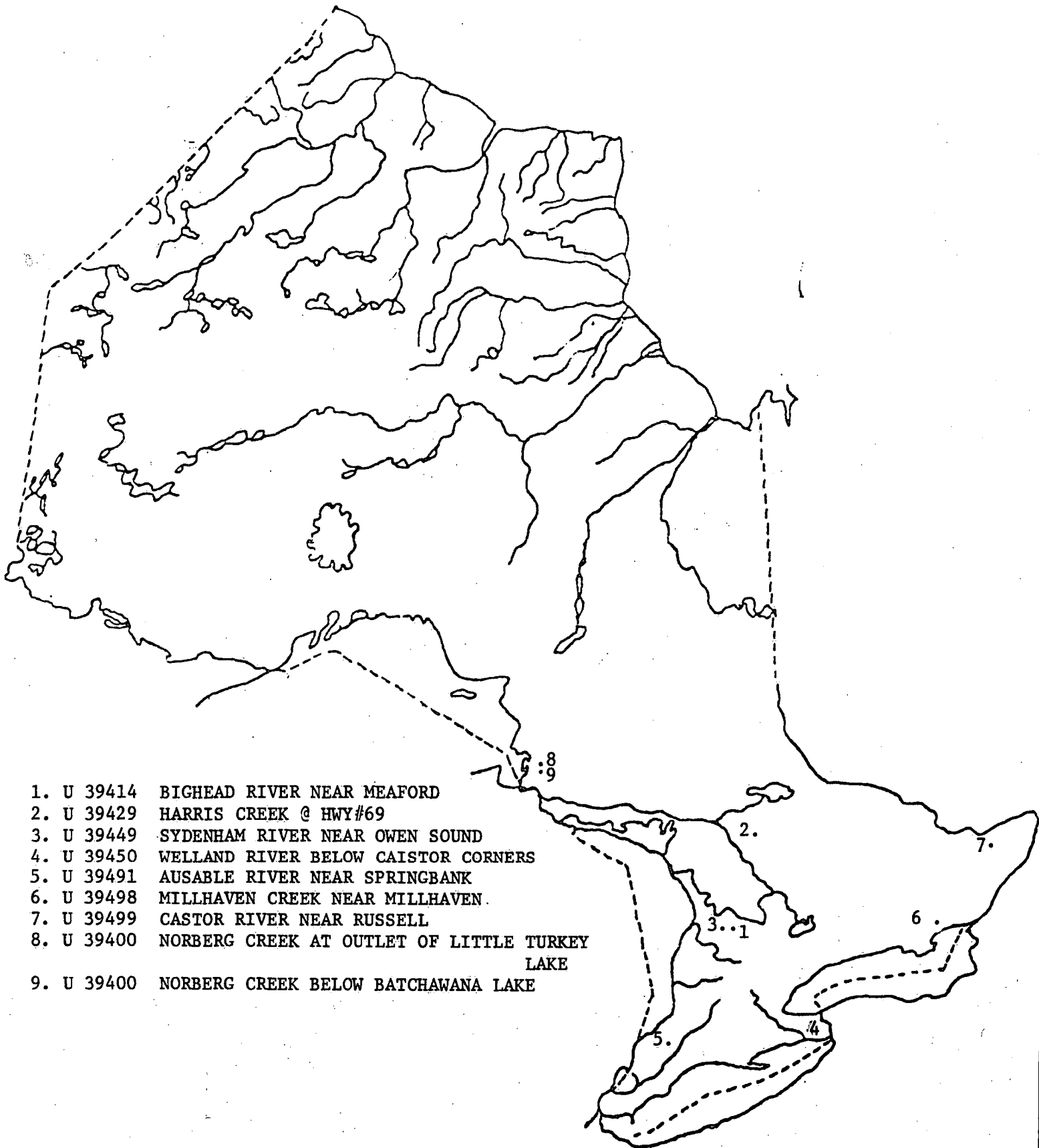
7. STURGEON RIVER AT UPPER GOOSE FALLS

C-39448 *

The Armco walk-in shelter complete with wooden base from Lower Goose Falls was relocated to Upper Goose Falls. The shelter was transported by helicopter. A new manometer pressure line was installed.

Cost: Salaries (1.2 man weeks)	\$ 786.93
Materials/Supplies	3580.21
Meals/Lodging	40.50
Vehicles	<u>97.92</u>
TOTAL	\$ 4505.56

* This project was carried out by the North Bay Sub-Office staff.



1. U 39414 BIGHEAD RIVER NEAR MEAFORD
2. U 39429 HARRIS CREEK @ HWY#69
3. U 39449 SYDENHAM RIVER NEAR OWEN SOUND
4. U 39450 WELLAND RIVER BELOW CAISTOR CORNERS
5. U 39491 AUSABLE RIVER NEAR SPRINGBANK
6. U 39498 MILLHAVEN CREEK NEAR MILLHAVEN.
7. U 39499 CASTOR RIVER NEAR RUSSELL
8. U 39400 NORBERG CREEK AT OUTLET OF LITTLE TURKEY
LAKE
9. U 39400 NORBERG CREEK BELOW BATCHAWANA LAKE

UPGRADING

1. BIGHEAD RIVER NEAR MEAFORD

U-39414

The original "Guelph Type" look-in shelter was replaced by a larger all aluminum look-in shelter. The shelter was insulated and equipped with a 30 ampere electrical service.

Cost: Salaries (0.7 man weeks)	\$ 318.72
Materials/Supplies	1569.35
Meals/Lodging	159.85
Vehicles	<u>138.16</u>
TOTAL	\$ 2186.08

2. HARRIS CREEK AT HWY #69

A concrete control was poured and free-formed at this hydrometric station.

Cost: Salaries (2.5 man weeks)	\$ 1088.00
Material/Supplies	4559.20
Meals/Lodging	495.20
Vehicles	<u>277.50</u>
TOTAL	\$ 6419.90

3. SYDENHAM RIVER NEAR OWEN SOUND

U-39449

The original "Guelph Type" look-in shelter was replaced by a larger all aluminum look-in shelter. The shelter was insulated and equipped with a 30 ampere electrical service.

Cost: Salaries (0.6 man weeks)	\$ 374.96
Materials/Supplies	1602.81
Meals/Lodging	199.30
Vehicle	<u>120.56</u>
TOTAL	\$ 2297.63

4. WELLAND RIVER BELOW CAISTOR CORNERS

U-39450

The original "Guelph Type" shelter was removed. A concrete pad was poured in place around the existing stilling well which was cut off to the required height. An insulated Armco walk-in shelter, complete with 60 ampere electrical service, was erected.

Cost: Salaries (man weeks)	\$ 1513.92
Materials/Supplies	2029.31
Meals/Lodging	565.87
Vehicle	<u>268.18</u>
TOTAL	\$ 4377.28

5. AUSABLE RIVER NEAR SPRINGBANK

U-39491

The concrete block walk-in shelter was insulated and panelled. The electrical service and instrumentation was re-installed.

Cost: Salaries (1.0 man weeks)	\$ 527.88
Materials/Supplies	379.00
Meals/Lodging	255.30
Vehicle	<u>131.78</u>
TOTAL	\$ 1293.96

6. MILLHAVEN CREEK NEAR MILLHAVEN

U-39498 *

A key was broken across the bedrock channel with a backhoe mounted rock-breaker. A free-formed concrete weir was then constructed in the key and re-inforced with steel.

Cost: Salaries (1.4 man weeks)	\$ 840.00
Materials/Supplies	1410.00
Meals/Lodging	504.00
Vehicle	<u>132.00</u>
TOTAL	\$ 2886.00

7. CASTOR RIVER NEAR RUSSELL

U-39499 *

A key was broken across the bedrock channel with a backhoe. A free-formed concrete weir was constructed in the key and re-inforced with steel.

Cost: Salaries (1.2 man weeks)	\$ 720.00
Materials/Supplies	3225.00
Meals/Lodging	64.80
Vehicles	<u>110.00</u>
TOTAL	\$ 4119.80

* These projects were carried out by the Ottawa Sub-Office staff.

8. NORBERG CREEK AT OUTLET OF LITTLE TURKEY LAKE U-39400 *

A galvanized steel "Hel-Cor" stilling well and intake pipe were installed. A Guelph type look-in shelter was mounted on top of the well. The construction was carried out to replace the existing pressure gauge system.

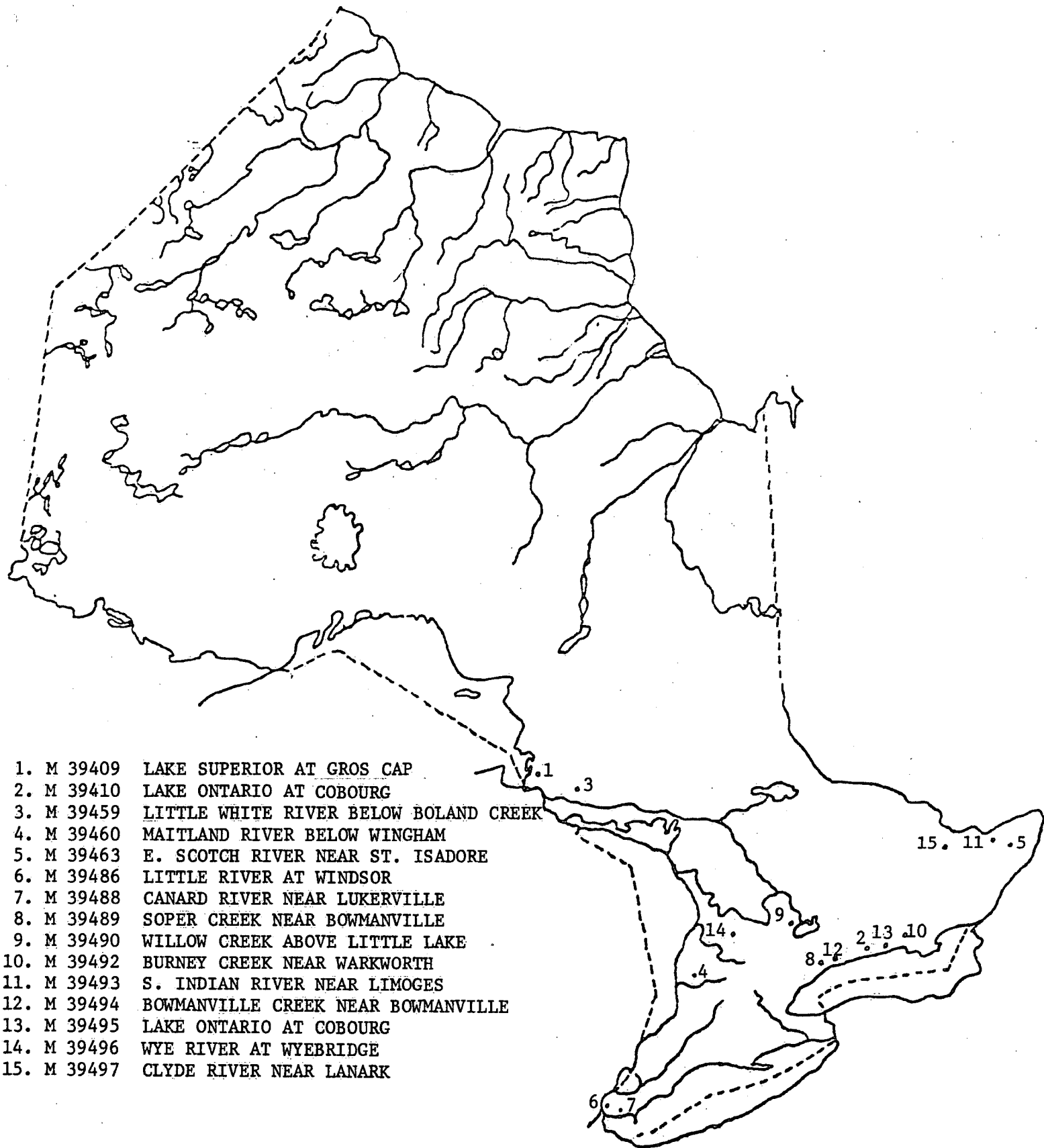
Cost: Salaries (1.1 man weeks)	\$ 487.86
Materials/Supplies	697.63
Meals/Lodging	106.20
Vehicle	<u>136.00</u>
TOTAL	\$ 1427.69

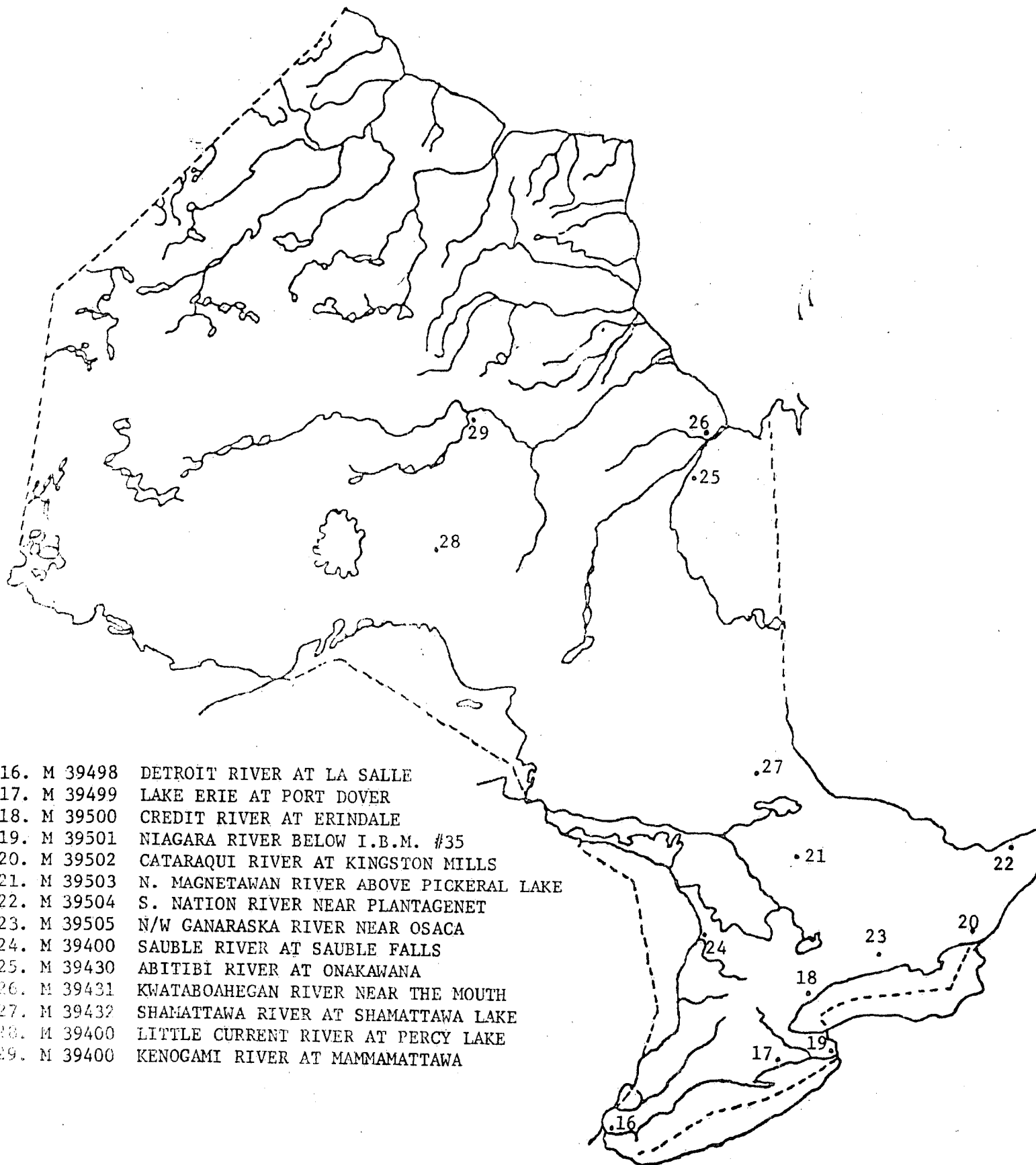
9. NORBERG CREEK BELOW BATCHAWANA LAKE U-39400 *

A galvanized steel "Hel-Cor" stilling well and intake pipe were installed. A Guelph type look-in shelter was mounted on top of the well. The construction was carried out to replaxe the existing pressure gauge system.

Cost: Salaries (1.1 man weeks)	\$ 487.86
Materials/Supplies	697.63
Meals/Lodging	106.20
Vehicle	<u>136.00</u>
TOTAL	\$ 1427.69

* These projects were carried out by the North Bay Sub-Office staff.





MAINTENANCE

1. LAKE SUPERIOR AT GROS CAP M-39409

The broken intake pipe was replaced and the intake was extended.

Cost: Salaries (2.2 man weeks)	\$ 1166.00
Materials/Supplies	3030.42
Meals/Lodging	576.02
Vehicles	<u>229.02</u>
TOTAL	\$ 5001.46

2. LAKE ONTARIO AT COBOURG M-39410

The brick walk-in shelter was re-insulated and re-panelled. A new baseboard heater and thermostat were installed. The existing electrical system was re-installed. The interior had been damaged by a fire.

Cost: Salaries (1.2 man weeks)	\$ 824.66
Materials/Supplies	308.15
Meals/Lodging	323.90
Vehicles	<u>73.28</u>
TOTAL	\$ 1529.99

3. LITTLE WHITE RIVER BELOW BOLAND CREEK M-39459

The shelter, concrete pad, and stilling well were returned to the verticle position by excavating around the pad and well. Extra fill and rock were placed around the well to stabalize the structure.

Cost: Salaries (2 man weeks)	\$ 870.40
Materials/Supplies	448.75
Meals/Lodging	676.50
Vehicle	<u>347.82</u>
TOTAL	\$ 2343.47

4. MAITLAND RIVER BELOW WINGHAM M-39460

The upper intake pipe was extended and the river bank was re-built and stabalized.

Cost: Salaries (1.2 man weeks)	\$ 522.24
Material/Services	1028.50
Meals/Lodging	291.60
Vehicle	<u>52.14</u>
TOTAL	\$ 1894.48

5. EAST SCOTCH RIVER NEAR ST. ISADORE

M-39463

Rock filled gabion baskets were placed adjacent to the stilling well and shelter to prevent bank erosion.

Cost: Salaries (1.4 man weeks)	\$ 539.20
Materials/Supplies	1031.00
Meals/Lodging	270.53
Vehicles	<u>208.00</u>
TOTAL	\$ 2048.73

6. LITTLE RIVER AT WINDSOR

M-39486

Adjustments were made to intake riser and well-intake system flushed.

Cost: Salaries (0.5 man weeks)	\$ 217.60
Materia/Supplies	
Meals/Lodging	164.37
Vehicles	<u>86.24</u>
TOTAL	\$ 468.21

7. CANARD RIVER NEAR LUKERVILLE M-39488

The "Guelph Type" look-in shelter was removed in order to extend the stilling well/metre. The shelter was replaced and the electrical service was reconnected. Fill was placed around the well.

Cost: Salaries (1.3 man weeks)	\$ 565.76
Materials/Supplies	124.69
Meals/Lodging	316.80
Vehicle	<u>299.52</u>
TOTAL	\$ 1306.77

8. SOPER CREEK NEAR BOWMANVILLE M-39489

Repairs were made to the sheet steel control.

Cost: Salaries (0.8 man weeks)	\$ 326.40
Materials/Supplies	228.00
Meals/Lodging	198.36
Vehicles	<u>165.44</u>
TOTAL	\$ 918.20

9. WILLOW CREEK ABOVE LITTLE LAKE

M-39490

The "Guelph Type" shelter was removed and a 1.0 metre extension was added to the stilling well. The shelter was replaced and the electrical service was reconnected. A retaining wall was erected from pressure treated wood and the area was backfilled.

Cost: Salaries (1.2 man weeks)	\$ 527.68
Materials/Supplies	438.99
Meals/Lodging	292.90
Vehicles	<u>92.40</u>
TOTAL	\$ 1351.97

10. BURNLEY CREEK NEAR WARKWORTH

M-39492

Repairs were made to the Armco walk-in shelter which was damaged by a vehicle.

Cost: Salaries (1.2 man weeks)	\$ 522.24
Materials/Supplies	100.00
Meals/Lodging	322.60
Vehicle	<u>196.24</u>
TOTAL	\$ 1141.08

11. SOUTH INDIAN RIVER NEAR LIMOGES

M-39493

The "Guelph Type" look-in shelter was removed, the well was cut off, and the well was filled with gravel. The hydrometric station had been discontinued.

Cost: Salaries (0.4 man weeks)	\$ 135.68
Material/Supplies	248.00
Meals/Lodging	108.21
Vehicle	<u>100.00</u>
TOTAL	\$ 591.89

12. BOWMANVILLE CREEK NEAR BOWMANVILLE

M-39494

Repairs were made to the shut-off valve for the intake pipe.

Cost: Salaries (0.4 man weeks)	\$ 174.08
Materials/Supplies	
Meals/Lodging	88.77
Vehicles	<u>71.39</u>
TOTAL	\$ 334.24

13. LAKE ONTARIO AT COBOURG

M-39495

Repairs were made to the shut-off valve for the intake pipe.

Cost: Salaries (0.4 man weeks)	\$ 174.08
Materials/Supplies	11.38
Meals/Lodging	88.77
Vehicles	<u>71.39</u>
TOTAL	\$ 345.62

14. WYE RIVER AT WYEBRIDGE

M-39496

The sheet steel control was removed.

Cost: Salaries (1.5 man weeks)	\$ 647.36
Materials/Supplies	
Meals/Lodging	309.80
Vehicle	<u>88.00</u>
TOTAL	\$ 1045.16

15. *CLYDE RIVER NEAR LANARK

M-39497

An extension was made to the intake pipe, the intake areas was excavated, and fill was added adjacent to the shelter.

Cost: Salaries (0.4 man weeks)	\$ 257.00
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Materials/Supplies	562.21
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Meals/Lodging	16.20
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Vehicle	27.35
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TOTAL \$ 862.76

* Ottawa Sub-Office staff carried out this project.

16. DETROIT RIVER AT LA SALLE

M-39498

Two attempts were made to extend the intake pipe. Due to unseasonably cold weather, the task was not completed.

Cost: Salaries (0.8 man weeks) \$ 542.47

Materials/Supplies	200.00
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Meals/Lodging	277.53
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Vehicles	117.30
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TOTAL \$ 1137.30

17. LAKE ERIE AT PORT DOVER

M-39499

Emergency repairs were made to the walk-in shelter door. A new door was installed at a later date.

Cost: Salaries (1.0 man weeks)	\$ 106.24
Materials/Supplies	15.00
Meals/Lodging	84.00
Vehicles	<u>52.14</u>
TOTAL	\$ 257.38

18. CREDIT RIVER AT ERINDALE

M-39500

The door of the Armco walk-in shelter was replaced and the inside refurbished.

Cost: Salaries (0.6 man weeks)	\$ 318.72
Materials/Supplies	200.00
Meals/Lodging	25.20
Vehicle	<u>106.19</u>
TOTAL	\$ 650.11

19. NIAGARA RIVER BELOW I.B.M. 35

M-39501

The damaged "Guelph Type" look-in shelter was replaced with a refurbished shelter.

Cost: Salaries (0.4 man weeks)	\$ 162.24
Materials/Supplies	505.00
Meals/Lodging	16.60
Vehicle	<u>79.20</u>
TOTAL	\$ 763.04

20. CATARAQUI RIVER AT KINGSTON MILLS

M-39502

Modifications were made tot he achoring of the main cable, cable car, and the tower of the cableway.

Cost: Salaries (0.4 man weeks)	\$ 212.48
Materials/Supplies	50.00
Meals/Lodging	148.70
Vehicle	<u>154.66</u>
TOTAL	\$ 565.84

21. NORTH MAGNETAWAN RIVER ABOVE PICKERAL LAKE M-39503

The hydro meter was raised to the required height. The work was carried out by a local electrical contractor.

Cost: Service Contract \$ 215.00

22. S. NATION RIVER NEAR PLANTAGENET M-39504

A new wooden platform was erected on the existing cableway tower. Supports for the platform were fabricated from aluminum.

Cost: Salaries (2.2 man weeks)	\$ 1000.96
Materials/Supplies	906.00
Meals/Lodging	666.20
Vehicle	<u>352.00</u>
TOTAL	\$ 2925.16

23. N/W GANARASKA RIVER NEAR OSACA

M-39505

Rip rap was placed on the bank and end of the sheet steel control to arrest erosion.

Cost: Salaries (0.6 man weeks)	\$ 318.72
Materials/Supplies	1660.23
Meals/Lodging	166.10
Vehicle	<u>135.74</u>
TOTAL	\$ 2280.79

24. SAUBLE RIVER AT SAUBLE FALLS

M-39400

A new aluminum cablecar was installed to replace the deteriorated wooden car.

Cost: Salaries (0.4 man week)	\$ 174.08
Materials/Supplies	1945.00
Meals/Lodging	16.60
Vehicle	<u>84.92</u>
TOTAL	\$ 2220.60

25. ABITIBI RIVER AT ONAKAWANA

M-39430 *

The existing wooden shelter was removed and disposed of. An Armco walk-in shelter was erected and insulated, and panelled. A concrete pad was poured around the existing 1.22 metre well to provide a base for the shelter.

Cost: Salaries (3.4 man weeks)	\$ 2055.09
Materials/Supplies	1390.00
Meals/Lodging	685.90
Vehicle/Transportation	<u>581.03</u>
TOTAL	\$ 4712.02

26. KWATABOAHEGAN RIVER NEAR THE MOUTH

M-39431 *

The existing wooden shelter was removed and disposed of. An Armco walk-in shelter was erected on a wooden base.

Cost: Salaries (2.1 man weeks)	\$ 1252.32
Materials/Supplies	1290.00
Meals/Lodging	171.60
Vehicles/Transportation	<u>4079.11</u>
TOTAL	\$ 6793.03

* These projects were carried out by the North Bay Sub-Office staff.

27. SHAMATTAWA RIVER AT SHAMATTAWA LAKE M-39432 *

Renovations were made to the Personnel/Instrument Shelter.

Cost: Salaries (4.2 man weeks)	\$ 2468.80
Materials/Supplies	1224.26
Meals/Lodging	777.90
Vehicles/Air Fare	<u>6499.00</u>
TOTAL	\$ 10969.96

* Project carried out by the North Bay Sub-Office staff.

28. LITTLE CURRENT RIVER AT PERCY LAKE M-39400 *

Renovation were made to the personnel/instrument shelter.

Cost: Salaries (3.0 man weeks)	\$ 963.79
Materials/Supplies	489.52
Meals/Lodging	489.60
Vehicle/Air Fare	<u>2204.50</u>
TOTAL	\$ 4147.41

29. KENOGAMI RIVER AT MAMMAMATTAWA M-39400 *

Renovations were made to the personnel/instrument shelter.

Cost: Salaries (2.7 man weeks)	\$ 885.64
Materials/Supplies	734.28
Meals/Lodging	424.80
Vehicle/Air Fare	<u>914.50</u>
TOTAL	\$ 2959.22

* Projects were carried out by the North Bay Sub-Office staff.

CONSTRUCTION COSTS 1985-86

FIELD INVESTIGATIONS

COST

1. F-39400 Lake Huron at Sarnia	\$ 1128.25
2. F-39447 Kettle Creek Above St. Thomas	195.80
3. F-39441 Saugeen River (Beatty) near Holstein	301.60
4. F-39429 Harris Creek at Hwy #69	565.78
5. F-39400 Maitland River Below Wingham	103.92
6. F-39400 Bear Brook near Petrolia	163.84
7. F-39436 Lake Ontario at Cobourg	<u>197.67</u>

\$ 2656.86

CONSTRUCTION COSTS 1985-86

NEW CONSTRUCTION

COST

1. C-39439 Blue Jay Creek near Tehkummah	\$ 7365.52
2. C-39440 Madawishkwia River at Hearst	12338.71
3. C-39441 Saugeen River (Beatty) near Holstein	7396.26
4. C-39445 Neebing River at Thunder Bay	5910.08
5. C-39446 McVicar's Creek at Thunder Bay	12927.97
6. C-39447 Kettle Creek above St. Thomas	13536.19
7. C-39448 Sturgeon River at Upper Goose Falls	<u>4505.56</u>

\$63980.29

CONSTRUCTION COSTS 1985-86

UPGRADING

COST

1. U-39414 Bighead River near Meaford	\$ 2186.08
2. U-39429 Harris Creek at Hwy #69	6419.70
3. U-39449 Sydenham River near Owen Sound	2297.63
4. U-39450 Welland River below Caistor Corners	4377.28
5. U-39491 Ausable River near Spring Bank	1293.96
6. U-39498 Millhaven Creek near Millhaven	2886.00
7. U-39499 Castor River Near Russell	4119.80
8. U-39400 Norberg Creek at Outlet of Little Turkey Lake	1427.69
9. U-39400 Norberg Creek below Batchawana Lake	<u>1427.69</u>

\$26435.83

CONSTRUCTION COSTS 1985-86

<u>MAINTENANCE</u>	<u>COST</u>
1. M-39409 Lake Superior at Gros Cap	\$ 5001.46
2. M-39410 Lake Ontario at Colbourg	1529.99
3. M-39459 Little White River below Boland Creek	2343.47
4. M-39460 Maitland River below Wingham	1894.48
5. M-39463 E. Scotch River near St. Isadore	2048.73
6. M-39486 Little River at Windsor	468.21
7. M-39488 Canard River near Lukerville	1306.77
8. M-39489 Soper Creek near Bowmanville	918.20
9. M-39490 Willow Creek above Little Lake	1351.97
10. M-39492 Burney Creek near Warkworth	1141.08
11. M-39493 S. Indian River near Limoges	591.89
12. M-39494 Bowmanville Creek near Bowmanville	334.24
13. M-39495 Lake Ontario at Cobourg	345.62
14. M-39496 Wye River at Wyebridge	1045.16
15. M-39497 Clyde River near Lanark	862.76
16. M-39498 Detroit River at La Salle	1137.30
17. M-39499 Lake Erie at Port Dover	257.38
18. M-39500 Credit River at Erindale	650.11
19. M-39501 Niagara River below I.B.M. #35	763.04
20. M-39502 Cataraqui River at Kingston Mills	565.84
21. M-39503 N. Magnetawan River above Pickeral Lake	215.00
22. M-39504 S. Nation River near Plantagenet	2925.16
23. M-39505 N/W Ganaraska River near Osaca	2280.79
24. M-39400 Sauble River at Sauble Falls	2220.60
25. M-39430 Abitibi River at Onakawana	4712.02
26. M-39431 Kwataboahegan River near the Mouth	6793.03
27. M-39432 Shamattawa River at Shamattawa Lake	10969.96
28. M-39400 Little Current River at Percy Lake	4147.41
29. M-39400 Kenogami River at Mammamattawa	<u>2959.22</u>
	\$61780.89

SUMMARY

CONSTRUCTION COSTS FOR 1985-86

ITEM	SALARY	O&M	CAPITAL	INSTR.	TOTAL
FIELD INVESTIGATIONS	\$ 1592.05	\$ 989.31	\$ 75.50	\$ -	\$ 2656.86
NEW CONSTRUCTION	11834.55	-	30920.74	21225.00	63980.29
UPGRADING	6359.20	-	20076.63	-	26435.83
MAINTENANCE	<u>17931.94</u>	<u>22609.37</u>	<u>21239.58</u>	<u>-</u>	<u>61780.89</u>
TOTALS	\$37717.74	\$23598.68	\$72312.45	\$21225.00	\$154853.87

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