Report of the Kansas State Board of Agriculture

LEVEES and Channel Changes

KANSAS STATE BOARD OF AGRICULTURE

1951

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VOL. LXX OCTOBER, 1951 No. 305

Entered at the post office, Topeka, Kan., as second-class matter. Act of June, 1900. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized on July 31, 1918. Published bimonthly by the Kansas State Board of Agriculture, Topeka, Kan.

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* This committee consists of representatives of various state agencies having an interest in the use and control of the state's water resources, who serve in an advisory capacity on questions relating to a state plan of water resources development.

By House Concurrent Resolution No. 5 of the 1945 legislature the same committee, under the chairmanship of the Chief Engineer of the Division of Water Resources, was constituted an advisory committee to the governor to examine and review reports submitted to him by the Chief of Engineers, War Department, or the Secretary of the Interior, under the provisions of the 1944 Federal Flood Control Act, and submit to the governor proposed written views and recommendations thereon.

CONTENTS

	PAGE
INTRODUCTION	6
PART I	7
Section 24-105, G. S. Kansas, 1949, as amended	7
Section 24-126, G. S. Kansas, 1949, as amended	8
Interpretation of Laws	8
General Information	12
Procedure for Obtaining Permit and Approval of Plans	13
A Map of the Location	14
A Detailed Plan of the Proposed Levee	14
Cross-sections	14
Profiles	14
PART II	15
Sections 82a-301 to 305, G. S. Kansas, 1949	15
Interpretation of Law	16
General Information	19
Procedure for Obtaining Permit	20

INTRODUCTION

The construction and maintenance of levees, channel changes and of dams or other obstructions in streams is generally subject to the provisions of one or more state laws. This bulletin is intended to serve as a guide to those who submit plans for such construction to the chief engineer of the division of water resources for approval in accordance with state laws quoted herein. The information contained in this bulletin is intended primarily for projects built by individual landowners or groups of landowners although it is applicable also to projects built by cities, counties and other such agencies.

Part I deals with the construction of levees and Part II with the placing of obstructions in streams and the changing of the course, current or cross section of streams.

PART I

Section 24-105, G. S. Kan., 1949, as amended, which follows, contains a provision limiting and defining the circumstances under which a landowner may construct a levee by making application to the chief engineer of the division of water resources requesting permission to build a levee to protect his land from floodwater that flows onto his land from that of an adjacent landowner and securing his permission for its construction.

24-105. Obstructing flow of surface water; examination by engineer. It shall be unlawful for a landowner or proprietor to construct or maintain a dam or levee which has the effect of obstructing or collecting and discharging with increased force and volume the flow of surface water to the damage of the adjacent owner or proprietor; but nothing herein shall be construed as preventing an owner of land from constructing a dike or levee along the bank of a natural watercourse to repel floodwaters from such natural watercourse if plans therefor have been approved as required in section 24-126 of the General Statutes of 1949, as amended: *Provided,* That the provisions of this section shall apply only to lands used for agricultural purposes and highways lying wholly outside the limits of any incorporated city: *Provided further,* That where such surface water is the overflow of a watercourse on the premises of an upper landowner and such upper landowner has not constructed or maintained a levee along the bank of such watercourse to prevent overflow, any landowner may make application to the chief engineer of the division of water resources stating in such application that an upper landowner, or landowners, if more than one, whose name and address is given in the petition, has not constructed a levee on his land to prevent the overflow from the stream, and requesting permission to build a levee on his own land to repel such floodwater. Each application shall be accompanied by maps, profiles, cross sections and such other data and information as the chief engineer of the division of water resources may require. The chief engineer of the division of water resources shall then set a day to examine the location of the proposed levee and shall notify the landowners whose names and addresses are given in said petition. If he finds from an examination of the location of the proposed levee and the submitted plans that the construction of the proposed levee is feasible, not adverse to the public interest and should be built, he may then grant permission for its construction. (L. 1911, ch. 175, § 1; L. 1917, ch. 176, § 1; L. 1931, ch. 184, § 1; L. 1951, ch. 261, § 1; April 2.)

Section 24-126, G. S. Kan., 1949, as amended, is a more general act relating to the construction, repair and maintenance of levees located on, along or near any stream which is subject to floods, freshets or overflows so as to control, regulate or otherwise change the floodwaters of such stream. It applies to persons, corporations, drainage or levee districts, counties, cities, towns and townships.

24-126. Unlawful to make improvement without plan approved; penalty. It shall be unlawful for any person, corporation, drainage or levee district, county, city, town or township, without first obtaining the approval of plans for the same by the chief engineer of the division of water resources, to construct, cause to be constructed, maintain or cause to be maintained, any levee or other such improvement on, along or near any stream of this state which is subject to floods, freshets or overflows, so as to control, regulate or otherwise change the floodwaters of such stream; and any person, corporation, county, city, town, township or district violating any provision of this act shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine of not less than one hundred dollars ($100) nor more than one thousand dollars ($1,000), or by imprisonment in the county jail for a period of not more than one (1) year, or by both such fine and imprisonment, and each day any structure is maintained or caused to be maintained shall constitute a separate offense. Plans submitted for approval shall include maps, profiles, cross sections and such other data and information as the chief engineer of the division of water resources may require. If he finds from an examination of such plans and pertinent information that the construction of the proposed structure is feasible and not adverse to the public interest, he shall approve the same. And in the event any such structure is about to be constructed, is constructed or maintained by any person, corporation, county, city, town, township or district without approval of plans by the chief engineer, it shall be the duty of the attorney general, to file suit in a court of competent jurisdiction, to enjoin the construction or maintenance of such structure: *Provided,* That prior to the adoption of a general plan of drainage and flood protection, as provided in section 24-901 of the General Statutes of 1949, and the commencement of construction in carrying such plan into effect, the chief engineer of the division of water resources may give temporary approval for the repair and maintenance of any levee or other drainage work in existence on May 28, 1929; but such approval for such temporary repair and maintenance shall be without prejudice to a withdrawal of such approval when a general plan shall be adopted: *Provided,* That nothing contained in this section shall apply to any drainage district heretofore organized under chapter 215 of the Session Laws of 1905 and having therein property of an assessed valuation of fifty million dollars ($50,000,000) or more. (L. 1929, ch. 176, § 71; L. 1951, ch. 261, § 2; April 2.)

Interpretation of Laws

WARDEN L. NOE

Section 24-126, as originally enacted, was a part of the seventy-three-section conservancy act enacted by the legislature in 1929. The constitutionality of this act was promptly challenged in 1930 in the case of *Verdigris Conservancy District v. Objectors,* 131 Kan. 214. The Kansas supreme court held that the act imposed certain legislative and administrative powers upon district courts and their presiding judges which was not possible under the tripartite arrangement of Kansas government under the state constitution. Section 69 of this act provided for the application of the rule of law that where a part of an act is held unconstitutional any part of it not tinctured with such infirmity was not necessarily invalidated by an unfavorable decision.

The legislature in 1937 repealed all of the conservancy act except section 24-126. The supreme court in 1940 in the case of *State, ex rel., v. Stonehouse Drainage District,* 152 Kan. 188, in considering the validity and effectiveness of section 24-1071 stated ". . . it seems clear that the section of the conservancy act of 1929 which the legislature of 1937 took particular care to preserve when it repealed the other seventy-two sections of it was not so vitally connected with the unconstitutional features of the act that it should be judicially set at naught therewith."

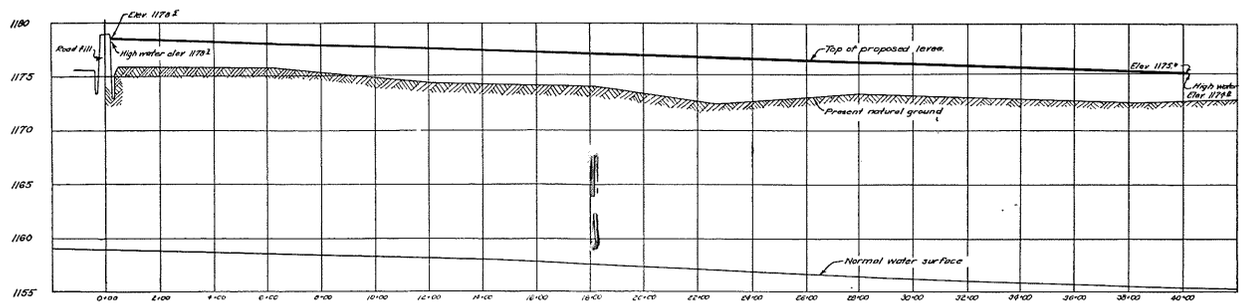
The court further held that this section should be construed in *pari materia* with the drainage district statutes and that the later statutes on the same general subject must be given paramount significance whenever there was seeming conflict with earlier drainage district statutes. The court noted that there was a growing legislative appreciation of the importance of drainage and flood control and the necessity of some competent authority to consider and approve the practicability of all projects of more consequence than those expressly excepted by statute, before any such construction was undertaken.

The legality of proceedings, both for the contract of levee construction and for the assessment of costs against the landowners to be benefited in the case of drainage districts, depends upon the prior approval of levee plans by the chief engineer.

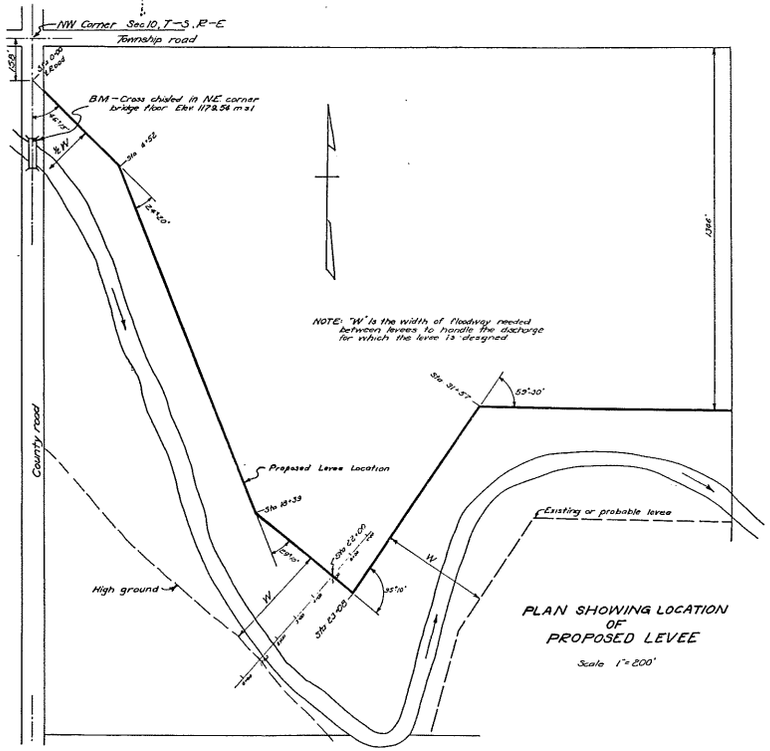
This statute provides for action to enjoin the construction of levee works threatened or in process of construction as well as for action to enjoin the maintenance of unlawfully constructed levees. This latter has been construed as authority for requiring the removal of unauthorized levee structures for which no plans were approved.

The statute also provides a penalty of from $100 to $1,000, or jail sentence up to one year, or both, for persons convicted of having violated this section.

In July, 1951, the supreme court in considering the application of these two statutes, before the 1951 amendments became effective stated that the attorney general has authority in the name of the state to maintain an action for injunctive relief where the alleged acts and conduct of the parties are such as to constitute a public nuisance, but in the absence of statute he has no authority in the name of the state to assume the burden of conducting an action on behalf of private interests. See *State, ex rel., v. Mills,* 171 Kan. 397; *State, ex rel., v. Barnes,* 171 Kan. 491.

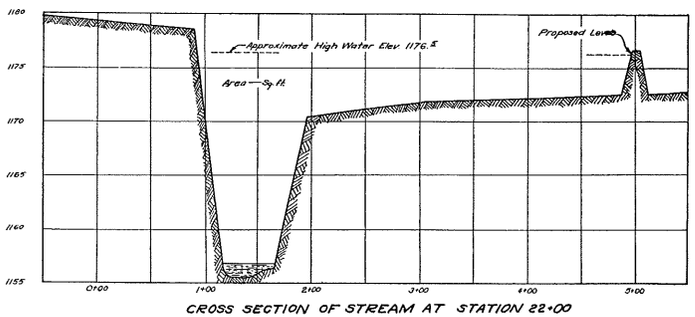


PROFILE ON CENTERLINE OF PROPOSED LEVEE

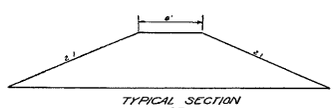


PLAN SHOWING LOCATION OF PROPOSED LEVEE

Scale 1" = 200'

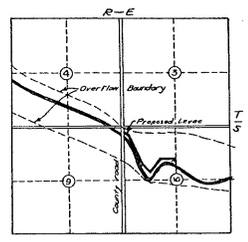


CROSS SECTION OF STREAM AT STATION 22+00



TYPICAL SECTION OF PROPOSED LEVEE

Scale 1" = 5



MAP SHOWING GENERAL LOCATION OF PROPOSED LEVEE

PROPOSED LEVEE
FOR
NAME OF LANDOWNER

_____ COUNTY SEC. ___ TWP. ___ RGE. ___

PLANS PREPARED BY: _____

DATE: _____ ADDRESS: _____

FIG. 1

General Information

R. V. SMRHA

In designing a system of levees consideration should be given to the magnitude of the flood against which the proposed levee is to provide protection. The levees should then be set back from the stream as far as is necessary to carry the design flood. Unless the engineer is well informed on probable flood discharges it may be desirable that he contact the division of water resources as to levee grades and distances between levees before the plans are prepared. It may be economically feasible to construct a levee to protect farm land against the smaller floods which occur frequently, while the cost of a levee to withstand the extreme floods that occur only once in twenty-five or fifty years might be greater than the benefits to be derived.

It may in some instances be desired only to close low washed out places along a stream bank so as to develop the full capacity of the channel before overflow takes place. Plans for such construction should include a general location map, a detailed plan, a typical cross section and a profile extending for some distance to show natural ground elevation upstream and downstream from the project. The height of such fills is generally limited to the general elevation of the creek bank at the proposed location.

Application for temporary approval for repair of an existing levee, as provided in section 24-126, should be made on a form furnished by the division of water resources, giving the date when the levee was first constructed and including a statement that the proposed repairs as shown on the plan will not result in a levee grade higher or a location substantially different from that of the original levee. The plans which accompany the application should include also a general location map, plan, profile and typical cross section.

Section 24-901 of the General Statutes of Kansas provides for the working out of a systematic general plan for the complete development of each watershed in the state. It is expected that when such a plan for any watershed has been completed and adopted it will be required that plans for any levee must conform to standards set forth in such general plan.

When plans for a levee have been approved by the chief engineer of the division of water resources the landowner may from time to time make needed repairs to maintain the levee in accordance with the approved plans without further action by the chief engineer. Such repairs may also be made where temporary approval has been

given for repair of an existing levee unless the approval has been withdrawn as is provided in the act.

Any proposed new levee should be considered from the standpoint of how it may be included in and become a part of a future general plan for levees in the area. In most instances a levee should be set back from the stream to provide one-half the required floodway in order that a similar levee may be built on the opposite side.

When the plans have been approved the location of the levee should be staked out by an engineer or by someone who is familiar with the use of surveying instruments so that the builder will be able to make the location, elevations and dimensions conform to the approved plan. The bench mark to which elevations are referred should be of a permanent nature and should be so located that it will not be disturbed.

In building a levee the base ought first to be cleared of all vegetation and plowed so that there will be a bond between the base and the embankment. The embankment should be placed in lifts and compacted so water cannot percolate through it. Some allowance should be made for settlement, the amount depending upon the compaction of the fill. When the levee is completed it is desirable to seed it to brome grass or some similar cover to prevent erosion by water or wind.

The levee should be inspected regularly and kept in good repair. The side slope facing the stream may be damaged by floods or transverse cracks may form across the levee during long periods of drought.

Procedure for Obtaining Permit and Approval of Plans

W. H. SUNDERLAND

Any application made under provisions of either of these acts must be accompanied by detailed engineering plans of the proposed levee construction. Such plans should in all cases include plan, profile and cross section drawings as well as a map showing the general location of the levee. In some cases it is necessary in order to reach some conclusion as to the probable effect of the proposed levee to include such additional information as valley cross sections, high-water profiles, topography of the area, size of bridge openings and the drainage area of the stream above the proposed location. In general, plans for new levees should furnish more detailed information than is necessary on plans for repair of an existing levee.

Following is a description of the various items generally included on levee plans:

A MAP OF THE LOCATION

There should be a map showing by section, township and range the general location of the proposed levee with respect to the stream and to property lines, highways, railroads, farm buildings, boundaries of overflow and other features of the area which might be affected by the proposed levee. Such a map may be traced from aerial photographs.

A DETAILED PLAN OF THE PROPOSED LEVEE

The plan should show the exact location of the proposed levee by defining the position of its point of beginning with reference to a section corner or some such permanent point and giving its alignment and length. It should show the location of the stream and of existing levees or high ground on the opposite side of the stream. The detailed plan may be made a part of a topographic map of the area if desired. The scale should be not more than 200 feet to one inch.

CROSS-SECTIONS

There should be a typical cross-section of the levee and a cross-section of the valley at its most restricted point along the levee showing normal water level, maximum flood elevations and the end section of the levee.

PROFILES

There should be a profile showing the elevation of the natural ground along the center line of the proposed levee, the top of the proposed levee, normal water level and high-water elevations along the proposed levee. All elevations should be referred to a permanent bench mark, preferably to sea-level datum, and its location, elevation and description should be shown on the plan.

Figure 1 is intended as a sample levee plan to show in a general way the information which should be on levee plans submitted for the consideration of the chief engineer. In special cases some additional data may be needed while in others a part of the details illustrated might not be needed.

The several items of information described above can ordinarily be shown on a single sheet. Such information accompanying applications submitted to the division of water resources should be prepared on sheets twenty-two by thirty-six inches outside dimensions. Border lines should be arranged to provide a binding margin two inches wide at the left end of the sheet. There should be a one-half-inch margin on the remaining sides. Sheets of this size should be used whether plans are submitted under these acts or under sections 82a-301 to 82a-305, G. S. Kan., 1949, discussed later in this report.

PART II

The law relating to the placing of obstructions in streams and changing the course, current or cross section of streams.

82a-301. Permit of chief engineer to make dam or embankment or change watercourse. From and after the passage of this act, it shall be unlawful for any person or persons, partnership, association, corporation, county, city, town, or township to construct any dam or other water obstruction; or to make or construct, or permit to be made or constructed, any change therein or addition thereto; or to make, or permit to be made, any change in or addition to any existing water obstruction; or in any manner to change or diminish the course, current, or cross section of any stream within this state without the consent or permit of the chief engineer of the division of water resources, in writing, previously obtained, upon written application to said chief engineer therefor: *Provided,* That jetties or revetments placed for the purpose (of) stabilizing a caving bank shall not be construed as obstructions to this act providing such jetties and revetments are properly placed. (L. 1929, ch. 203, § 1; May 28.)

82a-302. Same; maps, plans, profiles and specifications to accompany application. Each application for the consent or permit required by the first section of this act shall be accompanied by complete maps, plans, profiles, and specifications of such water obstruction, or of the said changes or additions proposed to be made, and such other data and information as the chief engineer, division of water resources, may require. (L. 1929, ch. 203, § 2; May 28.)

82a-303. Same; conditions; rules and regulations. The chief engineer of the division of water resources shall have power to grant or withhold such consent or permit or may incorporate in and make a part of said consent or permit such conditions, regulations, and restrictions as may be deemed by him advisable. It shall be unlawful to construct or begin the construction of any such water obstruction, or to make or begin any change or addition aforesaid, except in accordance with the terms, conditions, regulations, and restrictions of such consent or permit, and such rules and regulations, with regard to said obstructions, changes, or additions, as may be prescribed by the chief engineer of the division of water resources. (L. 1929, ch. 203, § 3; May 28.)

82a-304. Same; exceptions. The provisions of this act shall not prohibit the placing in any purely private stream of any dam not more than ten feet high and not impounding more than fifteen (15) acre-feet of water. (L. 1929, ch. 203, § 4; L. 1933, ch. 330, § 1; June 5.)

82a-305. Same; penalty; injunction, when. Any person, firm, association or corporation, or any officer of such corporation or of any county, city or township, or other political subdivision, who shall violate any of the provisions of section 82a-301 and 82a-303 of this act shall be deemed guilty of a misdemeanor, and upon conviction shall be fined in any sum not exceeding one thousand dollars. In the event that any obstruction or structure is about to be constructed or created, or is constructed, created or maintained, or any change or diminution of the course, current, or flow of the river or stream or any change in the cross section of the bed or channel of any river or stream

is created or caused to be created by any such person, firm, association or corporation, without the approval of plans by the chief engineer, then upon petition of the state of Kansas on relation of the attorney general, the construction or creation of any such obstruction or structure shall be enjoined by any court of competent jurisdiction and such court in its discretion may by mandatory injunction require the removal or modification of any such structure or obstruction. (L. 1929, ch. 203, § 5; L. 1945, ch. 389, § 1; June 28.)

Interpretation of Law

WARDEN L. NOE

The 1929 legislature provided a companion act for the levee statute when it adopted sections 82a-301 to 82a-305, inclusive, of the General Statutes of 1935. This act required the obtaining of written consent or permission from the chief engineer before any dam or water obstruction could be placed in any stream of the state or before the course, current or cross section of the stream could be changed or diminished. Section 82a-304 of the act excepted dams on purely private streams, when the dam was not more than ten feet high and did not impound more than fifteen acre-feet of water.

The applicant is required to submit a written application for such consent and permit and accompany it with complete maps, plans, profiles and specifications for the proposed stream change, dam or other such structure as well as other data and information which the chief engineer might require.

The act specifically applies to individuals and corporations as well as municipalities, such as the county, city and township. Its provisions were construed as applicable to drainage districts although such were not specifically named in the act. *State, ex rel., v. Dolese Bros. Co.,* 151 Kan. 801. The penalty section does refer to officers of a county, city, township, or other political subdivision. Violations of these are made misdemeanors punishable upon conviction by fine of not to exceed $1,000.

The threatening of construction or creation of any such unlawful dam, obstruction or change in any stream, or the beginning of work on any such project or proposal without first obtaining the consent or permission of the chief engineer is subject to injunction action, under statutory authorization. This matter was given judicial construction in case of *Lyman Flood Prevention Association v. City of Topeka,* 152 Kan. 484. The court held that where a flood protection project was authorized by federal statute and by correlative state statutes, to be undertaken by the federal government in co-operation with state, city and drainage districts, that the consent and approval of the state chief engineer was a prerequisite to the lawful construction thereof. The court there stated:

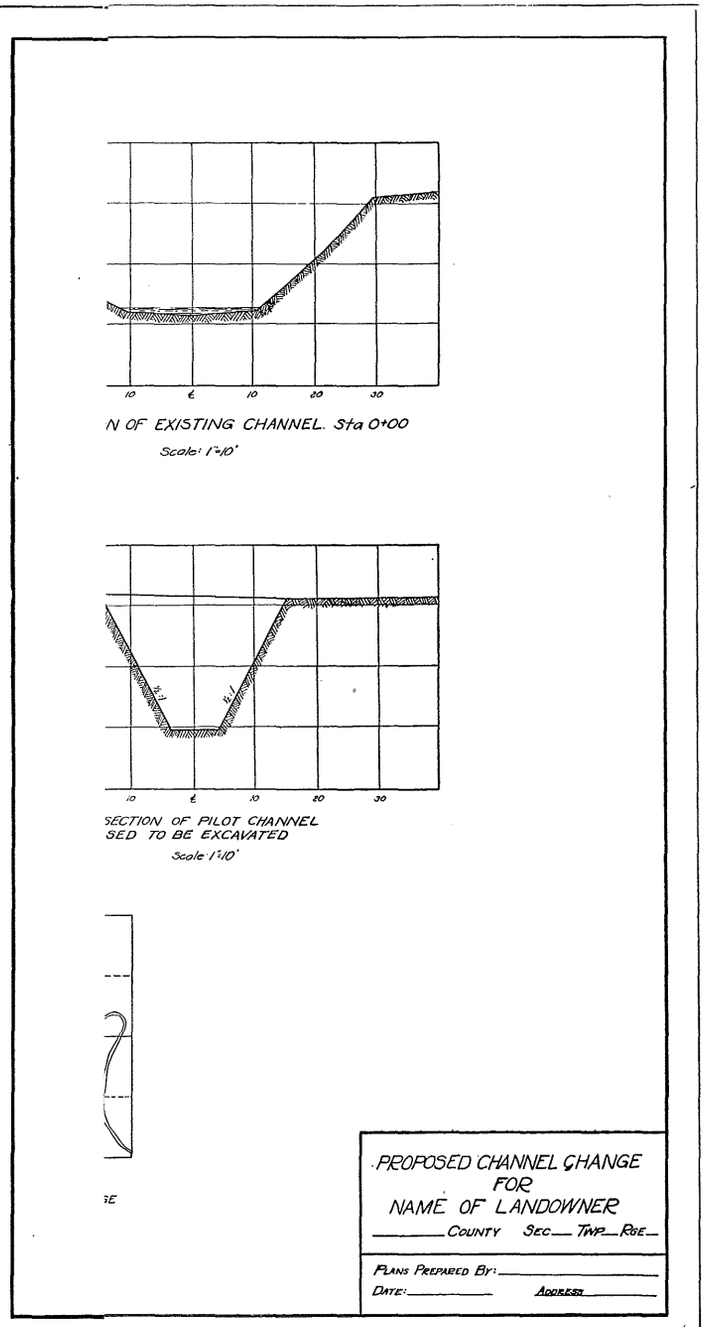
"It may be conceded that the federal government does not ordinarily need to conform to local statutory regulations before setting about the construction of projects which are exclusively of national concern. But in the particular instance under present consideration, the federal statute . . . declares that such a flood-control project as is contemplated for North Topeka is to be undertaken in co-operation with the state and its political subdivisions and localities. Such co-operation requires the full accord of the state, the county, the city and the drainage district concerned. The co-operation of the state includes the approval of the officers in whom it has vested authority to act in its behalf as the public welfare may seem to require—the chief engineer of the division of water resources, and the approval of the state corporation commission."

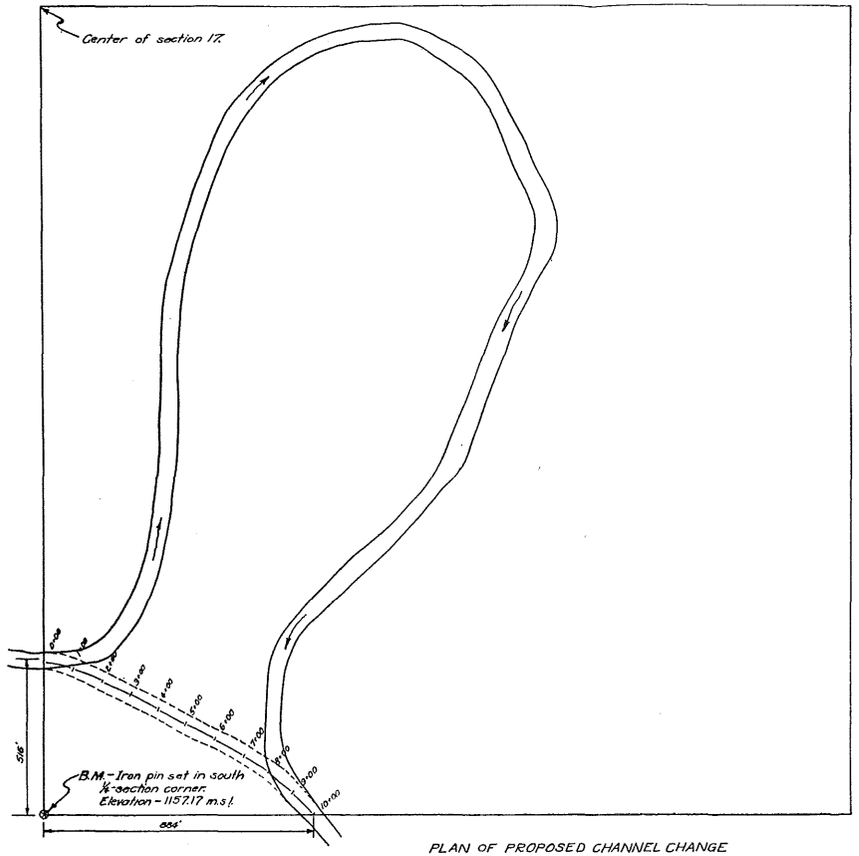
Section 12-637 of G. S. Kan., 1949, which pertains to cities, also requires the approval of the corporation commission regarding such matters.

Section 82a-305 of the original 1929 act was amended in 1945 to provide that where dams, obstructions or changes in a stream had been constructed or created without the required prior approval and consent of the chief engineer that the district court in an action for mandatory injunction to compel removal and restoration might in its discretion require the removal or modification of any such structure or obstruction.

Section 82a-304 excepts certain dams located in any "purely private streams." The term "purely private streams" has not been defined by the legislature nor has it been given judicial construction. The division of water resources and its chief engineer have given an administrative interpretation to this term which defines a "purely private stream" as a watercourse upon the contiguous property of an individual where the head of the watercourse—the beginning of the drainage area—originates on the property of such individual.

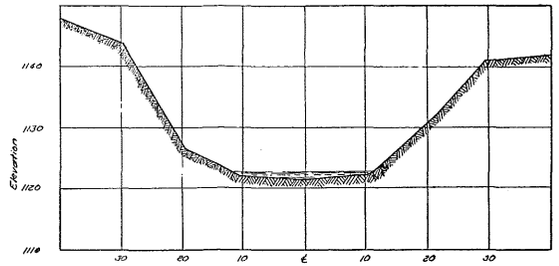
FIG. 2.—Aerial photograph showing channel changes on the Delaware river.





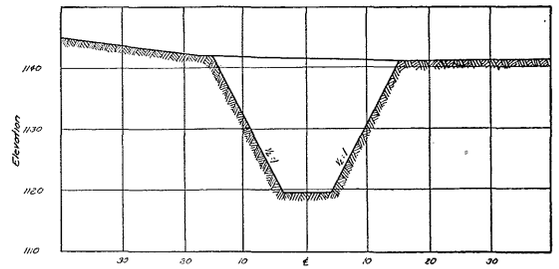
PLAN OF PROPOSED CHANNEL CHANGE

Scale: 1"=200'



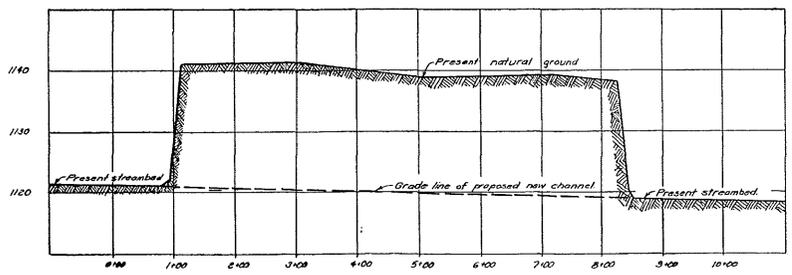
CROSS SECTION OF EXISTING CHANNEL. Sta 0+00

Scale: 1"=10'

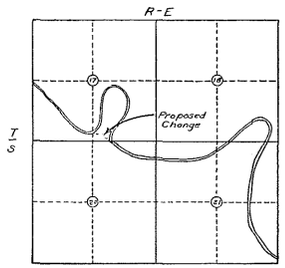


CROSS SECTION OF PILOT CHANNEL PROPOSED TO BE EXCAVATED

Scale 1"=10'



PROFILE ALONG CENTERLINE OF PROPOSED CHANNEL



GENERAL LOCATION OF PROPOSED CHANNEL CHANGE

PROPOSED CHANNEL CHANGE
FOR
NAME OF LANDOWNER
_____ COUNTY SEC.__ TWP.__ R.__E.__

PLANS PREPARED BY: _____

DATE: _____ ADDRESS _____

FIG. 3

General Information

R. V. Smrha.

The provisions of this act are generally considered as being applicable to anything placed in a stream in such a manner as to deflect or restrict the flow of water within the channel at any stage as well as to any changes in the course, current or cross section of a stream. In order to comply with the act a permit should be obtained for such stream obstructions as bridge piers, dams, water intake structures, sand or trash dumps and certain types of jetties, and for such changes as channel cutoffs or removal of material from the bed or banks of a stream.

It does not prohibit the placing in any purely private stream of any dam not more than ten feet in height and not impounding more than fifteen acre-feet of water. The height of an earth dam is measured from the lowest point in the natural bed of the stream on the axis of the dam to the elevation at which the top of the embankment is to be maintained. For an overflow type of dam the height is measured from the lowest point in the material bed of the stream on the axis of the dam to the crest of the spillway.

Trash, trees and other such material dumped over the bank into a stream may constitute an obstruction which is subject to provisions of this act. Plans which are submitted for a trash dump should show in detail the location of the bank line proposed to be maintained. When the plans have been approved and a permit issued, substantial markers should be set to show the location of the proposed bank line. Trash dumping should be limited to the area between that line and the existing bank.

Operation of a sand plant comes within the provisions of this act where such operation involves the taking of material from the bed or banks of a stream or where waste material resulting from operation of such a plant is deposited in a stream. The application of this act to sand plant operation is discussed in another publication, copies of which will be furnished on request.

A permit should be obtained for the excavation of channel changes or cutoffs along a stream. In general, the cross section area of the excavated channel should be made approximately equal to that of the natural channel of the stream. It is sometimes desirable because of the quantity of earthwork involved to excavate only a pilot channel and to leave the abandoned channel open to carry a part of the flood flows of the stream.

It is important that the new channel be excavated to stream bed elevation throughout its length so that it will carry the normal flow of the stream. A properly constructed pilot channel, unless it is cut through rock, shale or other hard material, will be enlarged to the approximate size of the natural channel after a few floods. The abandoned channel will generally fill more readily if it is left open to carry a part of the flow of the stream during floods and freshets. Particular attention should be given to the proposed new alignment in order to avoid sharp turns at either the entrance or the outlet of the cutoff.

Where the bottom of the new channel is left higher than the natural stream bed so it carries water only during floods the result may be unsatisfactory. Experience has shown that the stream will not scour the bottom of such a channel as readily as the sides. Growth of trees and brush in such a channel may seriously reduce its carrying capacity and may result in scouring of one bank so that its alignment may be changed.

Procedure for Obtaining Permit

W. H. SUNDERLAND

In order to comply with the provisions of this act a permit should be obtained from the Chief Engineer of the Division of Water Resources, Kansas State Board of Agriculture, Topeka, Kan. Forms on which application should be made will be furnished on request to anyone desiring such a permit. Each application should be accompanied by complete and detailed plans prepared from a survey by a competent engineer and showing details of the location and of the work proposed to be done. The information shown on the plans should be of the same general nature as previously outlined for levee plans. Figure 3 is a sample plan intended to show generally the information needed on plans for channel changes.

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TOPEKA, KANSAS
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24-1503