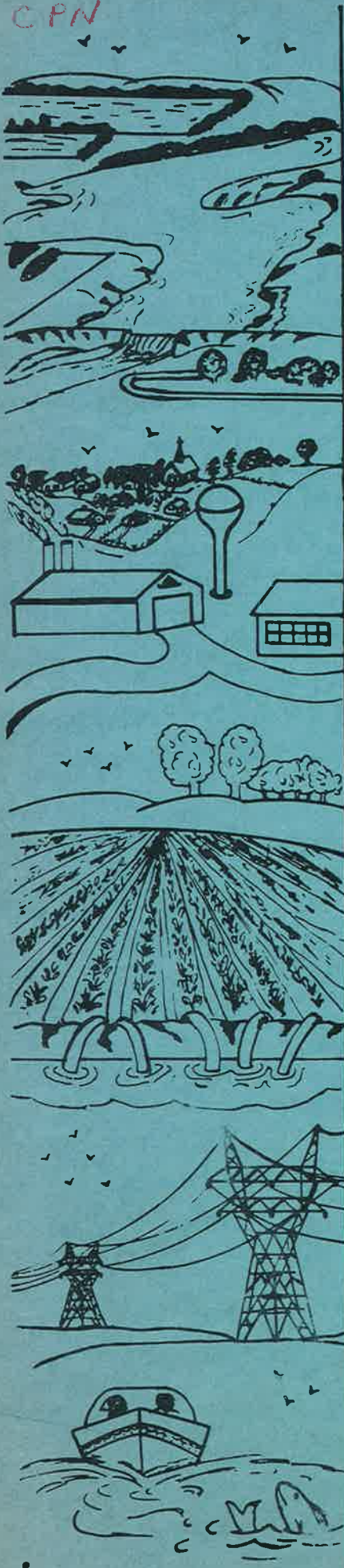


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Report of
NORTH DAKOTA STATE WATER CONSERVATION COMMISSION

1301 State Capitol
 BISMARCK, NORTH DAKOTA

Clausen Springs Recreation Complex

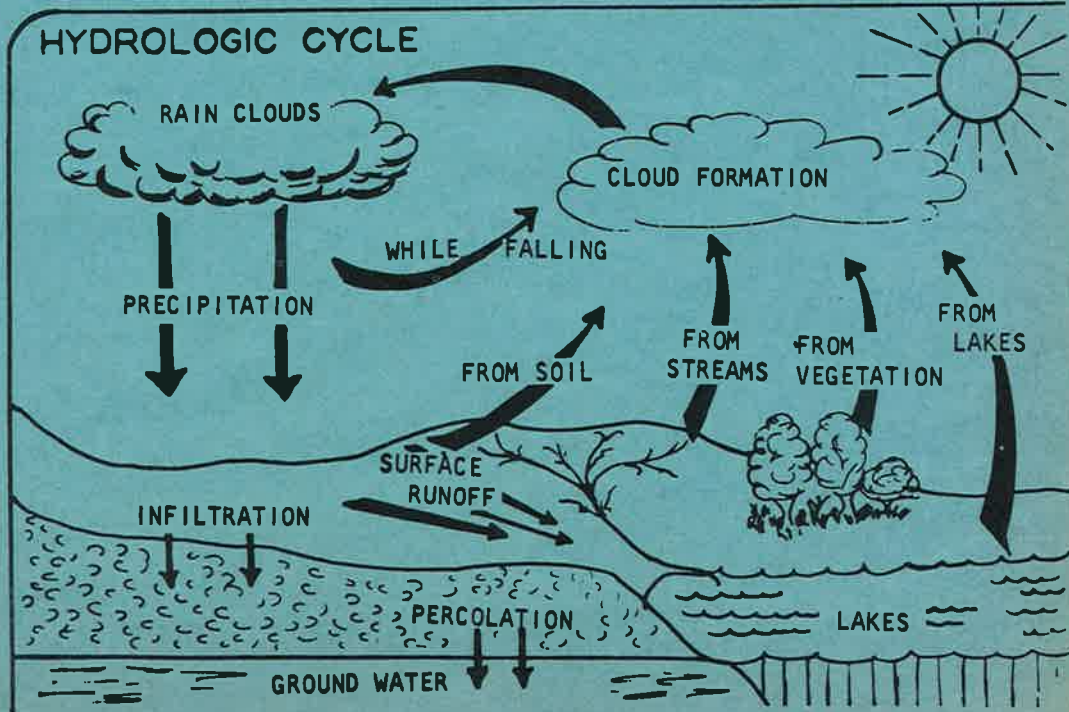
Barnes County

SORA Project #2-37 (SWC Project #1378)

Prepared in Cooperation with the
 North Dakota State Game & Fish Department
 North Dakota State Outdoor Recreation Agency
 Barnes County Park Board
 Barnes County Water Management District

April 15, 1966

HYDROLOGIC CYCLE



NORTH DAKOTA STATE WATER COMMISSION

Project Report

Name: Clausen Springs Recreation Complex, Barnes County
Project #: SWC #1378, SORA #2-37
Date: April 15, 1966

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 2. State maps and picture of area
 3. Topog. mapping report and map
 4. Soil investigation report
 5. Hydrologic report and area capacity graph
 6. Preliminary design data - main structure
 7. Cost estimate - main structure
 8. Map and charts - main structure
 9. Recreation complex - maps and cost estimate
 10. Economic feasibility report
 11. Agreements

North Dakota State Water Commission

1301 State Capitol

223-8000 Ext. 251

Bismarck, North Dakota 58501

April 19, 1966

John Carlisle, Chairman
Barnes County Park Board
Valley City, North Dakota

RE: SWC Proj. #1378
SORA Proj. #2-37

Dear Mr. Carlisle:

Enclosed is a copy of the signed agreement for development of the Clausen Springs Recreation Complex. Also enclosed is a copy of the report on the project prepared in our office with the cooperation of your Board, the Barnes County Water Management District, North Dakota State Game and Fish Department, and the North Dakota State Outdoor Recreation Agency.

Copies of the agreements and the project proposal are also being sent to the Department and Agency as well as an extra copy of the proposal to you for the water management district's information.

The proposal is quite complete and should be forwarded to the Bureau of Outdoor Recreation office in Denver without delay. The State Outdoor Recreation Agency will keep all entities advised of the project's progress.

We appreciate the fine cooperation of all concerned in developing this project proposal and look forward to working with you in the construction of the facilities proposed.

Sincerely yours,

Milo

Milo W. Hoisveen
Engineer-Secretary

MWH:JS:kl

cc. Russell Stuart, Game & Fish Dept.
John Greenslit, Outdoor Recreation Agency
Gordon Gray, Water Commission, Valley City

Governor William L. Guy
Chairman
Richard P. Gallagher
Vice Chairman - Mandan

Harold Hanson
New England
Russell Dushinske
Devils Lake

Henry J. Steinberger
Donnybrook
Gordon K. Gray
Valley City

Arne Dahl, Ex-Officio Member
Comm. of Agriculture & Labor
Milo W. Hoisveen, Secretary
Chief Engineer & State Engineer

DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
PROJECT PROPOSAL - ACQUISITION

LEAVE BLANK FOR BOR USE ONLY

Date Received	Priority	Project Number
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Project Officer

Use this form for submission of individual projects for acquiring lands and waters or interests in lands and waters for public outdoor recreation purposes. If concurrent Development is being undertaken, check here

SECTION 1

1. State or Territory North Dakota	2. Name and address of agency responsible for project North Dakota State Game and Fish Department Fort Lincoln, Bismarck, North Dakota 58501
---------------------------------------	--

3. Project Title
Clausen Springs Recreation Complex, Barnes County, SORA Proj. #2-37

4. Brief description of project The Clausen Springs Recreation Complex encompasses 345 acres; 45 of which will be used for a reservoir. 54 acres are now under cultivation and 291 in pasture. Trees are well established at the site making an ideal area for multi-recreation activity development. The project is situated in Sections 17 and 18, Township 137 North, Range 58 West, Barnes County, 16 miles south of Valley City. 345 acres are to be acquired in fee simple through purchase and if necessary one parcel may be acquired through condemnation. Public use facilities are to be provided on the land for such activities as picnicking, swimming, boating, hunting, fishing and playing games.

SWC Proj. #1378

5. Duration of project from 2-1-64 to 6-30-70	6. Federal assistance requested \$11,775	7. Recommended priority A
--	---	------------------------------

8. Name, Organization, and Title of individual having day-to-day responsibility for direction of project John Carlisle, Chairman, Barnes County Park Board, Valley City, North Dakota	9. Name and Address to appear on check Mito W. Hoisveen, Fiscal Officer North Dakota State Outdoor Recreation Agency, State Capitol, Bismarck, N.D.
--	---

10. TERMS AND CONDITIONS: In submitting this Project Proposal, the State hereby accepts the Terms and Conditions set forth in the BOR Grants-in-Aid Manual, which will be a part of the Project Agreement for any grant awarded under this proposal.

11. CERTIFICATION: As the official designated to represent the State and act for the State for purposes of the Land and Water Conservation Fund Act, I recommend that assistance be made available from the Fund, when monies are available, in accordance with the recommended priority. No financial assistance has been given or promised under any other Federal program or activity with regard to the proposed project. The State or public agency to be responsible for the proposed project has the ability and

intention to finance its share of the costs of this project. The Applicant will not discriminate against any person on the basis of race, color, or national origin in the use of any property or facility acquired or developed pursuant to this proposal, and shall comply with the terms and intent of Title VI of the Civil Rights Act of 1964, P. L. 88-354 (1964), and of the regulations promulgated pursuant to such Act by the Secretary of the Interior and contained in 43 CFR 17.

(Signature)

John Greenslit (Name)

(Date)

State Liaison Officer

(Title)

12. For State use

6 BOR
1 SORA
8 SWC
2 G & F
1 Barnes Co. W.M.D.
1 Barnes Co. Pk.Bd.

April 15, 1966

SECTION 11

1. Nature and Extent of Use—A. For entire area in which acquisitions are to be made:
Farming and livestock grazing.

B. For area to be acquired: 54 acres is cultivated and 291 acres is pasture. A 45 acre reservoir will be created and the balance developed for other public uses to provide outdoor recreation opportunities including public hunting, fishing, picnicking, boating, swimming and playing games.

2. BOR Classification of area General Outdoor Recreation	3. Check one <input checked="" type="checkbox"/> New Site <input type="checkbox"/> Addition to existing site	4. Location County <u>Barnes</u> Town <u>Valley City</u> Town population <u>7809</u> Miles from Town <u>16</u>
5. Total acres to be acquired 345	6. Cover, acres in A. Forest <u>5</u> B. Rock _____ C. Cutover _____ D. Swamp _____ E. Grass <u>340</u> F. Desert _____ G. Water _____	
7. Topography, acres in A. Flat _____ B. Hilly _____ C. Rolling <u>345</u> D. Mountainous _____	8. Waterfront, feet on A. Ocean _____ B. Lake <u>8,400</u> C. Stream _____	9. Roadfront, feet on A. Dirt _____ B. Gravel <u>1,200</u> C. Paved _____

10. PARCELS TO BE ACQUIRED All in Twp. 137 N, Rge. 58 W.

PARCEL NUMBER	ACRES	ESTIMATED VALUE	NUMBER OF BUILDINGS	ESTIMATED VALUE	METHOD OF ACQUISITION	APPROX. DATE OF ACQUISITION	TOTAL VALUE
SW ¹ / ₄ NW ¹ / ₄ 17	40	\$2,600	-	-	purchase	6-30-66	\$2,600
NW ¹ / ₄ SW ¹ / ₄ 17	40	2,600	-	-	"	6-30-66	2,600
N ¹ / ₂ SE ¹ / ₄ 18	80	5,200	-	-	"	6-30-66	5,200
S ¹ / ₂ NE ¹ / ₄ 18	72	4,680	-	-	"	6-30-66	4,680
NE ¹ / ₄ SW ¹ / ₄ 18	40	2,600	-	-	"	6-30-66	2,600
S ¹ / ₂ NW ¹ / ₄ 18	73	5,870	-	-	"	6-30-66	5,870
FOR CONCURRENT ACQUISITION AND DEVELOPMENT PROJECT SUBMISSIONS						TOTAL ESTIMATED VALUE \$	23,550
Total estimated acquisition value			23,550		Amount of Federal acquisition assistance requested		11,775
Total estimated development costs			90,000		Source of remainder of funds		
TOTAL			113,550		State Game and Fish Department		
Total amount of Federal assistance requested			56,775		Barnes County Park Board		
Source of remainder of funds			Barnes County Park Board,		Barnes County Park Board		
			State Outdoor Recreation Agency, Game and Fish Department, State Water Commission		Barnes County Water Management District		

SECTION 111 - ATTACHMENTS

Attach, by reference number, the following supplemental documents necessary to process this Acquisition Project Proposal:
A-660-1 *Project Justification*. A. Description of how the proposed project is in accord with the State outdoor recreation plan and would help meet priority needs identified in the plan. Indicate how the natural beauty of the area will be preserved. B. Indicate other organizations consulted during formulation of this proposal. C. Plans for Operations and Maintenance.

A-660-2 *Maps and Charts*. A. Simple plot plan or map showing the total area to be acquired and its relationship to the surrounding area. Annotate any plans for streets, highways, waterlines, sewers, etc. to be located on or near the involved area. (Key to show location within State, County, or city.) B. Description of any improvements on lands to be acquired. C. Description of all legal rights to be held by applicant and any other person or organization.

A-660-3 *Agreements*. A. Agreements or arrangements made with other organizations for participating in the project, or in later operation and maintenance of the completed project.

The items shown below need *not* be submitted with the project proposal. However, during the course of execution of an approved project, the applicant should be prepared to submit them to the Bureau for review, as follows:

A-660-4 Appraisal reports and other documentation of cost.

A-660-5 Satisfactory evidence of title (such as an opinion by the State Attorney General) for each parcel.

A-660-6 Five-year history of conveyances for each parcel listed in project proposal (name of parties involved, dates, interest conveyed and consideration).

DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
PROJECT PROPOSAL - DEVELOPMENT

LEAVE BLANK FOR BOR USE ONLY

Date Received	Priority	Project Number
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Project Officer

Use this form for submission of individual projects which will develop lands and waters to facilitate their use by the public for outdoor recreation. If concurrent Acquisition is being undertaken, check here

SECTION 1

1. State or Territory	2. Name and address of agency responsible for project
North Dakota	N.D. State Game & Fish Dept., Ft. Lincoln, Bismarck, N. Dak.

3. Project Title
Clausen Springs Recreation Complex (Barnes County) SORA Proj. #2-37

4. Brief description of project
Clausen Springs Recreation Complex encompasses 345 acres; 45 of which will be used for a reservoir. 54 acres are now cultivated and 291 are pasture. Trees are well established at the site, making it an ideal area for multi-recreation activity development. Located 16 miles south of Valley City in Section 17 & 18 - 137-58, Barnes Co., the public use facilities will be utilized by about 30,000 persons annually for such activities as picnicking, swimming, boating, fishing, and playing games.

The project will be developed in a manner which will enhance and preserve the area's natural beauty.

SWC Proj. #1378

5. Duration of project from 12-1-64 to 6-30-70	6. Federal assistance requested \$45,000	7. Recommended priority A
8. Name, Organization, and Title of individual having day-to-day responsibility for direction of project John Carlisle, Chairman, Barnes Co. Park Board Valley City, North Dakota	9. Name and Address to appear on check Milo W. Hoisveen, Fiscal Officer State Outdoor Recreation Agency State Capitol, Bismarck, N.D. 58501	

10. TERMS AND CONDITIONS: In submitting this Project Proposal, the State hereby accepts the Terms and Conditions set forth in the BOR Grants-in-Aid Manual, which will be a part of the Project Agreement for any grant awarded under this proposal.

11. CERTIFICATION: As the official designated to represent the State and act for the State for purposes of the Land and Water Conservation Fund Act, I recommend that assistance be made available from the Fund, when monies are available, in accordance with the recommended priority. No financial assistance has been given or promised under any other Federal program or activity with regard to the proposed project. The State or public agency to be responsible for the proposed project has the ability and	intention to finance its share of the costs of this project. The Applicant will not discriminate against any person on the basis of race, color, or national origin in the use of any property or facility acquired or developed pursuant to this proposal, and shall comply with the terms and intent of Title VI of the Civil Rights Act of 1964, P. L. 88-354 (1964), and of the regulations promulgated pursuant to such Act by the Secretary of the Interior and contained in 43 CFR 17.
---	---

(Signature)	John Greenslit (Name)
(Date)	State Liaison Officer (Title)

12. For State use
6 BOR
1 SORA
8 SWC
1 GF
1 Barnes Co. Pk. Bd. 4/15/66

SECTION 11 - TABULAR SUMMARY OF PROJECT ELEMENTS AND COSTS

Identify the phase or element of the Development Project suggested by the line items. Indicate additional breakdown of work elements necessary and desirable to allocate work assignments and costs.

	DATE OF		ESTIMATED COST	TOTAL ESTIMATED COST	
	BEGINNING	COMPLETION		Amount of Federal development assistance requested	\$ 90,000
DEVELOP SITE PLANS & SPECIFICATIONS				Source of remainder of funds Barnes Co. Pk. Bd. SORA G & F Dept. SWC	45,000
A. Dam	12-1-64	4-30-66	2,000		
B. Rec. Complex	12-1-64	4-30-66	200		
DEVELOP CONSTRUCTION PLANS AND SPECIFICATIONS				FOR CONCURRENT ACQUISITION AND DEVELOPMENT PROJECT SUBMISSIONS	
A. Dam	12-1-65	5-15-66	2,000	Total estimated acquisition value	\$ 23,550
B. Rec. Complex	12-1-65	7-1-66	1,000	Total estimated development costs	\$ 90,000
PREPARE SITE				TOTAL	\$ 113,550
A.				Total amount of Federal assistance requested	\$ 56,775
B.				Source of remainder of funds Same as above.	
UNDERTAKE CONSTRUCTION					
A. Dam	5-15-66	10-31-66	46,000		
B. Rec. Complex	7-1-66	6-30-70	38,800	SIZE IN ACRES OF ENTIRE AREA OR PARK	SIZE IN ACRES OF AREA TO BE DEVELOPED UNDER THIS PROPOSAL
OTHER				Land	Water
A.				345	303
B.					42

SECTION 111 - ATTACHMENTS

Attach, by reference number, the following supplemental documents necessary to process this Development Project Proposal:

D-660-1 *Project Plan and Justification.* A. Description of how the proposed project is in accord with the State outdoor recreation plan and would help meet priority needs identified in the plan. B. Summary of area, its nature and relation of development to the area. Indicate how the natural beauty of area will be enhanced. C. Descriptive outline of proposed accomplishments with funds requested. Indicate contemplated other uses of the area. D. List of names of organizations which will undertake the development and how this will be performed. E. Economic feasibility data, or other types of data to indicate extent and kind of use to be made of the completed area or facility. F. Plans for operations and maintenance.

D-660-2 *Maps and Charts.* A. Simple site plans or maps showing total area, in addition to area to be developed. Annotate to show plans for, or existing streets, highways, waterlines, sewers, etc. to be located on or near the area. (Key to allow location within State, County, or city.) Indicate uses now made of the area by applicant or other agencies or individuals. B. Description of all legal rights to the area to be held by applicant and any other person or organization.

D-660-3 *Agreements.* A. Agreements or arrangements made with other organizations for participating in project, including operation and maintenance of completed facility.

The terms shown below need *not* be submitted with the project proposal. However, during the course of execution of an approved project, the applicant should be prepared to submit them to the Bureau for review, as follows:

D-660-4 *Plans.* A. Site plans, specifications and cost estimates. B. Construction plans, specifications and cost estimates. These *must* be submitted for review and approval before construction may proceed on a structure to cost in excess of \$100,000.

D-660-5 *Contracts.* A. Copies of pertinent contracts, as specifically required by the Bureau of Outdoor Recreation.

NORTH DAKOTA STATE WATER COMMISSION

Project Justification Report - Development

Clausen Springs Recreation Complex, Barnes County

SORA Project #2-37
SWC Project #1378

April 15, 1966

D-660-1 Project Plan and Justification:

A. Activities which have a significant gap in the demand - supply Table #3 shown in Part 3, Volume 1 of the initial State Outdoor Recreation Plan include fishing, boating and camping. This project will provide facilities and area for participation in these activities.

Local unmet needs of picnicking and playing outdoor games in this area will be satisfied by providing facilities for these activities.

Goals for outdoor recreation in North Dakota as shown in the initial State Outdoor Recreation Plan include:

1. Further the development of an enjoyable urban and rural environment;
2. Stimulate the state's economy through development of recreation resources to provide more permanent employment as well as part-time employment during the slack seasons of other industries and non-school months;
3. Support the constructive use of increased leisure time and increased disposable income of our citizens;
4. Coordinate geographic distribution of outdoor recreation facilities to make them available to all the people of the state;
5. Encourage increasing quantity and quality of our natural, cultural and recreational resources in such a manner that people will regard North Dakota with greater pride;

6. Promote the physical fitness and mental health of individuals through provision of suitable outdoor recreation resources;
7. Encourage the acquisition, protection, interpretation, development and multiple-use management of natural and cultural resources; and
8. Emphasize the preservation and conservation of wildlife and scenic resources that are outstanding and unique in scientific and other values.

This proposed project will help North Dakota to meet these goals for outdoor recreation.

In accordance with the priority system outlined in Table #8, Part 3, Volume I, "Conclusions", North Dakota State Outdoor Recreation Plan, the proposed recreation complex would merit 120 points on the basis of its outstanding natural beauty, multiple recreation use, preservation of resources, all new development and all new acquisition.

B. Located 16 miles south of Valley City in Barnes County, the Clausen Springs Recreation Complex is situated on the western escarpment of the Sheyenne River Basin. A natural coulee through the area fed by springs and a 119 square mile drainage area provides an ideal location for construction of a dam to create a reservoir with appurtenant facilities to provide water-based recreation opportunities for a 30 square mile area.

Picnic grounds are to be developed in and around a grove of trees near the reservoir's upper end. Additional tree plantings are proposed along with other landscaping to enhance the area's natural beauty. A site plan for the area is shown on the State Water Commission map #6543-1378-6 included with this proposal.

C. The project is for multiple recreation purposes only and will be developed by a cooperative local-state-federal endeavor with the costs to be allocated as follows:

	<u>Prel. Engr.</u>	<u>Land</u>	<u>Dam</u>	<u>Facil.</u>	<u>Totals</u>
Water Commission	2,000	-	11,500	2,034	15,534
SORA	-	-	-	5,000	5,000
Game and Fish	-	5,887.50	7,600	-	13,487.50
Barnes Co. Park Board	-	5,887.50	3,900	12,966	22,753.50
BOR	<u>2,000</u>	<u>11,775</u>	<u>23,000</u>	<u>20,000</u>	<u>56,775</u>
Totals	4,000	23,550	46,000	40,000	113,550

1. Preliminary engineering funds will be used to obtain the necessary soils and topographic data, design the dam and recreation facilities, and prepare the plans and specifications for the project's construction. Estimated cost of preliminary engineering is \$4,000.

2. Funds for land acquisition are to be used for purchase of approximately 345 acres of land for the reservoir, access, and other public use area. Estimated cost of lands is \$23,550.

3. Dam construction funds will be used for a \$46,000 structure (detailed estimate of cost included with this proposal) to create a 45 acre reservoir with a capacity of 670 acre-feet. Average depth of the reservoir will be 16 feet with a maximum depth of 37 feet. The reservoir will be situated in Section 17, Township 137, Range 58, Barnes County.

4. Recreation facilities estimated to cost \$40,000 will be developed over a four-year period with \$25,600 to be utilized in Fiscal Year 1967; \$4,500 in Fiscal Year 1968; \$4,100 in Fiscal Year 1969; and \$5,800 in Fiscal Year 1970. A detailed cost estimate is included. In the picnic area the following items are to be installed: 30 picnic tables, 4 shelters, 15 fire-

places, 4 woodsheds, 15 trash receptacles, 5 comfort stations, 4 drinking fountains, 4 foot bridges, and a 2,000 foot water pipe. In the wading area a combination bath house and restroom will be installed along with a 1500 cubic yard sand blanket. In the boating area, a launching ramp and boat dock will be constructed. At the playground 3 ten foot 3-unit swings, a slide, seesaw and ball diamond back stop will be installed. For general area development a steel shed (30 x 40 ft.), trash incinerator, natural waterspring enclosure, signs, and lights will be provided. A gravel access road and parking lots are to be installed for all-weather use.

D. Agencies cooperating in the project include the Barnes County Park Board, Barnes County Water Management District, North Dakota State Game & Fish Department, North Dakota State Outdoor Recreation Agency, North Dakota State Water Commission, and Bureau of Outdoor Recreation.

The Barnes County Water Management District is providing funds to the Park Board for land acquisition and dam construction. The State Water Commission is providing the preliminary engineering services and will construct the dam utilizing contract forces. The State Game & Fish Department and Barnes County Park Board are acquiring necessary lands. The Bureau and all cooperating entities are providing financial assistance. The Barnes County Park Board will install the recreation facilities.

E. It is estimated that the project will serve a 30 mile radius which has a 24,000 population. Anticipated annual visitation is 30,000 with an assumed value per visitation of \$1. Total investment, including land, is \$113,550 with an estimated 30 year life for the project. Annual O&M is estimated at 2,515 and depreciation at 3,785 for total annual costs of \$6,300. With estimated annual benefits of \$30,000 less \$6,300 annual costs the average annual benefits are \$23,700.

Assuming the \$113,550 total costs were compounded at 4% for 30 years, we would have a total product of \$368,288. With net annual benefits of \$23,700 for 30 years we would receive total benefits of \$711,000 indicating a benefit-cost ratio for this project of 1.93:1.

A "project economic feasibility report" is included with this proposal.

F. The Barnes County Park Board will operate and maintain the project through an agreement with the State Game & Fish Department. The State Game & Fish Department will have an operating agreement with the State Outdoor Recreation Agency for the project prior to funding. Technical assistance for maintaining the dam will be provided by the State Water Commission.

G. The area is presently privately owned. Water rights for the reservoir are being processed by the State Engineer to the Barnes County Water Management District. Options for acquiring lands are being obtained by the State Game & Fish Department in cooperation with the Barnes County Park Board.

H. Development of site plans and specs was initiated in December 1964 and is scheduled for completion in April 1966. Construction plans and specs for the dam and recreation complex was initiated in December 1965 and will be completed by July 1966. Construction of the dam is scheduled to start May 15, 1966 if all lands are acquired and the project qualified by BOR. Construction of the dam is to be completed by 10-31-66 and start of construction on the recreation facilities is to be accomplished concurrently and is programmed for completion by 6-30-70 in accordance with the cost estimate and construction schedule included with the proposal.

D-660-2 Maps and Charts:

Maps, charts and pictures included with the proposal are as follows:

1. State map showing project location in relation to other projects in the state.

2. Picture of site where development is proposed.
3. Area - capacity curve.
4. State Water Commission map #6480-1378-4 showing dam location and proposed purchase line.
5. State Water Commission map #6543-1378-6 showing Clausen Springs Dam, recreation area and facilities.
6. State Water Commission map #6559-1378-7 showing pipe inlet and outlet details.
7. State Water Commission map #6318-1378-1 showing topography of Clausen Springs area.

D-660-3 Agreements:

1. Agreement for investigation or survey between Barnes County Park Board and North Dakota State Water Commission dated 11-23-64.
2. Agreement for construction of dam and appurtenant facilities and land acquisition between North Dakota State Water Commission, North Dakota State Outdoor Recreation Agency, North Dakota Game & Fish Department and Barnes County Park Board dated 4-5-66.
3. Project assurances provided by Barnes County Park Board to North Dakota State Outdoor Recreation Agency on 4-5-66 and signed by Chairman of Barnes County Park Board, Chairman of Barnes County Water Management District, and Chairman of Barnes County Board of Commissioners.

Prepared by:


Jim Schulz
Assistant Secretary

JS:jd

Dist.

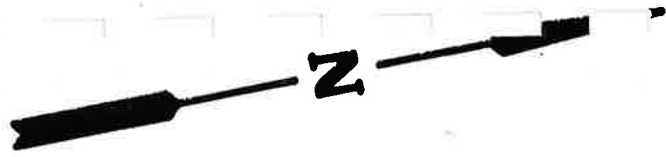
6 BOR

1 SORA

8 SWC

1 G & F, 1 Barnes Co. Pk. Bd.

"Clausen Springs Recreation Area - SORA #2-37"



NORTH DAKOTA STATE WATER COMMISSION

OFFICE MEMO

TO: Milo W. Hoisveen, Chief Engineer
FROM: Merrill C. Rivinius, Investigation Engineer
SUBJECT: Clausen Springs Area #1378
DATE: December 28, 1964

On December 10, I met with Mr. Gordon Gray, State Water Commissioner, Mr. William Baribeau, SCS Work Unit Conservationist, Mr. John Carlisle and Mr. Martin Larson, members of the newly created Barnes County Water Management District and county Park Board on the proposed water development project in the Clausen Springs area and other related projects in the county. A field trip to the area was made with the above named and discussion thereof.

The Clausen Springs area is located on an unnamed creek which drains a large portion of a non-contributing area in central Barnes County and the Stony Slough area. Its upper basin is relatively flat with the gradient increasing considerably near its confluence with the Sheyenne River at Kathryn, North Dakota. The valley is narrow and deep in this area with numerous springs enhancing tree, underbrush growth and wildlife habitat. The area has a fine setting for a water recreation development project.

It is the desire of the Barnes County Water Management District to have this proposed project investigated to the fullest extent as this is their No. 1 priority project.

From the site inspection it appears that a reservoir of sufficient depth can be constructed to fulfill all purposes. The village of Kathryn experiences recurring floods from this creek and the initial planning should include consideration for flood control.

Site inspection of the proposed Nome dam site proposed by the local wildlife club was made. It is proposed to construct a dam approximately one-half mile downstream from the present washed-out Nome Dam. The purpose of the dam would be recreational and flood control equal to the additional amount of water

drained from a proposed drainage project upstream. It was the opinion of the group that the area would not produce a very good recreation area and its proximity to the Clausen Springs area made it further unfavorable. It also appeared that the reservoir area would not be of sufficient size to incorporate any appreciative flood control storage. It was stated to the group that it would be better for the local wildlife group to direct their interest to a larger multi-purpose reservoir in the area of the confluence of the creek with the Maple River.


Merril C. Rivinius
Investigation Engineer

kl

Dist.
MWH (SWC File # _____)
HAS
VEZ

LAKE AGASSIZ TESTING

✓ Proc #1378
12/2/65
LABORATORIES

1322 FIRST AVENUE NORTH
MOORHEAD, MINNESOTA 56561

P. O. BOX 533
PHONE 233-7080
OR 233-3930

Report
on
SOIL INVESTIGATION

UZ (UZ)
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HAS

of

Clausen Springs Reservoir
Barnes County, North Dakota

1378

for

NORTH DAKOTA STATE WATER CONSERVATION COMMISSION
Milo W. Hoisveen, State Engineer
Bismarck, North Dakota

Robert J. Roberts
Registered Professional Engineer
Moorhead, Minnesota

October 28, 1965

LAKE AGASSIZ TESTING LABORATORIES

1322 FIRST AVENUE NORTH
MOORHEAD, MINNESOTA 56561

P. O. BOX 533
PHONE 233-7080
OR 233-3930

October 28, 1965

Report on: PRELIMINARY SOIL INVESTIGATION
Clausen Springs Reservoir
Barnes County, North Dakota
Project Number 1378

To: North Dakota Water Conservation Commission
Milo W. Hoisveen, State Engineer
Bismarck, North Dakota

From: Lake Agassiz Testing Laboratories
Moorhead, Minnesota

General: On October 15 and October 18, 1965, a series of five test borings was drilled on the site of the proposed dam structure which is intended to be a part of the final design of the Clausen Springs Reservoir. The test borings were located at the points indicated on the Soil Boring Location Plat attached to this report. This plat was adapted from Drawing Number 6324-1378-2, a copy of which was furnished to us by the Water Commission Engineers, and the test borings were located in accordance with instructions from and under their direction. Borings 2 and 5 were drilled to a depth of thirty feet and Borings 1, 3 and 4 were terminated at the twenty-five foot depth. In each case, the soil was tested in place by the Vane Shear and Penetration methods and 2-inch Shelby tube samples were removed to the laboratory for further testing. The results of the field tests are shown on the Test Boring Field Log, and the laboratory test results are tabulated on the Laboratory Test Sheets. Copies of each of these data sheets for the five test borings are attached to this report. In addition, each Field Log indicates the surface elevation for each test boring along with a notation indicating the static water level.

LAKE AGASSIZ TESTING LABORATORIES

1322 FIRST AVENUE NORTH
MOORHEAD, MINNESOTA 56561

P. O. BOX 533
PHONE 233-7080
OR 233-3930

Clausen Springs Reservoir, Barnes County, North Dakota 10/28/65 -2-

Soil Conditions: The soil conditions indicated by the five test borings appear to be uniform and consist of conglomerations of silt, fine sand and clay with the clays predominating, especially at the lower depths in each boring. The soils were encountered in a very firm well-packed condition as indicated by the high Vane Shear test results. Traces of gravel were encountered in the upper levels of all but Test Boring Number Two, and gray shale in a hard moist condition was encountered in the middle level (at the 17-foot depth) of Test Boring Number One. Neither of these soil materials was detected in any quantity to influence the characteristics of the predominantly-clay soil structures. It is our opinion that the hard firm clay materials which dominate the soil structures encountered will prove to be excellent materials for the construction of an earth-fill dam, although no testing beyond that indicated on the Field Logs and Laboratory Sheets was conducted as a part of this investigation.

Discussion: We feel that the information developed by this investigation is sufficient to classify this as an economically-feasible site for the construction of the reservoir intended as a part of the final project. We feel that the clay soils will readily lend themselves to the compaction process required for the earthwork. We do feel that additional testing should be projected prior to the final construction.

Recommendations: In view of the data developed by the five test borings located as indicated on the plat under the direction of the Water Commission Engineers, we recommend as follows:

1. That this site be utilized for the proposed reservoir construction.

LAKE AGASSIZ TESTING LABORATORIES

1322 FIRST AVENUE NORTH
MOORHEAD, MINNESOTA 56561

P. O. BOX 533
PHONE 233-7080
OR 233-3930

Clausen Springs Reservoir, Barnes County, North Dakota 10/28/65 -3

2. That additional testing including moisture/density relationships, permeability coefficient determinations, and similar tests be made prior to final construction, and that a complete testing program to insure adequate and complete compaction be evolved for the final construction phase of this project.

LAKE AGASSIZ TESTING LABORATORIES



Robert J. Roberts
Registered Professional Engineer
North Dakota Registration #343

LAKE AGASSIZ TESTING LABORATORIES
 P.O. Box 533
 Moorhead, Minnesota 56501

TEST BORING FIELD LOG

Test Boring Number 1
 Surface Elevation 1348.97
 Engineer Muscha

Project Number _____
 Name North Dakota Water Commission
 Location Clausen Springs, Kathryn, N. D.
 Architect _____
 Date October 15, 1965

1.5	Gray sandy loam with a trace clay
6	Gray sandy silt with small pebbles A trace clay - a few stones Firm-dry
9	Gray sandy silt, and small pebbles with a trace clay firm-dry
14.5	Dark tan sand, silt and clay with small pebbles Firm-slightly moist
17	Tan silt and clay Small pebbles
25	Gray shale Hard - moist

Depth	Sample Number	N	T
Feet		Blows	Ft-lbs
1-2.5	1-2.5		
3.5	1-3.5	11	
4.5			600+ *
7	1-7		
8.0	1-8	16	
9			600+ *
13	1-13		
14		9	
15			590
18	1-18		
19	1-19	50	
24	1-24	30-5½	
25			600+ *

* Capacity of Wrench
 Water Table No water in test hole after 72 hrs.

Project Number _____

TEST BORING FIELD LOG

Name North Dakota Water Commission

Test Boring Number 3

Location Clausen Springs, Kathryn, N. D.

Surface Elevation 1303.12

Architect _____

Engineer Muscha

Date October 18, 1965

1.5	Black muck
	Coarse gravel saturated
4	Gray silt clay and a few pebbles, Stiff-moist
6	Gray clay Very hard - moist
12	Gray clay Hard - moist
21	Gray clay Very hard - moist
25	

Depth	Sample Number	N	T
Feet		Rpf	Ft-lbs
3.5	3-3.5		
4.5		4	
5.5			300
7	3-7		
7.5	3-7.5	30-5"	
8			600+
14	3-14	29	
15			600+
19	3-19		
20			600+
24	3-24	30-5 $\frac{1}{2}$ "	
25			600+

Water Table Water 1 foot from surface after 3 hours

TEST BORING FIELD LOG

Test Boring Number 4
Surface Elevation 1313.18
Engineer Muscha

Project Number _____
Name North Dakota Water Commission
Location Clausen Springs, Kathryn, N. D.
Architect _____
Date October 18, 1965

0.5	Sod and top soil
	Black sandy silt top soil with a trace clay
	Firm - slightly moist
5.0	Tan silt and clay
	Stiff - moist
7	Tan sand silt with gravel
8	Firm-wet
	Gray clay
	Stiff - moist
11	Gray clay
	Hard - moist
17	Gray clay
	Hard-Slightly moist
26	

Depth	Sample Number	N	T
Feet		Bpf	Ft-lbs
3.5	4-3.5		
4.5		10	
5.5			555
8	4-8	8	
9.5			360
11			600+
13	4-13		
14		21	
15			600+
19	4-19	30-5"	
24	4-24		
25		20-6"	
26			600+

Water Table No water in test hole after 3 hours

Project Number _____

TEST BORING FIELD LOG

Names North Dakota Water Commission

Test Boring Number 5

Location Clausen Springs, Kathryn, N. D.

Surface Elevation 1332.16

Architect _____

Engineer Muscha

Date October 18, 1965

0.3	Black topsoil and sod
	Black sandy silt with a trace clay, stiff-moist
2.5	Dark tan silt and clay Stiff and moist
5	Tan fine sand Firm-slightly moist
7.5	Gray clay and silt a few pebbles, stiff-moist
9	Dark tan clay and silt Stiff - moist
13	Dark tan silt and clay A few laminations of coarse sand, moist - firm
17	Dark tan silt and clay Stiff - moist
23	Medium grained Tan sand with a trace clay firm-wet
24	Dark tan silt and clay Stiff - very moist
28	Gray clay, hard-moist
30	

Depth Feet	Sample Number	N	T
		Rpf	Ft.-lbs
3	5-3		
4.5	5-4.5	13	
5			600+
8	5-8		
9		9	
10			510
14	5-14	14	
15			600+
18	5-18	8	
19			325
24	5-24	6	
25			220
26			250
29	5-29	29	
30			600+

Water Table No water in test hole after 3 hours

Project Number _____

LABORATORY _____

Name North Dakota Water Commission

Test Spring Number 5

Location Clausen Springs, Kathryn, N. D.

Surface Elevation 1332.16

Architect _____

Engineer Muscha

Date October 18, 1965

Sample Number	Depth Feet	Original Moisture %	Liquid Limit %	Plastic Limit %	Unconfined Compression Tsf	Vane Shear Tsf
	3	23.1			4.93	
	4.5	14.5				
	5					4.04+
	6	17.4				
	8	47.0			2.34	
	10					3.43
	14	41.2				
	15					4.04+
	18	42.1				
	19					2.19
	24	39.5				
	25					1.48
	26					1.68
	29					
	30	25.8				4.04+

Tests: The following tests or criteria were employed in this investigation, or are mentioned in subsequent sections of this report:

Penetration: The penetration resistance of the soil was measured by driving a 1 3/8" ID split-spoon sampler one foot into the soil with a 140-pound weight and a 30-inch drop. This standard test gives an indication of the unconfined compressive strength of the soil. The results are tabulated for each of the borings. This test is not conclusive in itself, but it does afford an indication of the relative strength of the various soils tested.

Unconfined Compression: This test is based on undisturbed samples which are taken at the various depths with a 2" ID Shelby-tube sampler. The samples averaged 2.0 inches in diameter and 4.0 inches in length, and were tested in a spring-type compression machine, recognized as standard for this test.

Vane Shear: This test is made on the soil in place. It consists of driving a four-blade steel vane about one foot into the soil, turning the blade, and measuring the in-place shear strength of the soil adjacent to the blade in terms of the torque required to shear it from the in-place soil mass. The shear strengths thus obtained are tabulated for each of the borings.

Sensitivity: The sensitivity of a clay is defined as the ratio of the undisturbed strength to the remolded strength at the same strains. In this instance, the sensitivity values were obtained by computing the ratio of the unconfined compressive strengths (undisturbed and remolded) at the various depths. The water content was held constant for the two compressive strength determinations. The sensitivities thus obtained are tabulated for each of the borings.

Atterburg Limits: The Liquid and Plastic Limits, or Atterburg Limits, are arbitrary upper and lower boundaries of the plastic state in a soil. They are defined by the water content required to produce the consistencies specified for the limits. The Plasticity Index represents the range in water contents through which a soil is plastic and is the difference between the Liquid Limit and the Plastic Limit. The results of the laboratory tests on the samples obtained are tabulated for each of the test holes.

Moisture Content: The ratio of the weight of water to the weight of solids in a given sample is termed its moisture content or water content, and is expressed as a percentage. The wet weights for these samples were obtained at the site

Tests (continued):

as soon as the samples were removed from the test hole. The dry weights were obtained after a twenty-four hour drying period at 240°F in the laboratory. The moisture content results are tabulated for each of the test holes.

Original Density: The density is defined as the ratio of the unit weight of soil sample to the unit weight of water. The unit weight of the soil is the ratio of the soil sample to the volume of the soil sample. Original densities for several samples were thus obtained and are tabulated in the data sheets attached to this report.

Specific Gravity: The specific gravity of the individual soil particles is required in the determination of the soil's void ratio and degree of saturation. The specific gravity is the ratio of the weight of the solid matter to the weight of an equal volume of water at 4 degrees Centigrade. If this test is not made at 4°C, a small correction factor must be used to compensate for the difference in density of water. The specific gravities are tabulated for the various depths on the attached boring log sheets.

Void Ratio: The void ratio of a given soil mass is defined as the ratio of the volume of voids to the volume of solids in the given soil mass. It is always expressed as a decimal and is a necessary part of any consolidation or settlement study. The average void ratio for the soils encountered was found to be 1.130, and this figure was used to make the preliminary settlement analysis discussed in subsequent sections of this report.

Compression Index: The compression index is a measure of the compressibility of the soil and is obtained by computing the slope of the stress-void ratio curve for a consolidation study. The average compression index for the soils encountered in this investigation was found to be 0.403, and this figure was employed in the preliminary settlement analysis discussed in subsequent sections of this report.

Coefficient of Permeability: The coefficient of permeability is a constant, having dimensions of a velocity, that expresses the ease with which water passes through a soil. The clays encountered have a coefficient of permeability of 0.000001 centimeters per second, or less.

Tests (continued):

Allowable Bearing Capacities:

Per Unconfined Compressive Tests: These values were obtained from the average unconfined compressive strengths at the various depths by the following relationship:

$$q_c = 2.85/3 q_u$$

Where q_c is the allowable bearing capacity in pounds per square foot, q_u is the average unconfined compressive strength for the various depths in pounds per square foot

3 is the Factor of Safety

Per Vane Shear Tests: These values were obtained from the shear strengths at the various depths by the following relationship:

$$q_c = (1 + 0.3b/L) 4c$$

where q_c is the allowable bearing capacity in pounds per square foot

c is the shear strength in pounds per square foot

b is the proposed footing width in feet

L is the proposed footing length in feet.

It should be noted that this relation is limited to use in cases where the soil is a low sensitivity clay, and it should also be noted that the bearing capacity of a square footing would be equal to $5.2c$. Tests indicate that the bearing capacity of square footings on clay is 1.3 times that for strip loadings. A Factor of Safety of 3 was used in these computations.

NORTH DAKOTA STATE WATER COMMISSION
OFFICE MEMO
March 25, 1966

REPORT ON HYDROLOGY-CLAUSEN SPRINGS
SWC Project #1378

The location of the proposed Clausen Springs Dam is in Section 17, Township 137 North, Range 58 West, on a waterway known as Stoney Slough, a tributary of the Sheyenne River in southern Barnes County.

About eight miles upstream from the dam site, the Bureau of Sport Fisheries and Wildlife operate a waterfowl refuge, known as Stoney Slough Refuge. This refuge occupies about three sections of land. Water is held on a good part of it by means of the existing road fills, and in case there is a surplus of water, it is released through a 4'X4' gated concrete outlet through the road fill. In March, 1966, following the spring thaw this refuge, and the Stoney Slough drainage area up to the headwaters at Kee Lake, were inspected.

Generally, the stream has only a little gradient, and there are many large flat areas where water ponds at shallow depths. The water is held in storage by the graded roads and water is carried through the roads by culverts. Those culverts which were observed were quite small.

A long time is required for water to collect in Stoney Slough Refuge, because it has to pass through many ponding areas. On entering Stoney Slough, the stream passes through a 48" CMP. This was observed flowing about 3/4 full and indicates a flow of around 100 c.f.s.

The outlet gate from the Refuge was closed, and all the inflow was being used to replenish the refuge ponds. All water released downstream to Clausen Springs would have to pass through the 4'X4' gate or else overflow the road grade in which the gate is located. A resident for 16 years stated that she had never known the water to overflow the road.

In view of this field inspection, it was concluded that all of the drainage area above the outlet from Stoney Slough could be disregarded as a contributor of flood waters entering Clausen Springs reservoir.

The drainage area below Stoney Slough Refuge, which contributes to Clausen Springs reservoir is 12 square miles. A rainfall of 25-year frequency on the area would be about 2.8 inches falling in 2.70 hours, or about one inch per hour. The computed design inflow hydrograph has a peak of 1036. c.f.s. and total volume of 269 acre-feet which is equal to a runoff depth of 0.42 inches from the contributing drainage area of 12 square miles.

The spillway from Clausen Springs reservoir will consist of a drop inlet made of 84" RCP and a 42" RCP discharge conduit. The entrance lip of the inlet is at elevation 1336.0. The reservoir was assumed to be filled to the spillway elevation at time of arrival of the design flood. The flood was routed through this spillway and the following facts established:

- (a) The maximum discharge through the spillway would be 241. c.f.s.
- (b) The storage increase (surcharge storage) would be 187 acre-feet.
- (c) The reservoir water surface would rise to elevation 1340.4.
- (d) There would be unused storage space of 266 acre-feet below the level of the emergency spillway, which level was set at 1345.0 ft.

In view of the above, it is evident that there is more than 100% factor of safety with regard to a 25-year frequency flood. About one inch of runoff would be required within a few hours in order to fill the reservoir to the level of the emergency spillway, assuming the reservoir to be filled to spillway level at the beginning of such a flood.

The emergency spillway will add greatly to the factor of safety. This spillway is 40 feet wide and will safely carry water to a depth of four feet. The discharge under those conditions would be about 1000 c.f.s. Simultaneously, there would be a discharge of about 400 c.f.s. from the service spillway.

A copy of the flood computation and a graph showing the routing of the design flood are attached. The factors of safety pertaining to the proposed structure are more than adequate. Erosion of the emergency spillway should be prevented by use of considerable riprap at both upstream and downstream ends.



Dale H. Glover, Hydrologist

Attachments

Clausen Spring - Sec. 17, T 137 N, R 58 W - Proj. #1378

Drainage area, - 12.0 sq.mi.

Length of channel, 8.0 mi.

Fall, 50 Ft.

$$T_c = \frac{2.47 \times (8.0)^{1.15}}{50^{0.385}} = \frac{2.47 \times 10.9}{4.51} = 5.98 \text{ Hr. (Say 6.0 Hours)}$$

$$C = \frac{0.25}{6.0^{0.284}} = \frac{0.25}{1.665} = 0.15$$

$$\frac{P}{T_c} = 0.15 = 15\% \quad \text{Use 15\% Model Hydrograph}$$

$$P = .15 \times 6 = 0.90 \text{ Hr.}$$

$$\text{Use 3 Periods} = 3 \times 0.90 \text{ Hr.} = 2.70 \text{ Hr.}$$

$$25 \text{ yr. R.F., } 2.70 \text{ Hr.,} = 2.8 \text{ inches}$$

$$\text{R.O.} = 2.8 \times 0.15 = 0.42 \text{ inches}$$

$$M = DA/T_c = 12.0/6.0 = 2.0$$

$$D_{\text{Tot}} = M \times \text{R.O.} = 0.84$$

$$\text{Dist.} = 50\%, 35\%, 15\%$$

$$D = 0.42, 0.29, 0.13$$

Dale H. Glover
October 8, 1965

Clausen Spring - #1378

Time, % T _c	1st P. D=.42	2nd P. D=.29	3rd P. D=.13	Total = Disch., C.F.S.
0	0			0
5	16			16
10	56			56
15	142	0		142
20	320	11		331
25	545	39		584
30	690	98	0	788
35	697	221	5	923
40	604	377	17	998
45	515	477	44	1036 * Max. inflow.
50	430	482	99	1011
55	350	417	169	936
60	276	356	214	846
65	211	297	216	724
70	154	241	187	582
75	111	191	160	462
80	84	146	133	363
85	70	106	108	284
90	59	77	85	221
95	45	59	65	169
100	29	48	48	125
105	13	41	34	88
110	3	31	26	60
115	0	20	22	42
120		9	18	27
125		2	14	16
130		0	9	9
135			4	4
140			1	1
145			0	0
			TOTAL	<u>10,844</u>

Time int. = 5% T_c = .05 x 6 = 0.30 Hr.
 0.30 x 10,844 = 3253 Hr.Sec.Ft. = 269 Acre-feet.
 0.42¹¹ R.O. x 53.33 x 12 sq.mi. = 269 Acre-feet (check)

Max. inflow = 1036 C.F.S.

100 year frequency: Max. inflow = 1220 C.F.S.
 Vol. = 317 Acre-feet

Dale H. Glover
 October 8, 1965

NORTH DAKOTA STATE WATER COMMISSION

DESIGN DATA
 CLAUSEN SPRINGS RECREATION COMPLEX
 SWC Project #1378

April 7, 1966

Hydrology

Drainage area below Wildlife Refuge	12.0 mi. ²
Maximum floods	
25 year rainfall flood	1036 CFS
25 year rainfall flood	269 AF
100 year rainfall flood	1220 CFS
100 year rainfall flood	317 AF
USGS Flood	
10 year	360 CFS
25 year	600 CFS
50 year	840 CFS
100 year	980 CFS
1 inch runoff	640 AF
Drainage area above wildlife refuge	119 mi. ²
Capacity 4' gate before water flows over spillway @ Stoney Slough	100 CFS
Storage capacity @ Stoney Slough	1556.8 AF
Storage area @ Stoney Slough	344.4 Ac.
Last time went over spillway	1952

Proposal

Earth embankment with pipe spillway	
Embankment	
Crest elevation	1348' MSL
Length	650 ft.
Volume	48,700 yd ³
Height	48 ft.
Principal Spillway	
Drop inlet	84" RCP
Crest inlet	1338' MSL
Main pipe	42" RCP
Outlet	72" RCP
Capacity	262 CFS
Emergency Spillway (gross)	
Elevation	1344" MSL
Width	40 ft.
Reservoir	
Area @ control elevation	45 ac.
Capacity @ control elevation	670 CFS
Area @ emergency spillway elevation	54 ac.
Capacity @ emergency spillway elevation	980 AF
Capacity flood control zone	310 AF

The dam is designed so that the flood control zone will absorb the floods from below the Stoney Slough Wildlife Refuge and the pipe spillway will handle the water which is released through the gates at Stoney Slough. With a large margin of safety. The emergency spillway will be installed to control overflow during extreme floods and reduce damage to the structure.

H. A. Sandwick

H. A. Sandwick, Office Engineer

Distribution:

6 BOR
1 SORA
8 SWC
1 Game and Fish
1 Barnes County Park Board

NORTH DAKOTA STATE WATER COMMISSION

COST ESTIMATE
Clausen Springs Dam #1378

April 7, 1966

Water Control		\$ 300
Stripping	3,880 yd. ³ @0.25	970
Core	1,200 yd. ³ @.60	720
Embankment	48,700 yd. ³ @0.40	19,480
Seeding		200
Riprap	15" 1,480 yd. ³ @4.00	5,920
Gravel Base		720
42" RCP	144' @40.00	5,760
72" RCP	12' @45.00	540
72" RCP end section		550
84" RCP	6' @55.00	330
Concrete	4 yd. ³ @100.00	400
10" dipped and wrapped steel pipe		
	280' @7.00	1,960
10" gate valve with box		350
Tie RCPP		<u>300</u>
		\$38,500
Engineering, inspection		3,600
Contingencies		1,650
Indirect costs		<u>2,250</u>
		\$46,000

Hazen A. Sandwick
Office Engineer

Dist.
6 BOR
1 SORA
8 WC
1 G&F
1 Barnes Co. Pk.Bd.

Clausen Springs Recreation Area

April 1, 1966.

Facilities Desired:

Item	Number	Estimated Unit Cost	Estimated Total Cost	1966 Quantity	Proposed Construction Schedule					
					Est. Cost	1968 Quantity	Est. Cost	1969 Quantity	Est. Cost	1970 Quan.
1. Picnic Areas										
a. Table	30	40	1200	30	1200					
b. Shelter	4	600	2400	4	2400					
c. Fire Place	15	35	525	15	525					
d. Woodshed	4	100	400	2	200	2	200			
e. Trash Receptacles	15	10	150	15	150					
f. Comfort Station	5	900	4500	5	4500					
g. Drinking Fountain	4	25	100	4	100					
h. Foot Bridge	4	100	400	4	400					
i. Water Pipe	2000'	1	2000	2000	2000					
2. Wading Area										
a. Bath house & restroom (comb.)	1	1200	1200	1	1200					
b. Sand Blanket	1500 cy	.50	750	1500	750					
3. Boating Area										
a. Launching Ramp	1	1000	1000					1	1000	
b. Dock	1	500	500	1	500					

Item	Number	Estimated Unit Cost	Estimated Total Cost	1966 Quantity	Est. Cost	Proposed Construction Schedule				
						1968 Quantity	Est. Cost	1969 Quantity	Est. Cost	1970 Quantity
4. Play Ground										
a. 10 ft. 3 unit Swing	3	250	750	3	750					
b. Slide	1	400	400	1	400					
c. Seesaw	1	200	200	1	200					
d. Ball diamond back stop	1	350	350	1	350					
5. General Area Developed										
a. Steel shed (30'x40')	1	5000	5000	1					1	5000
b. Oil Fired Trash Incinerator	1	400	400	1	400					
c. Enclose Natural Waterspring	1	1000	1000	1	1000					
d. Signs	Lump Sum		300	Lump Sum	300					
e. Lights	9	Lump Sum	300	9	300					
6. Access Road										
a. Motor grader	140 hrs.	14	1960	110	1540	30	420			
b. C.M.P. 24"	72'	5	360	72'	360					
c. C.M.P. 36"	72'	12	864			36'	432	36'	432	
d. Crushed gravel	1500 cy	1.50	2250	700	1050	500 T	750	300 T	450	
e. Rip Rap	200 cy	6	1200			100 cy	600	100 cy	600	
7. Parking Lots										
a. Barriers	400	3	1200	100	300	200	600	100	300	

<u>Item</u>	<u>Number</u>	<u>Estimated Unit Cost</u>	<u>Estimated Total Cost</u>	<u>1966 Quantity</u>	<u>Est. Cost</u>	<u>1968 Quantity</u>	<u>Est. Cost</u>	<u>1969 Quantity</u>	<u>Est. Cost</u>	<u>1970 Quantity</u>	<u>Est. Cost</u>
b. Motor Grader	70 hrs.	14	980	30	420	20	280	20	280		
c. Crushed Gravel	1200 cy	1.50	<u>1800</u>	500 cy	<u>750</u>	400 cy	<u>600</u>	300 cy	<u>450</u>		
Sub Total			34,439		22,045		3,882		3,512		5,000
Engineering			3,441		2,200		390		350		500
Indirect Costs			<u>2,120</u>		<u>1,355</u>		<u>228</u>		<u>238</u>		<u>300</u>
Total			40,000		25,600		4,500		4,100		5,800

NORTH DAKOTA STATE OUTDOOR RECREATION AGENCY
 Project Economic Feasibility Report
 Benefit-Cost Ratio

Project Clausen Springs Recreation Complex
 Location (Co.) Barnes SORA # 2-37

I. BASIC DATA

A. Radius of anticipated use - 30 miles
 B. Population within use area - 24,000
 C. Anticipated annual visitation - 30,000
 D. Investment (include land) - \$113,550
 E. Estimated life of facilities - 30 years

II. ANNUAL COSTS

A.. Operation and Maintenance - \$ 2,515
 B. Depreciation (I.D ÷ I.E) - \$ 3,785
 C. Total annual costs - \$ 6,300

III. ANNUAL BENEFITS

A. Assumed value per visitation - \$ 1
 B. Est. Annual Benefits (III.A x I.C) - \$ 30,000
 C. Average Annual Net Benefits - \$ 23,700
 (III.B - II.C)

IV. BENEFIT-COST RATIO

A. Factor for value of I. compounded
 $\frac{30 \text{ yrs. @ } 4\%}{(\text{Standard} - 30 \text{ yrs. @ } 4\%)} = 3.24339751$ 3.24339751
 B. Product of Investment (I.D) x factor (IV.A) - \$368,288
 C. Total benefits (III.C x I.E) - \$711,000
 D. Benefit-cost ratio (IV.C ÷ IV.B) - 1.93:1

Green Form - D-660-1.E.

A G R E E M E N T
For Investigation Or Survey

THIS AGREEMENT made and entered into by and between the State Water Commission, hereinafter referred to as the Commission, party of the first part, and Barnes County Park Board whose post office address is Valley City, North Dakota hereinafter referred to as the Applicant, party of the second part,

WHEREAS, Barnes County Park Board
(Name of Applicant)

has requested the Commission to investigate, or survey, and study the feasibility and desirability of the following proposed undertaking (describe proposed undertaking or project):

Survey to determine feasibility of of establishing
County Park and Outdoor Recreation Center in the
Clausen Springs area.

and

WHEREAS, in order to investigate, or survey, and study the undertaking proposed by Applicant, a deposit of Two Hundred Dollars is required, under rules and regulations prescribed by the State Water Commission, to cover the cost of such investigation, or survey, and study of the feasibility and desirability of the proposed undertaking; and

WHEREAS, if the cost of such investigation, or survey, and study does not equal or exceed the amount deposited with the Commission, the excess deposit will be credited to and returned to the Applicant, or if the undertaking is approved by the Commission, and carried out, the entire deposit will be applied to the cost of the undertaking as part of local contribution to its construction;

NOW, THEREFORE, the parties hereto agree as follows:

1. Applicant agrees to deposit with the Commission the sum of Two Hundred Dollars to partially cover the cost of an investigation, or survey, and study of the desirability and feasibility of the proposed undertaking.

2. If, after investigation, or survey, and study of the proposed undertaking it is determined that it is not feasible, or that it will be of no public benefit, or if Applicant shall notify the Commission of abandonment of the proposed undertaking, or if the Applicant fails to show an intent to proceed with the undertaking within 18 months after the date of the deposit, the Applicant shall be furnished a statement of the expenses incurred in

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conducting the investigation, or survey, and study thereof, and any balance of Applicant's deposit remaining unexpended shall be returned to Applicant.

3. If, however, the proposed undertaking shall, after investigation, or survey, and study, be found to be feasible, and of benefit to the public, the Applicant shall be notified accordingly.

Dated this 23rd day of November 19 64.

BARNES COUNTY PARK BOARD

John W. Karlisch, Chairman
(Applicant)

STATE WATER COMMISSION

By *Milo W. Hossneen*
Chief Engineer *[Signature]*

Distribution:

- 1 Applicant
- 1 SWC - Project File ✓
- 1 SWC Acct.

PART E - PROJECT ASSURANCES

NORTH DAKOTA STATE OUTDOOR RECREATION AGENCY
1301 STATE CAPITOL
BISMARCK, NORTH DAKOTA

(for use of SORA office only)
(SORA PROJECT NO. 2-37)
(DATE RECEIVED _____)
(PRIORITY _____)

1. APPLICANT Barnes County Park Board AGENCY
Valley City, North Dakota ADDRESS
PROJECT IS LOCATED IN Barnes COUNTY

2. PROJECT IDENTIFICATION: TITLE Clauson Springs SORA NO. 2-37
LEGAL DESCRIPTION: S&NW 1/4 - SEC. 17 TWP 137 RGE 58
SCOPE OF PROJECT: Construct a large dam and develop approximately 345 acres into a recreational site.

TO BE STARTED April 1 19 66 . TO BE COMPLETED April 1 19 67

IN SUBMITTING THIS PROJECT PROPOSAL Barnes County Park Board
(Name of Applying Agency)

HEREBY CERTIFIES THAT:

- A. No financial assistance has been given or promised under any other Federal program or activity with regard to this proposed project.
- B. The Applicant responsible for the proposed project has the ability and the intention to finance its share of the project.
- C. The Applicant accepts the obligation to comply with applicable laws, rules and regulations in effect at the time of the award and to the further terms and conditions of the Bureau of Outdoor Recreation Manual in effect at the time of the award.
- D. Property acquired under this program will be placed in use as an outdoor recreation facility and will be retained for such use in perpetuity or otherwise as provided and agreed to in the project agreement. Prior approval of the North Dakota State Outdoor Recreation Agency will be obtained before any other disposal is made of such property.
- E. The Applicant has the intent and ability to finance the operation and maintenance of the facility being developed for so long as is required.
- F. No foreign uses of such property, other than those described in the proposal will be permitted unless approved in advance by the North Dakota State Outdoor Recreation Agency. In the event foreign use is made of such project the Applicant shall, within one year of such foreign use, reimburse the North Dakota State Outdoor Recreation Agency the cost of the project, less the amount of such cost paid by the Applicant.
- G. If for any reason it shall become necessary for any department or agency of the State of North Dakota to expend State funds in order to fulfill any obligations which the Applicant has agreed to perform in the construction and maintenance of this project, the Applicant shall, within a one year period, reimburse the State department or agency the amount of funds expended for such maintenance or operation.
- H. The Applicant understands that qualification of this project proposal by the North Dakota State Outdoor Recreation Agency does not in itself constitute an obligation or award of requested funds and does not guarantee that funds will necessarily be made available for the project.
- I. The Applicant will supply development specifications and detailed plans to the North Dakota State Outdoor Recreation Agency as requested to do so by the Executive Officer of the Agency.
- J. The Applicant shall, within thirty days after completion of the project, submit to the North Dakota State Outdoor Recreation Agency a certified and itemized statement of its expenditures made in connection with the project, and shall, upon request, make all financial records available to the North Dakota State Outdoor Recreation Agency at any time.

SUBMITTED BY Barnes County Park Board APPLICANT
(Name of Applying Agency)
[Signature] TITLE Chairman, Park Board DATE 4-5-66
(Authorized Representative)
[Signature] TITLE Chairman, Water Management DATE _____
(Authorized Representative)
[Signature] TITLE Chairman, County Board DATE _____
(Authorized Representative)

Dist.
SWC Proj. # 1378
SWC Acct.
Lea. Proj. Participant

SWC Proj. # 1378

A G R E E M E N T
CONSTRUCTION OF WORKS

THIS AGREEMENT is entered into by and between:

(1) The North Dakota State Water Commission, hereinafter referred to as the Commission, acting by and through, Milo W. Hoisveen, Secretary and Chief Engineer;

(2) The North Dakota State Outdoor Recreation Agency, hereinafter referred to as the Agency, acting by and through Milo W. Hoisveen,
(name)
Executive Officer ;
(title)

(3) The North Dakota State Game and Fish Department, hereinafter referred to as the Department, acting by and through Russell W. Stuart,
(name)
Commissioner ;
(title)

(4) The Barnes County Park Board, hereinafter referred to as the Board, acting by and through John Carlisle,
(name)
Chairman .
(title)

I. Project, Location and Purpose

WHEREAS, the parties to this Agreement propose to construct the following:

Clausen Springs Dam and recreation area

hereinafter referred to as the Project, located in Sections 17 & 18, Twp. 137 N,
Rge. 58 W Barnes County, North Dakota, the purpose of which is
to provide a water-based public use outdoor recreation area.

NOW, THEREFORE, IT IS AGREED:

II. Drawings and Specifications

That the Project shall be constructed in accordance with drawings

D. Construction of Appurtenant Works - Total Estimate \$ 25,600
(recreation facilities)

- 1. North Dakota State Water Commission - \$ 2,034 or 7.9 %
- 2. Agency (WC allocation) \$ 5,000 or 19.5 %
- 3. Board \$ 5,766 or 22.6 %
- 4. _____ \$ _____ or _____ %
- 5. Bureau of Outdoor Recreation \$ 12,800 or 50 %

~~E.~~ Other Items - Total Estimate \$ _____

- 1. North Dakota State Water Commission - \$ _____ or _____ %
- 2. _____ \$ _____ or _____ %
- 3. _____ \$ _____ or _____ %
- 4. _____ \$ _____ or _____ %
- 5. _____ \$ _____ or _____ %

F. Total Project Costs and Allocations - \$99,150

- 1. North Dakota State Water Commission - \$ 15,534 or 15.7 %
- 2. Agency (WC allocation) \$ 5,000 or 5.0 %
- 3. Department \$ 13,487.50 or 13.6 %
- 4. Board \$ 15,553.50 or 15.7 %
- 5. Bureau of Outdoor Recreation \$ 49,575 or 50 %

That all parties shall provide the others with cost statements within 30 days after the Project's completion and settlements shall be made within 30 days of receipt of said statements.

IV. Title to Lands and/or Easements

That title to all lands and/or easements for the Project shall be purchased in the name of North Dakota State Game & Fish Department by the Board and Department and recorded in the County Register of Deeds office wherein the Project is situated.

V. Operation and Maintenance

That the _____ Board _____ shall operate and maintain the Project in accordance with rules and regulations prescribed by the Agency and Department _____.

VI. Indemnification

That the _____ Board _____ does hereby accept responsibility for, and holds the Commission and the _____ Agency and Department _____ harmless from, all claims and damages to public or private properties, rights, or persons arising out of the construction, operation, and maintenance of the Project. In the event a suit is initiated or judgment entered against the Commission or Agency and Department _____ the _____ Board _____ shall indemnify them for any settlement arrived at or judgment satisfied.

VI. Changes in Responsibilities

That changes in any responsibilities of the parties hereto or conditions herein stated will not be effective or binding unless such changes or conditions are made in writing, signed by the parties concerned and attached hereto.

VIII. Other Stipulations

1. Agency commitments herein are subject to full Agency approval.
2. Bureau of Outdoor Recreation cost allocations herein are based on assumed qualification and funding through the Land and Water Conservation Fund Act.
3. Department cost participation in the Project shall be limited to \$13,500.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement the day and year indicated below.

WITNESS:

DATE:

NORTH DAKOTA STATE WATER COMMISSION

Jim Schwab
John J. Thorne

4-15-66

By:

Milo W. Hovineen
Secretary and Chief Engineer

North Dakota State Outdoor Recreation Agency

By:

Milo W. Hovineen Executive Officer

North Dakota Game and Fish Department

Jim Schwab
Carol J. Peterson
Ernest Holden

4-15-66

By: Russell W. Stewart Commissioner

Barnes County Park Board

M.A. Mason
John J. Thorne

4-15-66

4-15-66

4-15-66

4-15-66

By:

John W. Cantelmo Chairman