

Muskrats

20 p. 1

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SUPPLEMENTARY
MATERIAL
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Animal Husbandry

Design and Cost of Construction
of an Artificial Pond for
Raising Muskrat

A Thesis submitted to

The Faculty of
MICHIGAN STATE COLLEGE
of
AGRICULTURE AND APPLIED SCIENCE

By

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Candidate for the Degree of
Bachelor of Science

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THESIS

copy

Respectfully dedicated to
Clarence S. Mason and Alice E. Mason,
my father and mother,

who made it possible for
me to receive this Degree.

Bibliography

Fur Farming for Profit

by **Frank G. Ashbrook**

Foundations, Abutments and Footings

by **George A. Hool**
and
W. S. Kinne

The muskrat has been the chief factor in maintaining a high total value for the annual fur production of the United States, and in commercial importance it now heads the list of fur animals. The number produced is extraordinary in spite of the tremendous toll that has been taken annually over a long period. The average yearly production of muskrats in the United States is between 13,000,000 and 14,000,000. Muskrats not only multiply more rapidly than do other fur animals, but because of their aquatic retreats and general habits, are better fitted to maintain their numbers.

Its ability to maintain itself in large numbers in the face of constantly changing conditions makes the muskrat an animal of great economic possibilities. Although in some localities it is injurious to cultivated crops, it is for the most part a denizen of places unsuited to agriculture. The increasing use of its fur and meat makes it most desirable to perpetuate this animal as a natural resource. Its prolificness is more impressive when one stops to consider that until recently nothing had been done to encourage its perpetuation and increase except to place legal restrictions on trapping.

Formerly those who owned or controlled muskrat marshes did not realize or else they ignored the possibilities that these situations offered not only for increasing the annual harvest of fur but also for establishing muskrat fur production on a more suitable basis. This applies not only to large swamp and marsh areas but also to all other places

where the muskrat is found. Under present conditions, the areas where the muskrat exists are capable of supporting larger numbers than are ordinarily produced there.

Many persons unfamiliar with the muskrat industry are under the impression that muskrats are raised under conditions similar to conditions required by domestic animals. This, however, is not the case. The first essential is good marsh. The food plants should be of luxuriant growth and the marsh should contain enough water not to freeze solid during the winter. A marsh lowland comprising about 80 percent vegetation and 20 percent water is an excellent situation. The entire area should be inclosed by a fence that will retain the muskrats and keep out vermin. The marsh itself produces the necessary food, and the muskrats feed there and breed. When the trapping season comes around the owner traps, or if he does not care to do even this, he employs professional trappers. When the season is over, he returns to his attitude of watchful waiting while his muskrats take care of themselves and by their prolificacy produce enough young to make the next trapping season profitable.

The number of muskrats that can be produced on a given area depends largely on the number of breeding animals and the abundance of food and water. Marsh areas on the Eastern shore of Maryland have yielded the following returns for a single season -- On 1,300 acres, 5,000 pelts; on 5,000 acres, 13,000 pelts; on 800 acres, 4,205 pelts. In Louisiana 163,000 acres of marshland produced 350,000 muskrats. There are other sections of the United States where large numbers of muskrats are

trapped, but the tidal marsh areas seem to have a greater production to the acre than any other muskrat habitat.

In many sections of the United States, fur-farming as ordinarily carried on is a single-crop operation, without by-products -- the pelt is the only source of revenue and the carcass has to be destroyed. Muskrat raising, on the other hand is a two crop business, the carcass as well as the pelt bringing a good return. In 1904, muskrat pelts were selling at approximately 25 cents each and the carcasses at 1 dollar per dozen. In 1925, the pelts had advanced to \$1.50 each, and the carcasses to \$3.00 per dozen.

The high rate of increase of the muskrat is a factor that makes the animal an attractive subject for fur-farming, and this feature is used as an outstanding argument to persuade persons to invest money in the business. It is always to be kept in mind, however, that even though muskrats are very prolific, many other factors enter in and some tend to keep their numbers much below the figures that one may arrive at by simple arithmetical calculation. It is not the number of animals born that counts so much as the actual number raised to maturity. Natural checks on increase include injuries and deaths from fighting among themselves, and destruction from such predators as minks and the spring floods that drown many young muskrats in certain sections of the country.

Description and habits.

The muskrat (*Fiber zibethicus*) derives its name from the musky odor given off by certain glands. This odor pervades the entire skin to some extent, particularly in the summer. Musquash is the Cree Indian name, and has the authority of long

use, especially among fur dealers.

Muskrats inhabit the greater part of North America from the northern limit of trees south about to the Mexican border. They are absent from the coastal parts of South Carolina, Georgia, Alabama, and nearly all of California, and do not occur in localities of the inner plateau that have no streams or lakes.

When full grown the muskrat is about four times as large as the ordinary brown rat. It has a blunt muzzle, a short and scarcely noticeable neck, and a stout body. The tail is about two-thirds as long as the head and body, is compressed laterally, and tapers to a rather acute point. The eyes are small, black, and beady. The ears are short, covered with hairs, and in the winter are almost wholly concealed in the fur. The legs are short especially the front ones, and the feet are stout and provided with rather long claws. The hind feet are not webbed but are covered with hairs and are adapted to swimming.

Except for the beaver, no inland fur-bearing mammal of the United States leads a more aquatic life than the muskrat. Its characters especially adapt it to the water. Besides having feet specialized for swimming, it has a tail that serves as an efficient rudder, and fur that is practically waterproof.

Muskrats are chiefly nocturnal, but they are much more active by day than is ordinarily supposed. When seldom disturbed they often may be seen at work in bright sunlight, especially at the season when they are building winter houses. These structures, though smaller and less strongly built, are in many respects similar to those of the beaver. The muskrat

house rests on the bottom of a shallow pond, and is built mainly of the kind of plants on which the animals feed, such as rushes, grasses, and roots and stems of aquatic plants. These are heaped up without orderly arrangement until the dome-like top rises two or three feet above the water. The mud on the outside of the house seems to be collected accidentally with the roots. Within the part of the structure above the water a chamber is excavated, from which two or three passages lead downward through the mass into the water, reaching it at points well below the frost line. The houses are used mostly for winter shelter, food, and as a place in which to whelp the young. Occasionally, when muskrats are driven from their houses or are excluded from their underground burrows by barriers of ice or frozen ground, several families will occupy a house in the deeper parts of the pond.

As cold weather approaches, the animals become very active, adding to their old winter houses, building new ones, and deepening channels that lead to houses and burrows. They do not hibernate, and, aside from the vegetation of which their houses are made, seem to make little food provision for the winter. Some of the surplus food collected, however, may be found in their burrows at almost any time.

Where the range is ample, and natural conditions are suitable, there is probably no method of muskrat farming superior to that of fencing the inclosure and maintaining the preserve. The problem here is largely one of guarding against poaching, and employing wise trapping methods to insure a sufficient supply of breeding stock.

There is very little definite information supported by well-established facts concerning intensive methods of muskrat farming. The industry is steadily developing, however, and vast areas have been fenced; canals, ditches, and dikes are being constructed; and in some instances centrifugal and lift pumps have been installed to keep a constant supply of water on marsh areas.

DESIGN

EXTRA SHOULDER FOR ROAD -

As the water level is raised it will be necessary to use some means to prevent the road from becoming soaked. This can be accomplished by filling a 12 foot shoulder on each side of the road. The shoulder will be held in place and protected by Wakefield piling which will be built on the job. Each pile will be made from three short-leaf pine planks 2 in. x 10 in., 10 ft. long, lapped with the center plank 3 in. to the weather, making a tongue and groove joint. The piling will be placed in a 4 ft. trench, leaving 6 ft. out of the ground. The amount projecting above the shoulder will vary from 2 to 4 feet and will serve as a guard rail along the edge of the pond. This piling will be placed on both sides of the road, and will run from the bridge, each way to contour line 95 (see map).

Dist. to be covered = 690 ft.

No. of piles = 828

No. of planks = 2,484

No. board feet of lumber = 41,400

This planking will be finished on four sides, cut in 10 ft. lengths, and delivered on the job for \$ 36.00 / M.

Price for lumber - 41,400 x 36.00 = \$ 149.04

Contractor will dig the trench with small trench-digger, set the piles, and backfill for 40 cents per pile.

Price for setting - 828 x .40 = \$ 331.20

Labor - 2 men at 50 cents per hr. can make 5 piles per hr.

Price for labor - $\frac{828}{5} \times 1.00 =$ \$ 165.60

Each pile takes 20 spikes or a total of 16,560 no. 60 nails. These average 10 to the lb. so we need 17 kegs at \$ 2.95 each, delivered.

Price for nails - 17 x 2.95 = \$ 50.15

Total cost of piling. = \$ 695.99

The shoulder will then be filled by contractor with two-wheeled scrapers. Earth will be taken from the hills north of the fence line. Average haul = 700 ft. Total yardage = 570. Shoulder will be filled for 50 cents per yard.

Price of earthwork - 570 x .50 = \$ 285.00

Total cost of shoulder = \$ 980.99

ENCLOSURE -

The fence will be 1-1/2 in. mesh, 16 guage, galvanized muskrat fence, 5 ft. wide, set 2 ft. into the ground. A 2 ft. trench will be dug by the contractor for 10 cents per ft. A 14 in. galvanized strip will be placed above the top of the wire to keep the animals from climbing over. This is made of no. 28 guage roll valley roof strip. Comes 50 ft. in a roll at \$ 3.70 per roll. Posts will be steel T line posts, 7 ft. long. 105 of these needed. Corners will be angle steel corner posts with braces. Posts are 92 in. long and set 32 in. into the ground, in concrete.

The galvanized strip will be continued entirely around the enclosure. It will be nailed to the piling with the top edge of the strip flush with the top of the piles.. Around the fence, the strip will be fastened above the wire, lapping the top of the fence only about two inches. It will be securely wired to each post, by punching holes through the metal and running the wires through them. The strip will be wired to the fencing in the same manner, by tying through holes punched in the bottom of the strip, at about 4 ft. intervals.

The distance to be fenced is 1850 ft. and since the fencing comes in 150 ft. rolls, we need 13 rolls at \$ 15.65 each.

Price of fence - 13 x 15.65 = \$ 203.45

Line posts will be set at one rod intervals, so we will need 105 of them. They are priced at 36-1/2 cents each.

Price of T line posts - 105 x .365 = \$ 38.33

Nine corner posts will be needed at \$ 3.45 each.

Price corner posts - 9 x 3.45 = \$ 31.05

The corner posts will be set by digging holes with a post-hole digger, 32 in. deep, one for the post and one for each brace. The post will be set in place and the holes filled with concrete, keeping the post braced until the concrete has set.

Labor - 3 men - 16 hours at 60 cents per hr. each.

Price for setting - 48 x .60 = \$ 28.80

There are 2,200 ft. of galvanized strip needed for the top.

Price of strip - 44 x 3.70 = \$ 162.80

The trench dug by the contractor, for setting the fence in the ground will be 2 ft. deep and 1850 ft. long at 10 cents per ft.

Price of trench - 1850 x .10 = \$ 185.00

For setting line posts, attaching fencing and top strip.

Labor - 4 men - 32 hours at 60 cents per hour each.

Price of labor - 4 x 4 x 8 x .60 = \$ 76.80

Total cost of enclosure = \$ 726.20

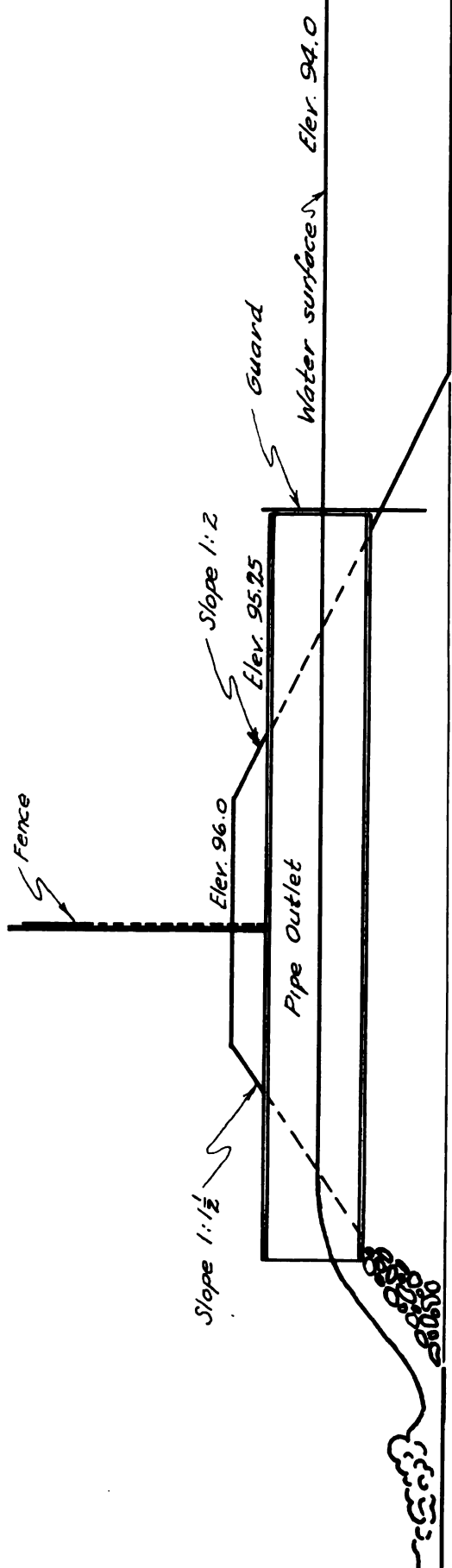
THE DAM

The dam will be of earth hauled from the hills north of the fence line. The contractor will do this at the same time the road shoulder is made, and for the same price, 50 cents per cubic yard. The dam will have a top width of six feet. This width will support the ditcher, and the 2 ft. ditch for the fence will be continued across the top of the dam without a break. The elevation of the top of the dam will be 96, giving the dam a maximum height of about five feet at the lowest part of the marsh. The outside face will have a slope of 1 : 1-1/2 and the inside face will have a slope of 1 : 2 .

The outlet will consist of two 30 inch concrete pipes through the dam, spaced 5 ft. center to center, with a center elevation of 94. This will bring the top of the pipes about 1 ft. from the top surface of the dam, so the fence will have to be notched where it goes over each pipe. This outlet will be placed over the old stream bed. The outside face of the dam will be protected from the washing action by letting the water discharge onto stones as shown in the sketch. To prevent the animals from escaping at the outlet, a guard will be constructed over the inlet end of each pipe, by driving 4 ft. iron rods of 1/2 in. diameter at 1-1/2 in. center to center. The rods will be driven 18 in. into the ground. Twenty rods are necessary for each pipe. This same type of guard will be

used where the stream enters the pond at the bridge. However, the rods used at this point must be 6 ft. long. These rods can be placed by using a template made from a 2 x 4 timber. A row of 40 holes, 5/8 in. diam., spaced 1-1/2 in. center to center will be drilled through the timber. This will be placed in the stream bed, 5 ft. from the bridge and parallel to it. The rods will be driven through the holes to a depth of 18 in. The template can then be raised and fastened near the top of the rods where it will brace them, and keep the space between them as desired. From the ends of this row of rods, the regular muskrat fence will be stretched to the piling and fastened thereto. The top of the fence and of the rods will be protected with the metal strip in the same manner as on the rest of the fence.

Earthwork on dam	=	395 cubic yards	
Price of dam	=	395 x .50	= \$ 197.50
Pipe outlet, 2- 30 in. concrete pipes each 18.5 ft. long.			
Price of pipes	-	37 x 2.75	= \$ 101.75
Guard at outlet	-	40 rods at 17 cents each.	
Price outlet guard	-	40 x .17	= \$ 6.80
Guard at inlet	-	40 rods at 24 cents each.	
Price inlet guard	-	40 x .24	= \$ 9.60
Labor, setting pipes and guards	-	2 men - 3 days at 60 cents per hour each.	
Price labor	-	48 x .60	= \$ 28.80
<u>Total cost dam, pipes, guards</u>	=		\$ 344.45
<u>TOTAL COST OF ENTIRE PROJECT</u>	=		\$ 2747.63



CROSS-SECTION OF DAM AT OUTLET

SCALE: 1" = 4'

This artificial pond when completed will be an ideal place for the purpose of raising muskrats. The fenced area comprises 6.88 Acres of marsh land, of which the pond is about two-thirds. The surface area of the pond is equal to 177,030 sq. ft., or 4.07 Acres. The pond contains 156,800 cubic feet of water, varying in depth from 0 to slightly under 4 feet, with an average depth in the entire pond of 1.34 feet. Fresh water comes into the pond, from the stream which feeds it, at the rate of 678.6 cubic feet per minute. This flow is very constant and more than takes care of the surface evaporation. This place will be nearly perfect for the purpose for which it is intended.

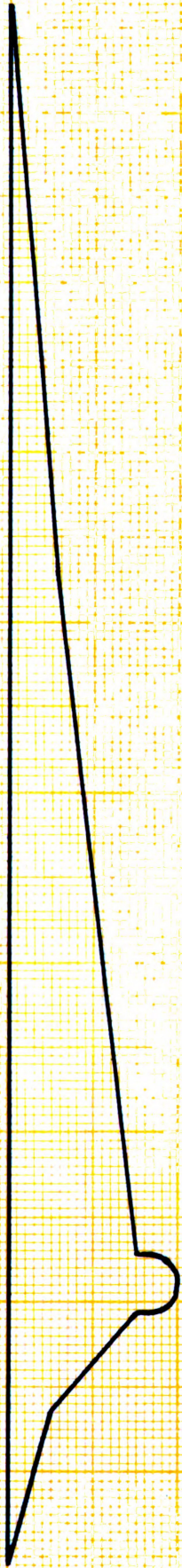
The following are

CROSS SECTIONS

OF THE POND

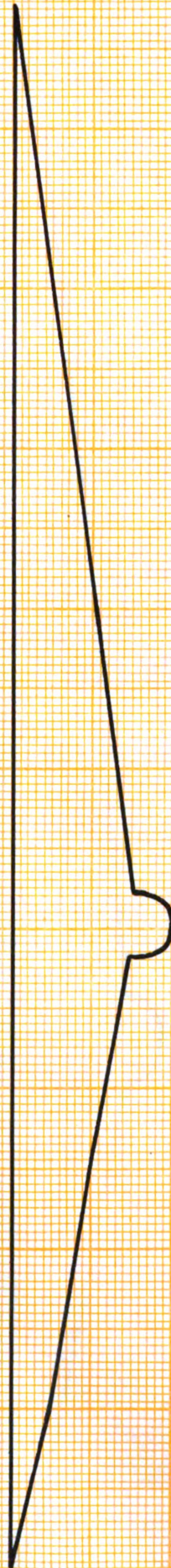
Horizontal scale 1 in. = 30 ft.

Vertical scale 1 in. = 2 ft.



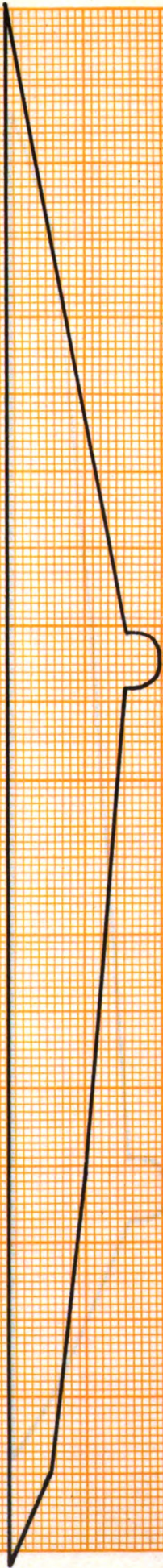
SECTION AT ROAD

AREA - 199.8 SQ. FT.



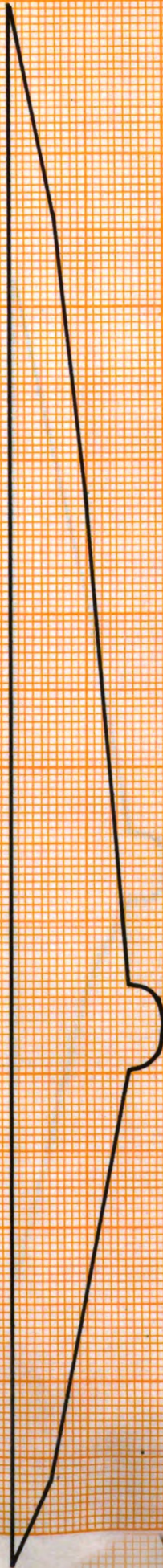
SECTION 100 FT. WEST

AREA - 243.0 SQ. FT.



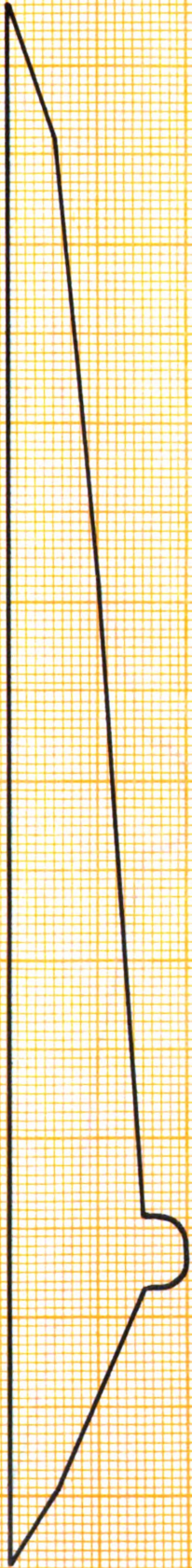
SECTION 200 FT. WEST

AREA = 270.0 SQ. FT.



SECTION 300 FT. WEST

AREA = 280.8 SQ. FT.



SECTION 400 FT. WEST
AREA = 259.2 SQ. FT.

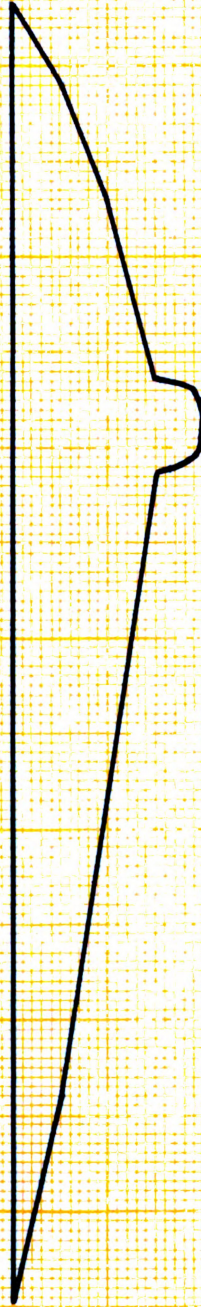


SECTION 500 FT. WEST
AREA = 159.6 SQ. FT.



SECTION 600 FT. WEST

AREA = 206.4 SQ. FT.



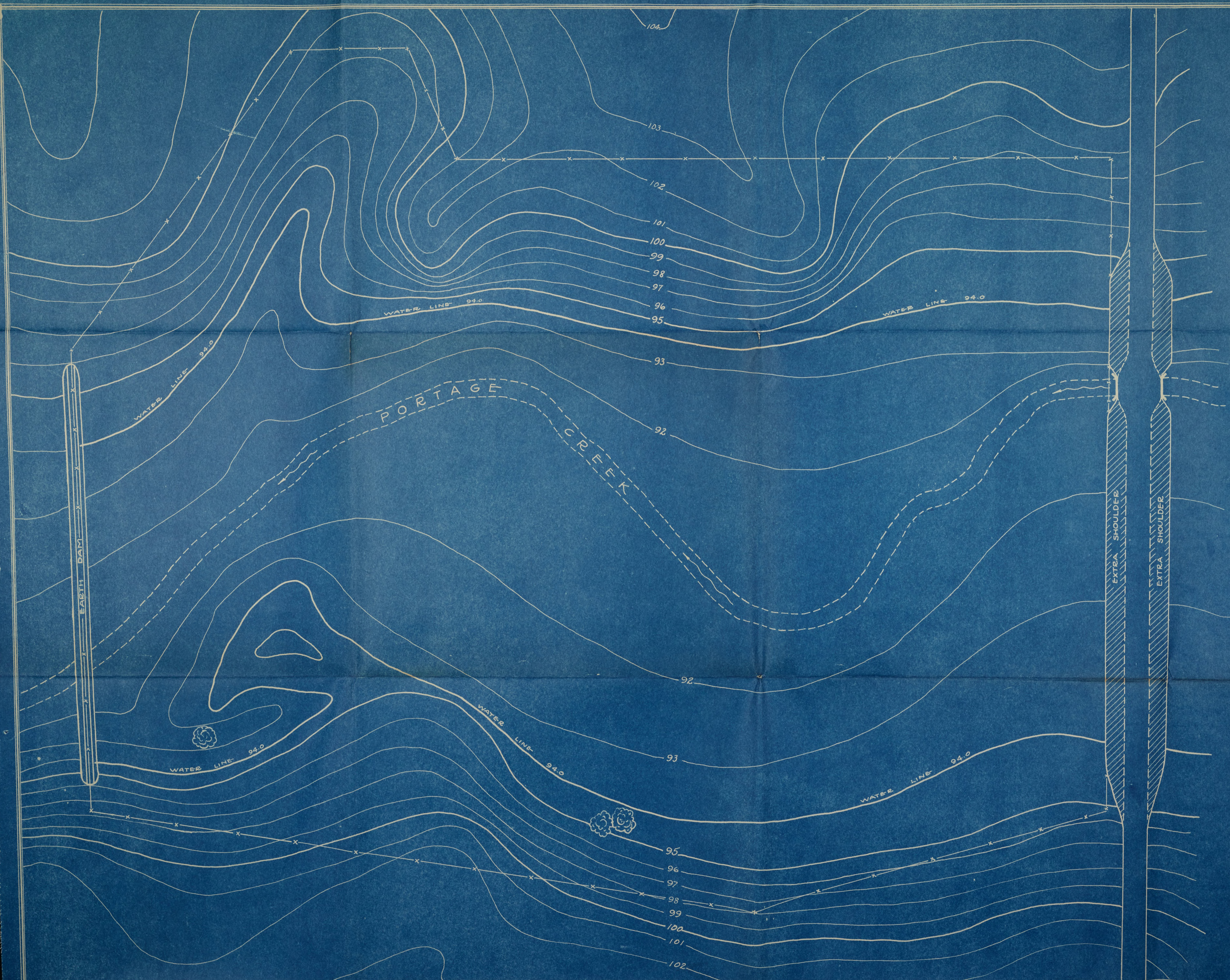
SECTION AT DAM

AREA = 187.8 SQ. FT.

2023

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MAP OF PROPOSED
ARTIFICIAL POND
 FOR RAISING MUSKRATS
 KALAMAZOO CO., MICH.
 JUNE 29, 1930 SCALE: 1 inch = 30 ft.
 Surveyed & Drawn by M.M. Mason.

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