

It was agreed that investigation of the feasibility of such a dam and pond would be beyond the terms of reference of the present study but it was suggested that it be mentioned in the report as being worthy of an auxiliary investigation.

(viii) Park and Nature Area

It would be practicable to provide for parkland and picnic facilities at the north end of the reservoir. It is proposed that this could be developed on a relatively small scale in the beginning and later expanded as required. It is suggested that initially an area incorporating launching facilities for canoes, and a grassed area with a dozen picnic tables would be satisfactory. Also, a number of nature trails could be cleared. At the Little Cataroqui Creek Conservation Area in Kingston a simple plank walk through a small swamp adjacent to a golf course (see photo at Figure A-13) attracts people from a wide area. A similar walkway could be incorporated in an appropriate location in the Ashton project.

It is envisaged that the park area would be used initially principally by canoeists, bird watchers, etc. However, consideration could later be given to expanding the facilities to provide a regional park and nature area as described in the Ottawa Board of Control letter quoted at Appendix "B".

A provisional sum is included in the estimated costs to allow for the limited park facilities described above.

(ix) Property

An examination of deeds and property transfers affecting the Ashton Marsh area has been carried out in the Registry Office of the County of Lanark in Perth. The names of the owners and the prices and dates of recent transfers are shown on the plan at Figure 9. The approximate limits of high water are also shown on this plan.

Conservation Authorities Branch officials have recommended that land be acquired to 2 feet above high water level and that land be purchased in rectangular units in general rather than in irregular parcels paralleling the flood line.

A tentative proposal for land acquisition has been shown on Figure 9 based on these criteria. On this basis, it would be necessary to purchase approximately 4780 acres for the basic reservoir project (4180 swamp and bush and 600 cleared), and about 600 additional acres (300 in bush and 300 cleared) if the supplementary wildfowl pond is developed.

5.5 Secondary Weir Sites

(a) Alternate Site for Richmond Weir

As noted previously, soil borings at the weir site proposed to be located at the lower extremity of the Village of Richmond have shown that an appreciable depth of overburden exists in the riverbed above the underlying bedrock, so that the overall height of a structure would be quite large. Reconnaissance has revealed an alternative site which may present several benefits.

Near the upper end of the section of rapids which accounts for a rise of 2.9 feet in the riverbed near the lower end of Richmond there is a location where a removable weir could be erected at appreciably less cost than at the site at the village boundary. Flat limestone bedrock is visible in the bed of the river near the shore, indicating that foundation conditions will not be difficult. Because of the rise in the riverbed at this location the height of the weir need be only 3 feet above the present riverbed to achieve the desired pond level throughout the village.

Access to this site will be much simpler than at the other site. Also, cofferdam and pumping expenses, which would be considerable at the original cemetery site, will be minimal at the rapids location.

Village officials have indicated that the developer of the Chenier subdivision has recently indicated to the village that he would sell the 26 acres of flood plain land lying below the development for \$10,000. This land, which cannot be used for building because it is subject to flooding, would make an admirable park and recreation area. The proposed alternate weir site is located at about the midpoint of the 2000 feet of shoreline of this property. The greater part of the property is over 3 to 5 feet above the proposed pond level. There is an area in the west part of the property, where excavated material has been removed, which is only 1 to 2 feet above pond level. However, it would be practicable to raise this area by filling, either with material from elsewhere on the site or by excess excavated material from the proposed village sewer project.

It is proposed that a removable weir be located at the rapids site, with the adjacent flood plain land being purchased for development as a park and outdoor recreation area. The weir and rapids below would be the central feature, while boating and fishing could be provided above the weir.

In an informal conversation Reeve Gamble indicated that he believed the village council would be prepared to give favourable consideration to the alternate weir site, particularly if the cost estimates indicated a substantial advantage in this location.

Figures 5 and 6 show the proposed weir location and a cross-section of the river.

(b) Richmond Swamp

The huge swamp area above Richmond offers the potential of providing a significant reservoir area for summer flow replenishment if levels could be raised sufficiently. The aerial photos taken during the spring flood of this year indicate the large area available for flooding. (See photos A-5 and A-6).

The river level in May of this year was at elevation 310.8. Ice damage markings on a tree below the Richmond Golf Club show that spring flood levels have reached 4 feet above this level, i.e. 314.8. The peak level this spring at the time the aerial photographs were taken was about 313.5.

The major obstacle to flooding the swamp is the presence of the Ottawa - Smiths Falls railway line of the Canadian National Railway passing through the centre of the swamp. The elevation of the top of rail opposite the proposed weir site is 317.2.

To provide a reasonable amount of storage it is proposed that a reservoir in the swamp should be held at about Elevation 314.0. It is estimated that at this level about 1000 acres would be flooded, providing an estimated 1500 acre-feet of storage and resulting in a potential July - August flow increment to the river of 12 cubic feet per second.

A weir could be constructed at the location of the old dam of 150 years ago but it would have to hold back about 8 feet of water and would be difficult to instal and remove. By moving upstream 1500 feet a location is available which would require a lower weir although it would be considerably longer. Flat limestone bedrock exists at this site. Low concrete retaining walls are proposed for the outer extremities of the dam, while the centre portion would include a low removable weir. A plan of the area and cross-section of the weir site are shown at Figures 10 and 11.

West of the weir site is a gently sloping grassed area bordered by cedars and containing some huge isolated oak trees. The foundation of an old homestead still remains. This area, containing about 5 acres, would make an excellent park in conjunction with the weir.

An informal verbal approach was made to the division engineer of the Canadian National Railway in Belleville to obtain a reaction to a proposal to maintain high water levels in the swamp throughout part of the summer. The reaction was negative, as the railway engineer said he was already concerned about the effect of the present water level on the roadbed and would strongly oppose any scheme which would worsen the situation.

The Richmond swamp reservoir area has, therefore, been designated as a secondary site for the purposes of this report. However, preliminary estimated costs involved are given later in the report in case the Authority should decide that it is desirable to negotiate further with the Canadian National Railway in regard to flooding.

(c) Weir Site Above Greenbank Road (Mileage 2.4)

As mentioned in Section 4.2(a), the river has a constant elevation in the 2-3/4 mile stretch between Greenbank Road and Moodie Drive. Above the rapids upstream of the Greenbank Road there is a site where a removable weir could be built to raise levels in this stretch of river by 3 or 4 feet.

The raising of water in this stretch would be favoured by a few but opposed by many. The principal objection comes from farmers who point out that raising the river level would back up water in some of the large municipal drains which enter this stretch of the river and would interfere with land drainage. One farmer indicated that any rise above the present level would cause water to back up in the tile drains in some of his fields.

(d) Weir Site Below Moodie Drive

A suitable site exists below Moodie Drive to construct a weir which could raise water levels by up to 4 to 5 feet all the way to Richmond. Such a rise would greatly improve the river for boating purposes and the deeper water would reduce the emergent weed growth which now tends to fill all but the centre of the river in summer. It would also necessitate replacing the six private bridges which now cross the river.

However, the most serious drawback involved in raising the level of this section is considered to be the loss of the trees which line the banks. For much of the length of this part of the river a single row of trees (maple, elm, ash and willow) line the banks just at water level. Any significant increase in level would drown the roots of all trees except possibly the willows and would leave the banks denuded and unattractive. It would be very worthwhile to encourage the planting of new trees along the top of the banks so that raising of the water at a future date would not have such a serious effect. With deeper water this section of the river could be extremely attractive and a great increase in property values would result.

However, it is not proposed that weir construction should proceed at the present time at the Moodie Drive site.

(e) Other Weir Sites

There are a great many other potential weir sites on the river, particularly between Richmond and Ashton. With a total rise of 200 feet in the whole river length it is evident that 50 weirs of 4 feet average height could be constructed to provide a series of ponds from one end of the river to the other. However, many of the weirs would benefit only one or two owners and therefore could not be justified. The weirs and impoundments considered in detail are those which would benefit the greatest numbers of persons.

## 5.6 Channel Improvements

Limited flooding occurs each spring along the Jock River. However, the flooding on the Jock results in virtually no damage and may be categorized as chiefly a nuisance. Examination of the flood profile at Figure 2 shows that the gradient of the water surface in the Twin Elm - Richmond area (where most of the flooding occurs) is extremely flat -- about 2 feet in 5 miles, or .00008 slope. The summer channel does not have the area to handle the peak flood, so the river must overflow its banks. Although some slight improvement in the gradient could be obtained by excavation of shallow areas at Moodie Drive and Greenbank Road the net additional capacity would be small and the overall effect relatively insignificant. It is concluded that the large expense of major channel excavation is not warranted under the circumstances.

However, there are a number of places throughout the whole length of the river where minor channel blockages have resulted due to debris and fallen trees. It is recommended that these obstacles be cleared away and a regular inspection made at reasonable intervals. A sum of money has been placed in the estimated costs to allow for clearing fallen trees and other debris.



SECTION NO. 6ESTIMATED COSTS

Estimated costs for the various structures and impoundments are given in the following paragraphs.

(a) Heart's Desire Removable Weir

|   |               |
|---|---------------|
| Excavation, rock and earth                        | \$ 2,100.     |
| Dewatering and cofferdams                         | 2,500.        |
| Concrete in place                                 | 16,400.       |
| Timber weir                                       | 3,100.        |
| Backfilling and erosion protection                | 2,000.        |
| Topsoil, sodding, access roadway                  | <u>1,800.</u> |
| Sub-Total   | 27,900.       |
| Allowance for engineering and contingencies (20%) | <u>5,600.</u> |
| Sub-Total   | 33,500.       |
| Allowance for right-of-way and property at weir   | <u>3,500.</u> |
| TOTAL   | \$37,000.     |

(b) Village of Richmond Weir at Site "A" (Cemetery)

|                                    |               |
|------------------------------------|---------------|
| Clearing and Excavation            | \$ 3,800.     |
| Dewatering and cofferdams          | 3,500.        |
| Concrete in place                  | 18,000.       |
| Timber weir                        | 4,000.        |
| Backfilling and erosion protection | 2,500.        |
| Topsoil, sodding, access roadway   | <u>1,500.</u> |
| Sub-Total                          | 33,300.       |

(b) (Cont'd)

|   |                |
|---|----------------|
| Allowance for engineering and contingencies (20%)               | \$ 6,660.      |
| Allowance for park facilities                                   | <u>2,500.</u>  |
| Sub-Total   | 42,460.        |
| Allowance for purchase of 26 acres of flood-plain land for park | <u>10,000.</u> |
| TOTAL   | \$52,460.      |

(c) Village of Richmond Weir at Alternate Site "B"

|   |                |
|---|----------------|
| Excavation  | \$ 2,400.      |
| Dewatering and cofferdams                                       | 2,000.         |
| Concrete in place   | 8,800.         |
| Timber weir   | 2,700.         |
| Backfilling and erosion protection                              | 2,000.         |
| Topsoil, sodding, access roadway                                | <u>2,000.</u>  |
| Sub-Total   | 19,900.        |
| Allowance for engineering and contingencies (20%)               | 4,000.         |
| Allowance for park facilities                                   | <u>2,500.</u>  |
| Sub-Total   | 26,400.        |
| Allowance for purchase of 26 acres of flood-plain land for park | <u>10,000.</u> |
| TOTAL   | \$36,400.      |

(d) Ashton Marsh Project

One of the major costs involved in the Ashton Marsh project will be that of acquiring the large areas of land needed for the reservoir. As noted previously, a total of 4,780 acres is recommended for the main project, and an additional 480 acres if the auxiliary migratory bird pond development is constructed. A preliminary approach to estimating the cost of the land has been made.

Examination of land sale prices as given in Figure 9 show that most transfers were in the range of \$2.50 to \$7.00 per acre for the low uncleared land. Although many of the transfers were 10 to 20 years ago, some of the more recent ones are not greatly different, e.g. a block of 50 acres bought for \$200. in 1967 by J. F. Spoor and a block of 100 acres bought in 1965 for \$400. by E. Kidd. On the other hand there have been occasional higher prices (up to \$32 per acre) in some cases for reasons that are not immediately clear.

Mr. Ansell has advised that on the basis of interviews he had with VLA and ARDA average allowances for land costs might be made on the basis of \$20. per acre for land which was not valuable for wood production, \$40. per acre for land useful for wood and \$60. per acre for tillable land.

For preliminary purposes values of \$20. per acre for all the wooded lands, \$60. for cleared land, and additional allowances when houses are affected, have been assumed. On this basis the total property costs for the basic reservoir project would be \$135,000.

Ashton Marsh Reservoir Project

39.

|  |               |                 |
|--|---------------|-----------------|
| Clearing   |               | \$ 5,000.       |
| Excavation and Dyke Construction                     |               | 80,000.         |
| Topsoil and seeding                                  |               | 6,000.          |
| Ditching and pipe drainage                           |               | 15,000.         |
| Control structure                                    |               |                 |
| Excavation   | 3,500.        |                 |
| Concrete   | 22,500.       |                 |
| Stop logs, misc.<br>metal, gate                      | 10,000.       |                 |
| Dewatering and<br>cofferdams                         | 8,500.        |                 |
| Backfilling and<br>erosion protection                | <u>8,000.</u> | <u>52,500.</u>  |
| Sub-Total  |               | 158,500.        |
| Allowance for engineering and<br>contingencies (20%) |               | 31,500.         |
| Allowance for park facilities                        |               | <u>5,000.</u>   |
| Sub-Total  |               | 195,000.        |
| Allowance for land costs                             |               | <u>135,000.</u> |
| TOTAL  |               | \$330,000.      |

(e) Richmond Swamp Project

|                                    |  |               |
|------------------------------------|--|---------------|
| Excavation                         |  | \$ 4,700.     |
| Dewatering and cofferdams          |  | 2,300.        |
| Concrete in place                  |  | 16,800.       |
| Timber weir                        |  | 4,000.        |
| Backfilling and erosion protection |  | 2,000.        |
| Topsoil, sodding, access roadway   |  | <u>8,000.</u> |
| Sub-Total                          |  | \$37,800.     |

(e) (Cont'd)

|   |                |
|---|----------------|
| Allowance for engineering and contingencies (20%)   | \$ 7,500.      |
| Allowance for park facilities                       | <u>2,500.</u>  |
| Sub-Total   | \$47,800.      |
| Allowance for purchase of reservoir land and access | <u>40,000.</u> |
| TOTAL   | \$87,800.      |

SECTION NO. 7SUMMARY AND RECOMMENDATIONS

The report presents the results of a study of the Jock River with a view to locating sites for weirs and impoundments which would contribute towards increasing low summer flows, providing improved conditions for fish and wildlife, providing community ponds for fire protection and community beautification, encouraging recreational use, and reducing spring flood peak flows in the Jock and Rideau Rivers.

Consideration is given in the report to weir sites at Heart's Desire, at the downstream boundary of Richmond Village, at an alternate site in Richmond upstream of the boundary, at a site above the Greenbank Road bridge and at a site below the Moodie Drive bridge. In addition the report discusses the provision of two large impoundment areas; -- the Ashton Marsh reservoir project in Beckwith Township and the Richmond Swamp project in Goulbourn and Marlborough Townships. The Ashton Marsh project would provide a multiple-use reservoir for summer flow regulation, wildfowl propagation, flood control, and recreation. The reservoir would have a flooded area of 3600 acres and would provide 6000 acre-feet (261,360,000 cubic feet) of storage which could increase the July- August flow of the Jock River by 49 cubic feet per second. The Richmond Swamp project would provide 1500 acre-feet of storage in a flooded area of 1000 acres, with a resulting summer flow increment of 12 cubic feet per second. However the raising of water levels in the Richmond Swamp would be opposed by the Canadian National Railway Company because of possible effects on the roadbed of the CNR Ottawa - Smiths Falls line in this area.

It is recommended that the Rideau Valley Conservation Authority give consideration to proceeding with the following projects:

- (a) The construction of a removable weir at the alternate site (Site "B") in the Village of Richmond at an estimated cost of \$26,400. This project should include the acquisition of approximately 26 acres of adjacent flood plain land for park and recreational development at an estimated additional cost of \$10,000.
- (b) The construction of the Ashton Marsh multipurpose reservoir project at a cost of \$195,000. The estimated cost of land acquisition for this project is \$135,000.
- (c) The construction of a removable weir at Heart's Desire at an estimated cost of \$37,000.
- (d) The removal of fallen trees and debris along the length of the Jock River channel at an estimated cost of \$5,000.

In addition, it is recommended that:

- (a) The Authority pursue the possibility of developing the Richmond Swamp storage area by opening negotiations with the Canadian National Railway Company.
- (b) Representation be made to the appropriate federal government authorities with a view to establishing one or more flow gauging stations on the Jock River.
- (c) The Authority establish a series of level gauges at selected points along the river, and provide for these gauges to be read daily during the spring flooding period each year.

It is further recommended that the Authority give consideration to investigating the feasibility of providing a permanent-level pond for migratory birds adjacent to and upstream of the Ashton reservoir, in accordance with a suggestion put forward by officials of the Conservation Authorities Branch of the Department of Energy and Resources Management.



ABSTRACT

SOIL REPORT BY H. Q. GOLDBER & ASSOCIATES LTD.  
RE PRIMARY WEIR SITES: HEART'S DESIRE, RICHMOND (AT CEMETERY)  
AND ASHTON MARSH

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The results of a soil investigation to determine the soil and bedrock conditions at three proposed dam sites on the Jock River, southwest of Ottawa, Ontario are reported and recommendations for foundation design and construction of the dams are given.

It was found that these proposed dam sites are underlain by 2 to 8 feet of overburden which generally has the composition of a silty glacial till, and as such is relatively impervious. Pervious soil was considered to exist in one borehole at Heart's Desire. Dolomitic limestone bedrock was encountered at all three sites. At Heart's Desire and Richmond, some zones in the bedrock are fractured and relatively pervious. The bedrock at Ashton was sound throughout.

It is recommended that the dams at Heart's Desire and Richmond be founded on the bedrock. At Ashton the dam may either be founded on the glacial till overburden or on the underlying bedrock. To reduce underseepage through the bedrock below each dam, the continuity of the upstream blanket at these sites should be maintained by backfilling the upstream foundation excavation with relatively impervious glacial till material.

At Ashton where the roadway embankment will be employed as a dyke beyond the dam abutments, the upstream face of the embankment should be blinded with relatively impervious glacial till which is readily available in the area.

EXTRACT FROM LETTER DATED 24 FEBRUARY 1967 FROM  
OTTAWA BOARD OF CONTROL TO ALDERMAN HOWARD E. HENRY, CHAIRMAN,  
RIDEAU VALLEY CONSERVATION AUTHORITY

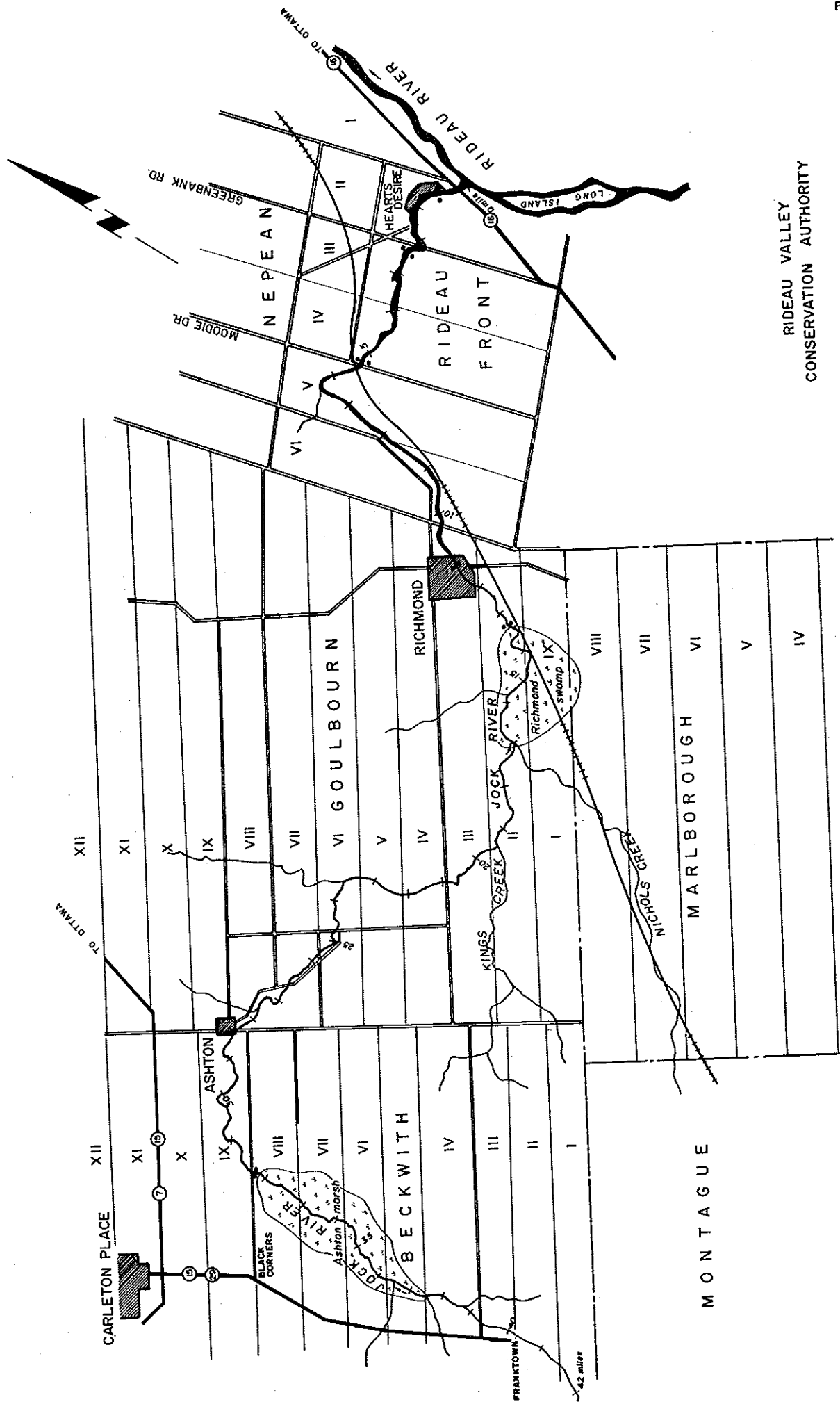
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"The following (projects for development) are suggested  
for first consideration of the Authority.

.....

The development of regional parks within reasonable distances  
of the main centres of population. The distribution of these regional  
parks would depend naturally on surveys to be made wherever they are  
established, provision should be made for supervised swimming facilities,  
park areas, open spaces for unorganized games, nature trails and boat  
rental and launching facilities and perhaps demonstration areas, such  
as maple sugar camps and fish ponds. It is suggested that some of these  
parks could be so designed and equipped for year round activities, which  
would be used in the winter time."

FIGURE 1.



RIDEAU VALLEY  
CONSERVATION AUTHORITY

OVERALL PLAN - JOCK RIVER

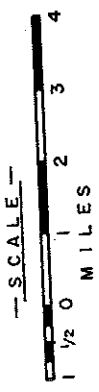


FIGURE 1.

FIGURE 2

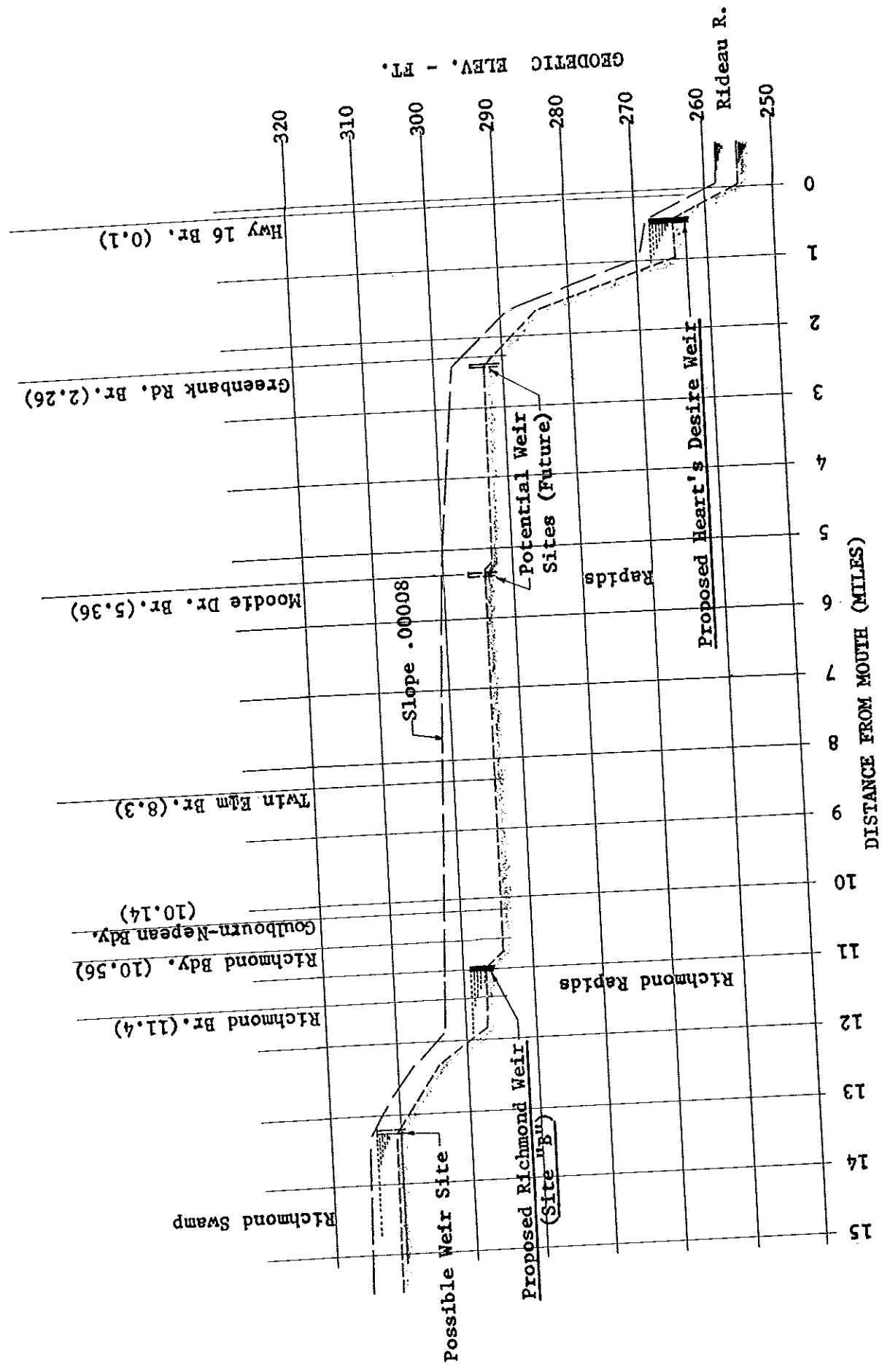
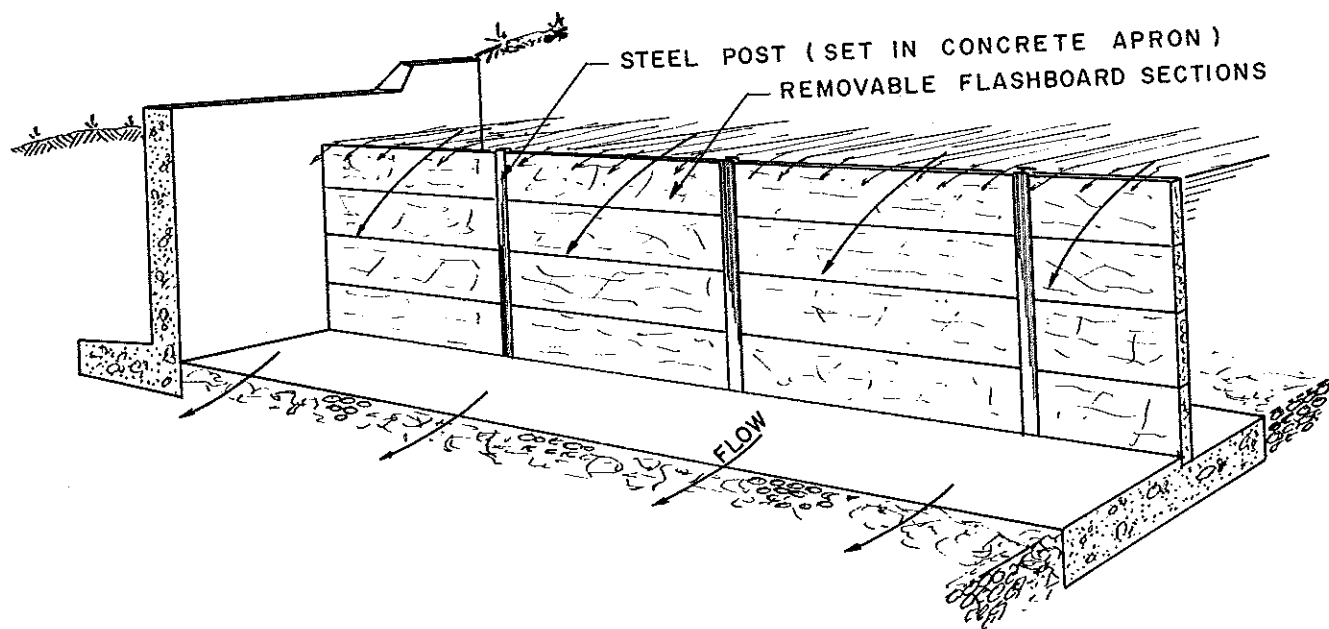


FIGURE 2

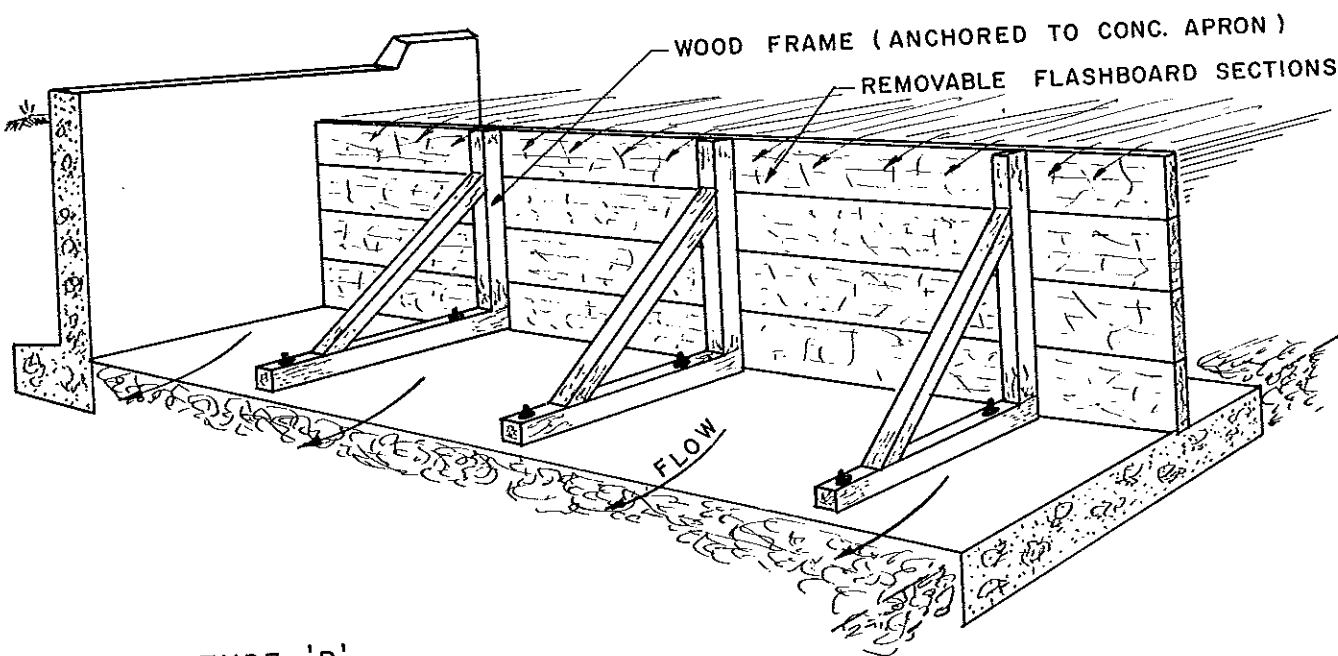
PROFILE - JOCK RIVER

Mileage 0 - 15

Scale 1" = 2 miles (hor)  
1" = 20 feet (vert)



TYPE 'A'

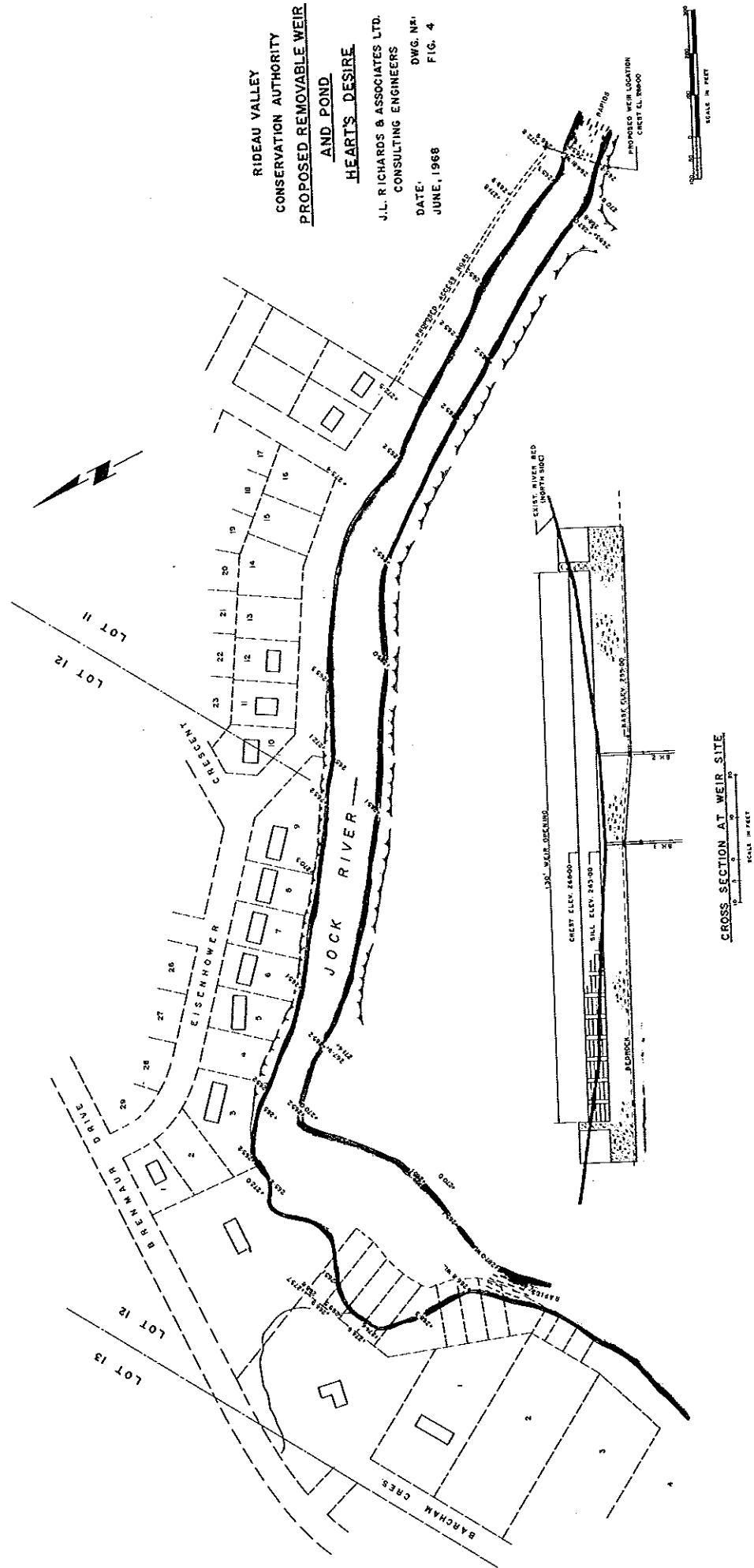


TYPE 'B'

FIG. NO. 3  
REMOVABLE WEIR DETAILS

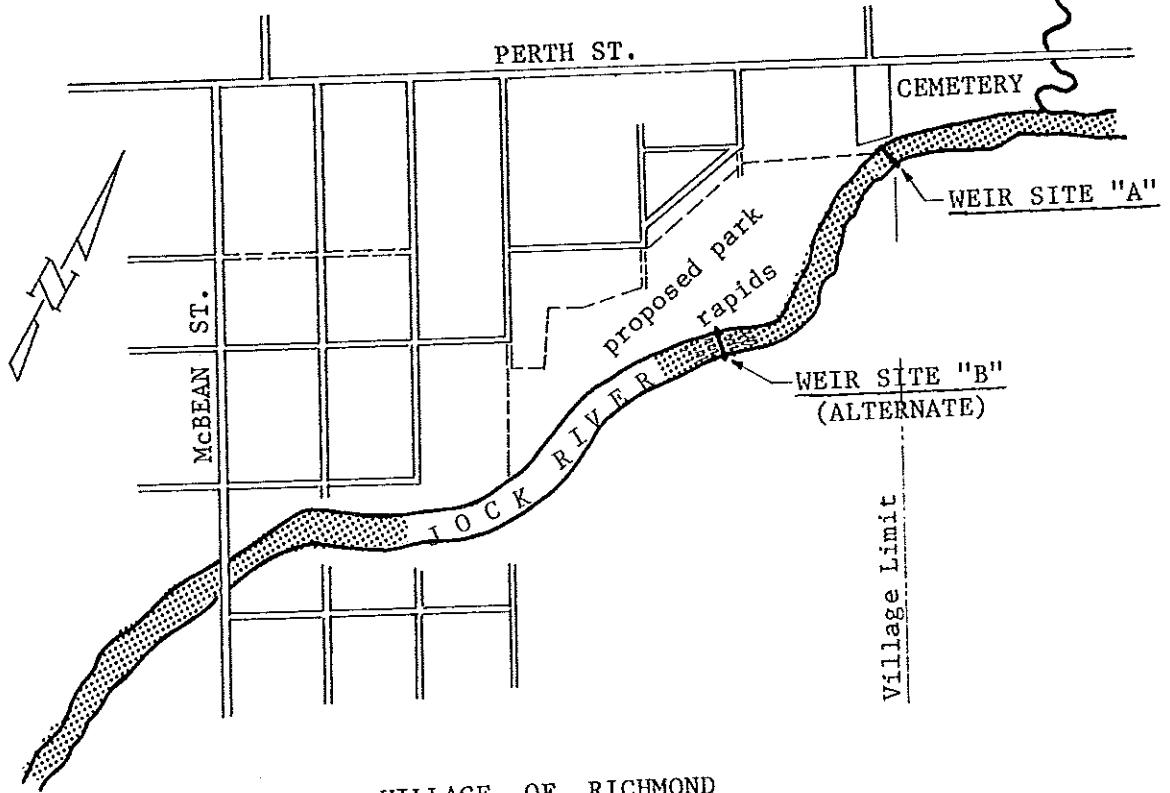
RIDEAU VALLEY  
 CONSERVATION AUTHORITY  
PROPOSED REMOVABLE WEIR  
 AND POND  
 HEART'S DESIRE

J.L. RICHARDS & ASSOCIATES LTD.  
 CONSULTING ENGINEERS  
 DATE: JUNE, 1968  
 DWG. NO: FIG. 4



CROSS SECTION AT WEIR SITE  
 SCALE IN FEET

FIGURE 5



VILLAGE OF RICHMOND

Scale 1" = 1000'

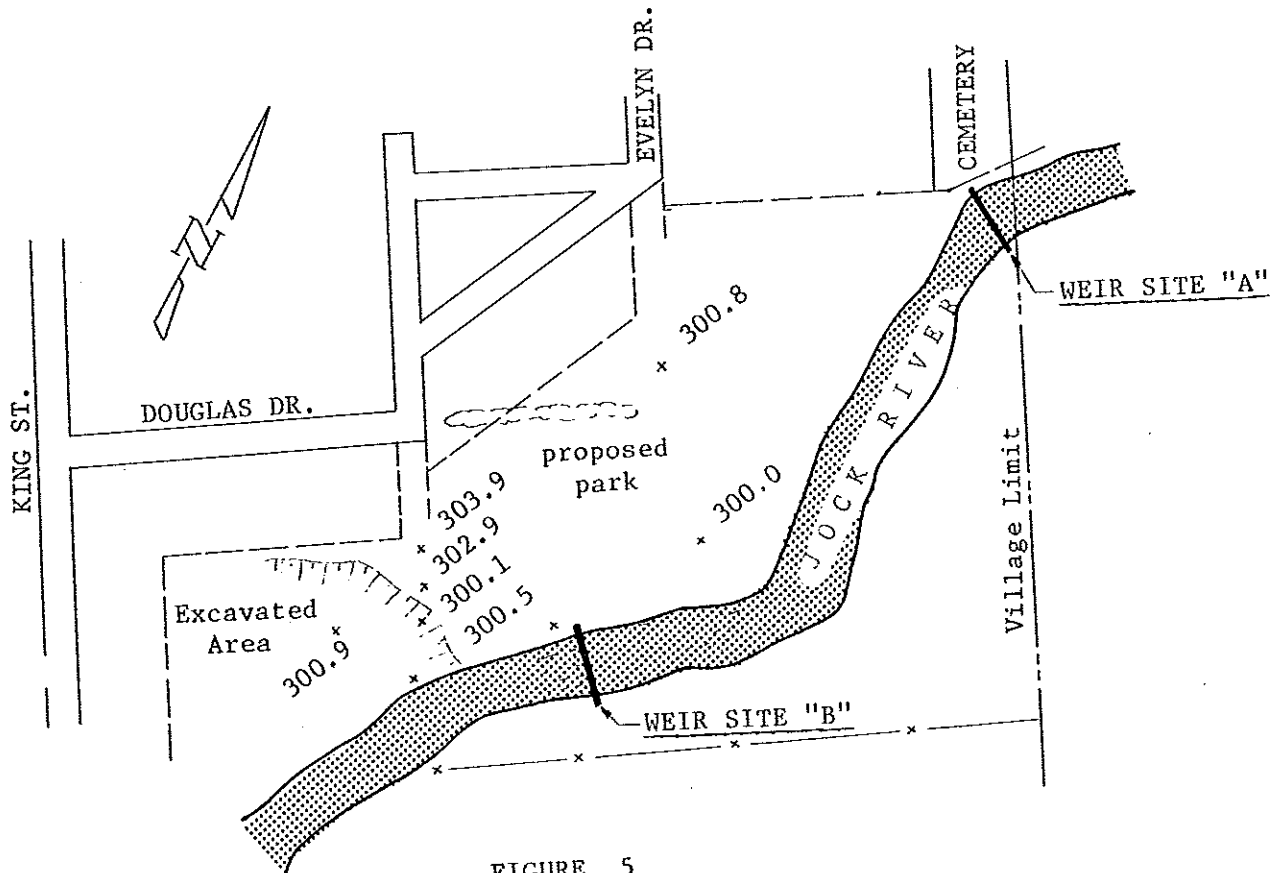
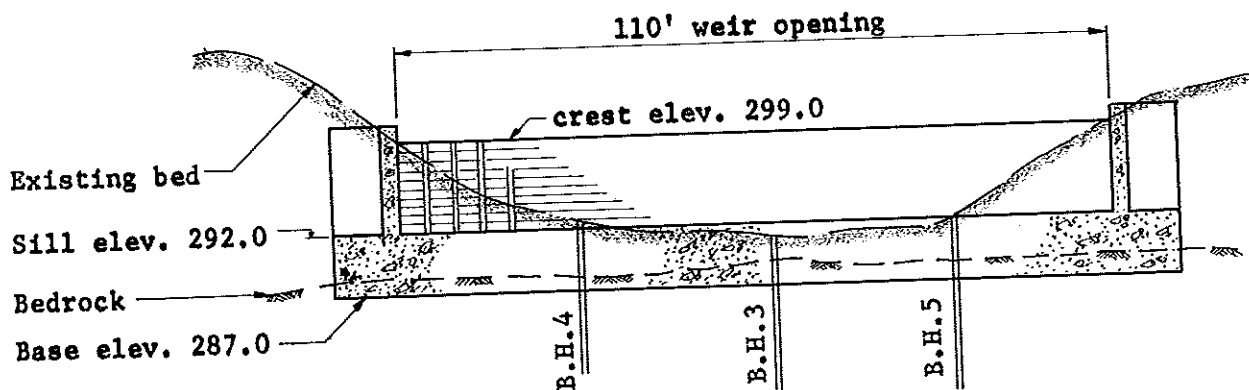


FIGURE 5

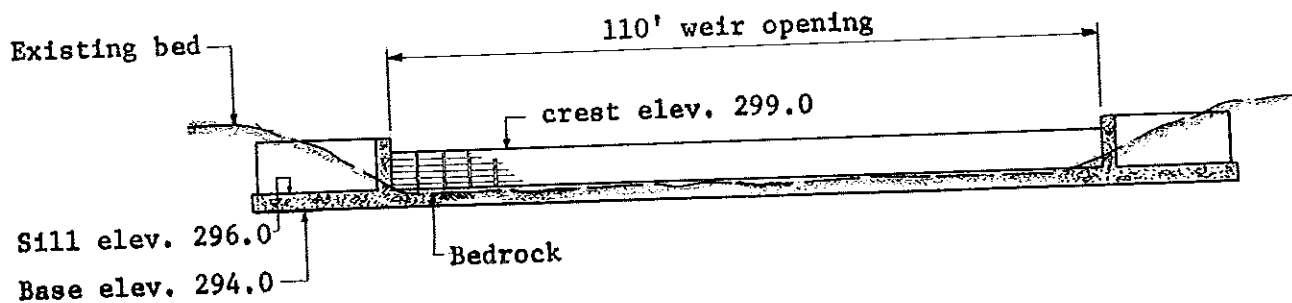
RICHMOND WEIR SITES

Scale 1" = 400'



SITE "A"

AT DOWNSTREAM EDGE OF VILLAGE



SITE "B" (ALTERNATE)

1500' ABOVE VILLAGE BOUNDARY

FIGURE 6

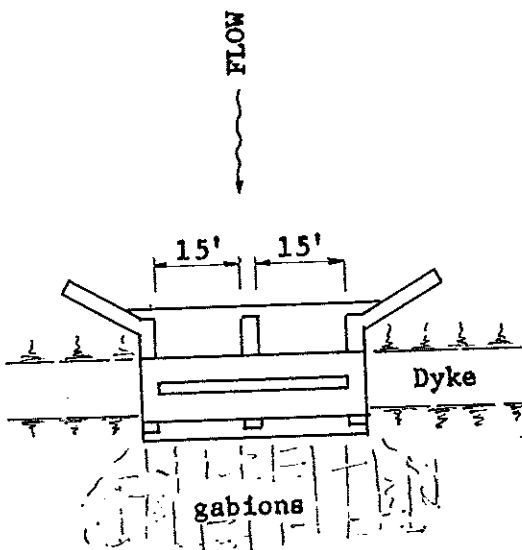
REMOVABLE WEIR FOR RICHMOND VILLAGE

CROSS-SECTIONS

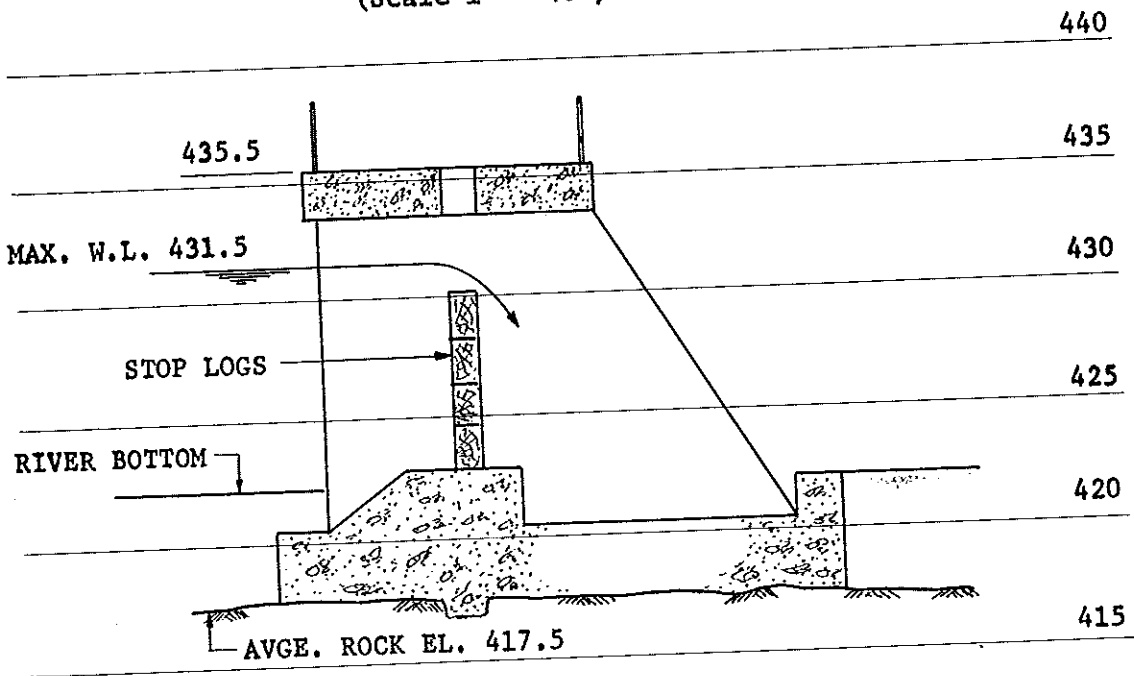
(LOOKING DOWNSTREAM)

Scales: hor 1"=30'  
vert 1"=15'





PLAN  
(Scale 1" = 40')



SECTION  
(Scale 1/8" = 1'-0")

FIGURE 7  
CONTROL STRUCTURE  
ASHTON MARSH

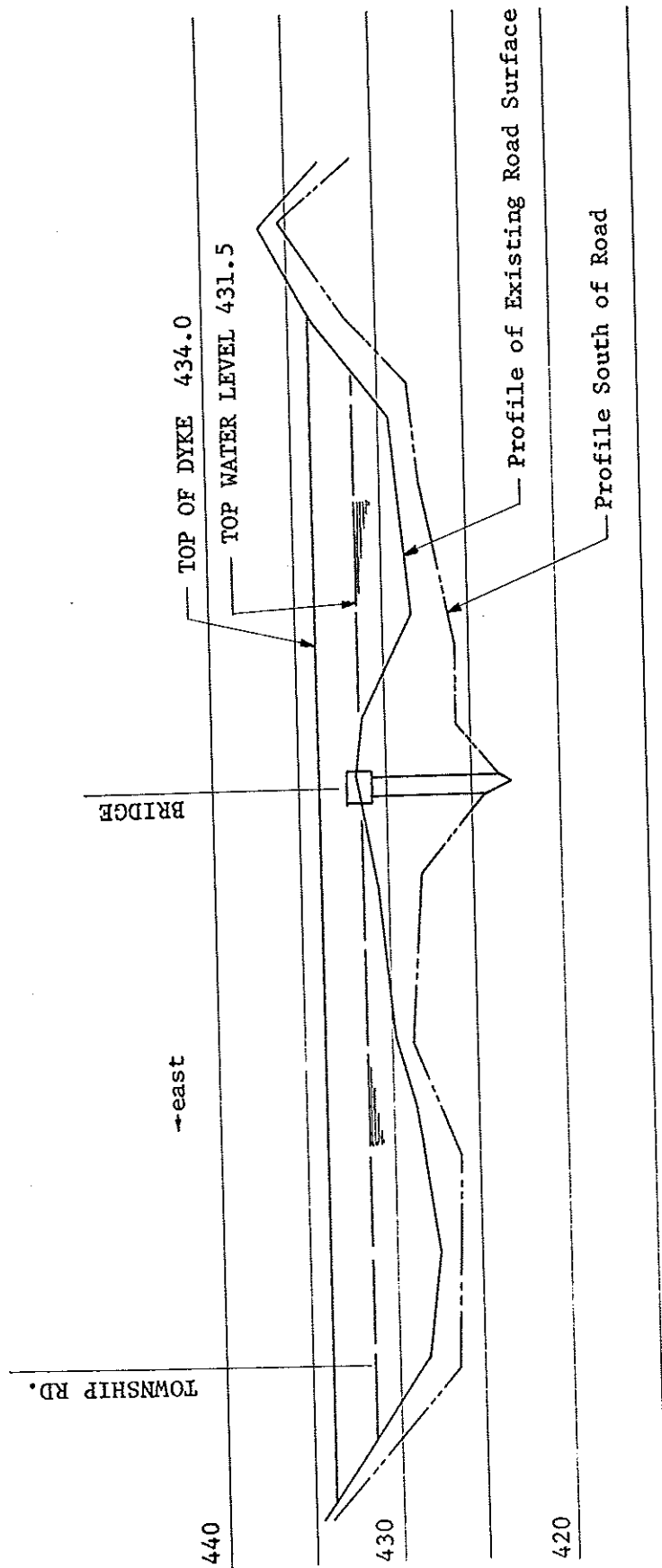


FIGURE 8

PROFILES AT CONCESSION RD.

ASHTON MARSH

Scale 1" = 500' (hor)  
1" = 10' (vert)