

Environment
Canada

Environnement
Canada

Inland
Waters
Directorate

Ontario
Region

ANNUAL CONSTRUCTION REPORT 1984 - 85

FIELD INVESTIGATIONS
CONSTRUCTION, UPGRADING
AND MAINTENANCE FOR
ONTARIO REGION

Direction
générale
des eaux
intérieures

Region de
l'Ontario

TH
153
B7
1984-85

Canada

DEPARTMENT OF THE ENVIRONMENT
INLAND WATERS DIRECTORATE
WATER RESOURCES BRANCH

ANNUAL CONSTRUCTION REPORT 1984 - 85

FIELD INVESTIGATIONS
CONSTRUCTION, UPGRADING
AND MAINTENANCE FOR
ONTARIO REGION

L. J. KAMP
REGIONAL CHIEF
W. M. ARCHER
REGIONAL ENGINEER
R. J. MYSLIK
ASSISTANT REGIONAL ENGINEER

REPORT BY:
N. D. DAWSON
CONSTRUCTION FOREMAN

MARCH 31, 1985

TABLE OF CONTENTS

	<u>PAGE</u>
1.0 INTRODUCTION	1
2.0 CONSTRUCTION METHODS AND PROCEDURES	3
2.1 Inlet Systems	5
2.2 Instrument Shelters	
2.3 Artifical Controls	7
2.4 Cableways	7
2.5 Station Cost Breakdown	10
3.0 Project Descriptions and Costs	15
3.1 Field Investigations	15
3.2 New Construction	24
3.3 Maintenance	28
3.4 Upgrading	33
4.0 Construction Program Cost Summary	39

INTRODUCTION

This annual construction report, prepared by the Ontario Region of the Water Resources Branch, is for the fiscal year 1984 - 1985.

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, 800mm 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, this whole apparatus, 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, 2 mm thick 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 30 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 13mm 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 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 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 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 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 (19.35kg/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 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, 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 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, Supervisors, Foreman, Term Employees and Hydrometric Personnel associated with field investigations, construction, upgrading and maintenance of the stations in this report.

MATERIALS/SUPPLIES

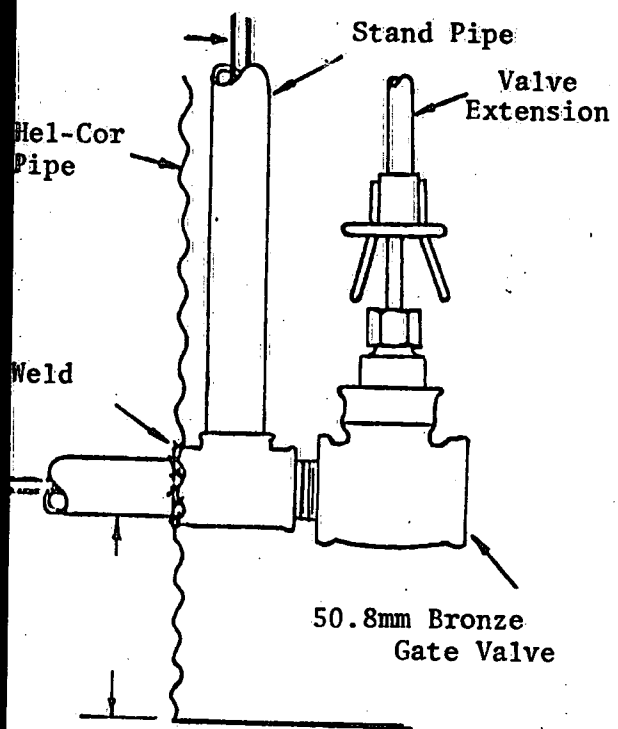
Stilling well, plumbing materials, electrical materials, concrete, instrument shelter, gravel, lumber, excavating machinery, rental equipment, steel, and contract services

MEALS/ROOMS

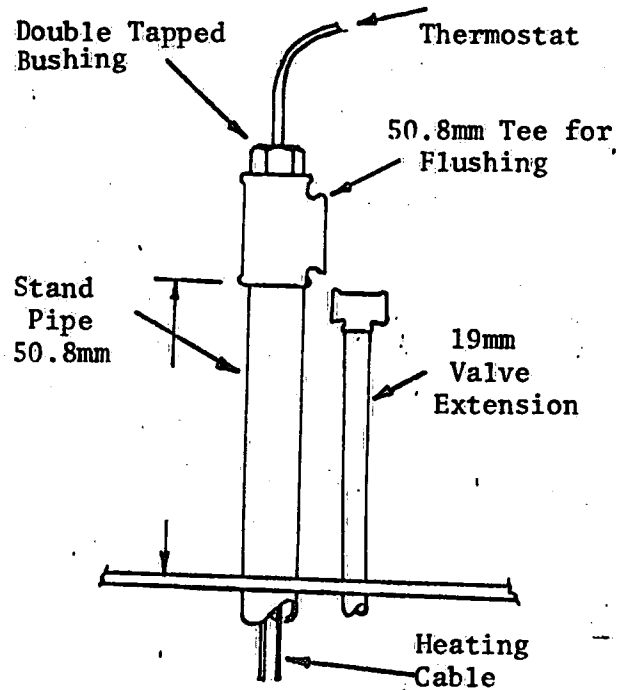
Living expenses for field personnel.

VEHICLES

Cost of operation and depreciation.



DETAIL "A"



DETAIL "B"

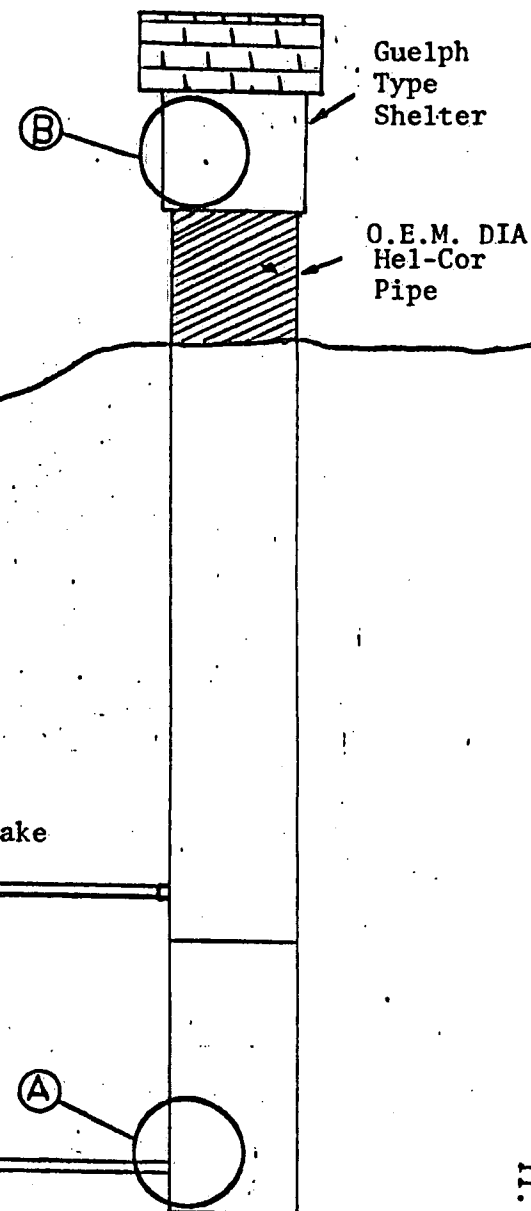


FIG. 1 INBANK STILLING WELL

FIG. 2

INBANK STILLING WELL

WITH ARMCO SHELTER

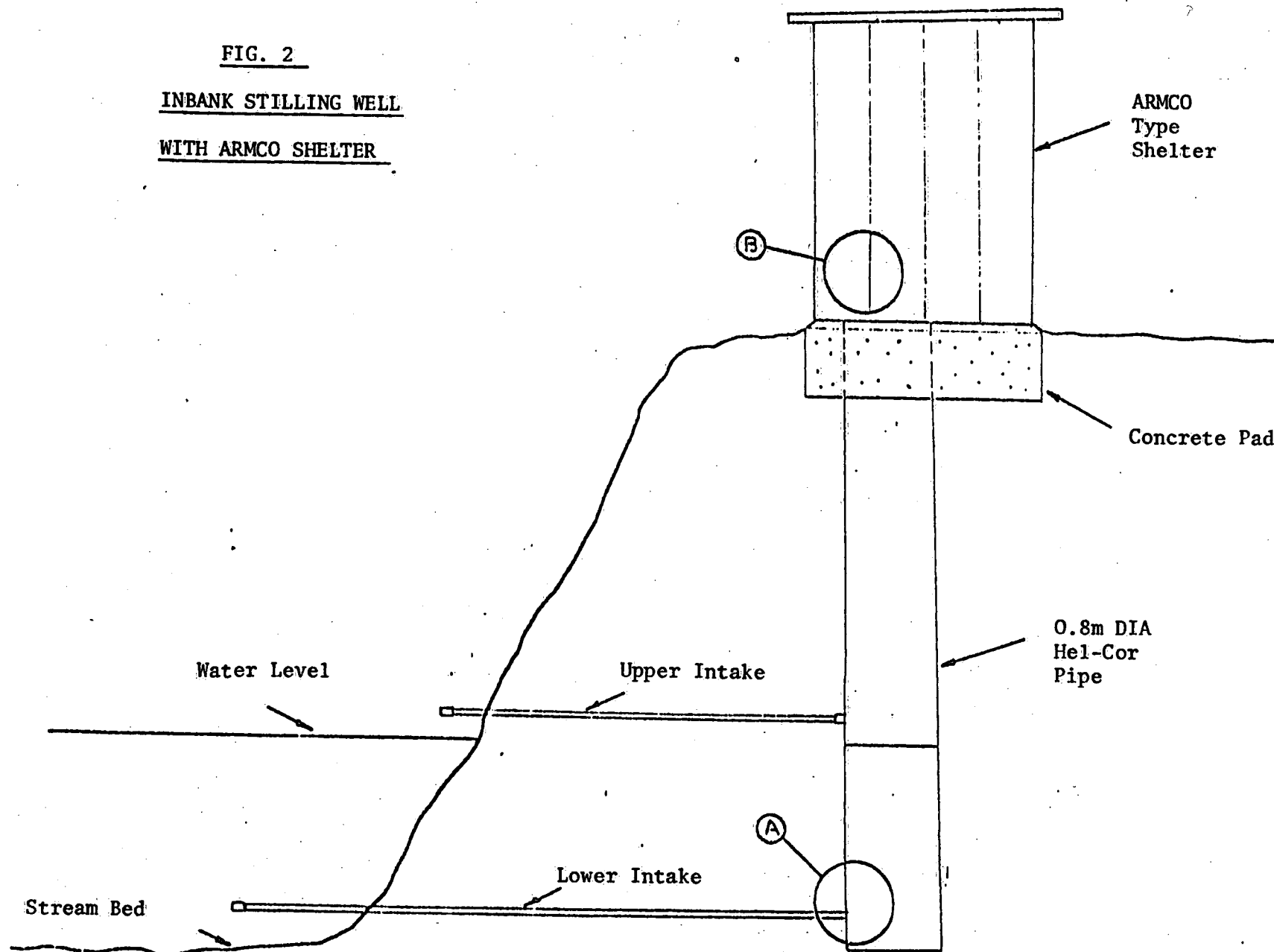
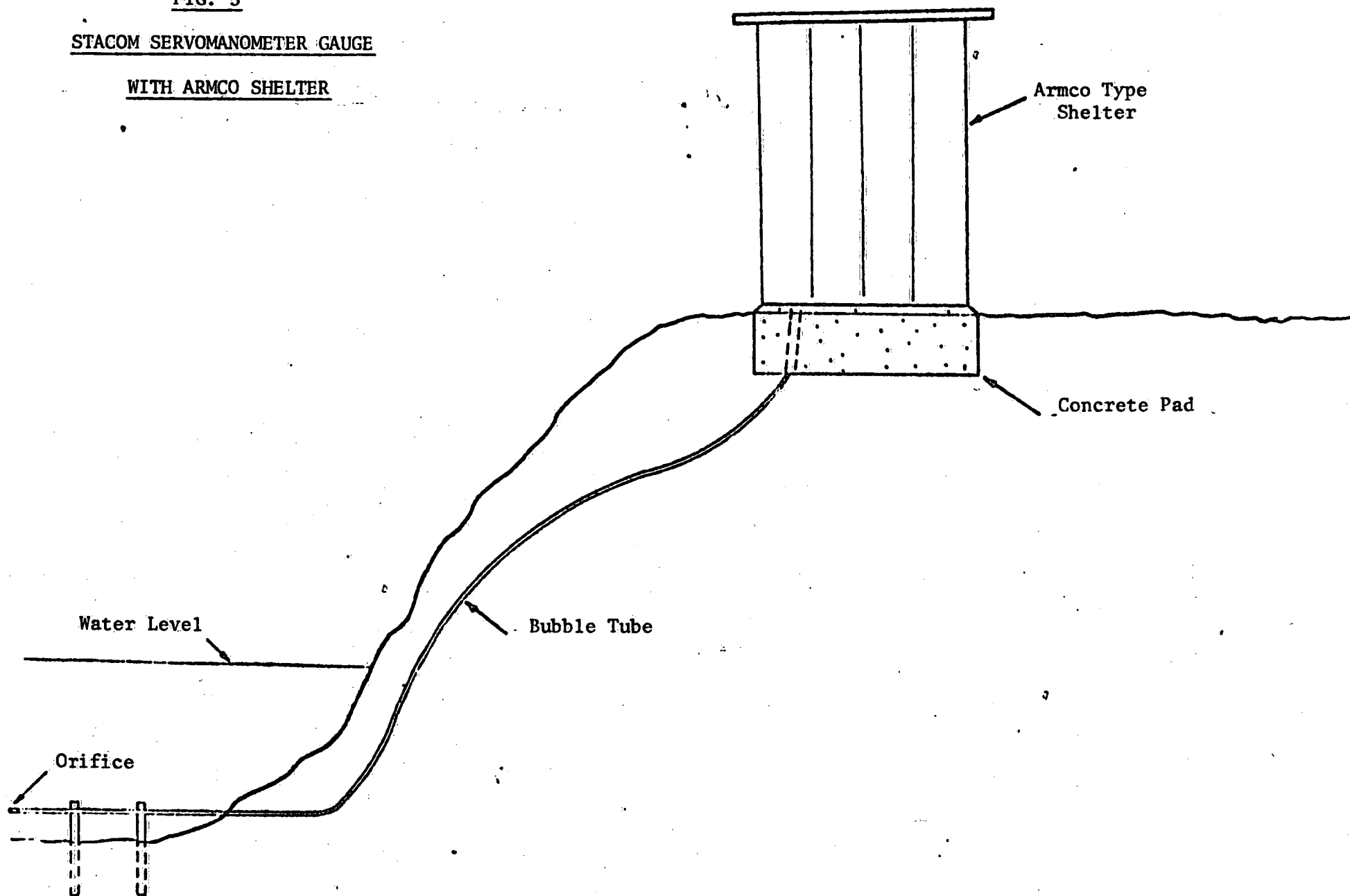


FIG. 3

STACOM SERVOMANOMETER GAUGE

WITH ARMCO SHELTER



ARMCO
Type
Shelter

FIG. 4

TIDES & WATER LEVEL GAUGE
with ARMCO SHELTER

Concrete Pad

1.6m D/A
Hel-Cor
Pipe

Water Level

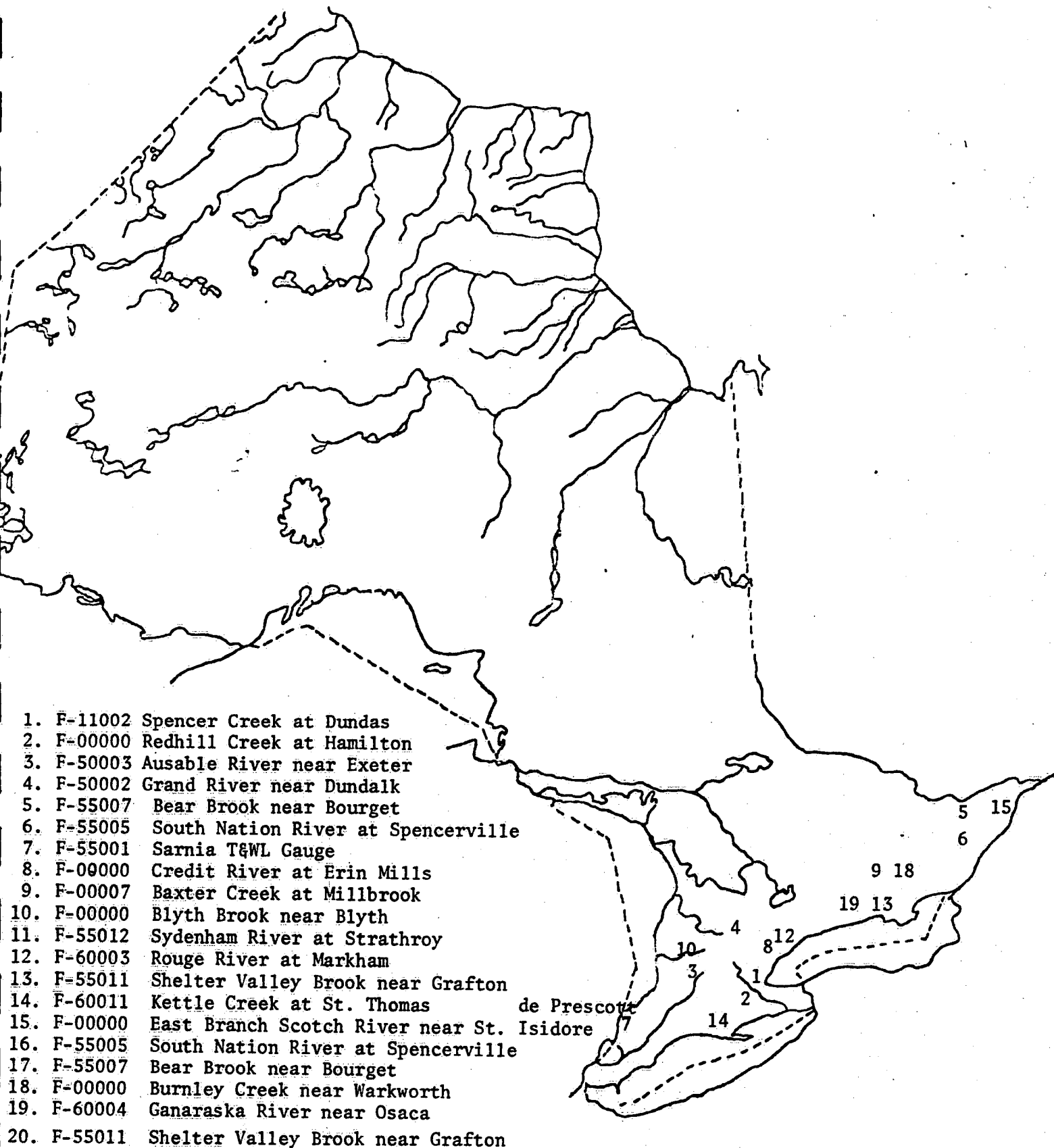
Sheet Steel
Wharf Piling

0.9m DIA
Hel-Cor
Pipe

Intake

Bottom

F- FIELD INVESTIGATIONS 1984-1985



F - FIELD INVESTIGATIONS 1984 1985F-11002 Spencer Creek at Dundas Crossing

Following two field investigations by the Construction Foreman, it was decided that moving the station downstream would be more cost effective and provide more stable conditions than repairing the concrete control at the original site.

COST:

Salaries (0.3 Man Weeks)	\$ 161.76
Meals/Rooms	15.60
Vehicles	<u>79.20</u>
Total	\$ 256.56

F-00000 Redhill Creek at Hamilton

An evaluation of the erosion problem around the control was carried out. Relocation of this station was suggested since severe turbulence causing the erosion is attributed to the concrete box culvert immediately upstream of the station site. The close proximity of this large culvert would necessitate extensive rip-rapping and meet with limited results.

COST:

Salaries (0.1 Man Weeks)	\$ 53.92
Meals/Rooms	-----
Vehicles	<u>13.20</u>
Total	\$ 67.12

F-50003 Ausable River near Exeter

A reconnaissance was conducted by the Assistant Regional Engineer, Construction Foreman, and representative of the Ausable - Bayfield C.A. with regard to choosing a suitable site for a hydrometric gauging station.

COST:

Salaries (0.4 Man Weeks)	\$ 269.09
Meals/Rooms	15.60
Vehicles	<u>58.40</u>
Total	\$ 343.09

F-50002 Grand River near Dundalk

The Assistant Regional Engineer and Construction Foreman met on site with a representative from the M.O.E. to choose and survey a suitable location for a hydrometric gauging station.

COST:

Salaries (0.4 Man Weeks)	\$ 269.09
Meals/Rooms	15.60
Vehicles	<u>41.12</u>
Total	\$ 325.81

F-55007 Bear Creek near Bourget (Non-Required)

F-55005 South Nation River at Spencerville

The Construction Foreman and Hydrometric Technicians conducted a reconnaissance with respect to installing a cableway at the Bourget station and upgrading the Spencerville station with a modern well, Armco shelter and concrete weir.

COST:

Salaries (0.2 Man Weeks)	\$ 111.60
Meals/Rooms	-----
Vehicles	<u>32.00</u>
Total	\$ 143.60

F-55001 Sarnia T&WL Gauge

A reconnaissance was conducted by the Assistant Regional Engineer and Construction Foreman in order to select a site for a T&WL gauge at the Sarnia Yacht Club. A meeting was also held with the Commodore of the club. It was decided that a temporary gauge would be installed in order to assess the site for a permanent installation.

COST:

Salaries (0.4 Man Weeks)	\$ 269.09
Meals/Rooms	15.60
Vehicles	<u>72.00</u>
Total	\$ 356.69

F-00000 Credit River at Erindale

The present highway No. 5 site (original) of this gauge was examined by the Construction Foreman and assistant to evaluate repairs required to the intake system. It was recommended that the station be relocated a short distance upstream (to the Armco shelter in the new park area) since repairs to the lower intake would be costly and the control at the present site is unstable.

COST:

Salaries (0.4 Man Weeks)	\$ 175.68
Meals/Rooms	15.60
Vehicles	<u>58.08</u>
Total	\$ 249.36

F-50007 Baxter Creek at Millbrook

A reconnaissance was conducted by the Construction Foreman and Hydrometric Supervisor for the area with regard to installing a hydrometric gauging station at this site.

COST:

Salaries (0.4 Man Weeks)	\$ 232.94
Meals/Rooms	15.60
Vehicles	<u>69.60</u>
Total	\$ 318.14

F-00000 Blyth Brook near Blyth

An on-site meeting and survey was conducted by the Construction Foreman with a representative of the Maitland Valley C.A. for the establishment of a hydrometric gauging station.

COST:

Salaries (0.2 Man Weeks)	\$ 107.84
Meals/Rooms	7.80
Vehicles	<u>74.58</u>
Total	\$ 190.22

F-55012 Sydenham River at Strathroy

A field investigation was conducted in preparation for the installation of a sheet steel control at this station.

COST:

Salaries (0.1 Man Weeks)	\$ 53.92
Meals/Rooms	7.80
Vehicles	<u>87.12</u>
Total	\$ 148.84

F-60003 Rouge River near Markham

F-55011 Shelter Valley Brook near Grafton

A field investigation was conducted regarding the placement of fill and equipment access for repairs to the steel control at Rouge River.

The Construction Foreman also surveyed Shelter Valley Brook near Grafton for a steel control.

COST:

Salaries (0.2 Man Weeks)	\$ 107.84
Meals/Rooms	7.80
Vehicles	<u>110.88</u>
Total	\$ 226.52

F-60011 Kettle Creek at St. Thomas

The Construction Foreman and assistant ascertained the equipment and materials required to repair the erosion damages around the steel control at this site.

COST:

Salaries (0.4 Man Weeks)	\$ 175.68
Meals/Rooms	132.30
Vehicles	<u>41.14</u>
Total	\$ 349.12

F-00000 East Branch Scotch River near St. Isidore de Prescott

F-55005 South Nation River at Spencerville

The construction crew conducted a reconnaissance to assess corrective action required to curb the bank erosion around the well at the East Branch Scotch River.

As assessment was also made regarding a reinforced concrete retaining wall (to subsidize the previously placed stone wall) around the well at South Nation River.

COST:

Salaries (0.4 Man Weeks)	\$ 175.68
Meals/Rooms	15.90
Vehicles	<u>102.08</u>
Total	\$ 293.66

F-55007 Bear Brook near Bourget

The Construction Foreman met with the Hydrometric Supervisor of the area and property owner to finalize details of erecting a cableway at this station.

COST:

Salaries (0.2 Man Weeks)	\$ 107.84
Meals/Rooms	34.75
Vehicles	<u>40.70</u>
Total	\$ 183.29

F-00000 Burnley Creek near Warkworth

F-60004 Ganaraska River near Osaca

F-55011 Shelter Valley Brook near Grafton

A reconnaissance trip was made by the Construction Foreman to Burnley Creek to assess damage caused to the Armco shelter by an automobile.

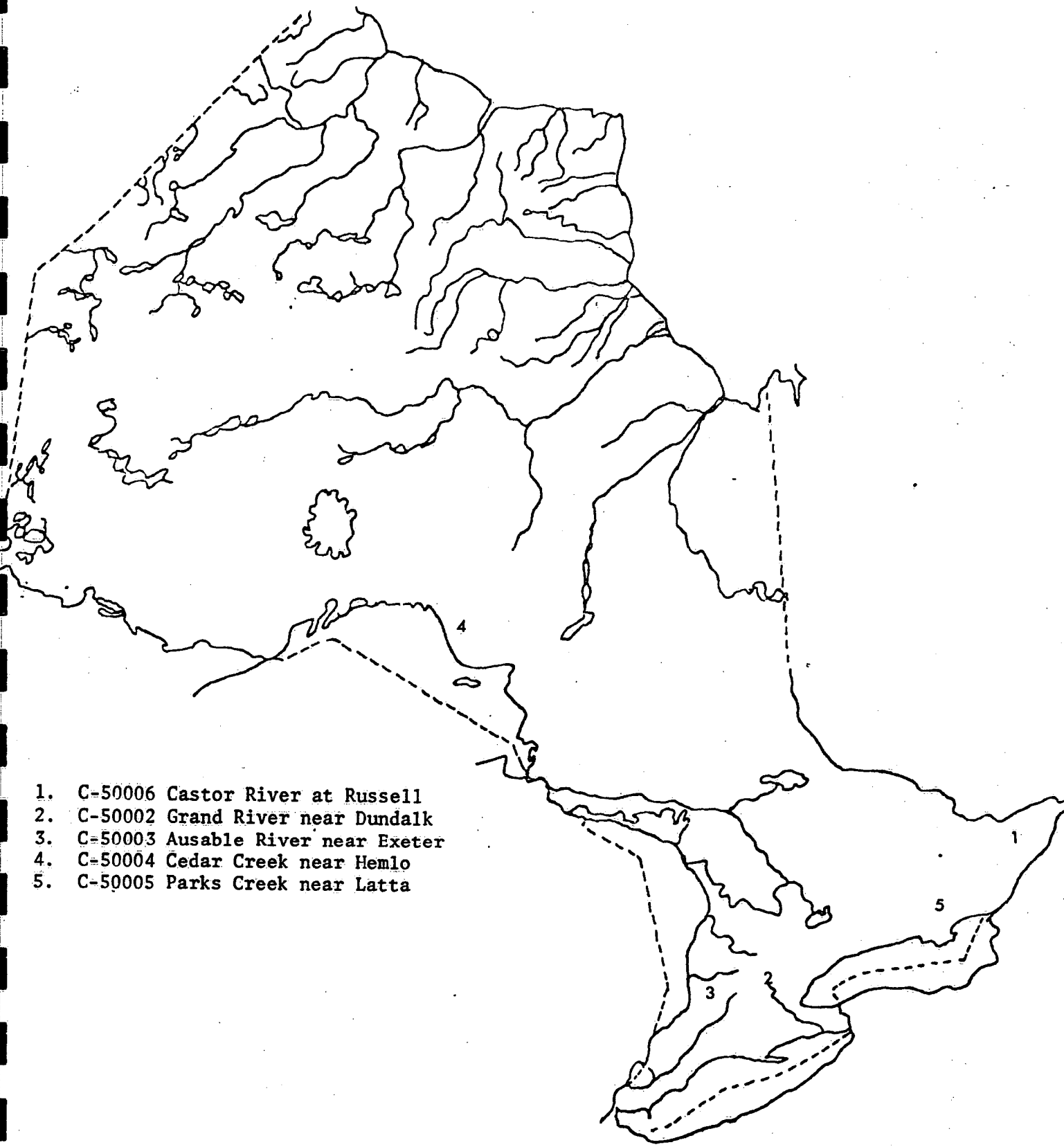
The abutments for the north foot bridge at the Ganaraska River were also examined for reported erosion.

The recently installed steel control (early September 1984) was examined for erosion of rip-rap in centre stream by high stage and remedial action undertaken.

COST:

Salaries (0.3 Man Weeks)	\$ 161.76
Meals/Rooms	86.50
Vehicles	<u>55.84</u>
Total	\$ 304.10

C- NEW CONSTRUCTION 1984-1985

- 
1. C-50006 Castor River at Russell
 2. C-50002 Grand River near Dundalk
 3. C-50003 Ausable River near Exeter
 4. C-50004 Cedar Creek near Hemlo
 5. C-50005 Parks Creek near Latta

C-50006 Castor River at Russell

The area around the existing well was built up with fill, the Guelph type shelter removed, and an Armco shelter (complete with 60 A. electrical service) was relocated from the discontinued East Castor River near Russell site and anchored on a poured-in-place concrete pad at this station.

COST:

Salaries (2.4 Man Weeks)	\$1,486.79
Materials/Supplies	523.57
Meals/Rooms	785.90
Vehicles	319.52
Instrumentation (re-use A-71)	<u>0.00</u>
Total	\$3,115.78

C-50002 Grand River near Dundalk

Installed a galvanized steel "Hel-Cor" stilling well and intake. Built a retaining wall of pressure treated wood and placed fill. An insulated Armco walk-in shelter, complete with a 60 A. electrical service, was erected on a poured-in-place concrete pad.

COST:

Salaries (4.2 Man Weeks)	\$ 2,179.85
Materials/Supplies	3,589.08
Meals/Rooms	959.55
Vehicles	396.96
Instrumentation	<u>3,634.35</u>
Total	\$10,759.79

C-50003 Ausable River near Exeter

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 60 A. electrical service was erected.

COST:

Salaries (3.6 Man Weeks)	\$1,795.23
Materials/Supplies	2,567.33
Meals/Rooms	828.70
Vehicles	371.90
Instrumentation	<u>3,634.35</u>
Total	\$9,197.51

C-50004 Cedar Creek near Hemlo

An Armco walk-in shelter (not insulated) was erected on a poured-in-place concrete pad. The shelter was also equipped with a 60 A. electrical service for future connection as required.

COST:

Salaries (2.0 Man Weeks)	\$ 1,356.03
Materials/Supplies	1,755.72
Meals/Rooms	817.90
Vehicles	789.60
Instrumentation	<u>7,428.25</u>
Total	\$12,147.50

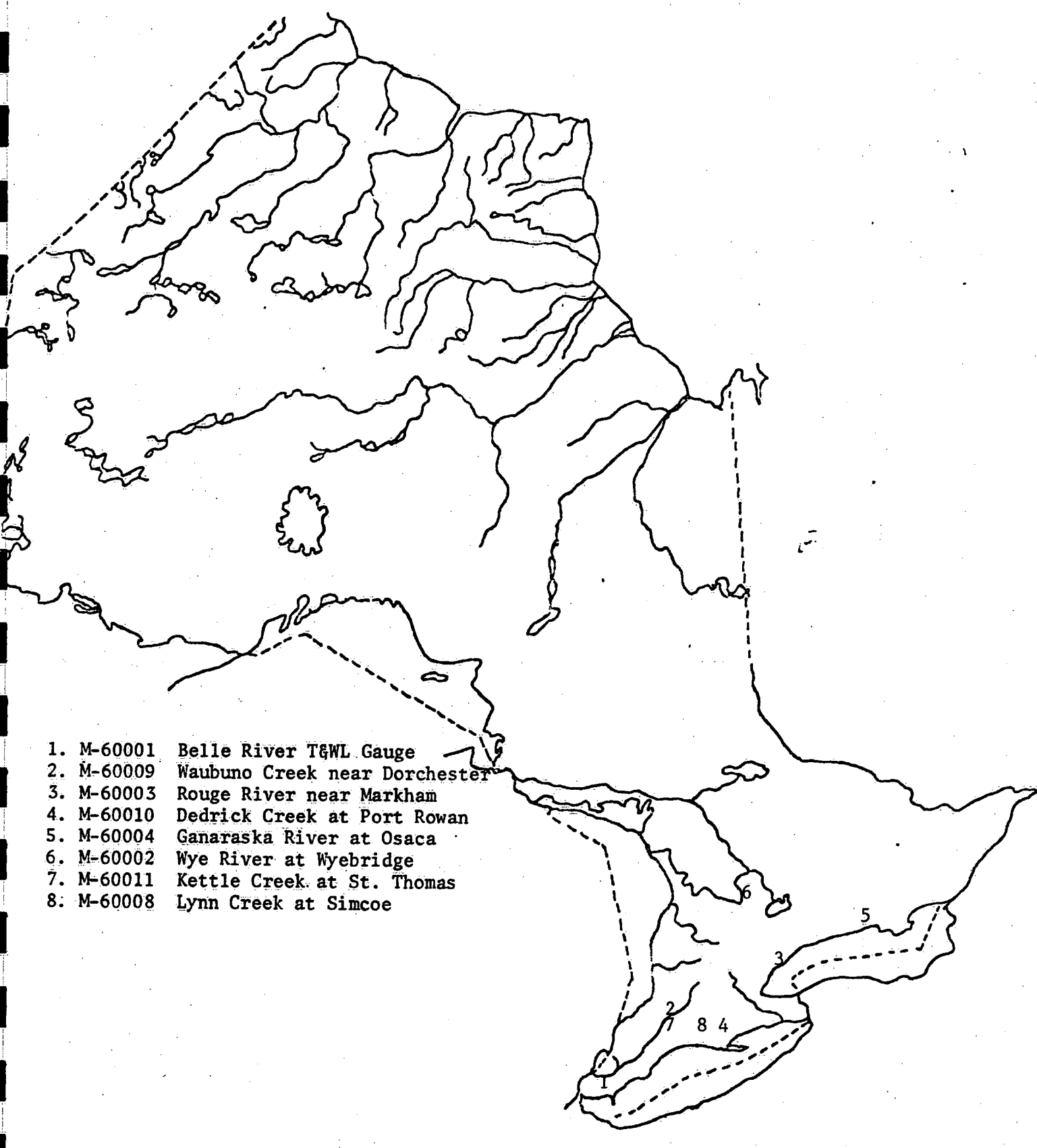
C-50005 Parks Creek near Latta

Installed a galvanized steel "Hel-Cor" stilling well and intakes. An insulated Armco walk-in shelter was erected on a poured-in-place concrete pad and equipped with a 60 A. electrical service.

COST:

Salaries (4.4 Man Weeks)	\$2,293.84
Materials/Supplies	1,988.25
Meals/Rooms	1,179.37
Vehicles	765.86
Instrumentation	<u>3,634.35</u>
Total	\$9,861.67

M- MAINTENANCE 1984-1985

- 
1. M-60001 Belle River T&WL Gauge
 2. M-60009 Waubuno Creek near Dorchester
 3. M-60003 Rouge River near Markham
 4. M-60010 Dedrick Creek at Port Rowan
 5. M-60004 Ganaraska River at Osaca
 6. M-60002 Wye River at Wyebridge
 7. M-60011 Kettle Creek at St. Thomas
 8. M-60008 Lynn Creek at Simcoe

M-60001 Belle River T&WL Station

Repairs were made to the Armco shelter as a result of damage caused by an automobile.

COST:

Salaries (1.0 Man Weeks)	\$ 454.40
Materials/Supplies	95.85
Meals/Rooms	292.35
Vehicles	<u>208.00</u>
Total	\$1,050.60

M-60009 Waubuno Creek near Dorchester

Damage to the Armco shelter as a result of an automobile accident was repaired.

COST:

Salaries (0.4 Man Weeks)	\$ 174.08
Materials/Supplies	12.00
Meals/Rooms	27.60
Vehicles	<u>60.16</u>
Total	273.84

M-60003 Rouge River near Markham

The eroded bank around the sheet steel control was repaired.

COST:

Salaries (1.0 Man Weeks)	\$ 419.20
Materials/Supplies	847.25
Meals/Rooms	39.00
Vehicles	<u>181.72</u>
Total	\$1,487.17

M-60010 Dedrick Creek at Port Rowan

This discontinued station was dismantled in May 1984. The hydro pole and Guelph shelter were removed and the well cut to ground level and filled with stone.

COST:

Salaries (0.6 Man Weeks)	\$ 243.52
Materials/Supplies	158.00
Meals/Rooms	23.40
Vehicles	<u>144.76</u>
Total	\$ 569.68

M-60004 Ganaraska River at Osaca

The abutment supporting a wooden walk-way bridge was rebuilt using gabion baskets. The bridge had been extended twelve feet in January 1984 to facilitate the use of gabions as well as increasing the channel width under the bridge. The construction crew received assistance from the area hydrometric technician in completing this repair.

COST

Salaries (2.8 Man Weeks)	\$ 1,314.82
Materials/Supplies	1,702.59
Meals/Rooms	725.40
Vehicles	<u>290.84</u>
Total	\$ 4,033.65

M-60002 Wye River at Wyebridge

The steel control at this station was completed and rip-rap placed.

COST

Salaries (1.8 Man Weeks)	\$ 790.98
Materials/Supplies	1,116.19
Meals/Rooms	423.30
Vehicles	<u>112.64</u>
Total	\$ 2,443.11

M-60011 Kettle Creek at St. Thomas

Erosion around one end of the steel control was repaired with redi-mix concrete and the river bank rebuilt with rubble and fill.

COST

Salaries (1.2 Man Weeks)	\$ 527.04
Materials/Supplies	1282.70
Meals/Rooms	315.80
Vehicles	<u>89.10</u>
Total	\$ 2,214.64

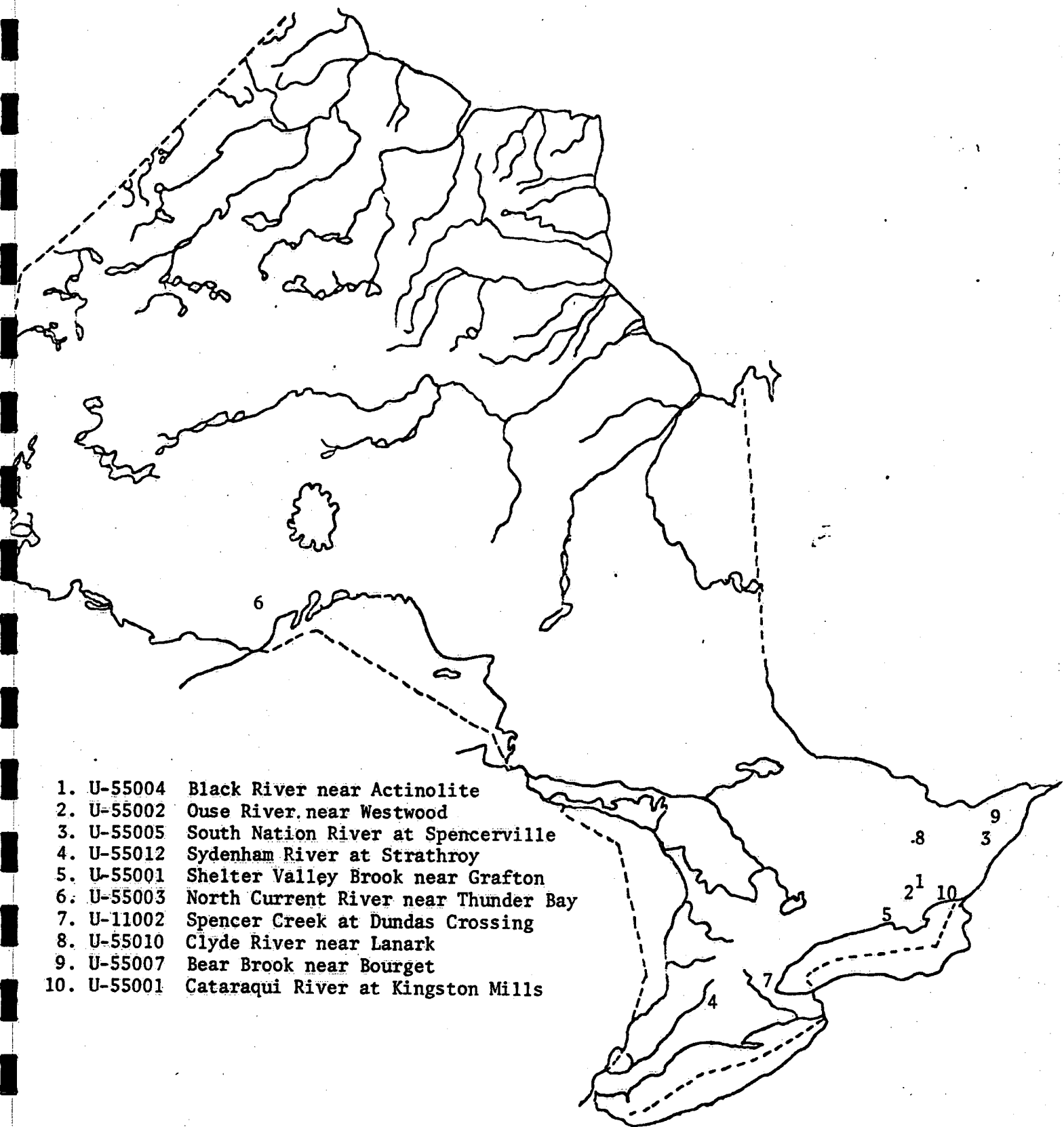
M-60008 Lynn Creek at Simcoe

The construction labourer replaced the roof of the Guelph-type shelter at this location.

COST

Salaries (0.2 Man Weeks)	\$ 67.84
Materials/Supplies	35.00
Meals/Rooms	7.80
Vehicles	<u>36.48</u>
Total	\$ 147.12

U-UPGRADING 1984-1985

- 
1. U-55004 Black River near Actinolite
 2. U-55002 Ouse River, near Westwood
 3. U-55005 South Nation River at Spencerville
 4. U-55012 Sydenham River at Strathroy
 5. U-55001 Shelter Valley Brook near Grafton
 6. U-55003 North Current River near Thunder Bay
 7. U-11002 Spencer Creek at Dundas Crossing
 8. U-55010 Clyde River near Lanark
 9. U-55007 Bear Brook near Bourget
 10. U-55001 Cataraqui River at Kingston Mills

U-55004 Black River near Actinolite

A retaining wall of treated lumber was built and the area around the well backfilled. The Guelph-type shelter was removed, a concrete pad poured, and an insulated Armco walk-in shelter, complete with a 60 A. electrical service was erected.

COST

Salaries (5.4 Man Weeks)	\$2,873.92
Materials/Supplies	1,109.72
Meals/Rooms	1,475.19
Vehicles	<u>962.00</u>
Total	\$6,420.83

U-55002 Ouse River near Westwood

A free-formed concrete control was constructed at this station.

COST

Salaries (2.0 Man Weeks)	\$1,108.98
Materials/Supplies	4,376.00
Meals/Rooms	521.61
Vehicles	<u>258.06</u>
Total	\$6,264.65

U-55005 South Nation River at Spencerville

The original Guelph-type shelter and undersized well were removed. A galvanized steel "Hel-Cor" well with intakes was installed at the same location. A retaining wall of layered stone and reinforced concrete was constructed and backfilled. An insulated Armco walk-in shelter, complete with 60 A. electrical service, was relocated from the discontinued Little Castor River near Embrun site and mounted on a concrete pad at this station. In addition, a free-formed concrete control was constructed.

COST

Salaries (6.0 Man Weeks)	\$ 3,199.79
Materials/Supplies	4,821.40
Meals/Rooms	1,630.19
Vehicles	<u>816.86</u>
Total	\$10,468.24

C-55012 Sydenham River at Strathroy

The construction crew, with assistance from the hydrometric technician for this area, installed a sheet steel control at this station.

COST

Salaries (1.6 Man Weeks)	\$ 730.24
Materials/Supplies	1,736.00
Meals/Rooms	501.17
Vehicles	<u>150.48</u>
Total	\$ 3,117.89

U-55011 Shelter Valley Brook near Grafton

The construction crew and hyrometric technician for the area installed a sheet steel control at this station.

COST

Salaries (2.0 Man Weeks)	\$ 1,130.14
Materials/Supplies	1,459.20
Meals/Rooms	697.80
Vehicles	<u>292.60</u>
Total	\$ 3,579.74

C-55003 North Current River near Thunder Bay

This manual station was upgraded to an automatic station with the installation of a galvanized steel "Hel-Cor" well with intakes and a poured-in-place concrete pad. An insulated Armco walk-in shelter with 60 A. electrical service was erected. There is a natural bedrock control at this station.

COST

Salaries (4.0 Man Weeks)	\$ 2,399.13
Materials/Supplies	3,380.16
Meals/Rooms	1,341.53
Vehicles	<u>750.14</u>
Total	\$ 7,870.96

U-11002 Spencer Creek at Dundas Crossing

The construction crew relocated this station downstream with the installation of a new galvanized "Hel-Cor" well, intakes, and concrete pad. The insulated Armco walk-in shelter, with 60 A. electrical service, was then relocated to the new gauge site near the corner of Market Street South and Mill Street in Dundas.

COST

Salaries (3.0 Man Weeks)	\$ 1,297.60
Materials/Supplies	1,777.52
Meals/Rooms	119.25
Vehicles	<u>293.12</u>
Total	\$ 3,487.49

U-55010 Clyde River near Lanark

A galvanized "Hel-Cor" stilling well, with intakes and heating cable, was installed at this station for the Mississippi Valley Conservation Authority who completed the project with the placement of a walk-in shelter.

COST

Salaries (1.6 Man Weeks)	\$ 702.72
Materials/Supplies	1,751.81
Meals/Rooms	487.65
Vehicles	<u>187.22</u>
Total	\$ 3,129.40

U-55007 Bear Brook near Bourget

The construction crew installed a cableway comprising of poured-in-place concrete anchor blocks and one galvanized steel tower mounted on a reinforced concrete pad. An aluminum two-man sit-down cablecar will be used at this site.

COST

Salaries (3.8 Man Weeks)	\$ 2,500.00
Materials/Supplies	6,050.00
Meals/Rooms	1,500.00
Vehicles	<u>850.00</u>
Total	\$10,900.00

U-55001 Cataragui River at Kingston Mills

A cableway was erected at this site by the construction crew using galvanized rock anchors and one galvanized steel tower with platforms. An aluminum cablecar will also be used at this station.

COST

Salaries (2.4 Man Weeks)	\$ 1,494.09
Materials/Supplies	3,929.07
Meals/Rooms	631.56
Vehicles	544.96
Instrumentation (A-71)	<u>3,634.35</u>
Total	\$10,234.03

Construction Costs for 1984-85

<u>Field Investigations</u>	<u>Cost</u>
1. F-11002 Spencer Creek at Dundas	\$ 256.56
2. F-00000 Redhill Creek at Hamilton	67.12
3. F-50003 Ausable River near Exeter	343.09
4. F-50002 Grand River near Dundalk	325.81
5. F-55007 Bear Brook near Bourget)	
6. F-55005 South Nation River at Spencerville)	143.60
7. F-55001 Sarnia T&WL Gauge	356.69
8. F-00000 Credit River at Erin Mills	249.36
9. F-50007 Baxter Creek at Millbrook	318.14
10. F-00000 Blyth Brook near Blyth	190.22
11. F-55012 Sydenham River at Strathroy	148.84
12. F-60003 Rouge River at Markham)	
13. F-55011 Shelter Valley Brook near Grafton)	226.52
14. F-60011 Kettle Creek at St. Thomas	349.12
15. F-00000 East Branch Scotch River near St. Isidore de Prescott)	
16. F-55005 South Nation River at Spencerville)	293.66
17. F-55007 Bear Brook near Bourget	183.29
18. F-00000 Burnley Creek near Warkworth)	
19. F-60004 Ganaraska River near Osaca)	304.10
20. F-55011 Shelter Valley Brook near Grafton)	
Total	3,756.12

Construction Costs for 1984-85

<u>New Construction</u>		<u>Cost</u>
1.	C-50006 Castor River at Russell	\$ 3,115.78
2.	C-50002 Grand River near Dundalk	10,759.79
3.	C-50003 Ausable River near Exeter	9,197.51
4.	C-50004 Cedar Creek near Hemlo	12,147.50
5.	C-50005 Parks Creek near Latta	<u>9,861.67</u>
Total		\$45,082.25

Construction Costs for 1984-85

	<u>Maintenance</u>	<u>Cost</u>
1.	M-60001 Belle River T&WL Gauge	\$ 1,050.60
2.	M-60009 Waubuno Creek near Dorchester	273.84
3.	M-60003 Rouge River near Markham	1,487.17
4.	M-60010 Dedrick Creek at Port Rowan	569.68
5.	M-60004 Ganaraska River at Osaca	4,033.65
6.	M-60002 Wye River at Wyebridge	2,443.11
7.	M-60011 Kettle Creek at St. Thomas	2,214.64
8.	M-60008 Lynn Creek at Simcoe	<u>147.12</u>
	Total	\$12,219.81

Construction Costs for 1984-85

<u>Upgrading</u>	<u>Cost</u>
1. U-55004 Black River near Actinolite	\$ 6,420.83
2. U-55002 Ouse River near Westwood	6,264.65
3. U-55005 South Nation River at Spencerville	10,468.24
4. U-55012 Sydenham River at Strathroy	3,117.89
5. U-55011 Shelter Valley Brook near Grafton	3,579.74
6. U-55003 North Current River near Thunder Bay	7,870.96
7. U-11002 Spencer Creek at Dundas Crossing	3,487.49
8. U-55010 Clyde River near Lanark	3,129.40
9. U-55007 Bear Brook near Bourget	10,900.00
10. U-55001 Cataraqui River at Kingston Mills	<u>10,234.03</u>
Total	\$65,473.23

SUMMARY
CONSTRUCTION COSTS FOR 1984-85

ITEM	SALARY	OPERATION AND MAINTENANCE	CAPITAL	INSTRUMENTATION	TOTAL
Field Investigations	2,433.73	1,322.39	-	-	3,756.12
New Construction	9,111.74	-	17,639.21	18,331.30	45,082.25
Upgrading	17,436.61	-	44,402.27	3,634.35	65,473.23
Maintenance	<u>3,991.88</u>	<u>8,227.93</u>	<u>-</u>	<u>-</u>	<u>12,219.81</u>
Totals	32,973.96	9,550.32	62,041.48	21,965.65	126,531.41

Environment Canada Library, Burlington



3 9055 1018 0094 3