

**ALBERTA
CONSTRUCTION AND MAINTENANCE
ANNUAL REPORT
1997-98**

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1.0 INTRODUCTION

The Alberta District, Water Survey of Canada Division since 1949, has prepared annual gauging station construction reports. These reports contain financial and construction details for all projects. This report is for the fiscal year April 1, 1997 to March 31, 1998.

The contents of this report include a summary of expenditures incurred during 1997/98 for new station construction, for normal maintenance, for removal or relocation, for electrical power installations, and for fall restraint installs.

The report also contains details on work performed and expenditures at each site. Cost breakdowns are grouped by gauging designation; Federal, Federal-Provincial, and Provincial.

Brief descriptions of construction practices, material and equipment are presented in Appendix A.

Appendix B contains information and costs for work performed for the Atmospheric Environmental Service. Appendix B also contains photographs taken during the season.

2.0 COST-SHARING ARRANGEMENTS

The 1997/98 construction and maintenance program between Canada and the Province of Alberta is managed under the Memorandum of Agreement for hydrometric surveys signed by both governments on April 15, 1975. The annual construction programs are established via a joint consultative process between Alberta Environmental Protection and Environment Canada.

Under the terms of the agreement each gauging station is designated as Federal, Federal-Provincial or Provincial by a Co-ordinating Committee. Maintenance, power installation upgrading or new construction costs are shared according to the designation of the hydrometric gauging station.

Costs chargeable to the construction program are defined in the Memorandum of Agreement and Schedule B of the agreement. In summary, direct costs such as salaries of construction personnel, field travel expenses, vehicle operating costs, construction materials, contract payments for services and depreciation of construction equipment are chargeable. Stations designated as Federal are the cost responsibility of the Water Survey of Canada; stations designated as Federal-Provincial are cost shared equally; and stations designated Provincial are the cost responsibility of the Province of Alberta. The exceptions relate to equipment and instrumentation whereby, under Article VII of the Memorandum of Agreement, the operating agency is responsible for providing and paying the total cost of the basic water level recording equipment. However, beginning with 1983/84, manometer gauges have not been considered to be water level recording equipment and are shared according to designation. Specialized equipment and/or instrumentation is paid for by the party or parties requiring the service.

3.0 THE 1997/98 CONSTRUCTION PROGRAM

Two new stations were installed during the 1997/98 construction season. Willow Creek at Oxley Ranch and St. Mary River at Highway 501.

In all, maintenance was carried out at 73 W.S.C. Sites and 3 A.E.S. Sites.

This maintenance consisted of the following:

- Removal of 7 stations
- Relocation of 0 stations
- Cableway repairs at 8 stations
- Maintenance at 36 sites
- Fall restraint was installed at 20 stations

The installation of electric power at a gauging station reduces the incidence of record loss, eases the manual work effort of the field technician and in general, improves the efficiency of operation. There were 2 power installations done in 1997/98, bringing the total power installations at gauging stations in the Alberta District at 139 sites.

3.1 Distribution of Costs

Table 1, which follows, contains a summary of costs and numbers of construction projects according to gauging station designation. The costs in Table 1 include instrumentation and supervision, but do not include cost for depreciation.

3.2 Specific Costs and Site Locations

Table 2, which follows, contains a summary of costs for each specific site. Bracketed figures are negative costs because of the return of salvageable materials to the warehouse, to be used again (salvaged material less construction costs).

TABLE 1

1997/98 CONSTRUCTION PROJECTS AND COSTS

<u>TYPE</u>	<u>NUMBER</u>	<u>DESIGNATION</u>	<u>COST</u>
<u>MAINTENANCE</u>	28 37%	Federal/Provincial	\$41,292.84 20646.42/ea.
	15 20%	Federal	\$25,962.49
	32 43%	Provincial	\$65,033.49
<u>RECORDERS</u>	<u>100%</u>		<u>\$0.00</u>
<u>TOTAL</u>	<u>75</u>		<u>\$132,288.82</u>

97/98 132,288.82

Prov		
Prov	85,679.91	65%
FED	46,608.91	35%
	<u>132,288.82</u>	<u>100%</u>

500/DAY
350x

1.25 RECONN 2
.25 T... 2 2 2
1.5 x 500 = 750/DNIT
80 600 ACCOM.
640 200 MHS
MLS.

FEDERAL MAINTENANCE COSTS		NUMBER	TOTAL	DES	Fed Share	Prov Share
M-01	Birch River below Alice Creek	07KE001	\$403.75	F1	\$403.75	\$0.00
M-02	Boxelder Creek near Walsh	05AH001	\$1,395.26	F2	\$1,395.26	\$0.00
M-03	Breed Creek near International Boundary	11AA040	\$1,991.80	F3	\$1,991.80	\$0.00
M-04	Coal Creek at Bow City	05BN014	\$482.70	F1	\$482.70	\$0.00
M-05	Cold River at Outlet Cold Lake	06AF001	\$778.00	F2	\$778.00	\$0.00
M-06	Highwood Diversion Canal near Headgates	05BL025	\$898.80	F2	\$898.80	\$0.00
M-07	Little Bow River at Carmangay	05AC003	\$653.00	F2	\$653.00	\$0.00
M-08	Little Bow River below Travers Dam	05AC012	\$1,165.00	F2	\$1,165.00	\$0.00
M-09	Milk River at Milk River	11AA005	\$3,509.07	F3	\$3,509.07	\$0.00
M-10	Milk River at Western Crossing of Int'l Boundary	11AA025	\$6,969.92	F3	\$6,969.92	\$0.00
M-11	Oldman River near Lethbridge	05AD007	\$496.14	F2	\$496.14	\$0.00
M-12	Prairie Blood Coulee near Lethbridge	05AD035	\$1,165.00	F4	\$1,165.00	\$0.00
M-13	South Saskatchewan River at Medicine Hat	05AJ001	\$979.05	F2	\$979.05	\$0.00
M-14	St Mary River at Highway 501	05AE043	\$3,690.50	F3	\$3,690.50	\$0.00
M-15	St. Mary River at International Boundary	05AE027	\$1,384.50	F3	\$1,384.50	\$0.00
TOTAL FEDERAL MAINTENANCE COST			\$25,962.49		\$25,962.49	\$0.00

FED-PROV MAINTENANCE COSTS						
M-16	Alkali Creek near the Mouth	05CK005	\$1,230.00	FP3	\$615.00	\$615.00
M-17	Bullpound Creek near Watts	05CG004	\$857.50	FP3	\$428.75	\$428.75
M-18	Castle River at Ranger Station	05AA028	\$2,269.35	FP3	\$1,134.68	\$1,134.68
M-19	Clearwater River near Dovercourt	05DB006	\$1,181.85	FP3	\$590.93	\$590.93
M-20	Crowsnest River at Frank	05AA008	\$374.00	FP3	\$187.00	\$187.00
M-21	Drywood Creek near the Mouth	05AD010	\$1,666.79	FP3	\$833.40	\$833.40
M-22	Ethel Lake near Cold Lake	06AC004	\$778.00	FP2	\$389.00	\$389.00
M-23	Fish Creek above Little Fish Lake	05CG006	\$1,250.00	FP3	\$625.00	\$625.00
M-24	James River near Sundre	05CA002	\$1,781.86	FP3	\$890.93	\$890.93
M-25	La Biche River at Highway No. 63	07CA011	\$614.50	FP3	\$307.25	\$307.25
M-26	Lac La Biche at Lac La Biche	07CA004	\$1,951.17	FP3	\$975.59	\$975.59
M-27	Lee Creek at Cardston	05AE002	\$1,443.44	FP2	\$721.72	\$721.72
M-28	Little Paddle River near Mayerthorpe	07BB005	\$1,225.44	FP3	\$612.72	\$612.72
M-29	Mackay Creek at Walsh	05AH002	\$901.26	FP3	\$450.63	\$450.63
M-30	Medicine River near Eckville	05CC007	\$360.68	FP3	\$180.34	\$180.34
M-31	Muskeg River near Grande Cache	07GA002	\$1,995.05	FP3	\$997.53	\$997.53
M-32	Namepi Creek near the Mouth	05EC004	\$827.24	FP3	\$413.62	\$413.62
M-33	Nordegg River at Sunchild Road	05DD009	\$982.68	FP3	\$491.34	\$491.34
M-34	Oldman River near Waldron's Corner	05AA023	\$795.88	FP3	\$397.94	\$397.94
M-35	Paddle River near Anselmo	07BB011	\$2,610.75	FP3	\$1,305.38	\$1,305.38
M-36	Red Deer River below Burnt Timber Creek	05CA009	\$608.45	FP3	\$304.23	\$304.23
M-37	Rolph Creek near Kimball	05AE005	\$798.00	FP2	\$399.00	\$399.00
M-38	Saddle River near Woking	07FD006	\$5,612.14	FP3	\$2,806.07	\$2,806.07
M-39	Sakwatamau River near Whitecourt	07AH003	\$1,230.44	FP3	\$615.22	\$615.22
M-40	Threehills Creek below Ray Creek	05CE018	\$1,669.33	FP3	\$834.67	\$834.67
M-41	W.I.D. Main Canal near Headgates	05BM015	\$4,439.81	FP1	\$2,219.91	\$2,219.91
M-42	West Arrowwood Creek near Ensign	05BM018	\$771.90	FP3	\$385.95	\$385.95
M-43	Willow Creek near Nolan	05AB002	\$1,065.33	FP3	\$532.67	\$532.67
TOTAL F/P MAINTENANCE COSTS			\$41,292.84		\$20,646.42	\$20,646.42

PROV. MAINTENANCE COSTS

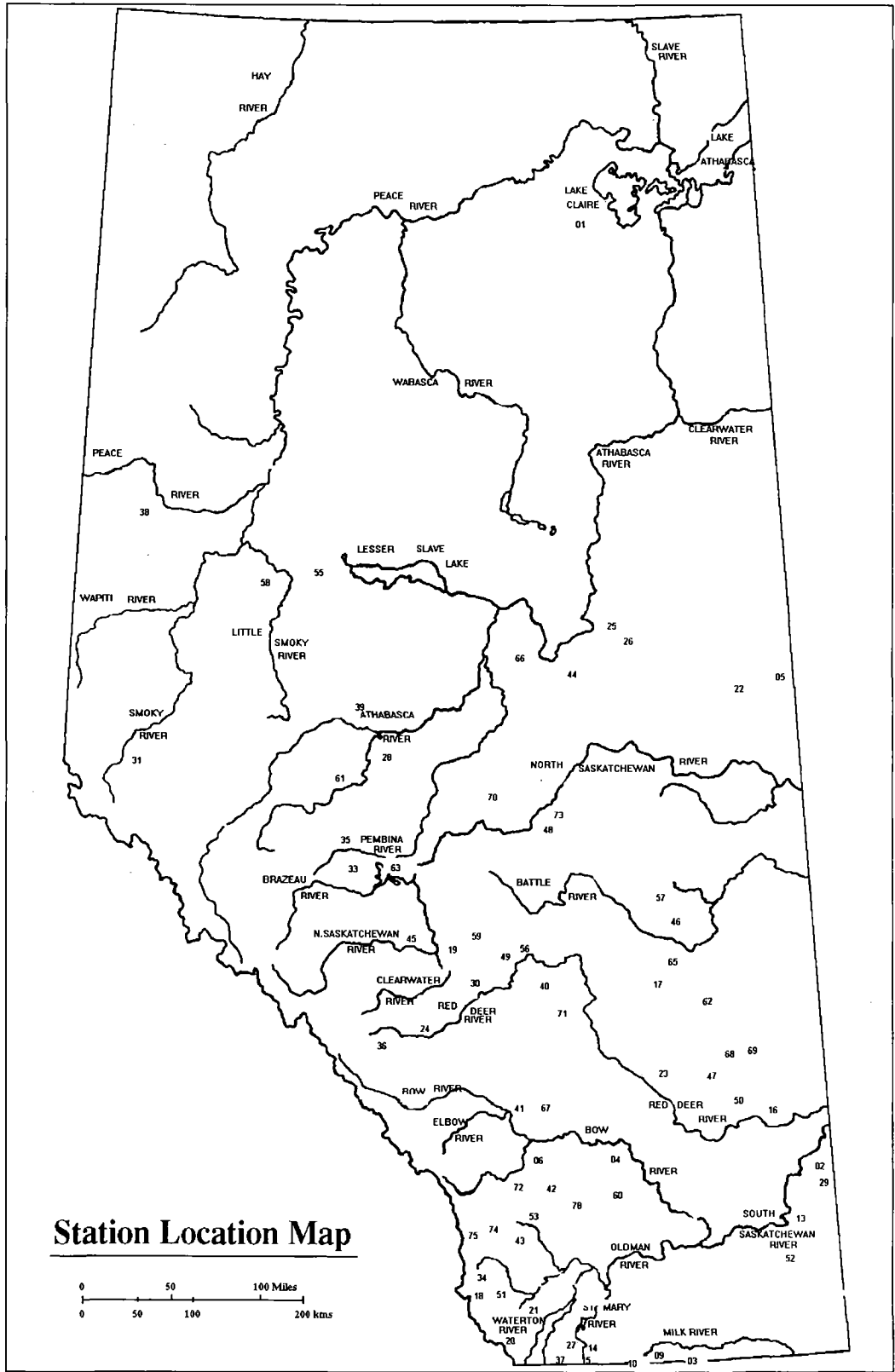
M-44	Babette Creek near Colinton	07CA008	\$584.20	P1	\$0.00	\$584.20
M-45	Baptiste River near the Mouth	05DC012	\$1,678.56	P1	\$0.00	\$1,678.56
M-46	Battle River near Forestburg	05FC001	\$792.68	P1	\$0.00	\$792.68
M-47	Berry Creek Reservoir Outlet	05CH011	\$459.00	P1	\$0.00	\$459.00
M-48	Blackmud Creek near Ellerslie	05DF003	\$2,385.36	P1	\$0.00	\$2,385.36
M-49	Blindman River near Blackfalds	05CC001	\$1,530.63	P1	\$0.00	\$1,530.63
M-50	Blood Indian Creek near the Mouth	05CK001	\$1,230.00	P1	\$0.00	\$1,230.00
M-51	Castle River near Beaver Mines	05AA022	\$1,551.64	P1	\$0.00	\$1,551.64
M-52	Cavan Lake Diversion near Dunmore	05AH044	\$1,213.00	P1	\$0.00	\$1,213.00
M-53	Chain Lakes Reservoir near Nanton	05AB037	\$822.00	P1	\$0.00	\$822.00
M-54	Dickson Dam Tunnel Outlet	05CB007	\$510.60	P1	\$0.00	\$510.60
M-55	East Prairie River near Enilda	07BF001	\$7,968.51	P1	\$0.00	\$7,968.51
M-56	Haynes Creek near Haynes	05CD006	\$779.33	P1	\$0.00	\$779.33
M-57	Iron Creek near Viking	05FB003	\$831.32	P1	\$0.00	\$831.32
M-58	Little Smoky River near Guy	07GH002	\$761.00	P1	\$0.00	\$761.00
M-59	Lloyd Creek near Bluffton	05CC009	\$1,121.82	P1	\$0.00	\$1,121.82
M-60	Lomond Lateral near Headgate	05AC017	\$481.11	P1	\$0.00	\$481.11
M-61	McLeod River near Cadomin	07AF013	\$1,446.14	P1	\$0.00	\$1,446.14
M-62	Monitor Creek near Consort	05GA011	\$1,248.00	P1	\$0.00	\$1,248.00
M-63	North Saskatchewan River near Rocky Mountain House	05DC001	\$10,553.01	P1	\$0.00	\$10,553.01
M-64	Oldman River near the Mouth	05AG006	\$724.20	P1	\$0.00	\$724.20
M-65	Paintearth Creek near Halkirk	05FC004	\$1,348.15	P1	\$0.00	\$1,348.15
M-66	Porter Creek above Baptiste Lake	07BE003	\$3,340.98	P1	\$0.00	\$3,340.98
M-67	Rosebud River below Carstairs Creek	05CE006	\$1,141.20	P1	\$0.00	\$1,141.20
M-68	Sounding Creek near Chinook	05GA012	\$1,253.00	P1	\$0.00	\$1,253.00
M-69	Sounding Creek near Oyen	05GA008	\$197.11	P1	\$0.00	\$197.11
M-70	Sturgeon River near Magnolia Bridge	05EA010	\$1,225.44	P1	\$0.00	\$1,225.44
M-71	Threehills Creek near Carbon	05CE007	\$1,228.00	P1	\$0.00	\$1,228.00
M-72	Trout Creek near Granum	05AB005	\$4,605.11	P1	\$0.00	\$4,605.11
M-73	Whitemud Creek near Ellerslie	05DF006	\$615.00	P1	\$0.00	\$615.00
M-74	Willow Creek at Oxley Ranch	05AB041	\$10,416.03	P	\$0.00	\$10,416.03
M-75	Willow Creek below Lane Creek	05AB039	\$991.36	P1	\$0.00	\$991.36
TOTAL PROV. MAINTENANCE COSTS			\$65,033.49		\$0.00	\$65,033.49

TOTAL COST OF 1997 WSC CONSTRUCTION
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\$132,288.82

\$46,608.91

\$85,679.91



4.0 STATION COST BREAKDOWN

4.1 Definitions

The following are definitions and/or lists of items included in this report.

LABOUR

The cost includes salaries for the construction foreman, construction assistant and actual on-site time for the construction supervisor. Salaries of hydrometric staff are not included.

BOARD & ACCOMMODATION

Meals and living accommodation for personnel.

TRAVEL

Road and air travel costs for labour, equipment and materials, or freight costs, of materials and equipment to pick up point.

MATERIALS

Components and supplies used in construction and maintenance of gauging stations (instruments excluded).

CONTRACT SERVICES

All services supplied by outside sources such as aircraft, earth moving, machinery rental, electrical wiring, trucking of gravel, rock and concrete, etc.

INSTRUMENTS

Type A recorder.

SALVAGE MATERIAL

Salvaged material is credited to the station.

4.2 Site Specific Cost Breakdowns

For each gauging station site at which either a new station was established and built, normal maintenance was carried out, or electric power was installed, the cost breakdowns are contained in this section and divided according to designation.

M-04: Coal Creek near Bow City (05BN014) (F1)

Removed 18" well and flip open shelter from discontinued site.

Labour	\$ 365.00
Board	\$ 98.20
Travel	\$ 19.50
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 482.70</u>

M-05: Cold River at Outlet Cold Lake (06AF001) (F2)

Straightened culvert and shelter and anchored shelter base to bridge..

Labour	\$ 488.00
Board	\$ 200.00
Travel	\$ 65.00
Contracts	\$ 0.00
Materials	\$ 25.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 778.00</u>

M-06: Highwood Diversion Canal near Headgates (05BL025) (F2)

Install fall restraint.

Labour	\$ 365.00
Board	\$ 18.80
Travel	\$ 15.00
Contracts	\$ 0.00
Materials	\$ 500.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 898.80</u>

M-07: Little Bow River at Carmangay (05AC003) (F2)

Mouse cleanup.

Labour	\$ 388.00
Board	\$ 65.00
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 175.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 653.00</u>

M-08: Little Bow River below Travers Dam (05AC012) (F2)

Install fall restraint

Labour	\$ 465.00
Board	\$ 160.00
Travel	\$ 40.00
Contracts	\$ 0.00
Materials	\$ 500.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,165.00</u>

M-09: Milk River at Milk River (11AA005) (F3)

Site maintenance.

Labour	\$1,959.00
Board	\$ 526.65
Travel	\$ 154.00
Contracts	\$ 0.00
Materials	\$ 869.42
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 3,509.07</u>

M-10: Milk River at Western Crossing of Int.l Boundary (11AA025) (F3)

Site maintenance after high water damage.

Labour	\$3,519.00
Board	\$1,084.88
Travel	\$ 200.20
Contracts	\$ 417.30
Materials	\$ 1,748.54
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 6,969.92</u>

M-11: Oldman River near Lethbridge (05AD007) (F2)

Mouse cleanup.

Labour	\$ 365.00
Board	\$ 80.80
Travel	\$ 30.00
Contracts	\$ 0.00
Materials	\$ 20.34
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 496.14</u>

M-12: Prairie Blood Coulee near Lethbridge (05AD035) (F4)

Install fall restraint.

Labour	\$ 465.00
Board	\$ 160.00
Travel	\$ 40.00
Contracts	\$ 0.00
Materials	\$ 500.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,165.00</u>

M-13: South Saskatchewan River at Medicine Hat (05AJ001) (F2)

Parged large cracks in brick block shelter. Done by contract.

Labour	\$ 0.00
Board	\$ 0.00
Travel	\$ 0.00
Contracts	\$ 979.05
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 979.05</u>

M-14: St.Mary River at Highway 501 (05AE043) (F3)

Install desert box, WWG, heavy orifice and line.

Labour	\$1,579.50
Board	\$ 640.00
Travel	\$ 80.00
Contracts	\$ 0.00
Materials	\$ 1,391.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 3,690.50</u>

M-15: St.Mary River at International Boundary (05AE027) (F3)

Repair ice damaged well.

Labour	\$ 979.50
Board	\$ 240.00
Travel	\$ 80.00
Contracts	\$ 0.00
Materials	\$ 85.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,384.50</u>

M-16: Alkali Creek near the Mouth (05CK005) (FP3)

Install fall restraint.

Labour	\$ 465.00
Board	\$ 220.00
Travel	\$ 45.00
Contracts	\$ 0.00
Materials	\$ 500.00
Equipment - Inst.	\$ 0.00
TOTAL	\$ 1,230.00

M-17: Bullpound Creek near Watts (05CG004) (FP3)

Install Fall Restraint.

Labour	\$ 232.50
Board	\$ 100.00
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 500.00
Equipment - Inst.	\$ 0.00
TOTAL	\$ 857.50

M-18: Castle River at Ranger Station (05AA028) (FP3)

Installed Brytex shelter on hill and other site maintenance

Labour	\$ 976.00
Board	\$ 400.00
Travel	\$ 50.00
Contracts	\$ 0.00
Materials	\$ 843.35
Equipment - Inst.	\$ 0.00
TOTAL	\$ 2,269.35

M-19: Clearwater River near Dovercourt (05DB006) (FP3)

Install fall restraint.

Labour	\$ 373.00
Board	\$ 175.25
Travel	\$ 51.50
Contracts	\$ 32.10
Materials	\$ 550.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,181.85</u>

M-20: Crowsnest River at Frank (05AA008) (FP3)

Replaced lower plumbing and flushing pipes.

Labour	\$ 194.00
Board	\$ 65.00
Travel	\$ 35.00
Contracts	\$ 0.00
Materials	\$ 80.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 374.00</u>

M-21: Drywood Creek near the Mouth (05AD010) (FP3)

Removed old well and shelter.

Labour	\$1,306.00
Board	\$ 244.50
Travel	\$ 100.00
Contracts	\$ 0.00
Materials	\$ 16.29
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,666.79</u>

M-22: Ethel Lake near Cold Lake (06AC004) (FP2)

Site maintenance.

Labour	\$ 488.00
Board	\$ 200.00
Travel	\$ 65.00
Contracts	\$ 0.00
Materials	\$ 25.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 778.00</u>

M-23: Fish Creek above Little Fish Lake (05CG006) (FP3)

Install fall restraint.

Labour	\$ 488.00
Board	\$ 220.00
Travel	\$ 42.00
Contracts	\$ 0.00
Materials	\$ 500.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,250.00</u>

M-24: James River near Sundre (05CA002) (FP3)

Cableway maintenance.

Labour	\$ 265.00
Board	\$ 18.80
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$1,473.06
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 1,781.86</u>

M-25: La Biche River at Highway 63 (07CA011) (FP3)

Removed paneling and insulation from shelter.

Labour	\$ 365.00
Board	\$ 204.00
Travel	\$ 45.50
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 614.50</u>

M-26: Lac La Biche at Lac La Biche (07CA004) (FP3)

Relocated shelter to higher ground.

Labour	\$1,229.50
Board	\$ 450.00
Travel	\$ 97.75
Contracts	\$ 0.00
Materials	\$ 173.92
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 1,951.17</u>

M-27: Lee Creek at Cardston (05AE002) (FP2)

Repairs to lower intake.

Labour	\$ 832.00
Board	\$ 385.00
Travel	\$ 105.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,443.44</u>

M-28: Little Paddle River near Mayerthorpe (07BB005) (FP3)

Install fall restraint.

Labour	\$ 488.00
Board	\$ 197.44
Travel	\$ 40.00
Contracts	\$ 0.00
Materials	\$ 500.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,225.44</u>

M-29: Mackay Creek at Walsh (05AH002) (FP3)

Removed old wooden shelter and well.

Labour	\$ 365.00
Board	\$ 231.26
Travel	\$ 55.00
Contracts	\$ 250.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 901.26</u>

M-30: Medicine River near Eckville (05CC007) (FP3)

Clear trees and bush from around shelter.

Labour	\$ 265.00
Board	\$ 75.68
Travel	\$ 20.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 360.68</u>

M-31: Muskeg River near Grande Cache (07GA002) (FP3)

Site repairs after high water.

Labour	\$1,095.00
Board	\$ 498.52
Travel	\$ 105.25
Contracts	\$ 0.00
Materials	\$ 269.53
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 1,995.05</u>

M-32: Namepi Creek near the Mouth (05EC004) (FP3)

Removed shelter and cableway.

Labour	\$1,095.00
Board	\$ 228.84
Travel	\$ 50.00
Contracts	\$ 128.40
Materials	\$ (675.00)
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 827.24</u>

M-33: Nordegg River at Sunchild Road (05DD009) (FP3)

Cableway maintenance.

Labour	\$ 365.00
Board	\$ 300.70
Travel	\$ 40.00
Contracts	\$ 0.00
Materials	\$ 276.98
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 982.68</u>

M-34: Oldman River near Waldron,s Corner (05AA023) (FP3)

Install electrical service and wire shelter.

Labour	\$ 0.00
Board	\$ 0.00
Travel	\$ 0.00
Contracts	\$ 795.88
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 795.88</u>

M-35: Paddle River near Anselmo (07BB011) (FP3)

Relocate shelter to site upstream near bridge. Also mouse cleanup.

Labour	\$1,300.50
Board	\$ 741.06
Travel	\$ 145.00
Contracts	\$ 171.20
Materials	\$ 252.99
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$2,610.75</u>

M-36: Red Deer River below Burnt Timber Creek (05CA009) (FP3)

Recon site for possible access to install Cantilever gauge.

Labour	\$ 465.00
Board	\$ 28.20
Travel	\$ 35.00
Contracts	\$ 80.25
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 608.45</u>

M-37: Rolph Creek near Kimball (05AE005) (FP2)

Site maintenance.

Labour	\$ 488.00
Board	\$ 165.00
Travel	\$ 45.00
Contracts	\$ 0.00
Materials	\$ 100.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 798.00</u>

M-38: Saddle River near Woking (07FD006) (FP3)

Install new cableway.

Labour	\$2,036.00
Board	\$ 701.36
Travel	\$ 189.00
Contracts	\$ 592.50
Materials	\$2,093.28
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$5,612.14</u>

M-39: Sakwatamau River near Whitecourt (07AH003) (FP3)

Install fall restraint frame assembly.

Labour	\$ 488.00
Board	\$ 197.44
Travel	\$ 45.00
Contracts	\$ 0.00
Materials	\$ 500.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 1,230.44</u>

M-40: Threehills Creek below Ray Creek (05CE018) (FP3)

Insulated shelter on 26/June/97. Replaced upper intake and plumbing on 17/Sept/97. Backhoe supplied by County of Red Deer. Transalta at Innisfail will check power line.

Labour	\$1,018.00
Board	\$ 67.90
Travel	\$ 50.00
Contracts	\$ 176.55
Materials	\$ 356.88
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,669.33</u>

M-41: W.I.D. Main Canal near Headgates (05BM015) (FP1)

Installed AFFRA transducer pipes and cable. Installed brytex shelter (30/April/97). Vandals broke into shelter. Installed 1.6m corrugated bins sheets to outside of shelter. Installed cablecar with removable sheaves, removed A/C cable to try to keep kids off. Welded lock box on tower for cablecar chain (30/July/97).

Labour	\$2,658.50
Board	\$ 91.50
Travel	\$ 40.00
Contracts	\$ 0.00
Materials	\$1,649.81
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$4,439.81</u>

M-42: West Arrowwood Creek near Ensign (05BM018) (FP3)

Mouse cleanup.

Labour	\$ 547.50
Board	\$ 37.00
Travel	\$ 28.00
Contracts	\$ 0.00
Materials	\$ 159.40
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 771.90</u>

M-43: Willow Creek near Nolan (05AB002) (FP3)

Supplied and installed 1 power pole, 1 meter and tied into shelter.

Labour	\$ 0.00
Board	\$ 0.00
Travel	\$ 0.00
Contracts	\$1,065.33
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,065.33</u>

M-44: Babette Creek near Colinton (07CA008) (P1)

Straightened culvert and shelter after spring high water.

Labour	\$ 365.00 ²⁵⁰
Board	\$ 184.20
Travel	\$ 35.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 584.20</u>

M-45: Baptiste River near the Mouth (05DC012) (P1)

Replaced damaged shelter parts. Beavers had dropped large tree on shelter.

Labour	\$ 746.00
Board	\$ 461.40
Travel	\$ 51.00
Contracts	\$ 0.00
Materials	\$ 420.16
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,678.56</u>

M-49: Blindman River near Blackfalds (05CC001) (P1)

Installed temporary patch on ice damaged well (23/April/97). Installed Twister well patch (19/Nov/97).

Labour	\$ 995.00
Board	\$ 330.45
Travel	\$ 60.35
Contracts	\$ 0.00
Materials	\$ 144.83
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,530.63</u>

M-50: Blood Indian Creek near the Mouth (05CK001) (P1)

Installed fall restraint frame assembly.

Labour	\$ 465.00
Board	\$ 220.00
Travel	\$ 45.00
Contracts	\$ 0.00
Materials	\$ 500.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,230.00</u>

M-51: Castle River near Beaver Mines (05AA022) (P1)

Installed fall restraint system. Installed missing aircraft marker cones.

Labour	\$ 653.00
Board	\$ 166.74
Travel	\$ 45.00
Contracts	\$ 0.00
Materials	\$ 686.90
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,551.64</u>

M-52: Cavan Lake Diversion near Dunmore (05AH044) (P1)

Installed fall arrest frame assembly.

Labour	\$ 488.00
Board	\$ 200.00
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 500.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,213.00</u>

M-53: Chain Lakes Reservoir near Nanton (05AB037) (P1)

Mouse cleanup.

Labour	\$ 547.50
Board	\$ 233.54
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 15.96
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 822.00</u>

M-54: Dickson Dam Tunnel Outlet (05CB007)) (P1)

Replaced red A/C marker cone.

Labour	\$ 365.00
Board	\$ 49.10
Travel	\$ 10.00
Contracts	\$ 0.00
Materials	\$ 86.50
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 510.60</u>

M-55: East Prairie River near Enilda (07BF001) (P1)

Installed new cableway.

Labour	\$2,401.00
Board	\$ 945.20
Travel	\$ 230.61
Contracts	\$ 559.97
Materials	\$3,831.73
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$7,968.51</u>

M-56: Haynes Creek near Haynes (05CD006) (P1)

Insulated shelter.

Labour	\$ 365.00
Board	\$ 200.00
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 189.33
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 779.33</u>

M-57: Iron Creek near Viking (05FB003) (P1)

Removed shelter, cut off and filled in well.

Labour	\$ 730.00
Board	\$ 395.22
Travel	\$ 51.00
Contracts	\$ 192.60
Materials	\$ (537.50)
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 831.32</u>

M-58: Little Smoky River near Guy (07GH002) (P1)

Reset main cable and checked deadmen for movement. No visible movement.

Labour	\$ 496.00
Board	\$ 220.00
Travel	\$ 45.00
Contracts	\$ 0.00
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 761.00</u>

M-59: Lloyd Creek near Bluffton (05CC009) (P1)

Installed fall restraint frame assembly.

Labour	\$ 365.00
Board	\$ 204.00
Travel	\$ 25.00
Contracts	\$ 27.82
Materials	\$ 500.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,121.82</u>

M-60: Lomond Lateral near Headgate (05AC017) (P1)

Replaced shelter door with new ¾" plywood door.

Labour	\$ 244.00
Board	\$ 95.00
Travel	\$ 40.00
Contracts	\$ 0.00
Materials	\$ 102.11
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 481.11</u>

M-61: McLeod River near Cadomin (07AF013) (P1)

Mouse cleanup.

Labour	\$ 730.00
Board	\$ 408.04
Travel	\$ 51.00
Contracts	\$ 0.00
Materials	\$ 257.10
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,446.14</u>

M-62: Monitor Creek near Consort (05GA011) (P1)

Installed fall restraint frame assembly.

Labour	\$ 488.00
Board	\$ 220.00
Travel	\$ 40.00
Contracts	\$ 0.00
Materials	\$ 500.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,248.00</u>

M-63: N. Saskatchewan River near Rocky Mountain House (05DC001) (P1)

Relocate well, shelter, underground power and phone line to new site 40m downstream from bridge.

Labour	\$ 1,940.00
Board	\$ 550.00
Travel	\$ 125.00
Contracts	\$ 7,648.70
Materials	\$ 289.31
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$10,553.01</u>

M-64: Oldman River near the Mouth (05AG006) (P1)

Installed 5 new aircraft marker cones.

Labour	\$ 265.00
Board	\$ 9.50
Travel	\$ 36.00
Contracts	\$ 0.00
Materials	\$ 413.70
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 724.20</u>

M-65: Paintearth Creek near Halkirk (05FC004) (P1)

Insulated shelter with Styrofoam and installed fall restraint frame assembly.

Labour	\$ 547.50
Board	\$ 127.90
Travel	\$ 47.75
Contracts	\$ 0.00
Materials	\$ 625.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,348.15</u>

M-66: Porter Creek above Baptiste Lake (07BE003) (P1)

Cut off and buried old well. Reinstalled shelter on wooden floor. Rip rapped stream bank.

Labour	\$1,305.50
Board	\$ 732.70
Travel	\$ 75.00
Contracts	\$1,027.20
Materials	\$ 200.58
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$3,340.98</u>

M-67: Rosebud River below Carstairs Creek (05CE006) (P1)

Installed fall restraint frame assembly.

Labour	\$ 588.00
Board	\$ 28.20
Travel	\$ 25.00
Contracts	\$ 0.00
Materials	\$ 500.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,141.20</u>

M-68: Sounding Creek near Chinook (05GA012) (P1)

Installed fall restraint frame assembly.

Labour	\$ 488.00
Board	\$ 220.00
Travel	\$ 45.00
Contracts	\$ 0.00
Materials	\$ 500.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,253.00</u>

M-69: Sounding Creek near Oyen (05GA008) (P1)

John's Electric from Oyen installed a new power meter and moved it inside.
Meter was damaged by vandals.

Labour	\$ 0.00
Board	\$ 0.00
Travel	\$ 0.00
Contracts	\$ 197.11
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 197.11</u>

M-70: Sturgeon River near Magnolia Bridge (05EA010) (P1)

Installed fall restraint frame assembly.

Labour	\$ 488.00
Board	\$ 197.44
Travel	\$ 40.00
Contracts	\$ 0.00
Materials	\$ 500.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,225.44</u>

M-71: Threehills Creek near Carbon (05CE007) (P1)

Installed fall restraint frame assembly.

Labour	\$ 488.00
Board	\$ 200.00
Travel	\$ 40.00
Contracts	\$ 0.00
Materials	\$ 500.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$1,228.00</u>

M-72: Trout Creek near Granum (05AB005) (P1)

Installed 1 pole and electrical service shelter (Transalta). Supplied and installed wiring inside shelter and underground from pole to shelter (Beeken).

Labour	\$ 0.00
Board	\$ 0.00
Travel	\$ 0.00
Contracts	\$4,605.11
Materials	\$ 0.00
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$4,605.11</u>

M-73: Whitemud Creek near Ellerslie (05DF006) (P1)

Put 3/4" thimble on main cable and 1/2" thimble on R.B. tie back.. Replaced rusty clamps.

Labour	\$ 365.00
Board	\$ 219.42
Travel	\$ 20.00
Contracts	\$ 0.00
Materials	\$ 10.58
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 615.00</u>

M-74: Willow Creek at Oxley Ranch (05AB041) (P1)

Installed Brytex shelter, cantilever gauge, and R.B. deadman and tower supports (5/Jun/97) at new site at Oxley Ranch owned by Jim Gordon. Cableway will be completed when water drops to allow access to left bank.
Cableway completed (14/Aug/97).

Labour	\$ 4,765.00
Board	\$ 1,047.30
Travel	\$ 230.00
Contracts	\$ 604.84
Materials	\$ 3,768.89
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$10,416.03</u>

M-75: Willow Creek below Lane Creek (05AB039) (P1)

Removed well, shelter and cableway from discontinued site.

Labour	\$1,095.00
Board	\$ 600.00
Travel	\$ 45.00
Contracts	\$ 160.50
Materials	\$ (909.14)
Equipment - Inst.	\$ 0.00
TOTAL	<u>\$ 991.36</u>

APPENDIX A

DESCRIPTION OF CONSTRUCTION PRACTICES

MATERIAL AND EQUIPMENT

Well and Shelter Construction

In-Bank Well Installations (no in-bank well installations during 1997/98)

Other Wells

A few wells are installed using 45.7cm diameter, 16-gauge corrugated steel pipe (galvanized) with a look-in shelter to house the recorder. Strapping the culvert to suitable bridge abutments, piers, or piles makes these installations.

Shelters

Metal shelter 1.63m x 2.44m (walk-in type) are erected on a wooden base for pressure-type gauge installations. This base is constructed of 0.1016m x 1.63m pressure treated wood exterior framing with 0.1016m and 0.1016m wooden joints set at 0.61m and 1.22m for internal support. The framework is covered with 19mm plywood. The floor is anchored to the ground with wooden and/or galvanized iron stakes driven into the ground. A concrete foundation can also be utilized.

Special precautions are now being taken to be sure that the shelters are completely sealed to prevent the entry of mice. This is due to the recent cases of Hantivirus found in Western Canada.

Station Bench Marks

Each station has been supplied with two bench marks but the stations are presently being upgraded to 3 bench marks at each site. Former bench marks consisted of a standard bench mark cap set on a 50mm diameter standard pipe 1.524m in length at riveted to the pipe. The pipe was 20mm in diameter with a 6.25mm steel plate welded to the bottom. A hole approximately 304.8mm square was dug to take the length of the pipe. At ground level a 50mm x 100mm x 0.4064m square frame was built and the hole and square frame was filled with concrete.

Recently bench mark installations have been made utilizing 1.22m lengths of ground rod (19mm diameter) joined by couplings and driven into the ground refusal. When refusal is attained, the last section of the rod is cut off near ground level and the bench mark cap is fastened to the top.

One bench mark is placed near the shelter while the second and third are separated such that if the area is disturbed by construction, or for other reasons, at least one bench mark will remain intact.

Cableways

Towers and Platforms

All cableways are built to standard plan. A 10.16cm fabricated standard steel galvanized pipe is used for A-Frame construction. All steel is painted International orange and white to Department of Transport specifications. Cablecar access platforms are also provided and are made of 63.5mm x 63.5mm x 6.35mm angle iron, 1.31m wide by 1.64m long, with Armco floor plank (50mm rib) interlock leg, 16-gauge, 35 gram galvanized steel, non-skid surface.

Anchorage's and A-Frame Pedestal

Concrete: 20 Mpa at 28 days, maximum size of aggregate 25mm is specified. Where necessary, sulfate resistant cement is used in the mixture; otherwise normal Portland cement is used. Anchorage deadmen and pedestals are steel-reinforced. Deadmen are not a standard size, but are designed according to span and soil conditions for each cableway. Transit Mix concrete is used for cableways where available; otherwise, it is mixed on the job.

Two lengths of cold, roll steel, bent in the shape of triangles, are embedded in the concrete deadmen for cableway anchorage's. A 3.35m length of 2.54cm diameter steel is used for the main cable anchorage. A 2.13m length of 19mm steel is used for the A-Frame tower "tie-back" anchorage. If aircraft warning markers are required, another length of 2.13m of 19mm steel is embedded in the concrete for the warning marker cable anchorage.

The A-Frame pedestals are constructed of concrete with 2.54cm diameter redi-rod sat in the concrete to which the tower legs are bolted. The concrete forms are; 45.7cm in diameter and 0.91m in length of the A-Frame tower's 1.83m to 3.05m in height. For A-Frame towers 3.66m to 6.1m in height, 61cm diameter sonatube is used.

Wire Rope

22 diameter main cableway milled plough steel cable, galvanized 6 x 19 construction with independent wire rope center is now used for most new cableways and cable replacements.

12.7mm diameter tie-back cable milled plough steel cable, galvanized 6 x 19 construction with fiber core, regular lay 9 070 kg breaking strength.

9.53mm diameter main aircraft warning cable guy cable 6 x 19 construction, grade 110 galvanized 4 898 kg breaking strength.

Cable Accessories (all should conform to specifications of Crosby or better)

Turnbuckle - various sizes are used depending on cable size and length.

Turnbuckle 19mm diameter x 45.72cm, jaw and eye galvanized drop forged, approximate strength 8 165 kg.

Crosby clips - 19mm, 12.7mm, 9.53mm drop forged and galvanized.

Wire rope thimbles - 19mm, 12.7mm, 9.53mm regular pattern galvanized.

Aircraft Warning Markers

Standard extensions are designed for attachment to the 10.16cm pipe A-Frames. 12.7mm or 9.53mm (6 x 19) cable is used, depending upon the span, to carry the cones. The cable is anchored to the deadmen and is provided with a turnbuckle for adjustment.

Various types of cones are used. Fiberglass-molded cones 76.2cm diameter x 76.2cm high, painted orange; also 0.4522m spherical cones constructed in two halves, fabricated or molded fiberglass and painted International orange and white, half-and-half, and both made by commercial firms.

Cable Cars

Standard Sit-Down

A standard sit-down car with two seats and foot rest is 1.83m x 61cm x 27.9cm. The cable car frame is a rectangle made of 5.1cm x 6.4mm aluminum angle welded together at the corners, 19mm pressure-treated, plywood is bolted to this frame and the top edge is covered with a galvanized 28 gauge metal channel to keep out moisture. Standard cable car and foot rest hangers are made of 50mm x 4.68mm iron specifically shaped for their purpose.

Sheaves are made of an aluminum alloy, 203cm diameter, cast with a shallow groove to accommodate 19mm cable. The sheaves are equipped with an NSK 6205 DU bearing. A hand operated aluminum puller moves the cable car. The interior of the car is painted with an oil-based white paint and outside is painted with oil-based International orange and white to Department of Transport specifications. All cable cars are now equipped with a removable sheave hanger. This is an aluminum bracket, which allows the cable car to be hung from the main cable, while enabling the sheave to be removed.

Cable Car Puller

Adjustable aluminum cable car puller is made to standard plan.

Cable Car Lock and Car Holder

A standard padlock and chain is used to lock the car.

CONSTRUCTION PERSONNEL

Labour

One field crew consisting of the Facilities Specialist, and a Foreman, plus hydrometric field technologists, as required carried out the construction in Alberta. Two students were hired during the summer.

Supervision

A Facilities Specialist carries out construction supervision.

Equipment

During 1997/98 the construction crew used two 1ton dual wheel vehicles to transport staff, tools and materials to job sites.

Hired Equipment

Backhoes, draglines, ready mix concrete trucks and gravel trucks were hired under service contracts, when required. Helicopters were used in remote areas to transport staff and materials.

APPENDIX B

These costs were not included in any of the above tables.

Three sites were worked on during the 1997/98 season.

SITE	DATE	COST	WORK DONE
Banff AWOS	6-Oct-97	\$ 422.50	Buildings painted by contract paid by AEB.
Clarseholm Weather Station	30-Oct-97	\$2350.75	Installed concrete instrument pedestals, etc.
Kananaskis Tower	1-Oct-97	\$837.00	Installed electric winch.
	<u>TOTAL</u>	<u>\$3610.25</u>	

These costs are all-inclusive and include labour costs. They do not include contractor costs, which were paid by AEB in Edmonton.

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MOVING WAY

(15) -

CALLING IN



East Prairie River near Enilda
New cableway
2-October-1997





Willow Creek at Oxley Ranch
New cableway and Instrument Shelter
13-August-1997





North Saskatchewan River at Rocky Mountain House
Relocate well and shelter
4-November-1997

