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LOVES PARK CREEK
LOVES PARK, ILLINOIS

LOCAL FLOOD PROTECTION

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GENERAL DESIGN MEMORANDUM WITH ENVIRONMENTAL ASSESSMENT

MARCH 1988

REVISED SEPTEMBER 1989

REVISED JUNE 1990

US Army Corps of Engineers
Rock Island District

92-13926

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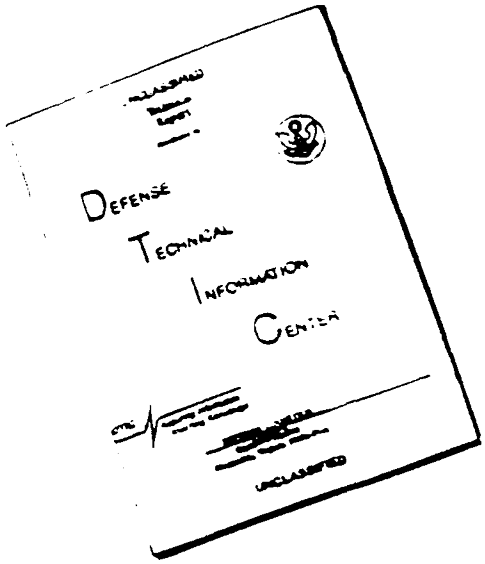

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LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

Pertinent Data

1. General. The authorized local flood protection project for Loves Park, Illinois consists of channel improvements, diversion of floodwater and temporary storage of floodwater. The work along Loves Park Creek includes deepening, widening and lining of the channel, removal of buildings over and adjacent to the stream, replacement of bridges, the construction of transi-
* tion, drop, diversion and outlet structures, a pump station, and underground pipelines.

2. Benefits. The project will protect major portions of the city from a 100-year flood. The protected area contains residential, commercial and industrial developments over most of the floodplain. In the event of the occurrence of the design event, $12,300,000 in damage would result. Construction of the project would prevent these damages. The benefit cost ratio for the project is 1.4 to 1.

3. Project Cost.

	Item		Cost ($)
**	Lands and Damages		$ 4,900,000
**	Relocations		559,000
**	Bridges		1,182,000
**	Channels		13,730,000
**	Pump Station		315,000
**	Revegetation		85,000
**	Engineering and Design		2,365,000
**	Supervision and Administration		879,000
**	Pebble Creek Dam	Credit 1/	439,000
**	Total Cost		$24,454,000

** Note: All figures are based on June 1990 prices

* 1/ Credit for the construction of the Pebble Creek Dam construction was given
* conditional approval and is included in this report. An analysis to determine
* the credit for the Pebble Creek Dam is included in Appendix H.

4. Non-Federal Cost. Local interests are to provide required lands and rights-of-way; make all relocations and alterations of buildings, utilities, and fences where necessary in the construction of the project; bear all cost for the operation and maintenance of the project; and prevent any encroachment on construction works that would interfere with the proper function of the project.

* Revised September 1989
** Revised June 1990

The investment required by local interests is estimated as follows:

Item Construction Costs		Cost ($)
**	Lands and Damages	$ 4,840,000
**	Relocations	1,788,000
**	Pebble Creek Dam - LERRD Credit	(439,000)
**	5% Cash Contribution	1,210,000
**	Total Non-Federal Cost	$ 7,399,000
**	During Construction	

Operation and Maintenance Cost

Annual O&M cost	$ 24,500

5. Principal Features.

A. Total Channel Work	17,900 ft
1) Concrete lined channel	(10,600 ft)
2) Concrete paver lined channel	(2,300 ft)
3) Grass lined channel	(3,900 ft)
4) Underground pipeline	(1,100 ft)

B. 3 - Detention Lakes

C. 1 - Pump Station w/3 - 25,000 GPM Pumps.
(See FDM for revisions with 2 - 8,150 GDM Pumps)

D. 10 - Bridge Removals, Modifications or Replacements
1) 2 - Removals (1 highway + 1 private pedestrian)
2) 6 - Removal and Replacement (highway and railroad)
3) 2 - Removal and Replacement (pedestrian)

E. 13 - Relocations
1) 8 - Residences
2) 5 - Business locations

F. 130 Acres of Right-of-Way
1) 110 acres of Permanent Right-of-Way
2) 20 acres of Temporary Right-of-Way

** 6. Construction Stages. The project is divided into 2 Stages as follows:

Stage I (all work upstream of the confluence of the 2 branches including the lake detention ponds)

Stage II (all Main Stem work)

* Revised September 1989
** Revised June 1990

Acknowledgments

The personnel responsible for the preparation of this General Design Memorandum are as follows:

Project Engineer:
D. J. Viktora, Project Management Section

Main Report:
D. J. Viktora, Report Contents
. . T. Riebe, Drawings

Appendix A, Hydrology and Hydraulics
G. C. Staley, Hydrology and Hydraulics Section

Appendix B, Geotechnical Analysis:
R. A. LaFauce, Geotechnical Branch

Appendix C, Detailed Cost Estimate:
J. L. Crittenden, Estimating Section

Appendix D, Economic and Social Analysis:
D. P. Fetes, Economic Resources Section

Appendix E, Environmental Assessment:
R. F. Klump, Environmental Resources Section

Appendix F, Local Cooperation Agreement and Financial Capability:
M. J. Alford, Real Estate Division
D. P. Fetes, Economic Resources Section

Appendix G, Relocations - Railroads, Highways and Utilities:
J. F. Merritt, Project Management Section

Appendix H, Pebble Creek Dam Credit:
D. J. Viktora, Project Management Section

Appendix I, Design Analysis:
D. A. Peterson, Structural Section

Real Estate:
J. D. Crooke, Real Estate Division

SYLLABUS

A feasibility report for flood damage reduction at Loves Park, Illinois, was completed by the Rock Island District in 1979 and was submitted to Congress on 4 October 1983 as House Document No. 98-121. The report was prepared in response to a resolution by the Committee on Public Works of the United States House of Representatives adopted on 2 December 1971.

The feasibility report recommended a plan to reduce damages incurred by flooding along Loves Park Creek (formerly the Large Unnamed Creek). Funds were appropriated in FY 85 to continue planning and engineering to incorporate recent developments in the floodplain and current policies regarding the implementation of flood control projects. A General Reevaluation Report completed in December 1986 recommended a plan for the construction of channel improvements, the partial diversion of floodwater and temporary storage.

The project was authorized for construction by the Water Resources Development Act of 1986. This report documents changes from the General Reevaluation Report and provides the basis for the preparation of plans and specifications. A 100 year level of protection is recommended. The project produces annual
** net economic benefits of $912,100 and has a benefit-to-cost ratio of 1.4.
This was based on a 100 year economic life and a discount rate of 8-5/8
* percent. The estimated total project cost is $22,398,000. The non-Federal
* share is estimated to be $7,218,000 and the federal share $15,180,000.
Environmental impacts of the plan are not significant and are evaluated in the attached Environmental Assessment.

** Section 401(a) of Public Law 99-662 requires that effects to existing
** recreational resources be assessed and that any adverse effects be mitigated.
** Recreational resources were considered during the reevaluation study report
** dated Decembeer 1986 and again for this general design memorandum. No adverse
** impacts to existing recreational resources or opportunities are anticipated as
** a result of project construction or operation. Hence, mitigation is not
** required.

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**Revised June 1990

LOVES PARK CREEK
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APPENDICES

LOVES PARK CREEK
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1. Project Authorization. The project was authorized for construction by the Water Resources Development Act of 1986 PL 99-662, dated November 17, 1986. Federal Funding has been allocated through fiscal year 1988. This provides the planning, engineering and design required for the completion of the General Design Memorandum and the initiation of plans and specifications for the 1st stage of construction. Funding budgeted for fiscal year 1989 will provide for the completion of the 1st stage construction plans and specifications.

2. Previous Studies and Authorities. On 2 December 1971, a resolution was adopted by the Committee on Public Works of the United States House of Representatives which authorized study of the Rock River in the vicinity of Rockford, Illinois. In response to this resolution, the Rock Island District, Corps of Engineers, completed a feasibility study for flood damage reduction at Loves Park, Illinois.

The feasibility report was completed in 1979 and was submitted to Congress on 4 October 1983 in House Document No. 98-121. The report recommended a plan to reduce damages incurred by flooding along Loves Park Creek, formerly called the Large Unnamed Creek. Funds were appropriated in FY 85 through FY 87 to continue planning and engineering to incorporate recent developments in the floodplain and current policies regarding the implementation of flood control projects. As a result, a General Reevaluation Report of the recommended plan for Flood Damage Reduction in Loves Park, Illinois was completed in December, 1986.

The General Reevaluation Report updated, modified and recommended the plan for flood damage reduction. That plan called for channel improvements with partial diversion and temporary storage of floodwaters in two gravel pits. The plan would provide a level of protection up to the 100-year flood event for an intensely developed and urbanized portion of the city of Loves Park. The major items of the protective works included approximately 17,350 lineal feet of improved channel, a 75,000 gallon-per-minute pumping plant, and 320 acre-feet of ponding storage. Environmental impacts of the plan were included and were not significant.

3. Study Purpose and Scope. The purpose of this report is to document changes from the General Reevaluation Report and to provide a basis for the preparation of plans and specifications. The primary purpose of the project is to reduce damages caused by flooding along Loves Park Creek. The report includes the views of local interests as well as the technical analysis for hydrology and hydraulics, geotechnical and structural. A detailed cost estimate, an economic analysis, an environmental assessment, and an evaluation of the Pebble Creek Dam Credit are other subjects covered in the appendix of the report.

* A Feature Design Memorandum has been prepared concerning all elements of the
* Pump Station. The FDM included the mechanical and electrical design along with other required technical analysis. Items such as plant operation including controls, monitoring of diversion inflows, lake levels and other
* items were addressed.

* Public Law 99-662 states that the project shall include flood protection
* measures along Small Unnamed Creek and that the probable effects of the
* project on existing recreational resources in the project area shall be
* studied.

* Small Unnamed Creek is now called William Howard Creek. It was investigated
* in a General Revaluation Report dated August 1987 and found to have a negative
** justification. Since no economically feasible solutions were found to the
** flooding problems along William Howard Creek, no further consideration was
** given to this feature of the Loves Park Creek project.

* Recreational resources should not be noticeably affected by the proposed
* project. Channel widening may encroach upon parks located along Loves Park
* Creek and its branches. Flood water storage in the Gravel Pits may disrupt
* fishing and occasional boating through temporary water level changes and small
* increases in sedimentation. However, impact at these sites would be minor and
* no mitigation measures are planned at this time.

4. <u>Location and Description of Project Area</u>. The city of Loves Park is located in northern Illinois, 17 miles south of the Illinois - Wisconsin state line. It is in Winnebago County, on the east side of the Rock River and immediately to the north of Rockford, Illinois. The city has a population of over 13,000 and is a suburb of Rockford, which has a population of about 140,000 (Plate 1). The specific study area is the Loves Park Creek watershed. Loves Park Creek generally flows in a south westerly direction through Loves Park to its confluence with the Rock River. In addition to Loves Park, the watershed encompasses parts of Harlem and Rockford Townships. Loves Park Creek has a watershed area of 7.8 square miles (4,992 acres) at its confluence with the Rock River. The drainage basin contains a North Branch (watershed area of 1.6 square miles), a South Branch (watershed area of 2.7 square miles), and a main stem (watershed area of 3.5 square miles). The above drainage area includes the South Gravel Pit, Windsor Lake and the North Gravel Pit.

The main stem of Loves Park Creek is about 2.5 miles long and flows through 17 bridges before entering the Rock River. Along its course, Loves Park Creek passes through significant residential, commercial, and industrial areas. The remaining areas adjacent to the creek include public and semi-public facilities, recreational/open space, and vacant land.

5. <u>Project Description</u>. The project consists of the development of two concepts to accomplish flood control along the creek in the City. The two concepts consist of a) channel improvements and b) the partial diversion and temporary storage of floodwaters. It is designed for a 100 year flood event.

a. Channel improvements are accomplished by various means which include the widening and deepening of the channel to an adequate size. Bridges that

* Revised September 1989
**Revised June 1990

have an inadequate flow capacity are to be replaced. Buildings that were constructed over the channel are to be removed and an adequate open channel installed. Eight residences are to be removed to permit the installation of a wider channel. The channel linings and configuration will consist of the following: 1) concrete with a trapezoidal shape, 2) concrete with rectangular shape, 3) concrete pavers with a trapezoidal shape and 4) grass lined trapezoidal channels. A small amount of Riprap is used at the outlet ends of the channels to reduce water velocities and control erosion.

b. Partial diversion and temporary storage is accomplished by diverting excess floodwater from the two upstream branches of the creek into three former gravel pits. When conditions permit, the stored water is pumped back into the channel to flow downstream to the Rock River. This is accomplished by the construction of a pump station, underground pipelines, inlet drop structures, outlet structures, a baffled chute spillway and the connection of the former gravel pits with open channels and pipelines.

The project is a cooperative effort between the Federal Government and the city of Loves Park. The Federal role consists mainly of planning, engineering and design, funding, and contracting for the construction of the various features. The basic responsibilities of the local interests are to provide planning input, right-of-way, maintain and operate the completed works, and bear certain initial costs related to utility alterations. The local cooperation requirements are discussed further in section 15, and a copy of the Letter of Intent from the City is included in appendix J.

6. Flooding Problems. Historical floods at Loves Park, such as those which occurred in February 1971, April 1973, 1975, 1978, and July 1978, have resulted from intense rainfall. The major problems on the creek are the hydraulically inefficient bridges and inadequate channel capacity. Once the floodwaters overtop the streambanks, the waters flow through various areas, spreading out across an expansive floodplain (plates A5 and A6). Flooding on the stream causes physical damage to industrial, commercial, residential, and public facilities, as well as employment interruptions. During flood conditions, the existing storm sewers are surcharged and/or backed up and thus unable to alleviate the flood problems.

Relatively flat topography, where some areas actually slope away from the creek, results in runoff problems during intense rainfalls, particularly when the ground is saturated or frozen. Thus, ponding, damages, and inconvenience can occur. Ponding can occur in various areas with or without overbank flow.

7. Hydrology and Hydraulics. Appendix A presents the procedures of hydrology and hydraulic analyses in detail. Other hydraulic and hydrologic topics considered during the preparation of this memorandum are:

a. Water Quality. The water quality of the three former gravel pits that are to be used for temporary storage and the underlying natural ground water system will not be adversely affected by this project. See appendix E for an Environmental Assessment.

* Information obtained from the Illinois Department of Public Health is that 6
* to 8 wells exist within 300 feet of the east side of Windsor Lake and the
* North Lake. The wells serve residences or commercial establishments on either
* side of Alpine Road and would be about 50 feet deep. The water table on the
* east side of the lakes is above the water level of the lakes. Refer to
* revised plate B-21. This indicates that the underground water is flowing
* toward the lakes, which means that the wells would be unaffected by any turbid
* water from the lakes. There are no known wells on the north, west and south
* sides of the lakes. Prior to the initiation of construction, samples of the
* fill material adjacent to the lakes will be taken and analyzed to determine if
* hazardous chemicals have been disposed of in the fill material.

b. Sanitary Drainage. It is proposed to accomplish the abandonment and relocation of certain existing sanitary lines by methods that will not affect the systems capacity or capability to function properly during a flood event.

8. Geotechnical. A detailed discussion of the geology and soils for the project area is presented in Appendix B. Logs of the soil borings are shown on Plates 18, 19, and 20. Appropriately spaced soil borings were taken along the entire length of the project.

9 Investigations.

a. For the general reevaluation report, topographic maps and a limited number of cross-sections were used for quantity estimates and for alternative studies. Aerial photographs of the upstream reaches of the project were used to update the topographic maps. Data on past flood damages were obtained and studies of existing and anticipated development were obtained from the city, together with property values, and possibilities for increased usage of protected areas. Subsurface explorations of limited scope were made along the line of protection. Office work consisted of hydraulic and preliminary design, cost estimates, and benefit analyses to accomplish the project formulation. Meetings and public workshops were held with local officials and visits were made to problem areas on several occasions. The local sponsors reviewed the proposed plans and voiced their approval with the understanding that the plan was subject to change.

b. For this General Design Memorandum study, field surveys and additional subsurface investigations have been accomplished. A base line has been established in the field with cross sections taken at 100-foot intervals and a feature survey was provided. Based on this and past information, new plans and profiles of the existing features along the full length of the project were drawn. The plans provided in this report are considered to be in sufficient detail and accuracy to be used for the initiation of final plans and specifications. A feature design memorandum is planned for the pump station. Additional items of investigation included the following:

(1) Hydrologic and hydraulic studies were reanalyzed for the entire project. Field visits were made. The economics of deeper and narrower channels, utilizing appropriate channel linings applicable to the individual channel reaches were applied. Where available, existing storm sewer information and proposed modifications were incorporated into the plans. Existing sani-

* Revised September 1989

tary sewer information was obtained from the Rockford Sanitary District, and plotted on the plans. Following consultations with the Sanitary District, proposed modifications were shown where there were conflicts with the proposed channel work.

(2) Selection of the types of structures and facilities proposed were based upon analyses complete enough to determine their location, size, stability, and cost in accordance with EM 1110-1-2101. Complete structural analysis will be made prior to submission of plans and specifications. A preliminary design analysis is included in appendix I of this report.

(3) All available pertinent information on gas, electric, telephone, sewer, and water facilities was obtained from the utility companies. Additional information was obtained through field investigations and subsequent discussions with the appropriate utility companies. Data concerning railroads, natural gas, and water lines were collected and are presented in Appendix G, Relocations. Contact was made with the Electric Company to discuss the power requirements for the proposed pumping stations.

(4) A study of lake levels was made based on recorded water level elevations taken between March 1978 and September 1982. The information was used to predict the water levels of the 3 lakes after the installation of the interconnecting channels. This information was also used to determine the elevations for the pump station sump, pipeline invert, lake outlet and interconnecting channels. The information was also used to determine minimum and maximum natural lake water levels, permissible and practical pump down levels and temporary water storage capacities. See figure 1 on page 6 for a graph of the lake levels. Backup data is included in the Geotechnical Appendix B.

(5) Cost estimates and benefit analysis for the project area are contained in appendices C and D. Where the design has progressed sufficiently to permit reasonably accurate takeoffs of quantities, the items are broken down to the estimated quantities involved. For some items, at this time, it is necessary to estimate the costs on the job or lump-sum basis.

(6) Meetings and discussions were held with the city of Loves Park and businesses affected by the project to determine the types of structures and alignments that would minimize adverse impacts on existing or proposed industrial and commercial operations.

10. Recommended Project Plan (100 Year Event). The General Plan for the proposed flood protection project is shown on plate 1. An index of the plan and profile plates is shown on Plate 2. Plates have been arranged so that they start at the downstream end of the project and proceed upstream.

a. Channel Work The project begins immediately upstream from a wooded
* area that comprises part of Shorewood park. This location is several hundred feet upstream from the mouth of the creek at the Rock River. From that point, the entire length of the Main Stem and South Branch channels are improved extending upstream to Forest Hills Road. The portion of the North Branch between Alpine Road and Forest Hills Road will also be improved. Except for

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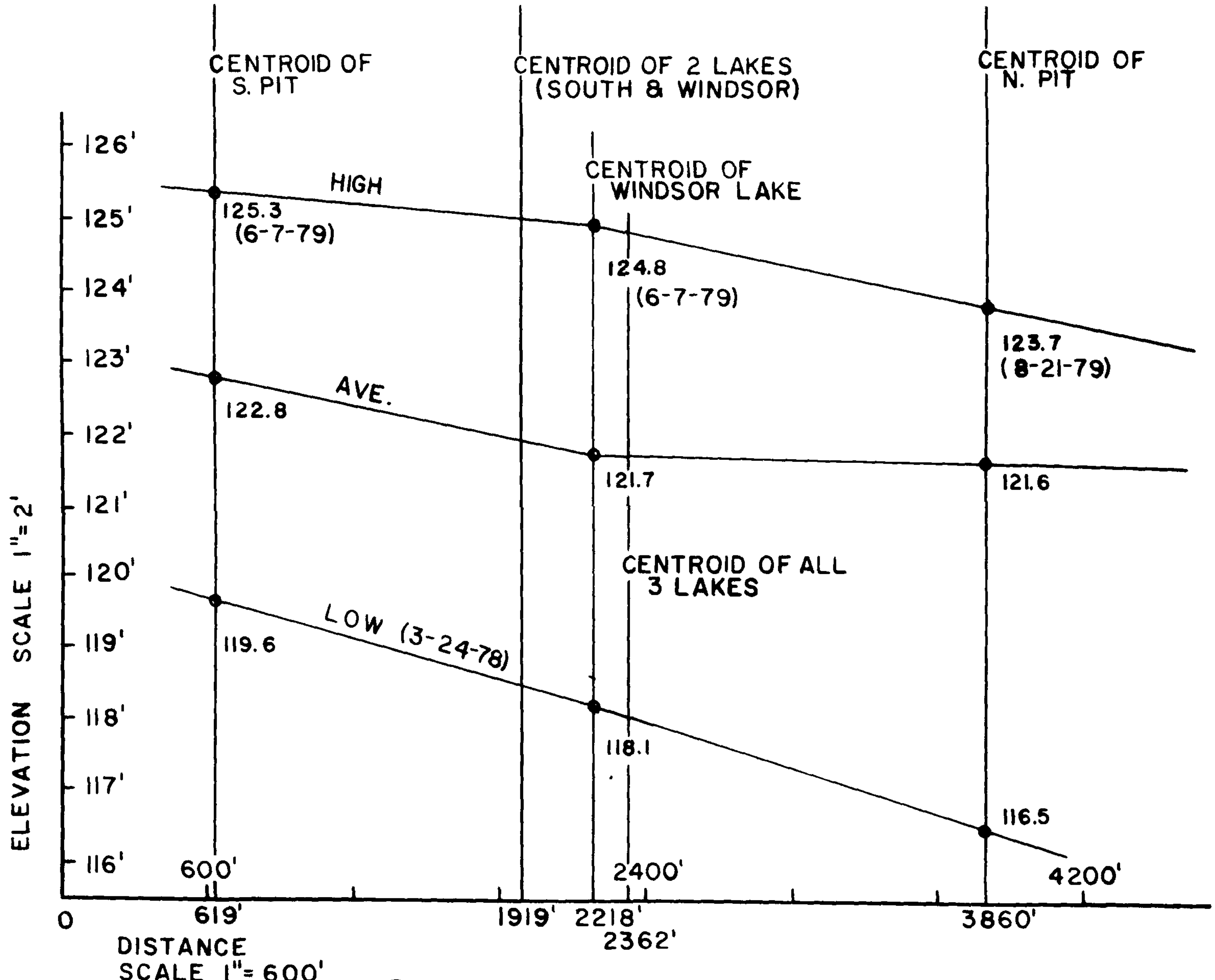

GRAVEL PIT WATER LEVELS
MARCH 1978 TO SEPTEMBER 1982

some modification at the pump station, no work is planned along the existing paved portion of the North Branch between the confluence and Alpine Road.

The channel work consists of 17,900 lineal feet of additional channel or improvements. Of this length, 10,600 feet is concrete lined, 2,300 feet is lined with concrete pavers, 3,900 feet is grass lined and 1,100 feet consists of underground pipeline.

The channel work is further defined as follows:

(1) Main Stem Channel. Forty feet of riprap is planned at the downstream end of the project. From that point, Station 4+35 (Plate 4), a trapezoidal concrete lined channel will be used up to Station 30+20 (Plate 6). After a 20 foot long transition, the channel will be concrete lined with a rectangular shape to Station 44+00 (Plate 7). The channel then returns to trapezoidal concrete lining that terminates with a transition at Station 74+00 (Plate 9). From that location the channel will be trapezoidal shaped with a concrete paver lining through a residential area to Station 96+83 (Plate 10). A 2.5 foot high drop structure is then used to change water levels. The channel then continues with a grass lining and a trapezoidal shape. At station 120+25 (Plate 12) a 5.5 foot drop structure is provided and the channel then becomes concrete lined with a trapezoidal shape to meet the existing concrete paved channel on the North Branch just above the confluence. The improved portion of the channel will vary from 6.0 to 8.17 feet deep. Dependent on existing grade the actual channel depth will vary up to 10.5 feet.

(2) South Branch. The South Branch channel is concrete lined with a trapezoidal shape from the Forest Hills Frontage Road to the Pump Station (Plate 13). The channel will have a depth of 6.0 feet.

(3) North Branch. Just above Alpine Road the diversion structure will be constructed between Stations 1+45 and 2+55 (Plate 15). From there, the North Branch has a trapezoidal concrete lining extending to Station 11+85 (Plate 16). Grass lined channels extend from Station 11+85 to Station 20+40 and from Station 28+25 to Station 32+07 (Plate 17). From Station 20+40 to Station 28+25 a rectangular concrete lined channel is proposed. Drop structures are proposed at Stations 28+25 and 32+37. The channel varies from 5.5 to 6.0 feet deep.

b. Businesses, Residences and Bridges. Four business structures over the channel at Second Street will be removed and the bridges at Second Street and River Lane will be replaced. Eight residences on the south side of the stream between Walker Avenue and Browns Parkway are to be removed. In the same area, two street bridges and a pedestrian bridge will be removed and replaced. The bridge at John Street will be removed. Upstream at the Barber Colman plant a highway and a pedestrian bridge will be replaced and two boxes will be added to an existing box culvert that supports a driveway and a railroad spur.

c. Diversion System. The South Branch is to be rerouted to meet the existing North Branch approximately 300 feet upstream of the present confluence of the two branches. See Plate 3 for the Diversion, Confluence and Storage System. Diversion of the excess South Branch flows and the pump station occurs at this location (Plate 29). The North Branch diversion occurs on the east side of Alpine Road (Plate 32). The diversion design is such that only the low flow water from the North and South branches (100 cfs and 150 cfs respectively) is allowed to proceed down the main stem. All water in excess of low flow is diverted via underground pipes to the lakes for temporary storage. The South Branch outlet to the lake is under water and also serves as the inlet to the pump station. At the North Branch a baffled chute spillway is used at the lake to dissipate the water energy. A trash rack is planned upstream of each diversion and a 6 foot high chain link security fence is provided at the diversion works. The channel shape will be modified to a rectangular section at the trash racks during final design to accommodate any flow restriction. A catwalk on top of the trash rack is not proposed as the channel is nearly dry most of the year.

d. Storage System. Three former gravel pits (lakes) are used for the detention of floodwater. They are the South Gravel Pit, Windsor Lake and the North Gravel Pit. A combination of open channels and underground concrete culvert pipes will be constructed to connect the lakes, see Plates 14, 15, 30 and 31. When flows decrease sufficiently on the South Branch so that water is no longer being diverted, pumping of water from storage can be initiated.

e. Pumping System. (Plate 29) The South Branch diversion pipeline also serves as the inlet for the pump station. The pump station will be constructed integral with the South Branch drop structure and diversion works. A pump station with three submersible propellor type pumps having a total capacity of 75,000 GPM was used in the preparation of this report. The design has been reviewed and modified to two pumps having a total capacity of 16,300 GPM in a Feature Design Memorandum dated July 1989. Electrical switchgear and disconnects will be installed in waterproof cabinets adjacent to the pump station. An electrical transformer will be installed on an elevated concrete pad. All electrical gear will be located above the standard project flood level (SPF). An equipment and operations yard is planned on the north side of the pump station. Security fencing is to be installed around the entire pump station area.

11. Departures from the General Reevaluation Report. In developing the plan proposed in this General Design Memorandum, some features of the General Reevaluation Report have been modified. In general, the overall plan has undergone relatively few alterations regarding alignment. Further investigations and more detailed information on existing conditions has caused many of the changes.

a. Main Stem Profile and Channel Size. The drop structure at the downstream end of the project has been eliminated and the channel profile changed. Based on better survey data and cross-sections, it was found that it was more economical to construct a narrower and deeper channel. The revised channel sections fit better under the existing bridges eliminating transitions at those locations. The resulting channel is more efficient hydraulically and new bridges have shorter spans.

Water surfaces have also been lowered in many areas to prevent local flooding. This was a special problem for the area north of Station 97+00 where flooding has been occurring when the present channel was not bank full. Aerial photos of this area, taken during a February 1971 flood, show Windsor Road under

* Revised September 1989

water and closed to traffic. In addition, water was up to the homes along Browns Parkway, and up to the west side of the Barber Colman Plant on Windsor Road. To correct this condition, water surfaces were maintained below elevation 124.0 at Station 97+00 for the 100 year flood event. A drop structure, planned for this location, permits the upstream water surfaces to be higher and remain within the stream banks.

b. Second Street and River Lane. (Plate 6) The number of business structures to be removed on either side of Second Street (State Highway 251) has been reduced due to better survey information and smaller channel widths. The required lengths for the new bridges at Second Street and River Lane have also been reduced.

c. Loves Park Drive to East Riverside Blvd. (Plate 7) The channel in this area has been changed from a grass lining to concrete lining to reduce the width of channel required. When all of the features were plotted from the new survey data, it was found that there was insufficient room for the grass lined channel.

d. Station 74+00 to Station 96+83. (Plates 9 and 10) The channel lining in this area has been changed from either grass or riprap to concrete pavers. Concrete pavers are precast concrete units that have an interlocking configuration with some voids that will allow some grass to grow. The cost of the paver is about the same as riprap and they have a more desirable appearance especially for a residential area such as this. The channel is smaller than that required for grass, and the pavers have a higher resistance to erosion.

e. Station 108+50 to Station 119+ 95. (Plates 11 and 12) It was decided to use a grass lined channel in this reach, as it would fit, and it is more economical to construct. Concrete pavers are used on the south side of the channel at Sta. 118+00 where the side slope had to be steepened.

f. Railroad Bridge at Station 112+35. (Plates 11 and 26) It was found that there is adequate clearance under the bridge and it will not have to be replaced. A partial concrete lining that forms the transition from the adjacent Material Ave. bridge will exist under the Bridge.

g. Pedestrian Bridges. The bridge at Station 9+80 will be removed. The bridges at Browns Parkway and Station 101+26 will be removed and replaced.

h. Lake Storage and Interconnecting Channels. Considerable filling of the South Gravel Pit and Windsor Lake has been accomplished and more is planned by the owner of the property. A plan was obtained from the owner showing the extent of filling he intends to accomplish. The information is shown on Plate 3. The proposed plan accommodates the owners filling plans. As a result, it was necessary to include the North Gravel Pit in our plans to obtain sufficient storage capacity for the 100 year flood event. An interconnecting channel between Windsor Lake and the North Gravel Pit is now necessary. It is also necessary to lengthen the interconnecting channel between the South Gravel Pit and Windsor Lake as the filling in that area has already been accomplished. An open grass lined channel is planned for the extra length and two-10 foot diameter pipes replace the former 10 x 10 box culvert. This system will pass the entire south branch flow when a one foot water surface differential exists between the South Pit and Windsor Lake.

This design feature was necessary due to the reduced size of the South Gravel Pit. It is provided to prevent overfilling of the South Pit during the filling process when the other two lakes are at lower levels. Similar design criteria was used in sizing the pipeline to the North Gravel Pit.

i. South Branch Channel, Diversion, Pump Station and Outlet Works. (Plates 13, 14, 29 and 30) A study concerning the layout scheme in this area has been provided. The scheme was found to be a more desirable system and provided considerable cost savings. The system is described in Section 10 Recommended Project Plan under paragraph c, Diversion System. Other advantages of the new plan are as follows:

(1) The outlet channel has been eliminated.
(2) Two business relocations have been avoided.
(3) The pump station inlet and the diversion outlet structures at the lake are combined into one structure.
(4) The inverted syphon was eliminated.
(5) The need for a street bridge and a railroad bridge over the formerly proposed open diversion channel was eliminated.
(6) Less right-of-way is required and more land remains usable for other purposes after construction is complete.

j. North Branch at Alpine Road. (Plate 15) At this location the open channel and the four lane highway bridge has been replaced with an underground reinforced concrete culvert pipe and a drop inlet. The diversion layout has also been modified.

k. North Branch Station 20+40 to Station 28+25. (Plates 16 and 17) After plotting all updated survey data, it was found that a grass lined channel would not fit through this area without relocations. This involved either the ballfield and a 138 KV power pole on the east side of the channel or a residence and significant backyard reductions on the west side. To accommodate the existing features a rectangular concrete lined channel is proposed. In addition, grade changes and economical channel depth considerations have resulted in the need for a drop structure at Station 28+25.

l. Channel Linings and Configurations. (Plates 21 and 22) Three types of channel linings are proposed in this report, concrete, concrete pavers and grass. See paragraph d of this section for a discussion on concrete pavers. Forty feet of riprap exists at the downstream end of the project where erosion control and water energy absorption was necessary. Each type of lining has a definite unique effect on the hydraulic flow and channel size as does the longitudinal slope and configuration of the channel. The channels have either a trapezoidal or rectangular shape. Each design was based on the most economical section that would fit in the particular area. Some further review of this subject will be made during plan and specification preparation.

Channel side slopes have been modified. The side slopes of the trapezoidal concrete sections have been steepened to a 2 horizontal on 1 vertical slope to make the construction more economical. This slope is not normally negotiable by vehicles but can be by pedestrians when proper conditions exist. Stair steps will be constructed periodically to provide exit capabilities when the side slopes become slick. Concrete paver and grass lined sections will have 3 horizontal on 1 vertical side slopes. This slope is negotiable and will permit grass mowing with proper equipment.

12. Description of Proposed Structures.

a. Channels. Typical channel sections are shown on Plates 21 and 22. All proposed channels will have a V-shaped bottom. A minimal slope of 30 horizontal on 1 vertical is provided. This will permit vehicle access for maintenance and cleaning purposes and also maintain the lowest flows in the center of the channel. Proposed concrete thickness and dewatering provisions are shown on the drawings. The individual types of channels are discussed as follows:

(1) Rectangular Concrete. This type of channel costs more to construct than other proposed sections. It is highly efficient, however, and requires the least space to install. It has, therefore, been used where there are existing buildings or other features that restrict the width of the channel. The concrete sidewalls and bottom slab will be structurally reinforced. A six foot high chain link fence will be used along the top of this channel section for safety purposes and to limit access.

(2) Trapezoidal Concrete. This type of channel has a reinforced concrete bottom and side slopes. It has two horizontal on one vertical side slopes and is highly efficient. A wider space is required for this type of channel, but it is more economical to construct than the rectangular section.

(3) Trapezoidal Concrete Paver. This type of section is constructed of interlocking precast concrete blocks. It is placed on top of a filter fabric to prevent loss of the underlying soil materials. It has three horizontal on one vertical side slopes. This type of material resists erosion and permits greater flow velocities. Some grass will grow in the voids of the blocks and will require mowing. This type of channel requires a greater width than the two previous channel types. It is more economical to construct and is readily repairable.

(4) Trapezoidal Grass. This channel type has three horizontal on one vertical slide slopes. It is the most economical type to construct, but requires the greatest channel width and is used where adequate space is available. Flow velocities have been limited to control erosion. Periodic mowing will be required and more maintenance work should be anticipated.

(5) Riprap. This material is placed over a crushed rock sub-base and it is highly erosion resistant. It will absorb water energy and slow down flow velocities. This material has been used for that purpose at the downstream end of the project and at the end of the baffle chute spillway into Windsor Lake.

(6) Existing Bridges. Each channel section has been modified as necessary at the existing bridges. Details of the channel at all existing bridges are shown on Plates 24, 25 and 26.

** b. New Bridges. The design and construction cost of the super structure, abutments, foundations and approach portions of the new highway and pedestrian

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bridges will be a responsibility of the city. One exception to this is the Private Bridge at Station 105+17 where the entire bridge will become a Project
** Construction responsibility since it supports a railroad. The channel work at
** all bridges will be a Project Construction cost. A profile along the center line of each proposed bridge is shown on plate 23. The individual bridges are further discussed as follows:

(1) Second Street Bridge. This bridge is on state highway 251. The state of Illinois will take on the city's responsibility for design and construction of this structure. A coordination letter with the Illinois Department of Transportation is included in Appendix J, Correspondence.

(2) River Lane, Walker Avenue and Elm Avenue. Each of these bridges is on a city street. A two span precast concrete slab bridge is proposed for this structure. The design is similar to that presently used on existing city bridges.

(3) Private Vehicular Bridge at Station 97+69. This bridge is proposed to be a precast concrete slab single span bridge.

(4) Private Vehicular and Railroad Bridge at Station 105+17. It is proposed to modify this structure with the addition of new box culvert on either side of existing structure. The invert of the proposed boxes would be at lower elevation than the existing bridge to meet proposed channel elevations. A concrete channel transition will be required at either end of the bridge to accommodate the box culvert invert elevations.

(5) Pedestrian Bridge at Brown's Parkway. Channel conditions will be similar to that shown for Walker Avenue on Plate 23. A pre-engineered, prefabricated bridge is proposed for this structure.

(6) Private Pedestrian Bridge at Station 101+26. The cross-section of the channel will be similar to that of private bridge at Station 97+69. A pre-engineered, prefabricated bridge is proposed for this structure.

c. Drop Structures.

(1) Main Stem. A drop structure is required at two locations on the main stem. These structures are constructed of reinforced concrete. One is at Station 97+00. It is detailed on Plate 27. The other drop structure is at Station 120+00 and it is detailed on Plate 28.

(2) North Branch. Two reinforced concrete drop structures are required on the North Branch. One is at Station 28+25 and the other at Station 32+37. Both structures are detailed on Plate 34.

d. Transitions. Transitions are required wherever there is a change in size or configuration of the channel. They are also required at certain bridge conditions such as the private bridge at Station 105+17 and the Material Avenue bridge. These are constructed of reinforced concrete and are a modification of the channel shape to adapt to the particular conditions. Some of these conditions are shown on Plates 27, 28 and 34.

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e. Sanitary Modifications and Manholes. One proposed manhole and three existing manholes will occur in the bottom of the proposed channel. The three existing manholes will be lowered to the bottom of the channel and sealed with a bolt-down cover. At Pearl Avenue, a new manhole will be installed under the bridge for the purpose of lowering an existing 8 inch line and connecting it to an existing 42 inch line. Since the top of these manholes will be in the bottom of the channel it may be necessary to sandbag around the manhole and de-water in order to remove the cover for sewer maintenance work.

At a number of locations between Second Street and Clifford Avenue the existing sanitary lines conflict with the proposed channel where they cross the creek. It is proposed to install a manhole on each side of the creek, as applicable, and abandon the existing line between the manholes. The upstream side of the sanitary line is then diverted into a 42 inch line. This modification has been proposed after consultation with the Rockford Sanitary District.

In the residential area extending from just below Walker Avenue to Brown's Parkway, five existing sanitary lines conflict with the proposed channel. All of the lines are presently collected and empty into the 42 inch line on Clifford Avenue just west of Walker Avenue. It has been proposed to re-route the lines along the proposed channel to Walker Avenue where they will empty into the 42 inch line at a new location. Additional manholes will be installed as required and the existing lines across the channel will be abandoned. It will also be necessary to re-route a sanitary line at the Pump Station.

f. South Branch Diversion and Trash Rack. (Plate 29) The diversion is constructed immediately adjacent to Pump Station. A trough is constructed in the bottom of the channel that will collect low flow water and pass it through a vertical orifice before the water enters the existing North Branch Paved Channel. Flows greater than the trough and orifice capacity will overflow into the drop structure and be diverted to the lake storage. Immediately upstream of the diversion works a trash collector will be constructed at a 45 degree angle across the channel. The trash rack consists of H-pile driven at a spacing 2.5 feet. The purpose of the trash rack is to remove the large debris that might become lodged in the orifice or pipelines to the lake.

g. Pump Station and Drop Structure. A feature design memorandum has been prepared on the Pump Station. The Pump Station and Drop Structure are combined to serve a dual purpose of diverting water to storage and acting as an intake for the Pump Station. It will be of reinforced concrete
* construction, and have a total depth of 28.0 feet. All exposed concrete corners will be beveled. It will occupy space 24 foot by 50 feet. See Plate 29 for more details of the structure. The Pump Station will discharge into the North Branch where the water will continue on down Main Stem Channel to the Rock River.

h. Pipeline and Outlet at the South Gravel Pit. (Plates 13, 14 and 30) The pipeline consists of two 7 foot diameter reinforced concrete pipes. They are placed at a low enough elevation to serve as the intake for the Pump Station. The pipes are sized to accommodate the South Branch Diversion flow to the lake. The outlet-inlet structure at the lake is placed below the lake water surface levels to prevent ice and other floating debris from entering

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the pipeline during pumping operations. Reinforced concrete is proposed for the construction of the inlet-outlet structure at the lake.

i. Interconnecting Channel - South Pit to Windsor Lake. (Plates 14 and 31) Two 10 foot diameter precast concrete pipes are proposed for the portion of the channel under Windsor Road. Reinforced concrete headwalls will be constructed at each end of the pipe. An open cut grass lined channel will be used for the remaining portion of the channel at each end of the pipeline. There should always be water in the channel as the proposed center line of the pipeline is at the normal pump down elevation of the lakes (EL.123.0').

j. Interconnecting Channel - Windsor Lake to North Pit. (Plates 15 and 30) Three 5 foot diameter reinforced concrete pipes are proposed for the channel. A reinforced concrete headwall is proposed at each end of the pipeline. Water in the North Gravel Pit is normally at a lower elevation than Windsor Lake. The invert elevation of pipeline has been placed above normal low water levels of Windsor Lake. Refer to Figure 1 on page 6 for the lake level information. The pipeline will therefore be above the water level of the two lakes during certain periods of the year.

k. North Branch Diversion. (Plates 15, 32 and 33) Four items make up the North Branch Diversion system which include the channel diversion, drop structure, pipeline under Windsor Road, and the baffle chute spillway at Windsor Lake. The channel diversion consists of a trough to collect water in the bottom of the channel and a vertical orifice that permits low water flows to continue down the existing North Branch channel. A trash rack constructed of H-pile spaced at 2.5 feet placed immediately upstream of the diversion will remove large debris from the channel. When the flow rises above the capacity of the trough and orifice, water will overflow into the drop structure. The drop structure will be constructed of reinforced concrete and serve as inlet to the pipeline. All exposed concrete corners will be beveled. Two 7 foot diameter reinforced concrete pipes are to be installed under Windsor Road. A baffled chute spillway constructed of reinforced concrete will be used to control water as it enters the lake. Some riprap will be installed at the end of the baffled shoot to control erosion.

13. Other Plans Investigated. For the preparation of the GDM, the area of the confluence, south branch diversion and pump station works has been thoroughly reinvestigated. The layout discussed in Section 11i and shown on Plate 3 is the result of this investigation. Other studies were considered as follows:

a. Confluence Lay-Out I. Under this system the South Branch continued downstream to the confluence, where the channel was blocked and the water was forced to run upstream in the existing paved North Branch Channel for approximately 1,000 feet. (To accomplish this it was necessary to construct levees along the existing channel and pressurize two existing box culverts.) At that location, a drop structure would be constructed between the North Branch Channel and the existing railroad track. The Pump Station was combined with the drop structure and a pipeline extended to the lake as in the proposed plan. Diversion occurs at the drop structure. Low flow water from the North and South Branches were combined and entered a pipeline along the west side of the railroad track to the main stem. The pipeline also served as the outlet for the Pump Station. This system was found to be more expensive than the selected plan.

b. Confluence Lay-Out II. This method consisted of re-routing of the open channels shown in the GRR proposal. The outlet channel from the Pump Station was located next to the diversion channel and extended along the railroad track so that it discharged into the main stem. An underground pipeline was also considered as the outlet channel with discharge into the North Branch at the private drive. The South Branch was relocated and diversion would have occurred at it's interception with the North Branch. A drop structure was to be constructed between the North Branch and the railroad tracks. A deeper open channel then extended to the lake. This layout was eliminated by observation during early design stages as being more expensive than the layout proposed in this report.

c. Confluence Lay-Out III. This layout is a modification of the proposed plan. The drop structure remained at its present location but the Pump Station was located near the lake. The Pipeline extending from the drop structure to the Pump Station would have been only low enough to clear the existing North Branch Channel. An additional 5 foot diameter pipeline was required to serve as the Pump Station Outlet. That line would have been placed above the twin diversion pipes and extended from the Pump Station to the North Branch near the private drive. The Pump Station and the South Branch Diversion would have a common inlet-outlet structure at the lake. The first construction costs of this layout was nearly equivalent to that of the system selected. Maintenance costs would have been greater.

d. Box Culvert Alternate. As a result of the public meeting held on March 16, 1988 an investigation was initiated to determine the feasibility of installing a box culvert in lieu of the open channel between Walker Avenue and Brown's Parkway. This involved a length of 1300 feet through a residential area. The object was to eliminate the removals of eight homes and a bridge plus three bridge replacements. The box culvert plan would cost $1,800,000 more for construction than the proposed plan. This considerably exceeds the cost of the eight resident removals.

e. Prepumpdown Concept. Lowering the levels of the lakes in advance of a storm event to obtain greater capacities or lower maximum water levels after a flood event was considered. This would be accomplished by pumping and would be initiated when warranted by weather predictions. It was determined that the maximum feasible pumpdown would be two feet to obtain a lake water surface elevation of 121.0 feet. Eight hours of pumping would be required to accomplish this plus the time required to account for infiltration from the ground water table. The underlying soil material in these former gravel pits is sand and gravel that readily permits water infiltration. There are times of the year when there would be very little storm warning so that the proposed maximum lake level elevation of 129.0 would still have to be maintained. Additional pumping and labor costs would be incurred and the study was discontinued.

f. Three Day Pumpdown Concept. The idea of this concept was to reduce the size of the pumps at the pump station by pumping the stored water from the lakes over a three day period instead of the 25 hours now required. This

* concept was studies further during the preparation of the Design Memorandum on
* the Pump Station, July 1989. Pumpdown designs varying from 1 day to 10 days
* and a no pumpdown condition were considered. A pump station design with a 5
* day pumpdown is now proposed as the most efficient design and replaces the one
* day pumpdown used in this report.

14. <u>Views of Local Interests</u>. The proposed project as described in this report has been presented at various conferences and a public meeting during the preparation of this report. The public meeting was held on March 16, 1988. Other meetings and workshops were held during the preparation of the General Reevaluation Report. The views of the local interests are favorable to the project. The views of the City of Loves Park are contained in Appendix J, Correspondence.

15. <u>Local Cooperation Requirements</u>. The city of Loves Park, the sponsoring agency for this project, would be required prior to the start of construction, and in accordance with Section 221 of the Flood Control Act of 1970, Public Law 91-611, to enter into a written agreement that it will:

a. Provide the following:

** (1) A cash contribution, during the period of construction, in the
** amount of 5 percent of total projects costs allocated to structural flood
** control;

** (2) All lands, easements, rights-of-way, and dredged material
** disposal areas, and perform all relocations (excluding railroad bridges and
** approached thereto) determined by the Government to be necessary for
** construction of the Project; and

** (3) If the value of the contributions provided under paragraphs (1)
** and (2) above represent less than 25 percent of total project costs, the City
** shall provide, during the period of construction, an additional cash
** contribution in the amount necessary to make its total contribution equal to
** 25 percent of the total project costs.

b. Modify or relocate buildings, utilities, highways, railroads, bridges (other than railroad bridges and approaches), sewers, and other facilities where necessary in the construction of the project:

c. Hold and save the United States free from all damages arising from the construction, operation, and maintenance of the project, except for damages due to the fault or negligence of the Government or its contractors;

d. Operate, maintain, replace and rehabilitate the project, or functional element thereof, in accordance with regulations prescribed by the Secretary of the Army;

e. Prevent encroachment on any of the flood protection structures, including ponding areas, and if ponding areas are impaired, provide substitute storage capacity or equivalent pumping capacity promptly without cost to the Government;

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f. Comply with Section 601 of Title VI of the Civil Rights Act of 1964 (Public Law 88-352) and Department of Defense Directive 5500.11 issued pursuant thereto and published in Part 300 of Title 32, Code of Federal Regulations, in connection with the construction, operation, and maintenance of the Project;

g. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, approved 2 January 1971, in acquiring lands, easements, and rights-of-way for construction and subsequent maintenance of the project, and inform affected persons of the pertinent benefits, policies, and procedures in connection with said Act;

h. Publicize floodplain information in the areas concerned and provide this information to zoning and other regulatory agencies for their guidance and leadership in preventing unwise future development in the floodplain and in adopting such regulations as may be necessary to ensure compatibility between future development and protection levels provided by the project;

i. At least annually, notify persons in the affected area that the project will not provide complete protection

The agreement will also grant the Government a right to enter, at reasonable times and in a reasonable manner, upon lands which the City owns or controls, for access to the project for the purpose of inspection. If such inspection shows that the City for any reason is failing to complete, repair, and maintain the project in accordance with the assurances hereunder and has persisted in such failure after a reasonable notice in writing by the Government delivered to the City, the Government shall have the further right, as stated above, to enter upon the land for the purpose of completing, operating, repairing, and maintaining the project. Completion, operation, repair, and maintenance by the Government in such event shall not operate to relieve the City of responsibility to meet its obligation as set forth in the Agreement or to preclude the Government from pursuing any other remedy at law or equity.

16. Spoil Area. All six sites studied in this report and shown on Plate 1 are potentially usable as spoil areas. Some of the sites have a limited capacity and would not be able to handle all of the material from this project. Other equally desirable sites may exist in the area.

Site 6 has been used as the most likely disposal area in this report for estimation purposes. It is an abandoned gravel pit located south of Harlem Road between Alpine Road and Forest Hills Road. The only areas of the pit that may be used for spoil material are those located above the water table and the wetlands marsh habitat areas. All spoil material can be disposed of at this site. The spoil area will be seeded after construction is completed to control erosion. See Appendix E for a description of the Illinois EPA requirements for containment and handling of contaminated materials. A borrow site is not required for this project.

17. Construction Materials. Information concerning the availability of sand, bedding stone, riprap and rock fill are discussed in Appendix B. Materials excavated from the project will be used for granular or random fill where applicable.

18. Access Roads. Existing streets will provide access to all parts of the project for construction, and operation and maintenance. Access easements will be provided along the entire project, except where existing buildings or other features prohibit such. Access ramps down into the channel are proposed at strategic locations along the project for maintenance purposes.

* 19. Pebble Creek Dam Credit. In accordance with the water resources development act of 1986 PL99-662, section 104, the city of Loves Park, Illinois has requested credit for the construction of the Pebble Creek Dam. Pebble Creek Dam is approximately 1.3 miles upstream of Forest Hills Road on the South Branch of Loves Park Creek. The dam was constructed after the completion of the feasibility report in 1979 and prior to the general re-evaluation report in 1986. See Appendix H for an evaluation and recommendation for general credit. The economic and social analysis in appendix D has been revised to include the benefits and costs associated with issuance of the credit. The credit was given conditional approval on May 17, 1988.

20. Relocations. Appendix G, Relocations provides a full discussion of relocation matters for the proposed project. The flood project will affect railroad, street and pedestrian bridges, gas, water, electric, telephone, sanitary and storm sewer lines. The proposed project has been discussed with each utility and affected agency. Agreements covering railroads, state highway bridges, and utilities will be finalized prior to advertising of any contract.

21. Environmental and Cultural Analysis. The project will have no adverse effect on the environment. Appendix E, Environmental Assessment, addresses only changes that have occurred on the recommended project. It contains a detailed discussion of the environmental interactions of the specific features involved.

22. Residual Flooding

* a. General. The project is designed for a 100 year flood event. A 100 year event is defined as a flood that has a 1 percent chance of occurring in any given year. Larger events are possible and could result in some flooding. The design has been carried out to contain flows in the channel itself and to accept flows of adjoining areas that drain into the channel whether by natural or a storm drain system. The flood plain topography of the city of Loves Park is very flat. In some areas, grade actually slopes away from the channel, and natural drainage to the stream will not occur except where an adequate storm system has been installed. The channel improvements will not correct conditions where an inadequate storm drainage system exists.

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b. Basement Flooding. The proposed project will not relieve the need for sumps and pumps in basements that are subject to water entry due to changing water table elevations. Water tables are subject to fluctuations throughout the year. Some short term water table fluctuations will occur along the west and the southwest sides of the lakes due to temporary water storage. See Plate B-7 in Appendix B, Geotechnical Analysis for anticipated water table levels due to water storage in the lakes. Without the project these areas would have been flooded with surface water for an equivalent event.

c. Diversion Structure Area. A one foot channel freeboard has been provided upstream of both diversion structures. The intake at the diversion structures will handle full channel flow (including freeboard) by developing a greater head in the drop structure. A larger intake structure would not provide any additional benefit. Overflow of the channel will cause flooding. The South diversion is located in an industrial area and should have little effect on people. Initial overflow of the channel would occur on the curve and proceed down the Main Stem without affecting people. The North diversion is in a partially residential area, mostly along the east side of Alpine Road. Some flooding will occur but the depth of water will be shallow.

d. Reservoir Overfilling. If the reservoirs should overfill, water would exit by two routes. Water would overflow out of the west side of Windsor Lake at the Southwest corner. Refer to Plate 3. The water would then proceed diagonally across the block toward Windsor Road. Once along Windsor Road the water would continue to the west to the low area north of Station 97+00 where it could re-enter the channel if the capacity is available.

At about the same time water would overflow out the west side of the South Lake, between buildings to Material Avenue. Material Avenue does not have curbs, therefore, the water would flow across industrial property and along Windsor Road to the low area north of station 97+00 where it could re-enter the channel.

Most of the area has been developed and a floodway is not planned for events exceeding 100 years. Instead, an operable gate or other closure device will be installed on each pipe of the South Branch Diversion pipeline. The gate will be closed when the reservoir is full. Closing of the pipeline will cause all subsequent South Branch flow to continue down the Main Stem as it does without the project. This will occur only for events exceeding the project 100 year design. With this modification, the direction of water flow from the South Gravel Pit will not change and flow velocities will not increase. A closure for the North Branch Diversion will not be provided as events above the 100 year design will overflow the upstream channel and follow the same routing as without the project with less damaging impact. The project will result in a decrease in flood potential for the overflow areas as they were subject to flooding without the project and will now be affected only by events exceeding the 100 year event. It should be noted that when the capacity of the channel at Station 97+00 and downstream is exceeded, flooding of wide areas as shown on plates A-5 and A-6 can occur.

23. Real Estate. The local interests are required to obtain the right-of-way necessary for the project. Some lands are required in permanent easement for construction and maintenance of the proposed facilities, and some on a

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temporary basis for construction accessibility. The city of Loves Park may already own certain portions of the land that is required. The acquisition of 5 business locations at Second Street will be required. Armed Forces Recruiters and Jensen Construction & Remodeling presently occupy two of the locations. Three locations now vacant were previously occupied by Jans Furniture, Salvatores and unknown. In addition, the acquisition of 8 residences on the south side of the creek between Walker Avenue and Brown's Parkway will be required. The city will need to acquire the following approximate amounts of right-of-way: 110 acres of permanent easement for channel improvements, lake storage, and permanent access; 10 acres of temporary easement for access purposes during construction; and 10 acres for spoil areas. It is estimated that the cost of acquiring the right-of-way, including the cost of acquisition, contingencies and relocation assistance is $4,300,000.

24. Construction Stages. It is proposed to accomplish the construction of the project in two stages. Stage I includes all work above the confluence of the North and South Branches of the creek and includes the lake storage system (Plates 13 - 17). Stage II includes all main stem channel work (Plates 4 -
** 12). Certain benefits can be gained at an early date by accomplishing Stage I
** work or by starting at the downstream end of Stage II and working upstream.
** The initial goal of stage I was to develop and implement the storage system.
** The City, however, requested that Stage II be accomplished prior to Stage I.
** This allows the City to make smaller initial property investments and
** coincides with opinions expressed during public meetings. Stage II work has,
** therefore, been scheduled ahead of Stage I.

25. Estimate of Cost Summary. The cost estimate is based on January 1988 prices. A detailed cost estimate is presented in Appendix C.

* 26. Comparison of Estimates. Table 1 on page 23 shows the transitions in cost from those contained in the general reevaluation report to those contained in this GDM.

27. Schedule of Design and Construction. Signing of the Local Cooperation
** Agreement by the City of Loves Park is scheduled for July 1990. Submission of
** rights-of-way drawings to the City is scheduled for August 1990. Subject to the availability of funds and rights-of-way, the project is otherwise scheduled as follows:

	Item	Submit P&S	Approval Date	R.O.W.	Adv.	Award	Start Const.	Complete Const.
**	Stage I	Feb 93	Mar 93	Mar 93	Mar 93	Apr 93	May 93	July 94
**	Stage II	Feb 91	Mar 91	Mar 91	Mar 91	Apr 91	May 91	July 93

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a. Expenditure of Federal funds would be as follows:

	Fiscal Year	Costs
*	Previous years	$1,016,000
**	1989	139,000
**	1990	338,000
*	1991	1,500,000
*	1992	3,300,000
*	1993	5,700,000
**	1994	3,187,000
**	Total Federal	$15,180,000

b. Expenditure of non-Federal funds would be as follows:

	Fiscal Year	Cost
*	Previous Years	$ 499,000
**	1990	200,000
**	1991	2,200,000
**	1992	2,200,000
**	1993	2,119,000
**	Total Non-Federal	$7,218,000

** Total Federal and Non-Federal $22,398,000

* 28. LAKE SEDIMENTATION. Page A-8 in the Hydrologic and Hydraulic appendix states that over a 100 year period 62 acre-feet of sediment is available in the channels at the diversion structures for deposit in the lakes. Not all of the sediment enters the lakes. Only 82 percent of the water at the diversions, from the 100 year event, will enter the lakes. This percentage of diversion will be smaller for lessor events.

* Twenty-seven years of rainfall records at the Rockford Airport were used to predict how often and the amount of diversion that could be expected in this basin. The analysis indicates that on average, diversion of floodwater might be expected to occur from one to two times a year. One-third to one-half of the expected diversion events are so minor that pumping of water from lake storage may not be necessary. Of these events, only 62 percent of the water that would pass the diversion structures would enter the lake storage. The actual percentage of diversion is even lower as the events that would not cause diversion were not included.

* The percentage of sediment entering the lake storage should be less than the percentage of water entering the lakes. The proposed diversion construction consists of a sunken trough in the bottom of the channel with an orifice at the downstream end of the trough. The orifice controls the amount of water that will continue down the channel to the Rock River. Water that overflows the side of the trough is diverted to the lakes for storage. The heaviest sediment flow will be at the bottom of the channel. This indicates that a greater portion of the sediment would tend to be collected by the trough and continue downstream.

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* The precise amount of sediment entering the lakes is not known. However, as
* an example for discussion purposes, if 60 percent of the sediment was to enter
* the lake, it would be equivalent to an 8 inch layer of sediment over the
* bottom of the 3 lakes at the end of 100 years. As stated in the report the
* sedimentation deposits would not be uniformly distributed and periodic
* dredging is recommended.

29. <u>OPERATION AND MAINTENANCE</u>. The project will be maintained and operated by local interests in accordance with Title 33 - Navigation and Navigable Waters, Chapter 2, Corps of Engineers, Department of the Army, Part 208 - Flood Control Regulations, Maintenance and Operation of Flood Control Works. Local interests will be entirely responsible for the maintenance and operation of the project after the completed works have been transferred to them. An Operation and Maintenance manual will be issued to the City upon completion of the project. The City of Loves Park will be required to submit periodic reports of inspection, maintenance, and operation to the District Engineer. The average annual non-Federal cost of operation and maintenance is estimated to be $24,500.

The following items were included in operation and maintenance cost:

a. Channel cleaning and maintenance - includes debris, trash, silt-up, brush removal, and erosion repairs.

b. Lake Maintenance - includes dredging at diversion outlets on a 10 year interval and bank work such as erosion repairs.

c. Pump station operating energy costs.

d. Pump station maintenance - includes trash removal, sump clean-out, maintenance and servicing of pumps, electrical system and gauges, and yard clean-up.

e. Inspection of all facilities.

* The expected amounts of sediment are small and it has therefore, been proposed
* that dredging be provided on a 10 year frequency. This requirement would be
* subject to adjustment based on actual deposits that do occur. The condition
* should be monitored annually. Any build-up of sediment that would approach
* blockage or reduce flow to, from, or within any of the underground pipleines
* would dictate the need for removal. The apearance of new islands within the
* lakes would be an indication of sediment build-up and that monitoring of the
* condition is necessary.

30. <u>BENEFITS AND ANNUAL CHARGES</u>. Current project benefits are evaluated in Appendix D, Economic Analysis. Interest and amortization charges are based on a rate of 8-5/8 percent and an economic life of 100 years. Annual costs are tabulated in table D-12 of Appendix D. The ratio of total annual benefits to total annual costs is 1.4.

31. <u>REVIEW OF COST EFFECTIVENESS OF DESIGN</u>. The design of this project has been reviewed for cost effectiveness by a multidisciplinary team and

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subsequent changes were made. Items of specific study included the arrangement of the diversion system at the confluence of the North and South branches of Loves Park Creek; replacement of new bridges with culvert pipe; and narrower and deeper channels. Approximate cost savings are estimated at $850,000.

The City of Loves Park has participated in the cost effectiveness review of this project and is satisfied with all features proposed. The project conforms with the requirements contained in EC 1110-2-259, Review of Cost Effectiveness of Design, dated 1 Feb. 1988.

32. RECOMMENDATION. Based upon careful consideration of social, cultural, environmental, and economic effects of the alternatives for providing local flood protection along Loves Park Creek, I recommend that the local flood protection project in Loves Park, Illinois be constructed substantially as described in this GDM. I also recommend approval of this report allowing implementation of the project subject to cost-sharing and financing arrangements outlined in this report and that necessary federal funds be made available. Based on the recommendation of our review personnel, I certify that the proposed design in this GDM is the most cost effective design for this design phase.

JOHN R. BROWN
Colonel, Corps of Engineers
District Engineer

TABLE 1

COMPARISON OF ESTIMATES

LOVES CREEK LOCAL FLOOD PROTECTION

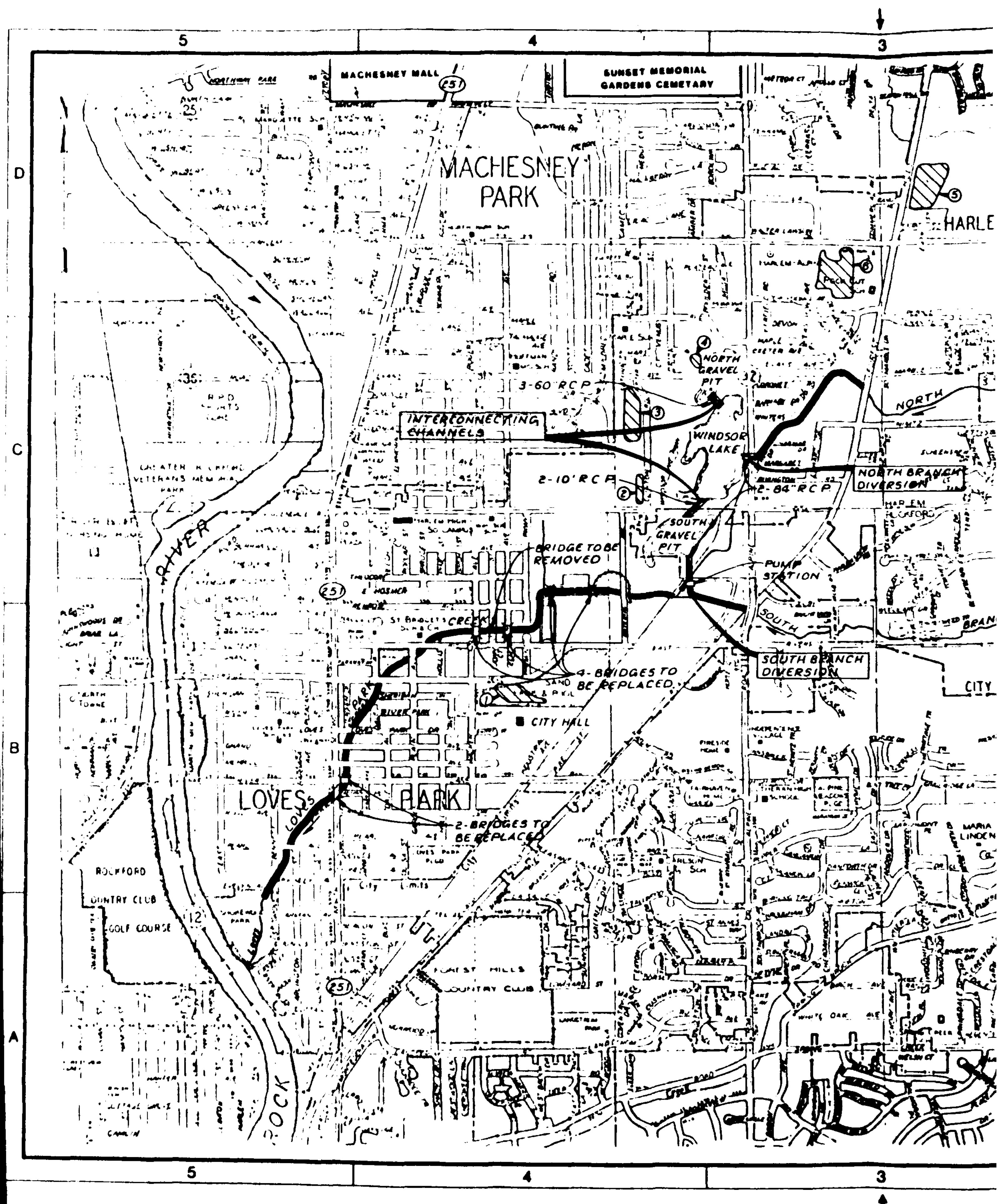
	Item	GRR (Mar. 86 Prices)	Latest Approved PB-3 (Oct. 87 Prices)	GDM Estimate (Jan. 88 Prices)	Explanation of Change - Latest PB-3 to GDM: Price Level	Other	Reason	Total
			Project Construction					
**	Channels & Bridges	$12,074 (1)	$13,040 (2)	$12,229	$+35	$ - 846	Less federal bridge work, no inverted syphon, added underground pipe	$ -811
*	Pump Station	640 (1)	690 (2)	874	+ 2	+ 182	Added Features including a drop Structure	+184
*	LERRD	0	0	439	0	+ 439	Federal LERRD to give sponsor credit for Pebble Creek Dam	+439
**	Engineering & Design	1,372	1,420	1,864	0	+ 444	Increased total project cost, redesign of features including lake storage, confluence layout, channels and bridge requirements	+444
**	Supervision and Administration	849	890	894	0	+ 4	Increase in total project cost	+ 4
**	Sponsor Cash Contribution	-1,028	-1,090	-1,120	0	- 30	Due to total project cost increase	- 30
**	Total Federal Cost	$13,907	$14,950	$15,180	+37	+ 193		+230
			Lands, Easements, Rights-of-Way, Relocation & Disposal (LEERD)					
*	Lands and Damages	$ 3,000	$ 3,000	$ 4,300	0	+1,300	Land and acquisition values have increased and boundaries have changed	+1,300
**	Relocations (including bridges)	2,269	2,410	1,219	+ 7	-1,198	Bridge replacement and utility Relocation costs have been reduced and credit to sponsor for Pebble Creek Dam Construction	-1,191
*	Dam Construction	0	0	499	0	+ 499	Credit for Pebble Creek Dam	+ 499
**	Revegetation	350 (1)	350 (2)	80	0	- 270	Reduced Requirements - Transferred from Project Construction to LERRD	- 270
**	Cash Contribution	1,128	1,090	1,120	0	+ 30	Due to total project cost increase	+ 30
**	Total Non-Federal Cost	$ 6,647	$ 6,850	$ 7,218	+ 7	+ 361		+ 368
**	TOTAL PROJECT COST	$20,554	$21,800	$22,398	+44	+ 554		+ 598

(1) Channels, Pump Station and Revegetation costs were combined in the GRR

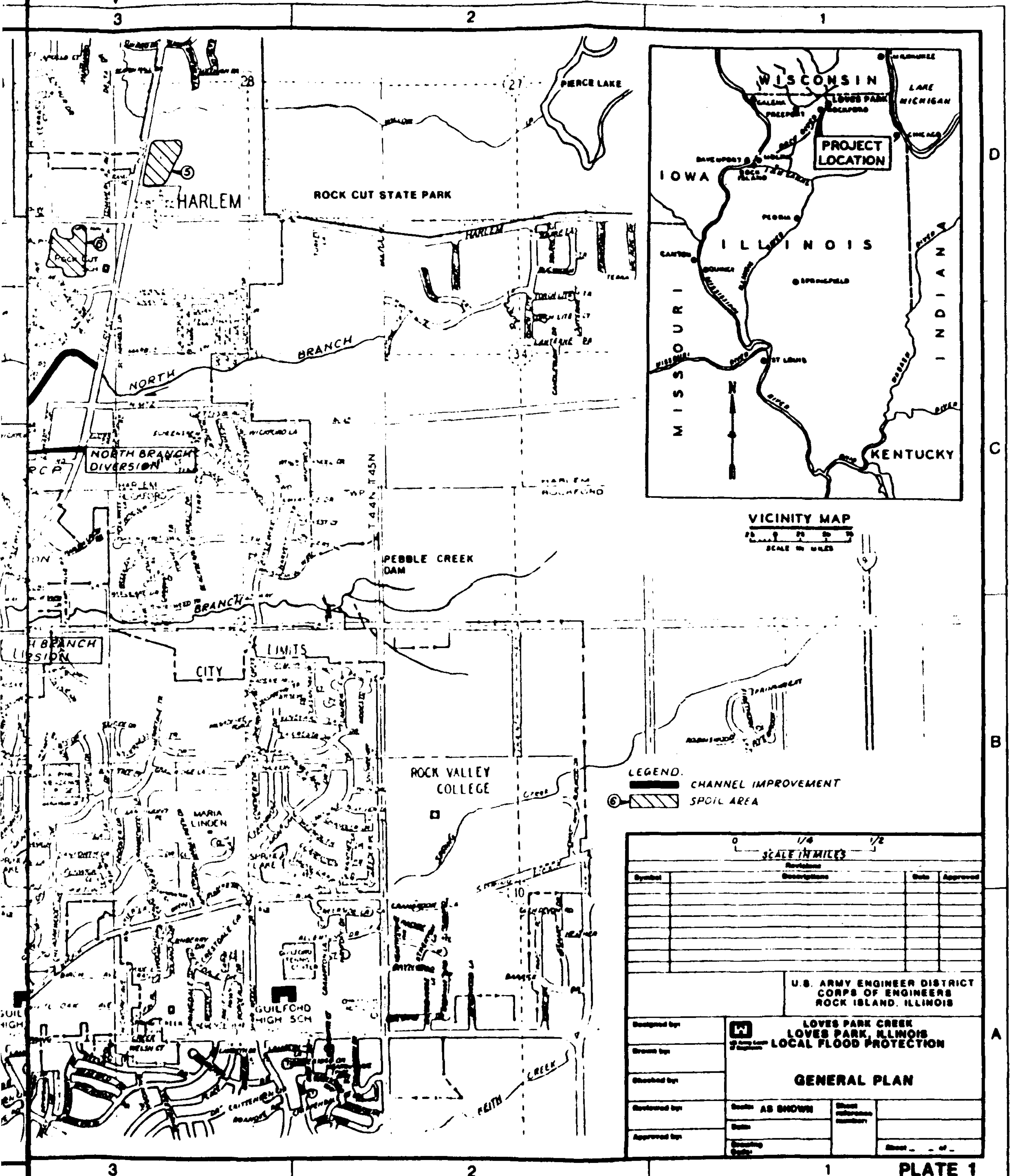
(2) Channels, Pump Station and Revegetation costs were combined in the Oct. 87 PB-3

* Revised September 1989

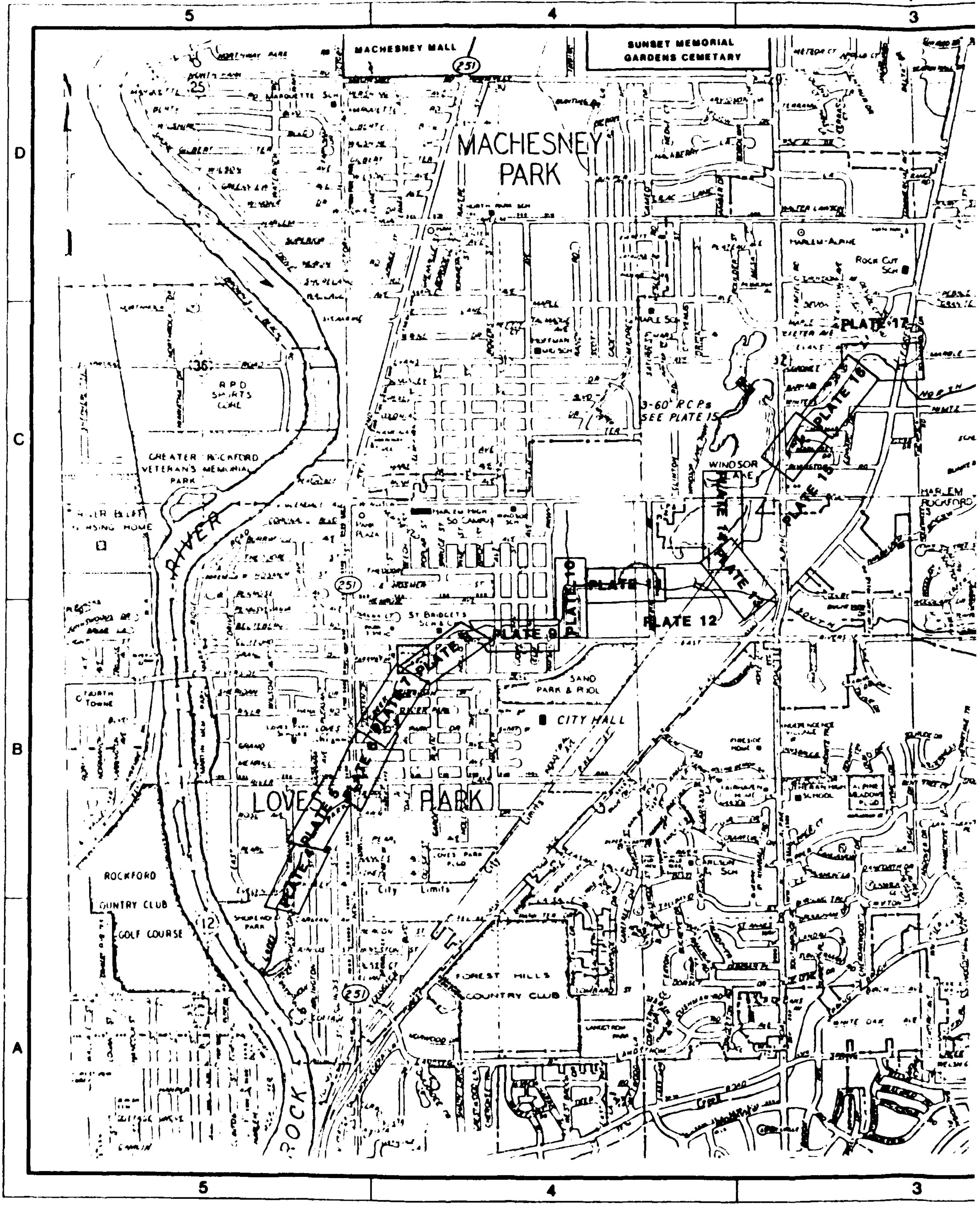
**Revised June 1990

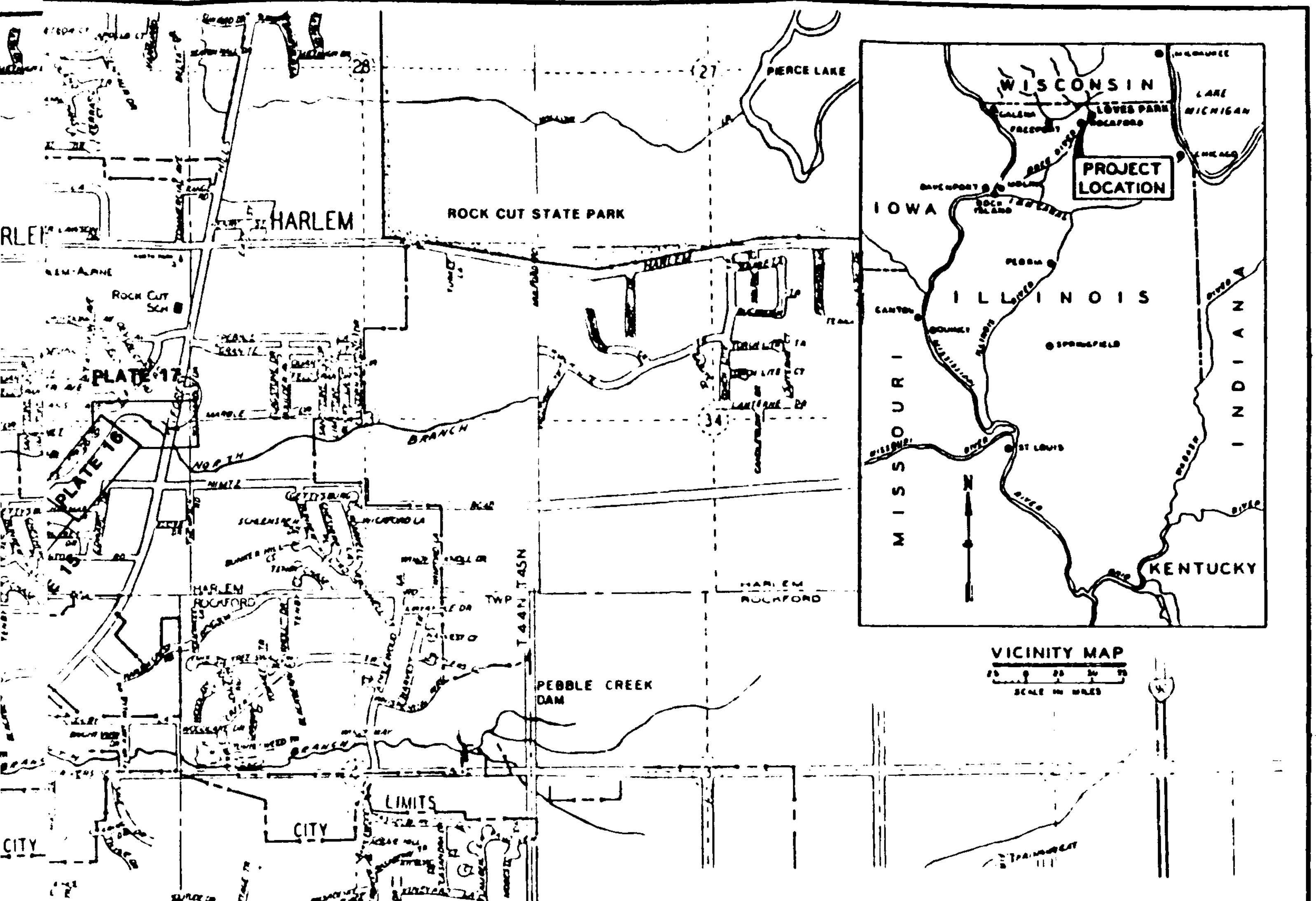


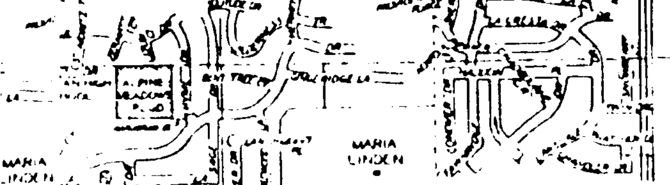
MACHESNEY MALL
SUNSET MEMORIAL GARDENS CEMETARY
MACHESNEY PARK
HARLE
NORTH GRAVEL PIT
3-60" RCP
INTERCONNECTING CHANNELS
WINDSOR LAKE
NORTH
NORTH BRANCH DIVERSION
2-10' RCP
2-84" RCP
SOUTH GRAVEL PIT
BRIDGE TO BE REMOVED
PUMP STATION
SOUTH
BRANC
CREEK
4-BRIDGES TO BE REPLACED
SOUTH BRANCH DIVERSION
CITY
CITY HALL
LOVES PARK
2-BRIDGES TO BE REPLACED
ROCKFORD COUNTRY CLUB GOLF COURSE
FOREST HILLS COUNTRY CLUB
ROCK RIVER
GREATER ROCKFORD VETERANS MEMORIAL PARK
251
173
5
4
3
D
C
B
A

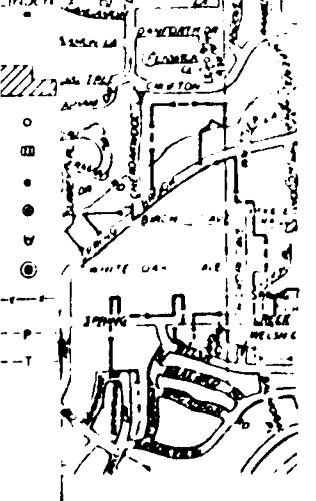


HARLEM
ROCK CUT STATE PARK
PIERCE LAKE
NORTH BRANCH
NORTH BRANCH DIVERSION
PEBBLE CREEK DAM
BRANCH
CITY LIMITS
ROCK VALLEY COLLEGE
MARIA LINDEN
GUILFORD HIGH SCH
KEITH CREEK
T 44N T 45N
WISCONSIN
IOWA
ILLINOIS
MISSOURI
INDIANA
KENTUCKY
LAKE MICHIGAN
PROJECT LOCATION
VICINITY MAP
LEGEND.
CHANNEL IMPROVEMENT
SPOIL AREA
SCALE IN MILES
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS
LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL PLAN
Scale: AS SHOWN
PLATE 1


5
4
3
D
C
B
A
MACHESNEY MALL
SUNSET MEMORIAL GARDENS CEMETARY
251
MACHESNEY PARK
HARLEM-ALPINE
Rock Cut Sch
PLATE 17
PLATE 16
R P D SPORTS CORE
3-60" R C Ps SEE PLATE 15
GREATER ROCKFORD VETERAN'S MEMORIAL PARK
WINDSOR LAKE
HARLEM ROCKFORD
RIVER
PLATE 10
PLATE 11
PLATE 12
PLATE 9
ST BRIDGETS SCHOOL
SAND PARK & POOL
CITY HALL
LOVES PARK
PLATE 4
ROCKFORD COUNTRY CLUB
GOLF COURSE
City Limits
12
FOREST HILLS COUNTRY CLUB
ROCK







GENERAL PLAN & PROFILE NOTES

1. ALL ELEVATIONS SHOWN ARE BASED ON ROCKFORD PROJECT DATUM
2. UNDERGROUND FACILITIES AND STRUCTURES AND ALL UTILITIES HAVE BEEN PLOTTED FROM AVAILABLE DATA AND SURVEYS. IT IS LIKELY THAT OTHERS WILL BE ENCOUNTERED
3. EXISTING INVERT ELEVATIONS ARE TO BE VERIFIED IN THE FIELD

PLAN & PROFILE LEGEND

(hatched)	BUILDING	P & T	POWER & TELEPHONE LINE
o	MANHOLE	---T---	BURIED TELEPHONE
▭	CATCH BASIN	--G--	GAS LINE
•	POWER & TELEPHONE POLE	--W--	WATER LINE
●	TRANSMISSION POLE	--ST--	STORM SEWER
♁	FIRE HYDRANT	--SAN--	SANITARY SEWER
◉	DRILL HOLE	:::::::	EXISTING PIPE
--+--+--	FENCE	▬▬▬	NEW PIPE
--P--	POWER LINE	- - -	DITCH
--T--	TELEPHONE LINE		

SCALE OF MILES

Symbol	Revisions Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:

US Army Corps of Engineers

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

INDEX OF
PLAN AND PROFILE PLATES

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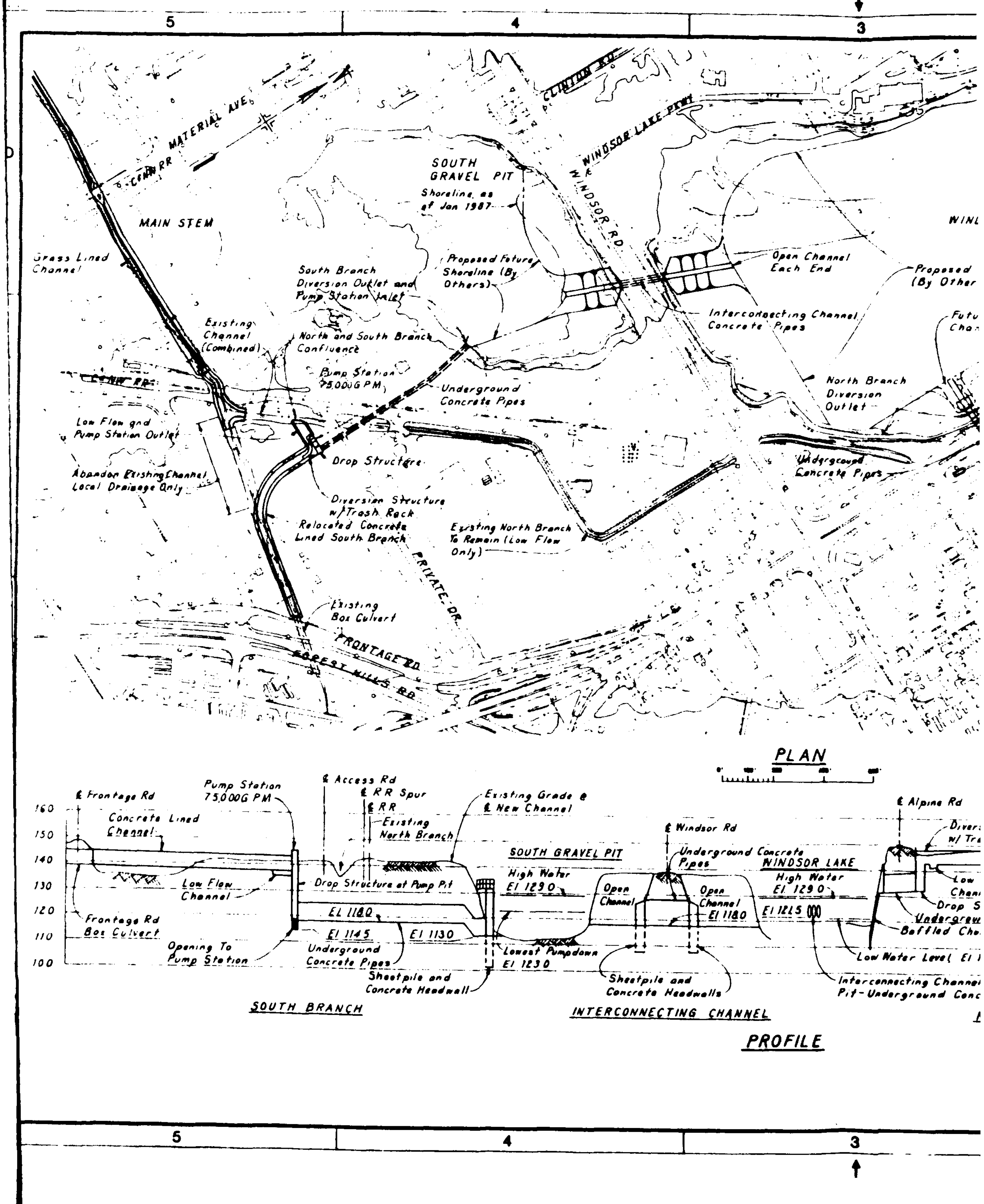
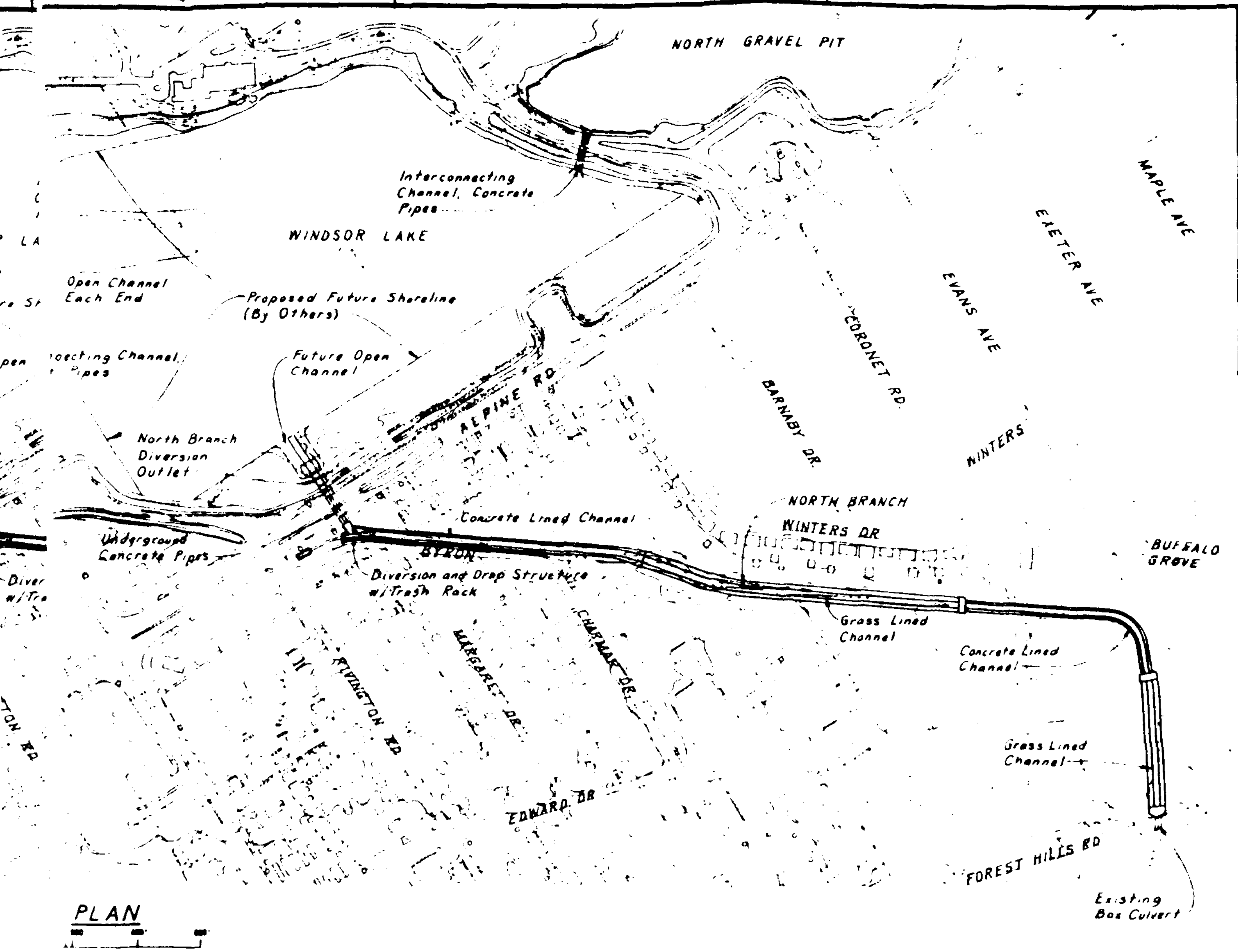
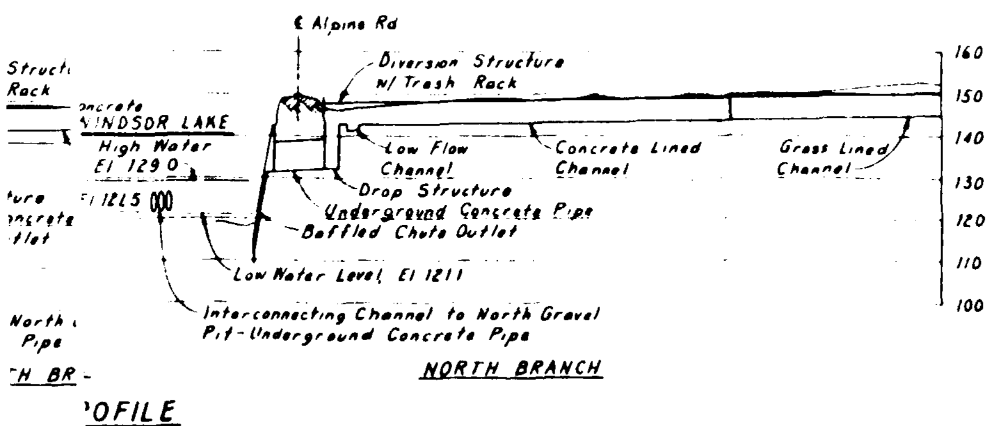
Date:
Drawing Code:
Sheet reference number:
Sheet _ of _

PLATE 2


5
4
3
CLINTON RD
MATERIAL AVE
C&NW RR
WINDSOR LAKE PKWY
SOUTH GRAVEL PIT
Shoreline as of Jan 1987
WINDSOR RD
MAIN STEM
Grass Lined Channel
South Branch Diversion Outlet and Pump Station Inlet
Proposed Future Shoreline (By Others)
Open Channel Each End
Proposed (By Other
Interconnecting Channel Concrete Pipes
Existing Channel (Combined)
North and South Branch Confluence
Pump Station 75,000G PM
Underground Concrete Pipes
North Branch Diversion Outlet
Low Flow and Pump Station Outlet
Drop Structure
Underground Concrete Pipes
Abandon Existing Channel Local Drainage Only
Diversion Structure w/Trash Rack
Relocated Concrete Lined South Branch
Existing North Branch To Remain (Low Flow Only)
PRIVATE DR
Existing Box Culvert
FRONTAGE RD
FOREST HILLS RR
PLAN
℄ Frontage Rd
Pump Station 75,000G PM
℄ Access Rd
℄ RR Spur
℄ RR
Existing North Branch
Existing Grade & ℄ New Channel
℄ Windsor Rd
℄ Alpine Rd
160
150
140
130
120
110
100
Concrete Lined Channel
Low Flow Channel
Drop Structure at Pump Pit
SOUTH GRAVEL PIT
High Water El 129.0
Open Channel
Underground Concrete Pipes
WINDSOR LAKE
High Water El 129.0
Open Channel
El 118.0
El 112.5
El 118.0
El 114.5
El 113.0
Frontage Rd Box Culvert
Opening To Pump Station
Underground Concrete Pipes
Lowest Pumpdown El 123.0
Sheetpile and Concrete Headwall
Sheetpile and Concrete Headwalls
Baffled Ch
Low Water Level
Interconnecting Channel
SOUTH BRANCH
INTERCONNECTING CHANNEL
PROFILE





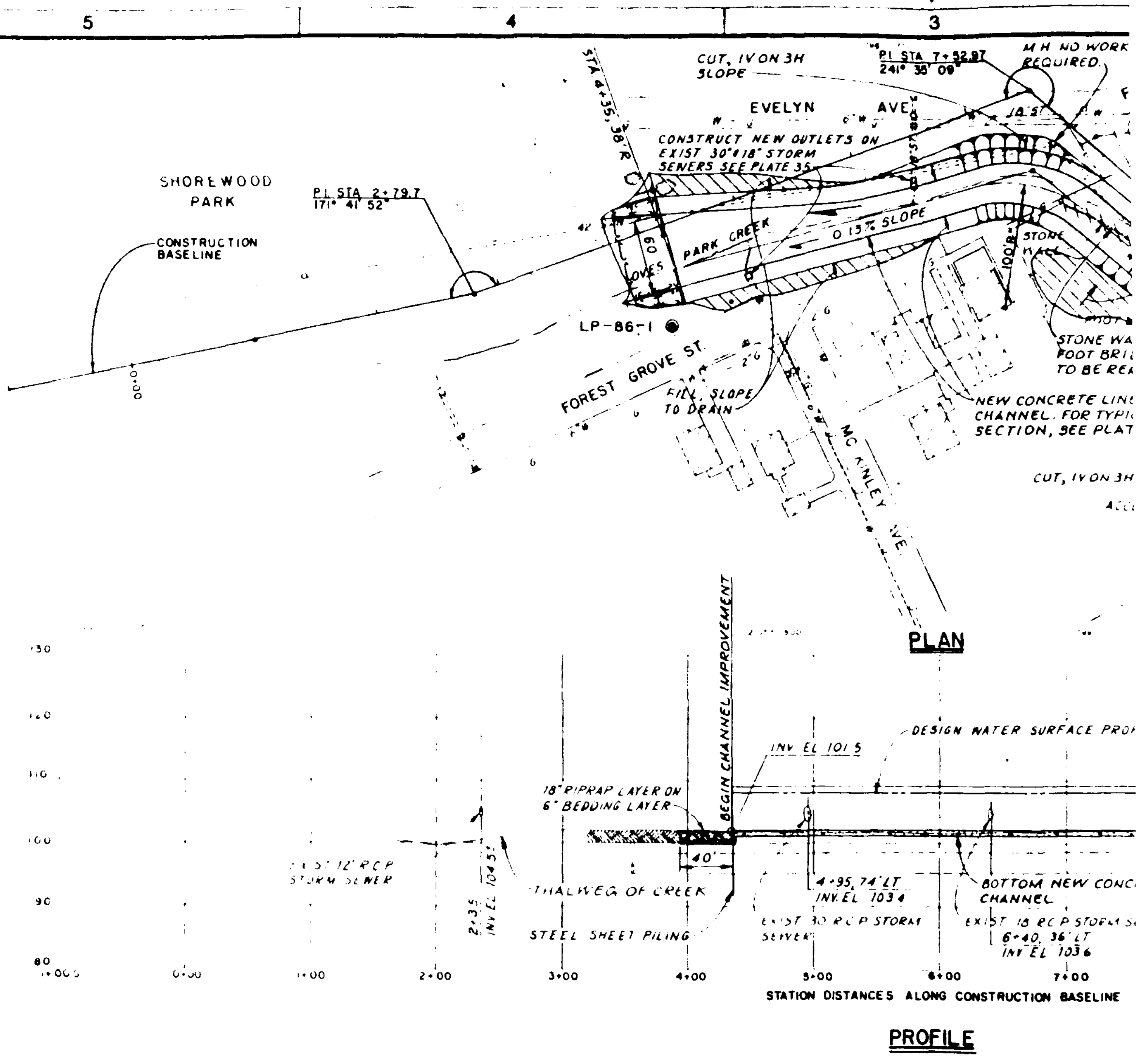
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

DIVERSION, CONFLUENCE, AND STORAGE SYSTEM

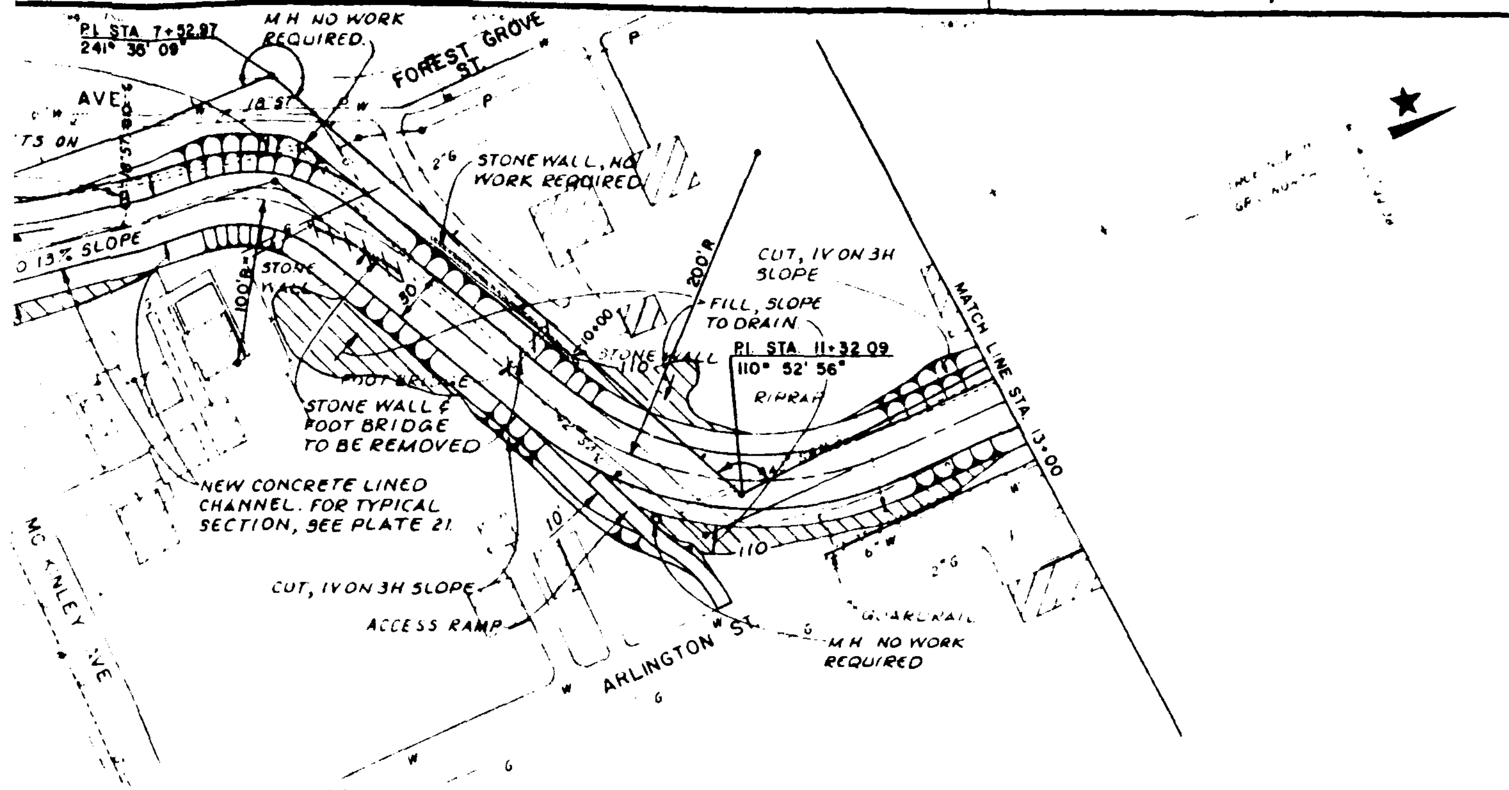
Scale: As Shown

PLATE 3

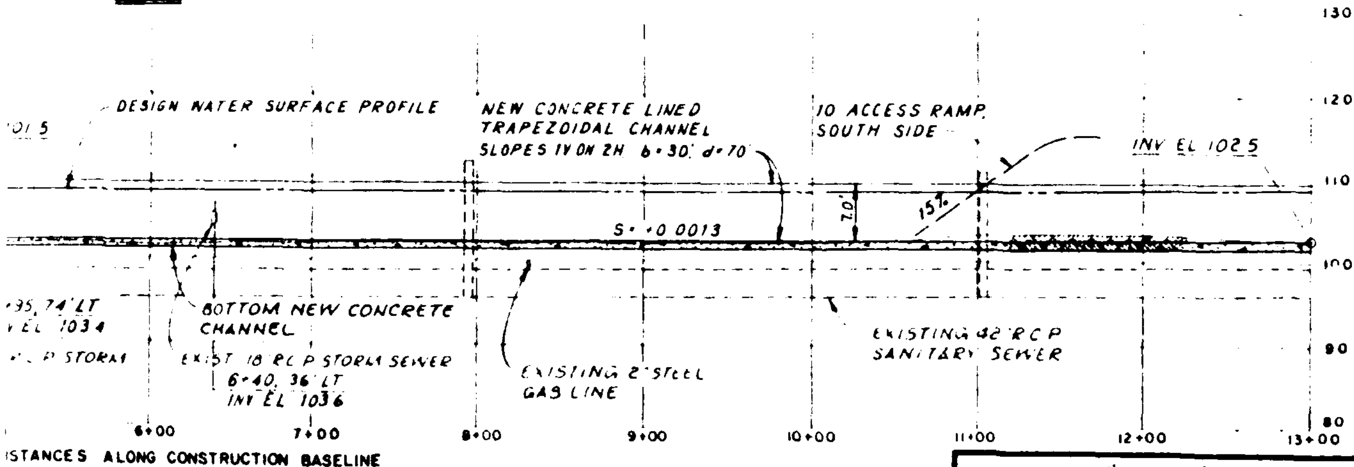


NOTES
1. ALL EXISTING UTILITIES CONFLICTING WITH THE NEW CHANNEL ARE TO BE RELOCATED

T 44 N, R 1 E ... 3RD PRIN MER
WINNEBAGO COUNTY
ILLINOIS



PLAN



PROFILE

...G UTILITIES CONFLICTING
...W CHANNEL ARE TO BE

REFERENCES:
1. FOR GENERAL PLAN AND PROFILE NOTES. SEE PLATE 2
2. FOR TYPICAL SECTIONS, SEE PLATE 21
3. FOR LOGS OF BORINGS, SEE PLATE 18
4. FOR STORM SEWER DETAILS, SEE PLATE 35.

NOTE: COORDINATES AND BEARINGS ARE REFERRED TO THE ILLINOIS COORDINATE SYSTEM WEST ZONE

Symbol	Descriptions	Date	Approved

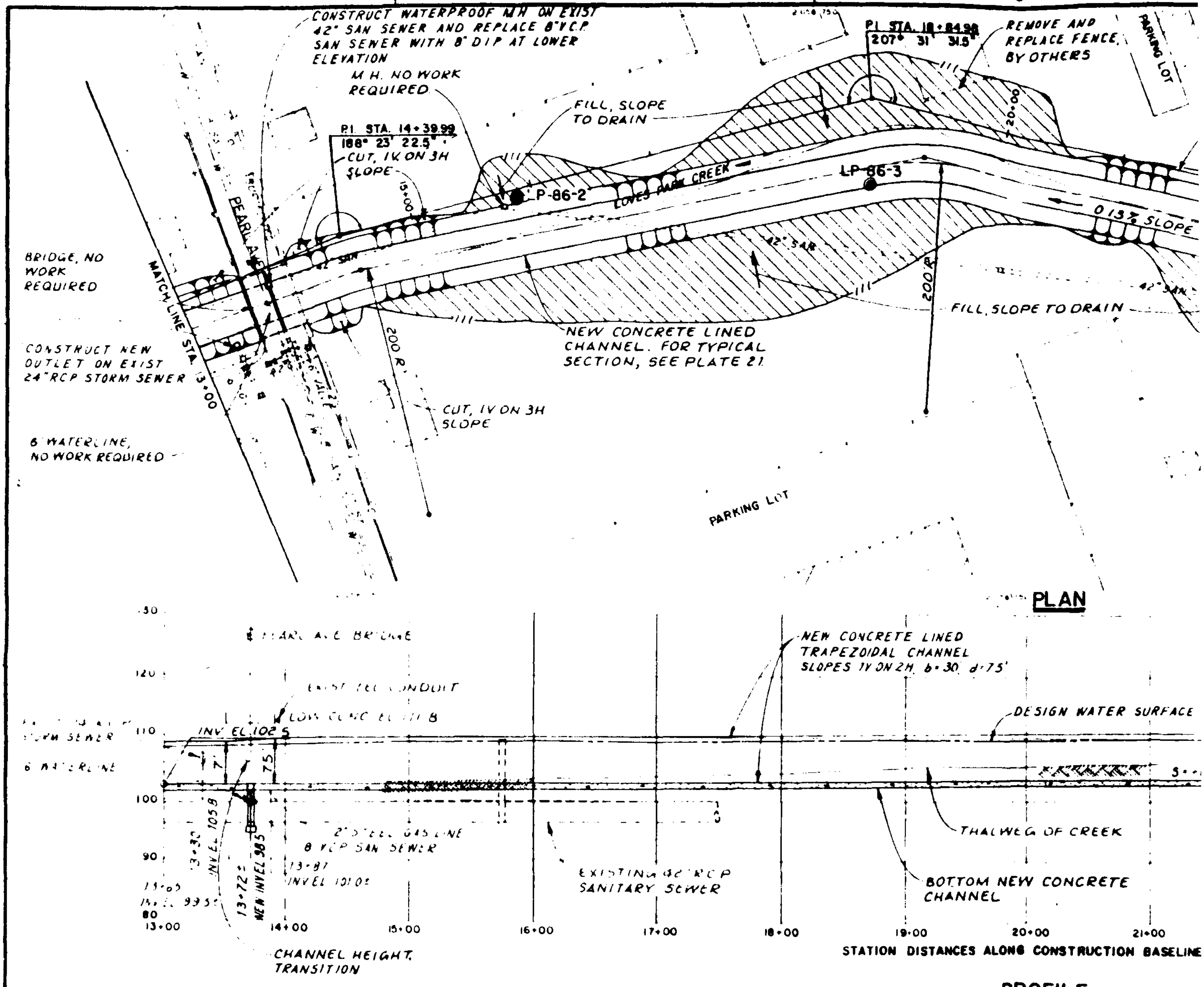
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

PLAN AND PROFILE
STA. 1+00 TO STA. 13+00

Designed by: Drawn by: Checked by: Reviewed by: Approved by:
Scale: 1"=50.0'

PLATE 4

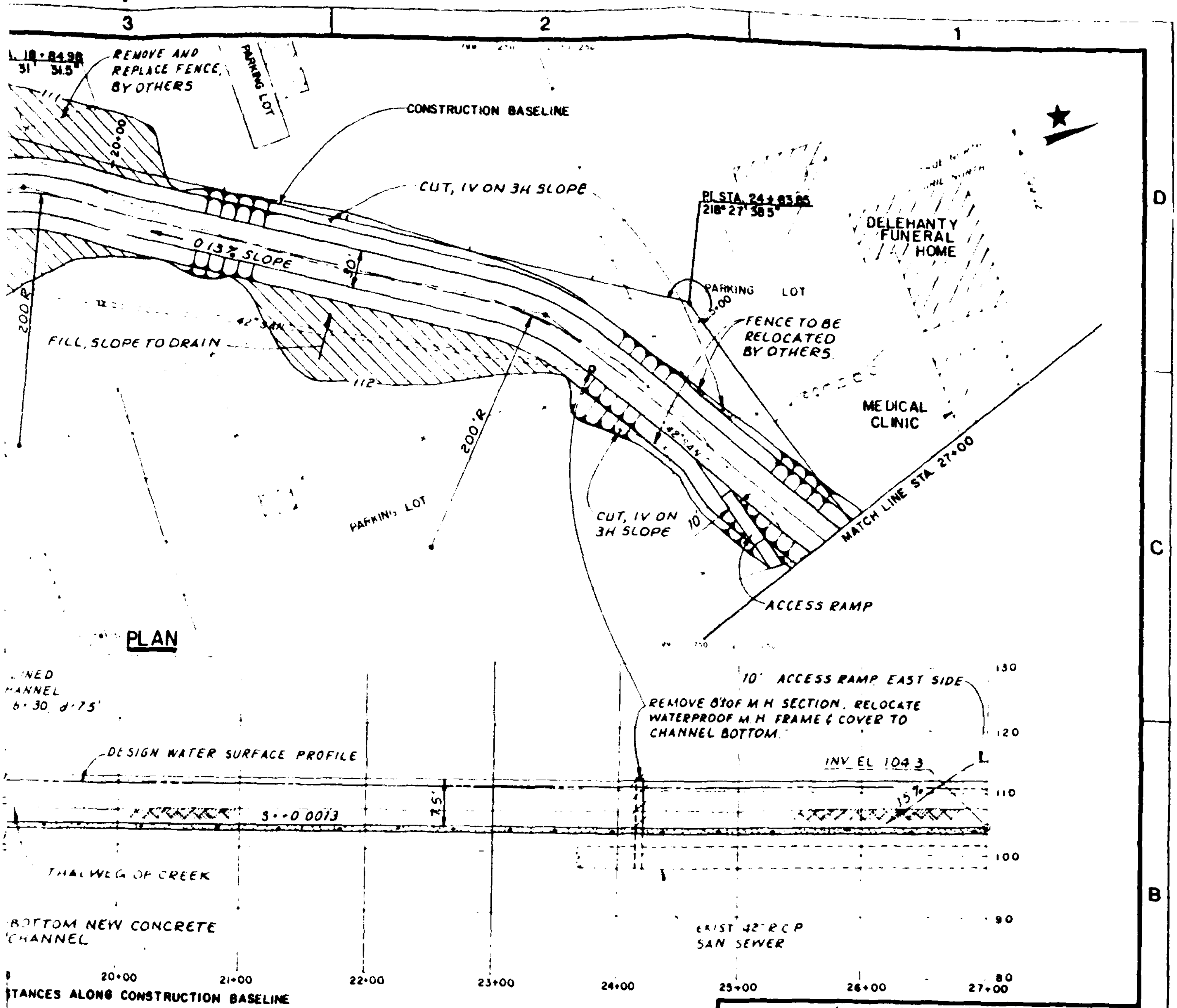


NOTES:
1. ALL EXISTING UTILITIES CONFLICTING WITH THE NEW CHANNEL ARE TO BE RELOCATED

T 44 N, R 1 E of the 3rd PRIN MER
WINNEBAGO COUNTY
ILLINOIS

NOTE: COORDINATES AND BEARINGS ARE [illegible] ILLINOIS COORDINATE SYSTEM WEST

5 4 3



PROFILE

EXISTING UTILITIES CONFLICTING WITH THE NEW CHANNEL ARE TO BE RELOCATED

REFERENCES:
1. FOR GENERAL PLAN AND PROFILE NOTES, SEE PLATE 2
2. FOR TYPICAL SECTIONS, SEE PLATE 21
3. FOR LOGS OF BORINGS, SEE PLATE 18.
4. FOR STORM SEWER DETAILS SEE PLATE 35.
5. FOR CHANNEL SECTIONS AT EXIST. BRIDGES, SEE PLATE 24

NOTE
COORDINATES AND BEARINGS ARE REFERRED TO THE ILLINOIS COORDINATE SYSTEM WEST ZONE

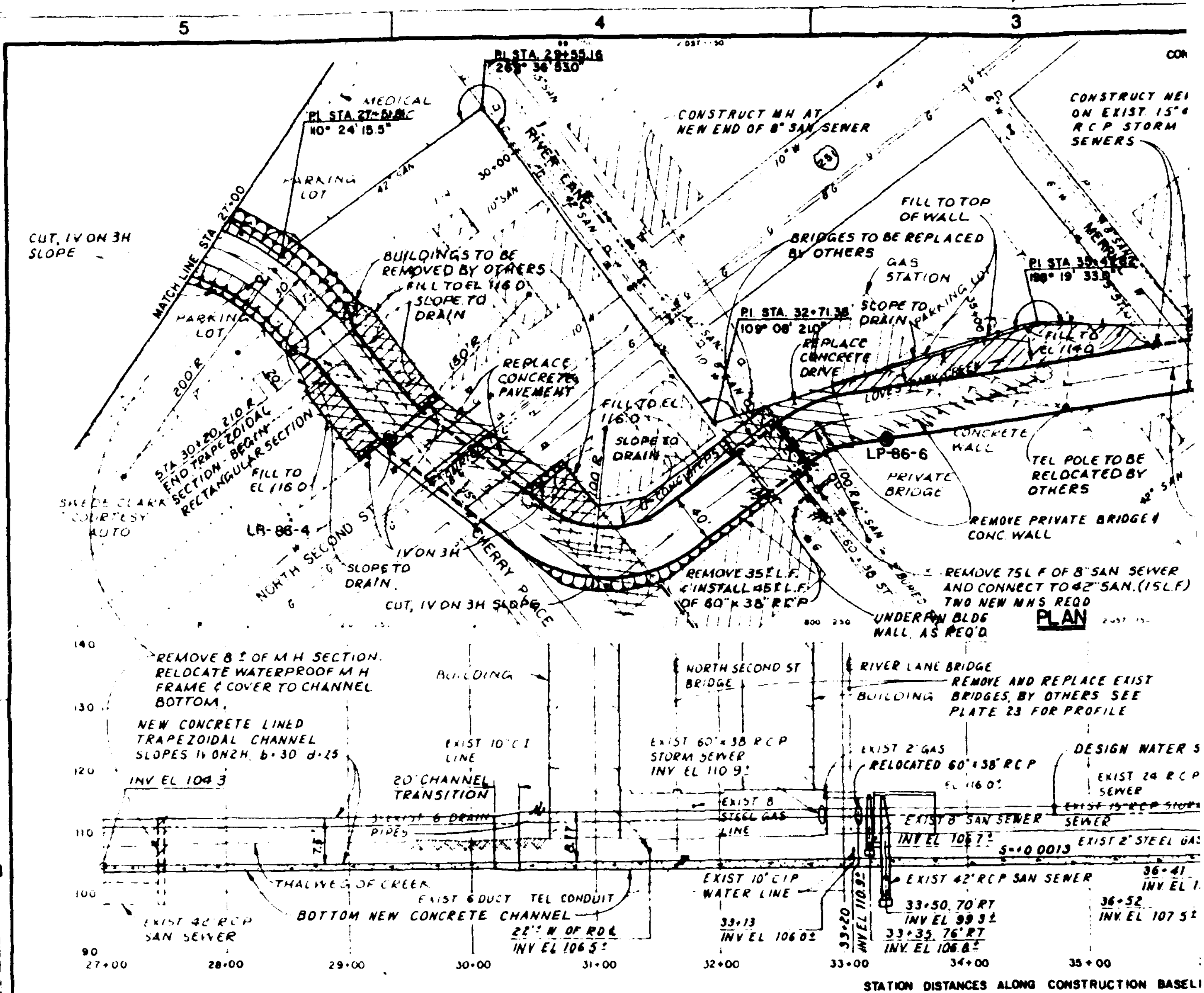
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

PLAN AND PROFILE
STA. 13+00 TO STA. 27+00

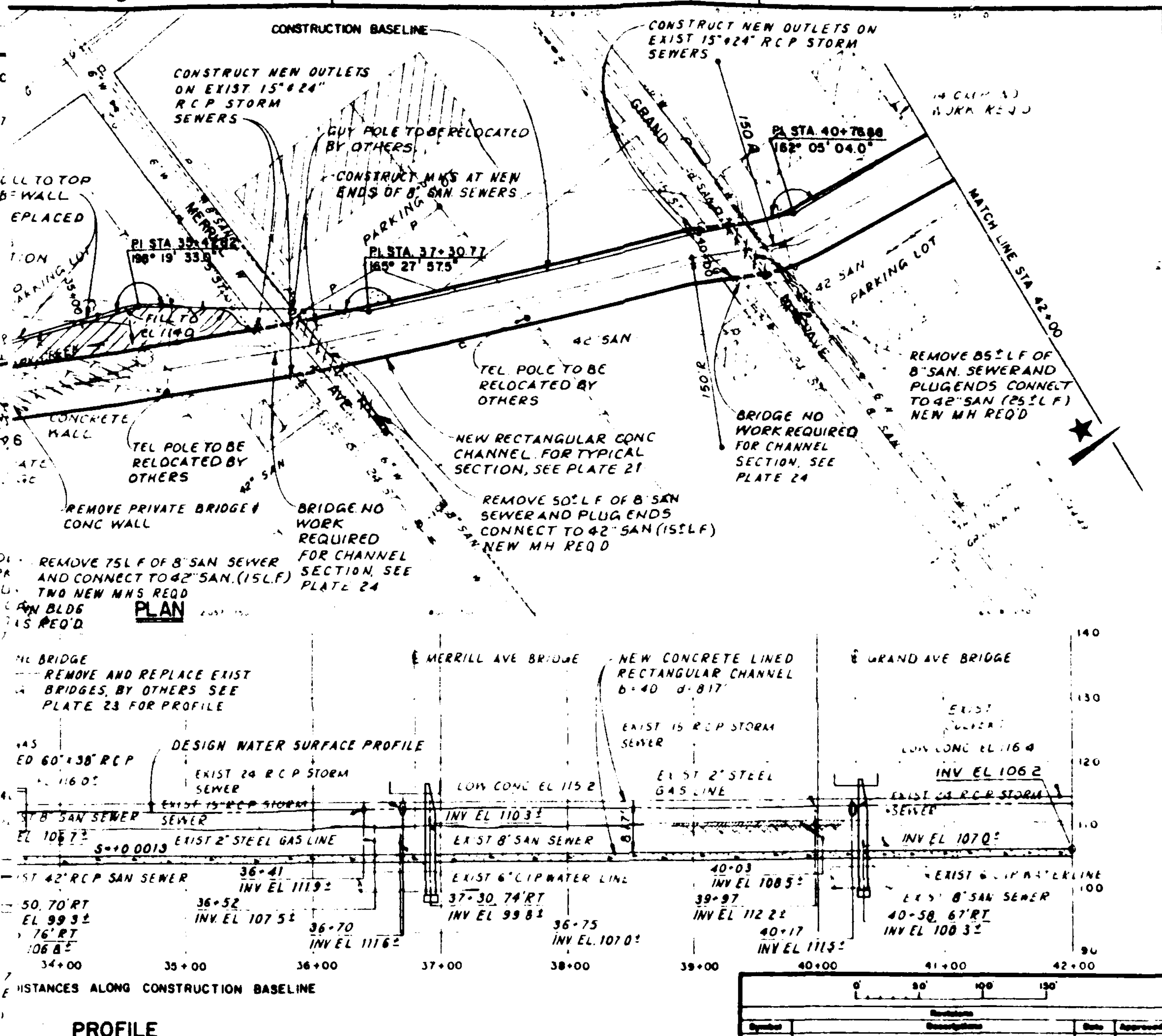
Scale: 1"=50.0'

PLATE 5



NOTES:
1. ALL EXISTING UTILITIES CONFLICTING WITH THE NEW CHANNEL ARE TO BE RELOCATED

T 44 N, R 1/2 E of the 3rd PRIN MER
WINNEBAGO COUNTY
ILLINOIS



REFERENCES:

1. FOR GENERAL PLAN AND PROFILE NOTES, SEE PLATE 2.
2. FOR TYPICAL SECTIONS, SEE PLATE 21
3. FOR LOGS OF BORINGS, SEE PLATE 18
4. FOR SEWER DETAILS, SEE PLATE 35.
5. FOR CHANNEL SECTIONS AT EXIST BRIDGES, SEE PLATE 24.
6. FOR NEW BRIDGE PROFILES, SEE PLATE 23.
7. FOR DETAILS OF CHANNEL TRANSITION AT STA. 30+18, SEE PLATE 27.

NOTE

COORDINATES AND BEARINGS ARE REFERRED TO THE ILLINOIS COORDINATE SYSTEM WEST ZONE

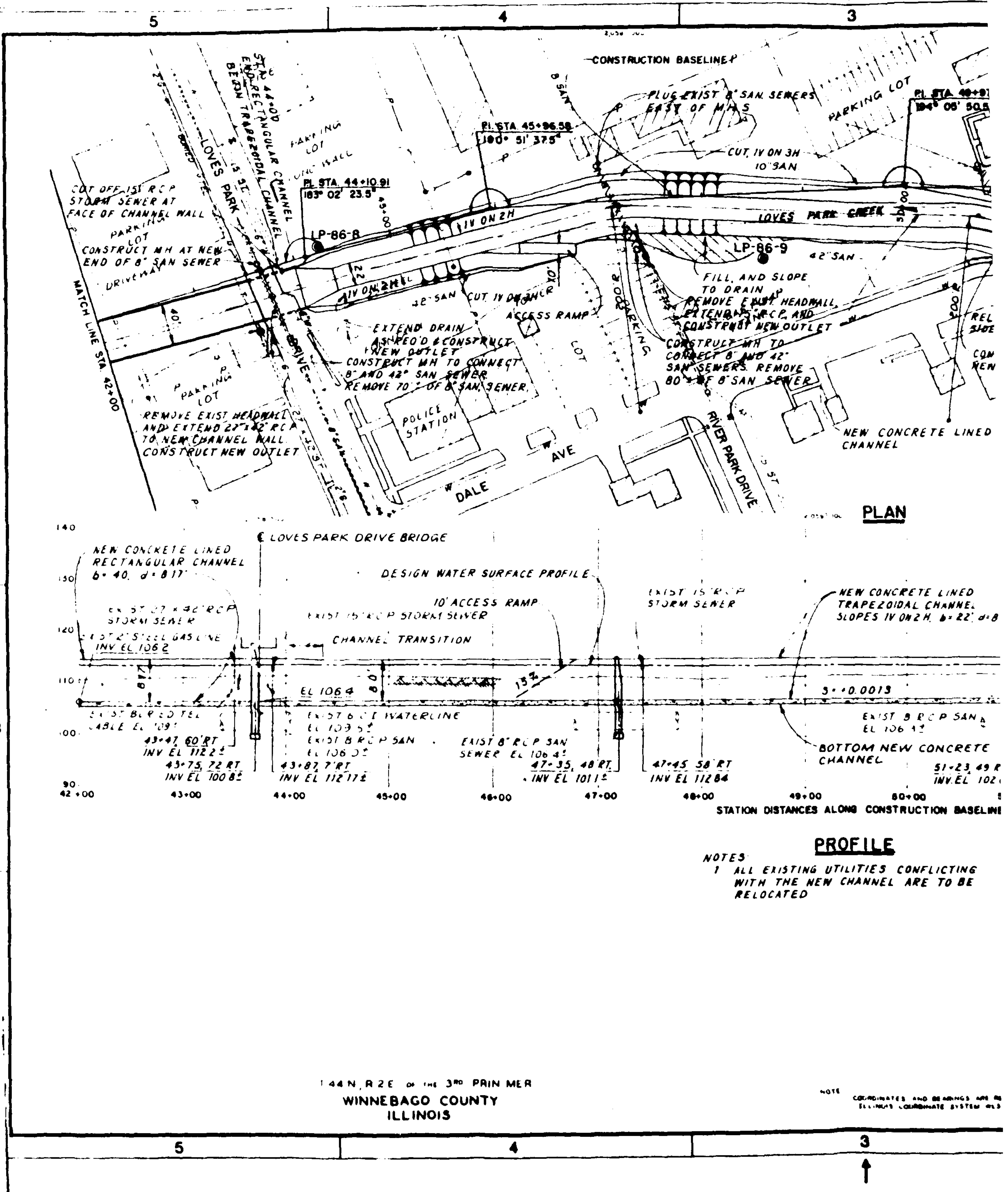
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

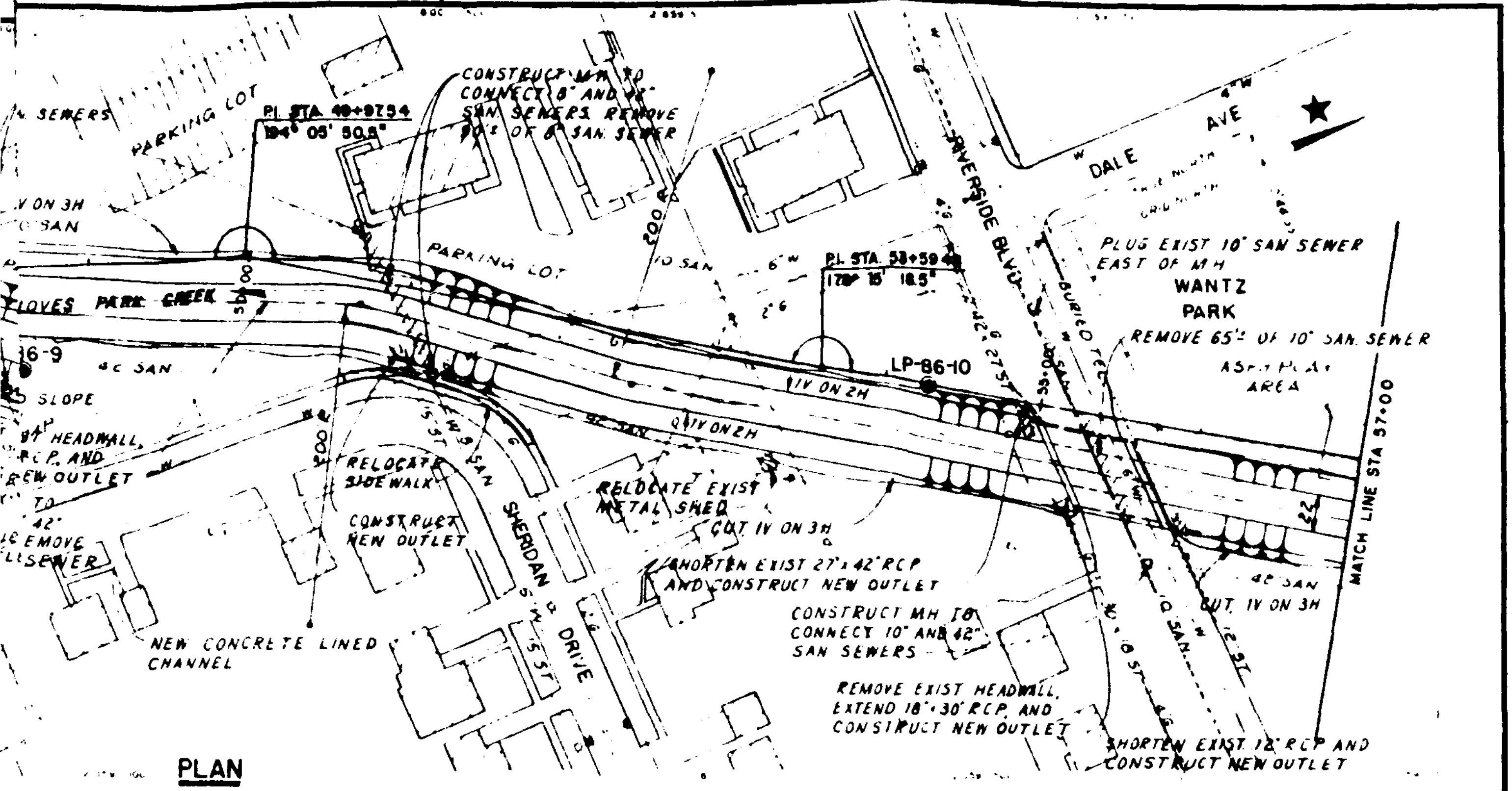
LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

PLAN AND PROFILE
STA. 27+00 TO STA. 42+00

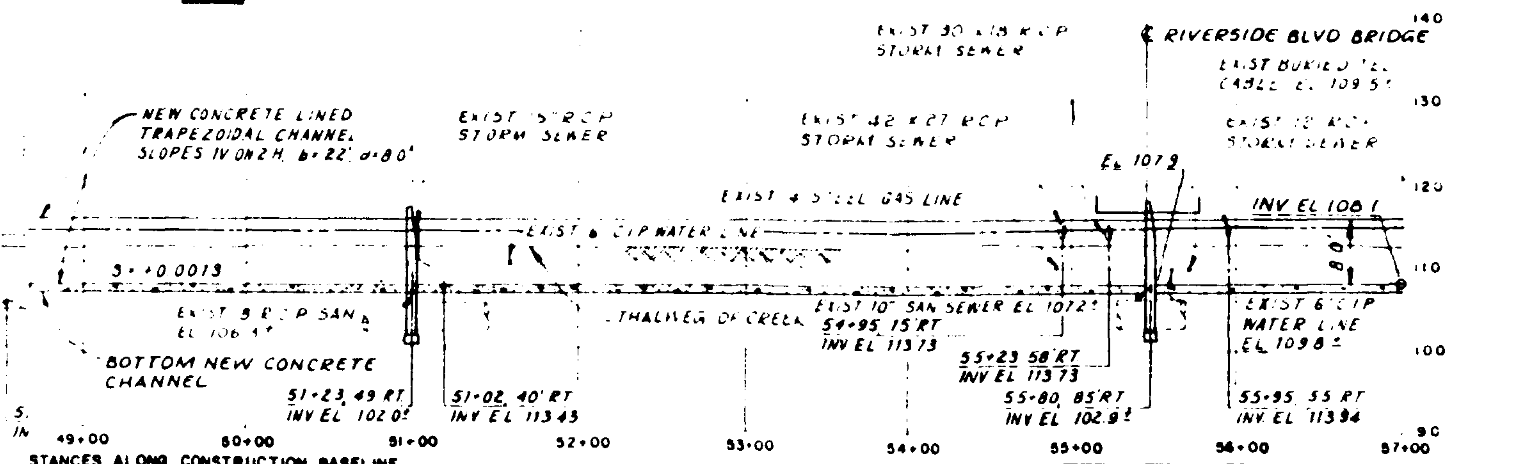
Scale: 1"=50 0'

PLATE 6


CONSTRUCTION BASELINE
PLUG EXIST 8" SAN SEWERS EAST OF MHS
PARKING LOT
PI STA 45+96.58
180° 51' 37.5"
PI STA 44+10.91
183° 02' 23.5"
STA 44+00 END RECTANGULAR CHANNEL BEGIN TRAPEZOIDAL CHANNEL
LOVES PARK
CUT OFF 15" RCP STORM SEWER AT FACE OF CHANNEL WALL
CONSTRUCT MH AT NEW END OF 8" SAN SEWER
DRIVEWAY
LP-86-8
1V ON 2H
CUT, 1V ON 3H
10" SAN
LOVES PARK CREEK
LP-86-9
42" SAN
FILL AND SLOPE TO DRAIN
REMOVE EXIST HEADWALL, EXTEND RCP AND CONSTRUCT NEW OUTLET
CONSTRUCT MH TO CONNECT 8" AND 42" SAN SEWERS. REMOVE 80' OF 8" SAN SEWER
MATCH LINE STA 42+00
ACCESS RAMP
EXTEND DRAIN AS REQ'D & CONSTRUCT NEW OUTLET
CONSTRUCT MH TO CONNECT 8" AND 42" SAN SEWER. REMOVE 70' OF 8" SAN SEWER
REMOVE EXIST HEADWALL AND EXTEND 27"x42" RCP TO NEW CHANNEL WALL. CONSTRUCT NEW OUTLET
POLICE STATION
DALE AVE
RIVER PARK DRIVE
PARKING
NEW CONCRETE LINED CHANNEL
PLAN
℄ LOVES PARK DRIVE BRIDGE
NEW CONCRETE LINED RECTANGULAR CHANNEL b=40, d=8.17
DESIGN WATER SURFACE PROFILE
10' ACCESS RAMP
EXIST 15" RCP STORM SEWER
EXIST 27"x42" RCP STORM SEWER
EXIST 2" STEEL GAS LINE INV EL 106.2
CHANNEL TRANSITION
NEW CONCRETE LINED TRAPEZOIDAL CHANNEL SLOPES 1V ON 2H, b=22', d=8
EL 106.4
S=0.0013
EXIST BURIED TEL CABLE EL 109±
43+47, 60' RT INV EL 112.2±
43+75, 72' RT INV EL 100.8±
EXIST 6" CI WATERLINE EL 109.5±
EXIST 8" RCP SAN EL 106.0±
43+87, 7' RT INV EL 112.17±
EXIST 8" RCP SAN SEWER EL 106.4±
47+35, 48' RT INV EL 101.1±
47+45, 58' RT INV EL 112.84
EXIST 8" RCP SAN EL 106.4±
BOTTOM NEW CONCRETE CHANNEL
51+23, 49' R INV EL 102.
140
130
120
110
100
90
42+00
43+00
44+00
45+00
46+00
47+00
48+00
49+00
50+00
STATION DISTANCES ALONG CONSTRUCTION BASELINE
PROFILE
NOTES
1 ALL EXISTING UTILITIES CONFLICTING WITH THE NEW CHANNEL ARE TO BE RELOCATED
T 44 N, R 2 E OF THE 3RD PRIN MER
WINNEBAGO COUNTY
ILLINOIS
5
4
3
D
C
B



PLAN



PROFILE

FE..ISTING UTILITIES CONFLICTING
..THE NEW CHANNEL ARE TO BE
..ATED

REFERENCES
1. FOR GENERAL PLAN AND PROFILE NOTES SEE PLATE 2.
2. FOR TYPICAL SECTIONS SEE PLATE 21.
3. FOR LOGS OF BORINGS, SEE PLATE 18
4. FOR SEWER DETAILS SEE PLATE 35
5. FOR CHANNEL SECTIONS AT EXIST BRIDGES, SEE PLATES 24 & 25
6. FOR DETAILS OF CHANNEL TRANSITION AT STA 44+00 SEE PLATE 27

NOTE
COORDINATES AND BEARINGS ARE REFERRED TO THE ILLINOIS COORDINATE SYSTEM WEST ZONE

0' 50' 100' 150'

Revisions

Symbol	Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

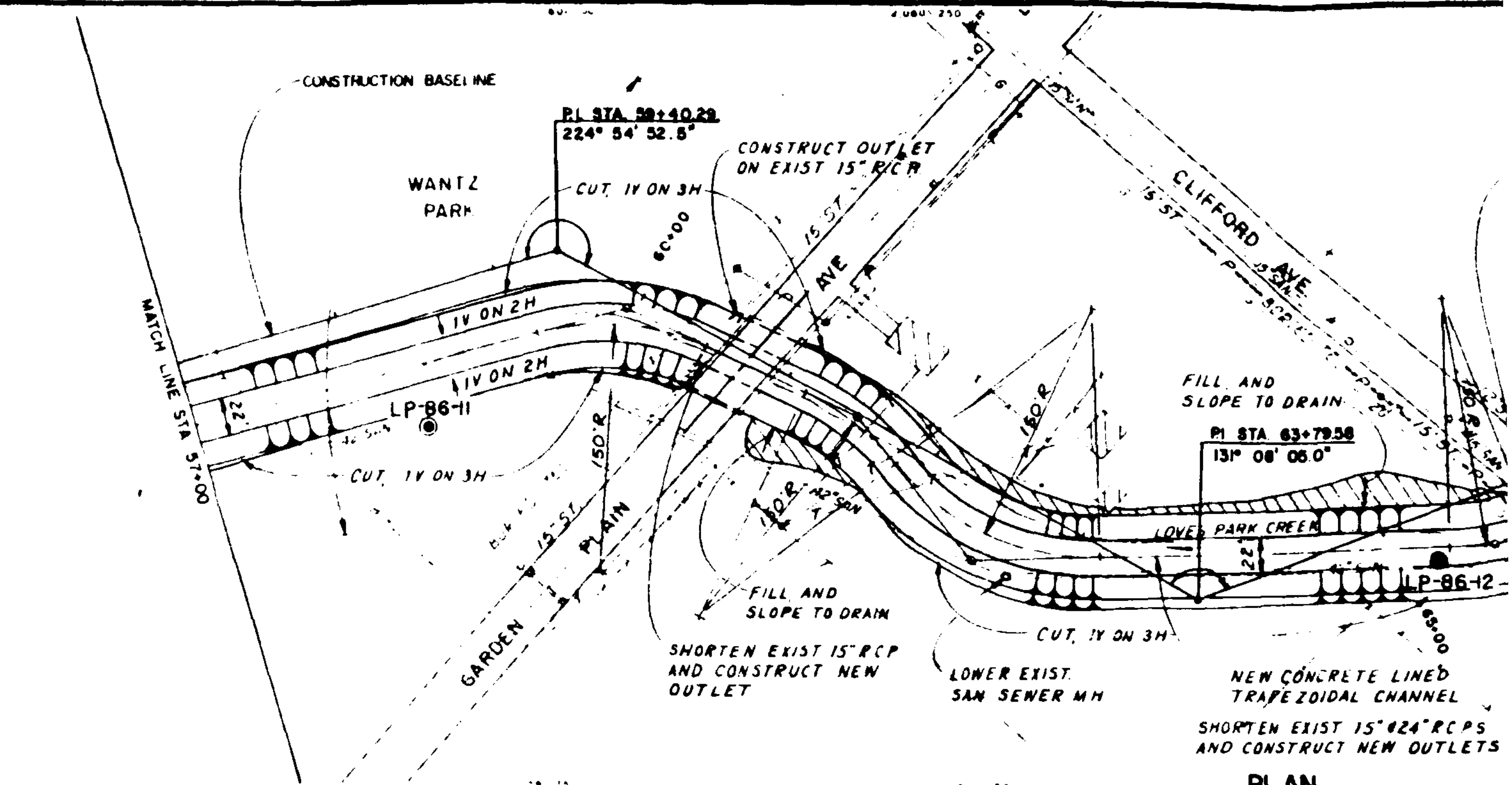
LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

PLAN AND PROFILE
STA. 42+00 TO STA. 57+00

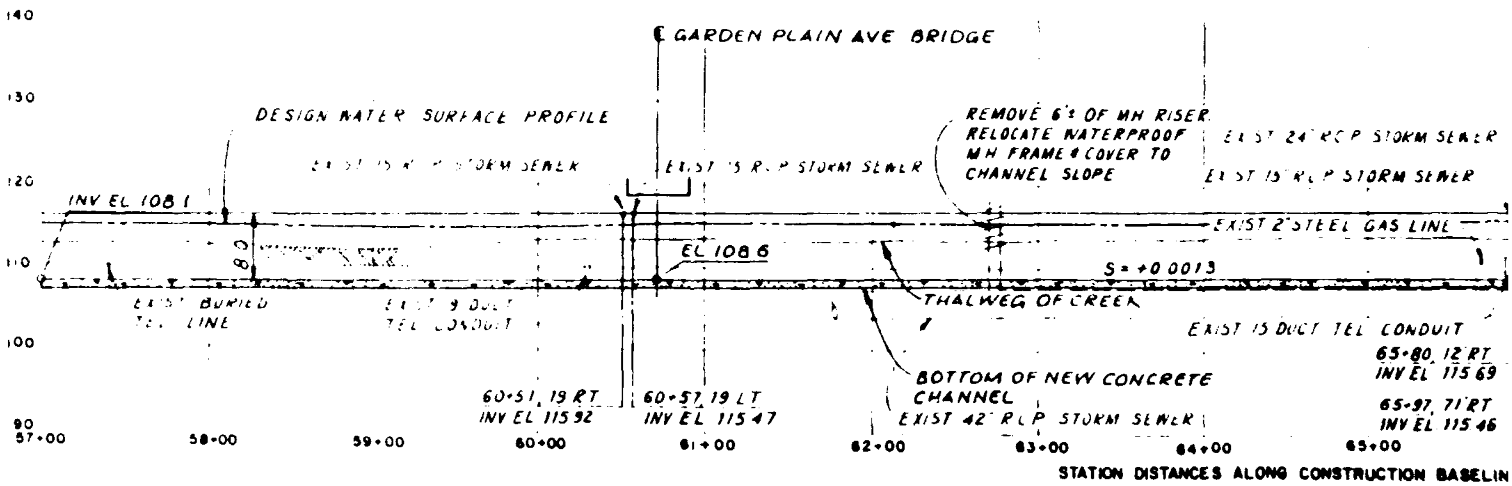
Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:
Scale: 1"=40.0'
Date:
Sheet reference number:
Drawing code:
Sheet _ of _

PLATE 7

5	4	3



PLAN



PROFILE

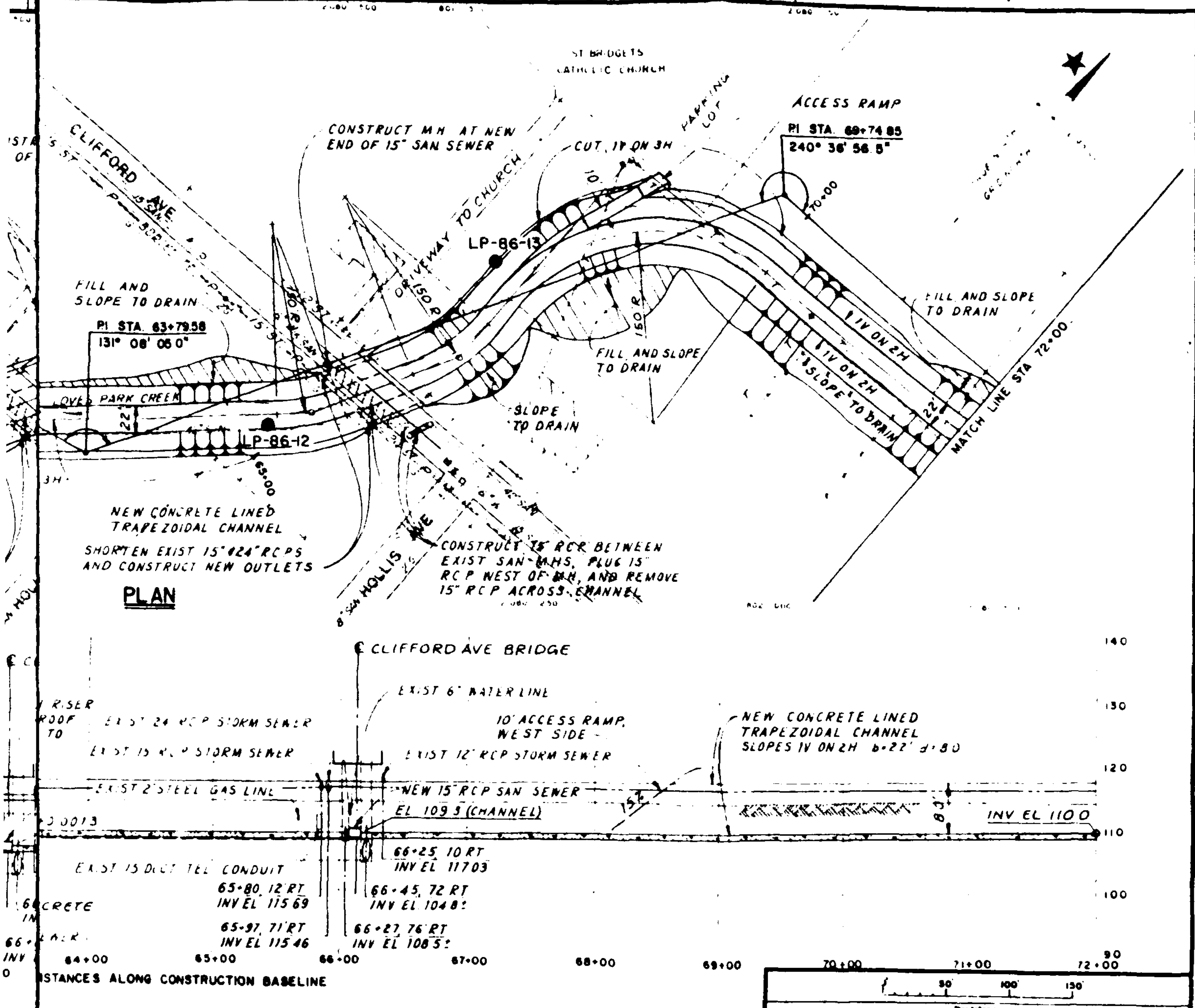
NOTES

1. ALL EXISTING UTILITIES CONFLICTING WITH THE NEW CHANNEL ARE TO BE RELOCATED

T 44 N, R 2 E of the 3rd PRIN MER
WINNEBAGO COUNTY
ILLINOIS

NOTE: COORDINATES AND BEARINGS ARE RE... ILLINOIS COORDINATE SYSTEM WE...

5	4	3



PROFILE

EXISTING UTILITIES CONFLICTING THE NEW CHANNEL ARE TO BE [RELO]CATED

REFERENCES:

1. FOR GENERAL PLAN AND PROFILE NOTES, SEE PLATE 2.
2. FOR TYPICAL SECTIONS, SEE PLATE 21
3. FOR LOGS OF BORINGS, SEE PLATE 18
4. FOR SEWER DETAILS SEE PLATE 35
5. FOR CHANNEL SECTIONS AT EXIST BRIDGES, SEE PLATE 25.

NOTE

COORDINATES AND BEARINGS ARE REFERRED TO THE ILLINOIS COORDINATE SYSTEM WEST ZONE

Symbol	Descriptions	Date	Approved

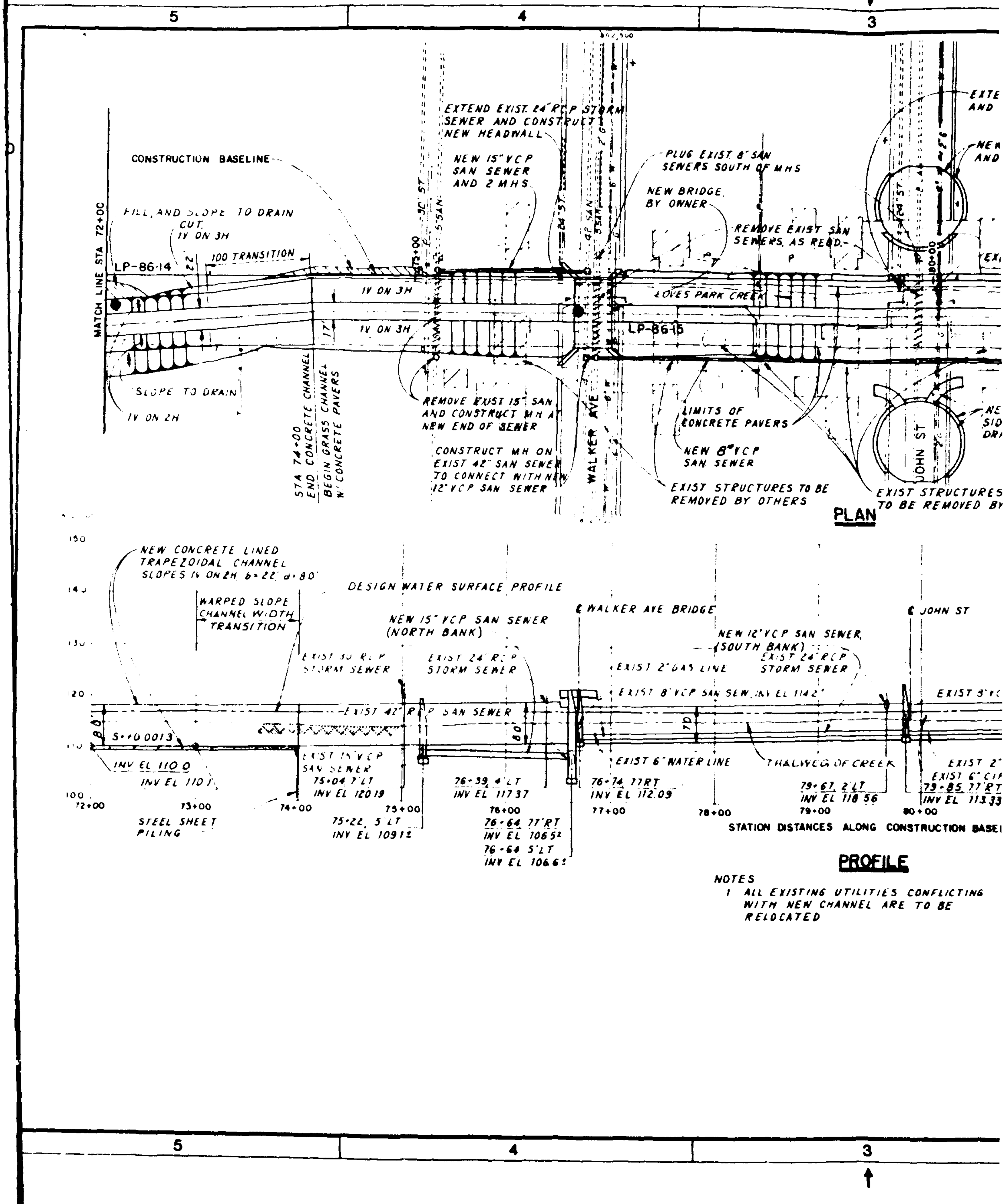
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

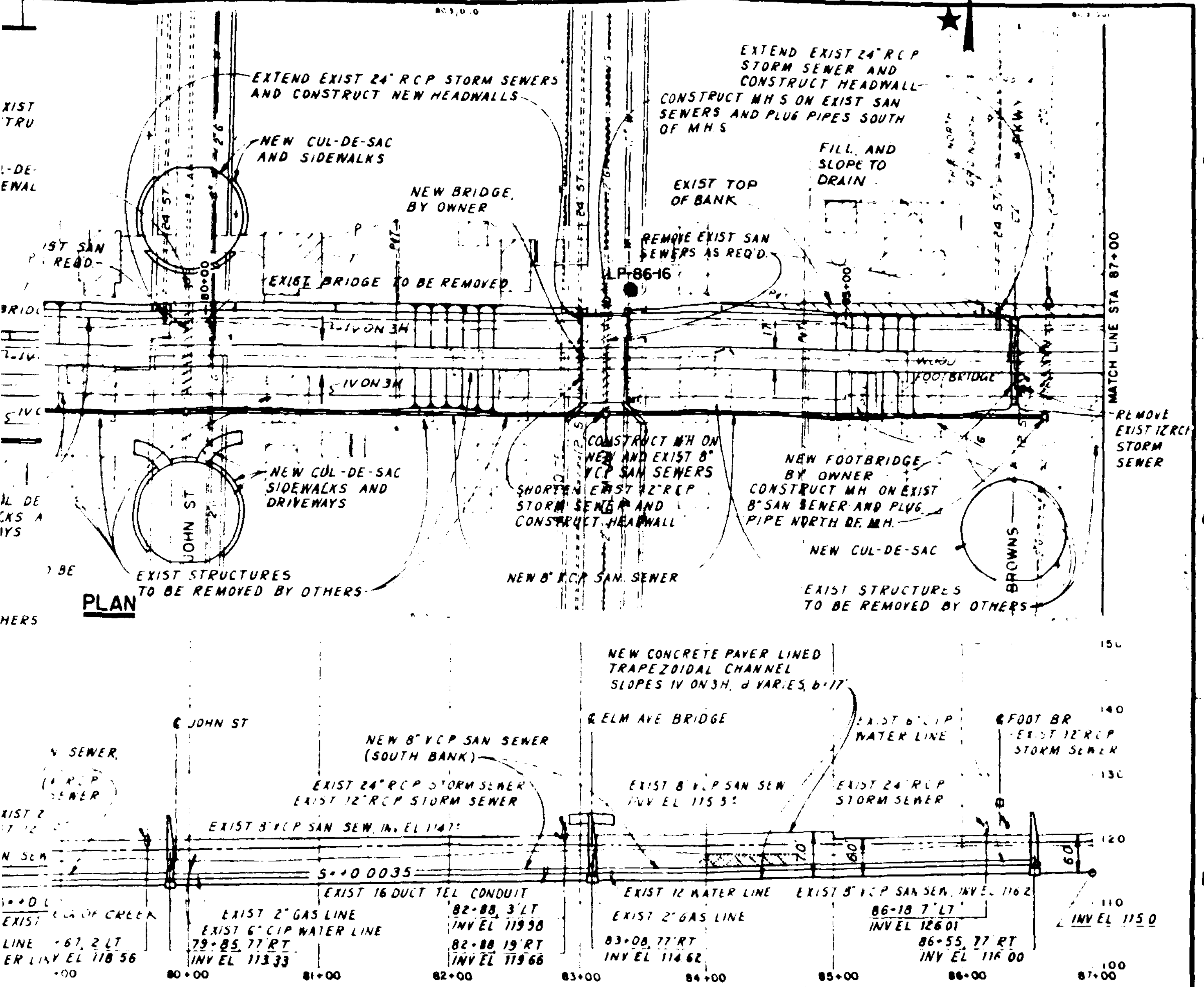
LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

PLAN AND PROFILE
STA. 57+00 TO STA. 72+00

Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:
Scale: 1"=50.0
Date:
Drawing Code:
Sheet Reference Number:
Sheet _ of _

PLATE 8


5
4
3
CONSTRUCTION BASELINE
EXTEND EXIST. 24" RCP STORM SEWER AND CONSTRUCT NEW HEADWALL
NEW 15" VCP SAN SEWER AND 2 MHS
PLUG EXIST. 8" SAN SEWERS SOUTH OF MHS
NEW BRIDGE BY OWNER
REMOVE EXIST SAN SEWERS AS REQD.
MATCH LINE STA 72+00
LP-86-14
FILL AND SLOPE TO DRAIN
CUT 1V ON 3H
100 TRANSITION
1V ON 3H
1V ON 3H
LOVES PARK CREEK
LP-86-15
SLOPE TO DRAIN
1V ON 2H
STA 74+00 END CONCRETE CHANNEL BEGIN GRASS CHANNEL W/ CONCRETE PAVERS
REMOVE EXIST 15" SAN AND CONSTRUCT MH AT NEW END OF SEWER
CONSTRUCT MH ON EXIST 42" SAN SEWER TO CONNECT WITH NEW 12" VCP SAN SEWER
WALKER AVE
LIMITS OF CONCRETE PAVERS
NEW 8" VCP SAN SEWER
EXIST STRUCTURES TO BE REMOVED BY OTHERS
EXIST STRUCTURES TO BE REMOVED BY
JOHN ST
PLAN
NEW CONCRETE LINED TRAPEZOIDAL CHANNEL SLOPES 1V ON 2H b=22' d=8.0'
DESIGN WATER SURFACE PROFILE
WARPED SLOPE CHANNEL WIDTH TRANSITION
NEW 15" VCP SAN SEWER (NORTH BANK)
℄ WALKER AVE BRIDGE
℄ JOHN ST
NEW 12" VCP SAN SEWER (SOUTH BANK)
EXIST 30" RCP STORM SEWER
EXIST 24" RCP STORM SEWER
EXIST 2" GAS LINE
EXIST 24" RCP STORM SEWER
EXIST 8" VCP SAN SEW. INV EL 114.2'
EXIST 42" RCP SAN SEWER
S=0.0013
INV EL 110.0
INV EL 110.1
EXIST 15" VCP SAN SEWER
75+04, 7'LT INV EL 120.19
76+39, 4'LT INV EL 117.37
EXIST 6" WATER LINE
THALWEG OF CREEK
76+74, 77'RT INV EL 112.09
79+67, 2'LT INV EL 118.56
79+85, 77'RT INV EL 113.33
STEEL SHEET PILING
75+22, 5'LT INV EL 109.1±
76+64, 77'RT INV EL 106.5±
76+64, 5'LT INV EL 106.6±
150
140
130
120
110
100
72+00
73+00
74+00
75+00
76+00
77+00
78+00
79+00
80+00
STATION DISTANCES ALONG CONSTRUCTION BASELINE
PROFILE
NOTES
1. ALL EXISTING UTILITIES CONFLICTING WITH NEW CHANNEL ARE TO BE RELOCATED
5
4
3



CES ALONG CONSTRUCTION BASELINE

PROFILE

NG UTILITIES CONFLICTING
FERE CHANNEL ARE TO BE
FOR D
FOR
FOR
FOR
FOR

REFERENCES
1. FOR GENERAL PLAN AND PROFILE NOTES SEE PLATE 2
2. FOR TYPICAL SECTIONS, SEE PLATE 21
3. FOR LOGS OF BORINGS, SEE PLATE 19
4. FOR SEWER DETAILS, SEE PLATE 35.
5. FOR NEW BRIDGE PROFILES SEE PLATE 23

0' 50' 100' 150'

Symbol	Revisions Descriptions	Date	Approved

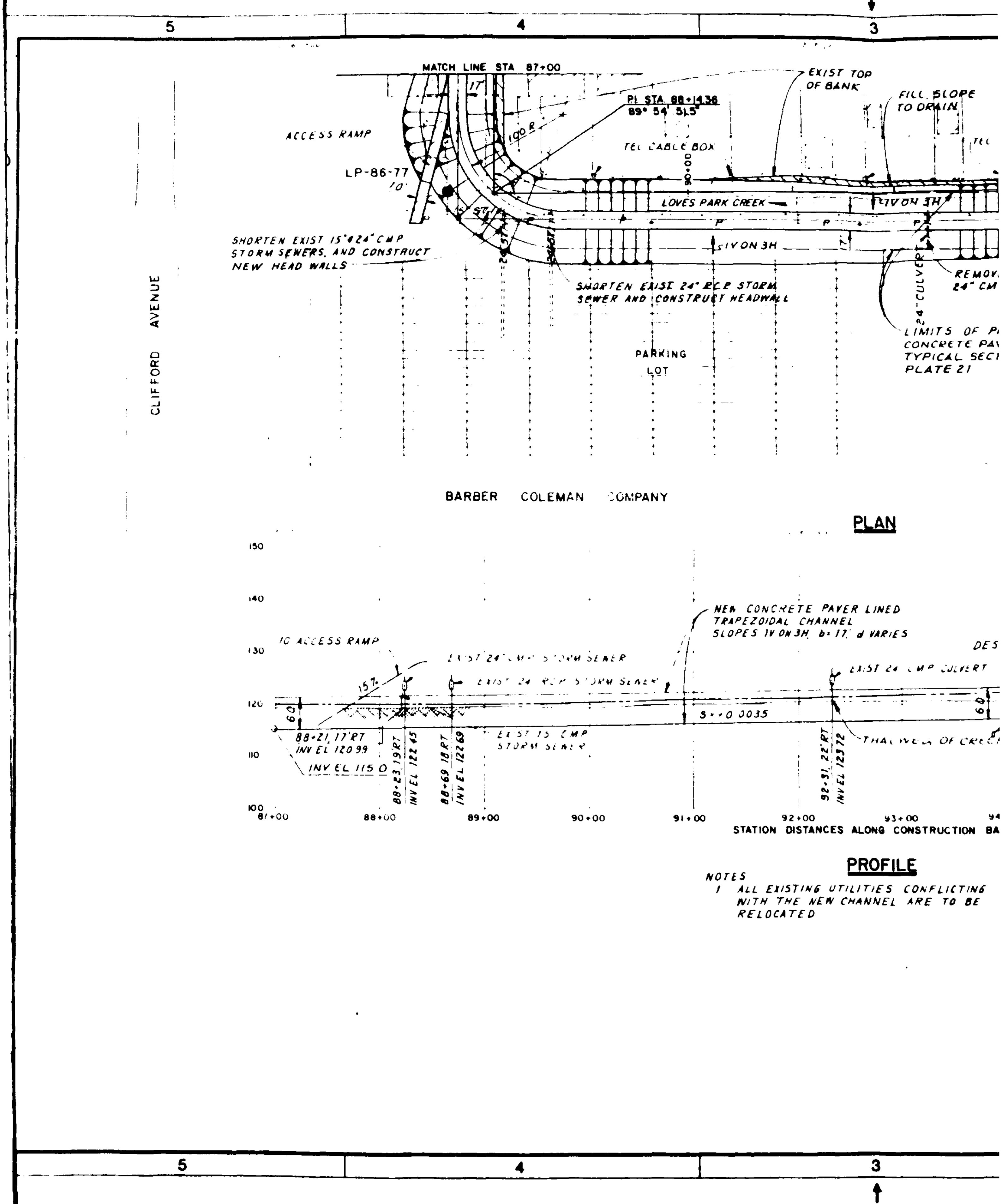
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

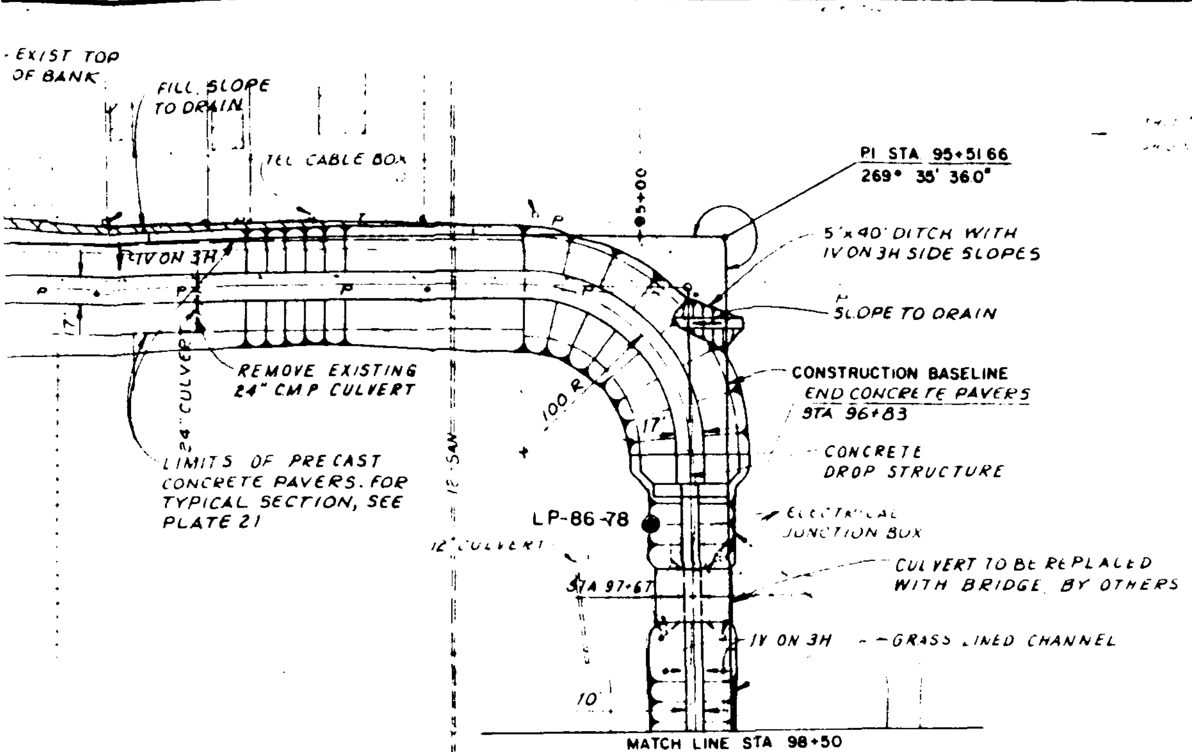
PLAN AND PROFILE
STA. 72+00 TO STA. 87+00

Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:
Scale: 1"=50'
Date:
Drawing Code:
Sheet reference number:
Sheet _ of _

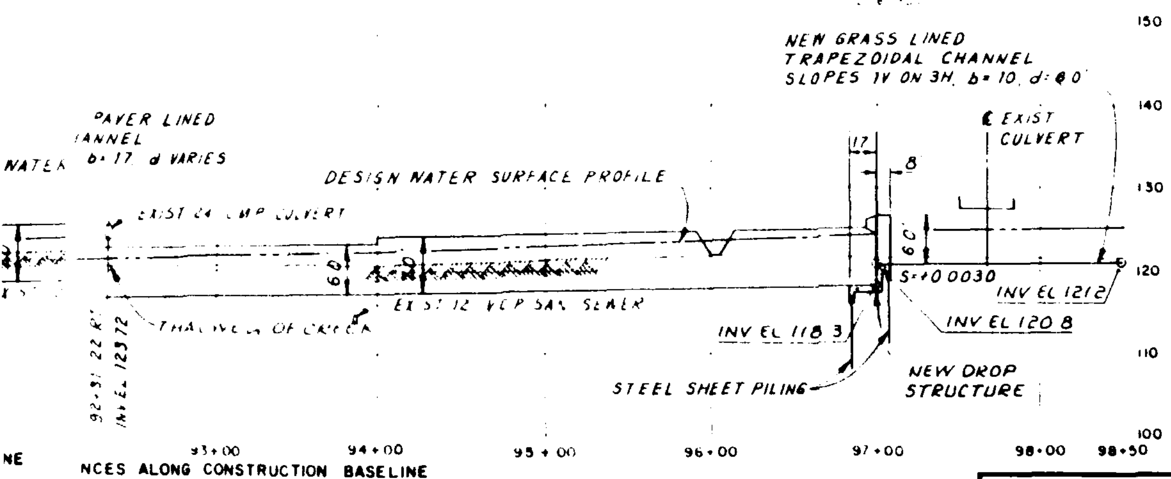
PLATE 9


5
4
3
MATCH LINE STA 87+00
EXIST TOP OF BANK
FILL SLOPE TO DRAIN
PI STA 88+14.36
89° 54' 51.5"
ACCESS RAMP
TEL CABLE BOX
90+00
LP-86-77
LOVES PARK CREEK
1V ON 3H
SHORTEN EXIST 15"&24" CMP STORM SEWERS, AND CONSTRUCT NEW HEAD WALLS
SHORTEN EXIST 24" RCP STORM SEWER AND CONSTRUCT HEADWALL
24" CULVERT
LIMITS OF P
CONCRETE PA
TYPICAL SEC
PLATE 21
CLIFFORD AVENUE
PARKING LOT
BARBER COLEMAN COMPANY
PLAN
NEW CONCRETE PAVER LINED TRAPEZOIDAL CHANNEL SLOPES 1V ON 3H, b= 17', d VARIES
TO ACCESS RAMP
EXIST 24" CMP STORM SEWER
EXIST 24" RCP STORM SEWER
EXIST 24" CMP CULVERT
S = 0.0035
88+21, 17'RT INV EL 120.99
INV EL 115.0
88+23, 19'RT INV EL 122.45
88+69, 18'RT INV EL 122.69
EXIST 15" CMP STORM SEWER
92+31, 22'RT INV EL 123.72
THALWEG OF CREEK
150
140
130
120
110
100
87+00
88+00
89+00
90+00
91+00
92+00
93+00
STATION DISTANCES ALONG CONSTRUCTION BA
PROFILE
NOTES
1 ALL EXISTING UTILITIES CONFLICTING WITH THE NEW CHANNEL ARE TO BE RELOCATED

3 | 2 | 1



PLAN



NCES ALONG CONSTRUCTION BASELINE

PROFILE

RE
1 UTILITIES CONFLICTING
2 W CHANNEL ARE TO BE
3
4
5
6

REFERENCES:
1. FOR GENERAL PLAN AND PROFILE NOTES, SEE PLATE 2.
2. FOR TYPICAL SECTIONS, SEE PLATE 21.
3. FOR LOGS OF BORINGS SEE PLATE 19.
4. FOR SEWER DETAILS, SEE PLATE 35.
5. FOR NEW BRIDGE PROFILES, SEE PLATE 23.
6. FOR DETAILS OF DROP STRUCTURE AT STA 97+00, SEE PLATE 27.

0' 50' 100' 150'

Symbol	Revisions Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

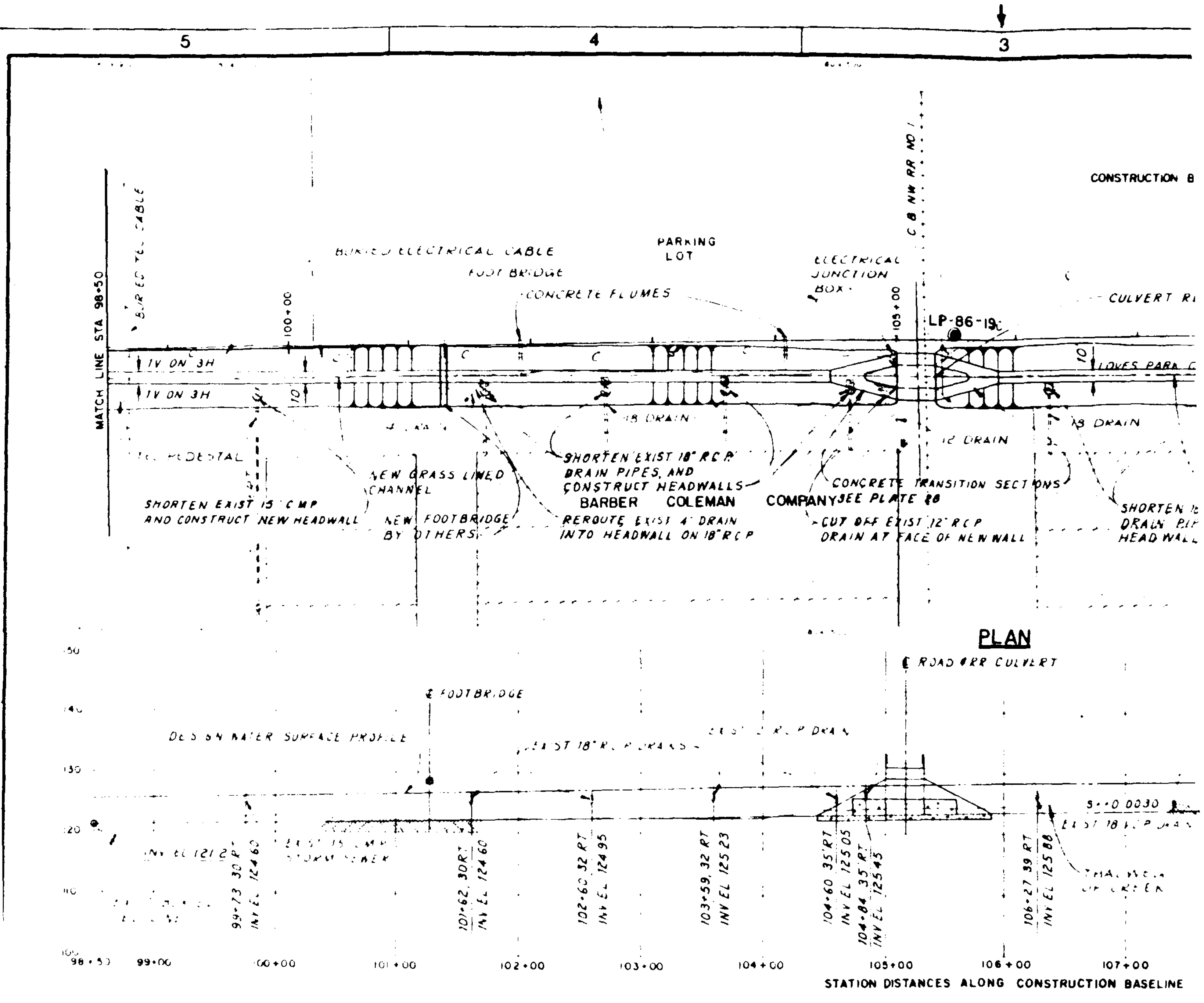
Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

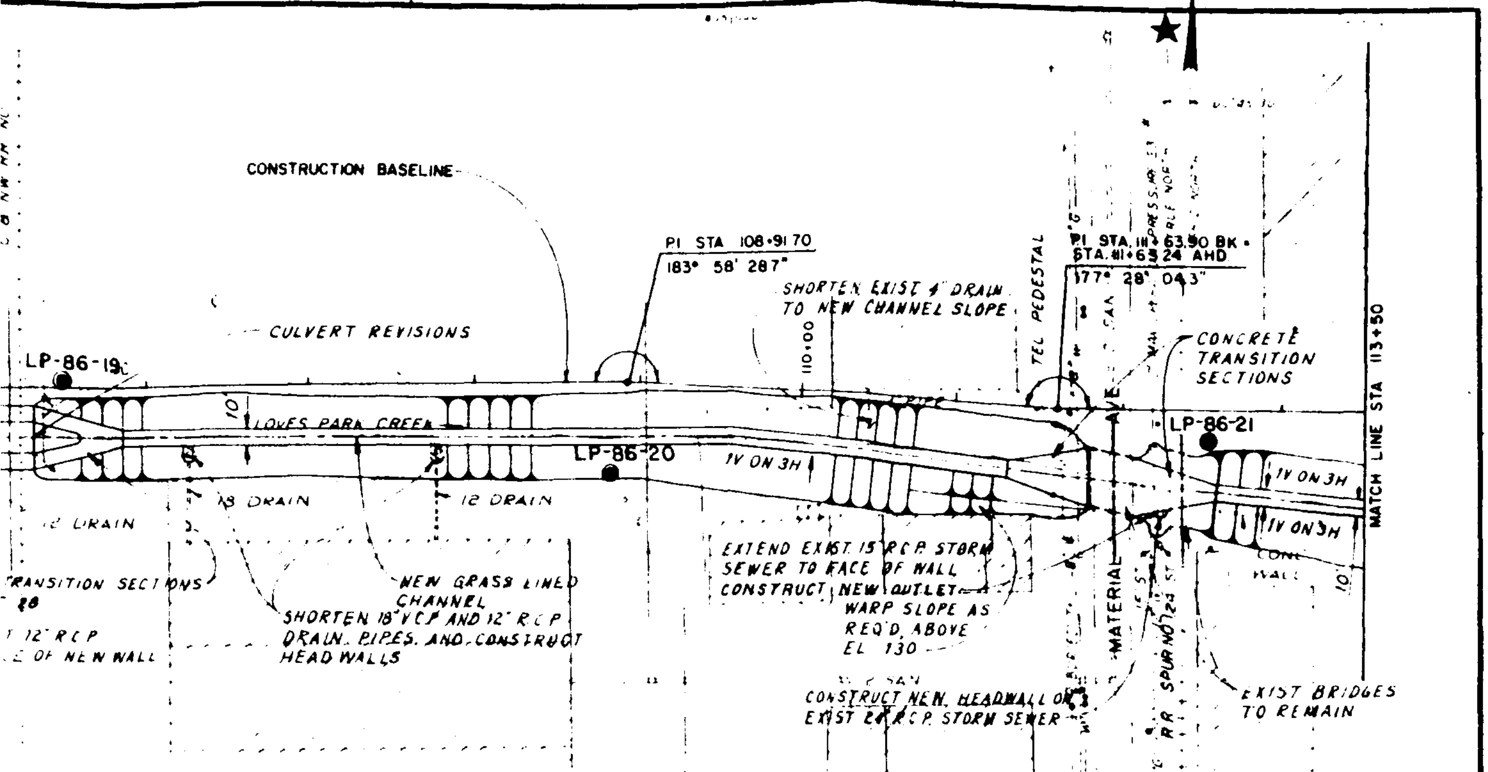
PLAN AND PROFILE
STA. 87+00 TO STA. 98+50

Scale: 1"=50.0' | Sheet reference number:
Date:
Drawing Code:
Sheet _ of _

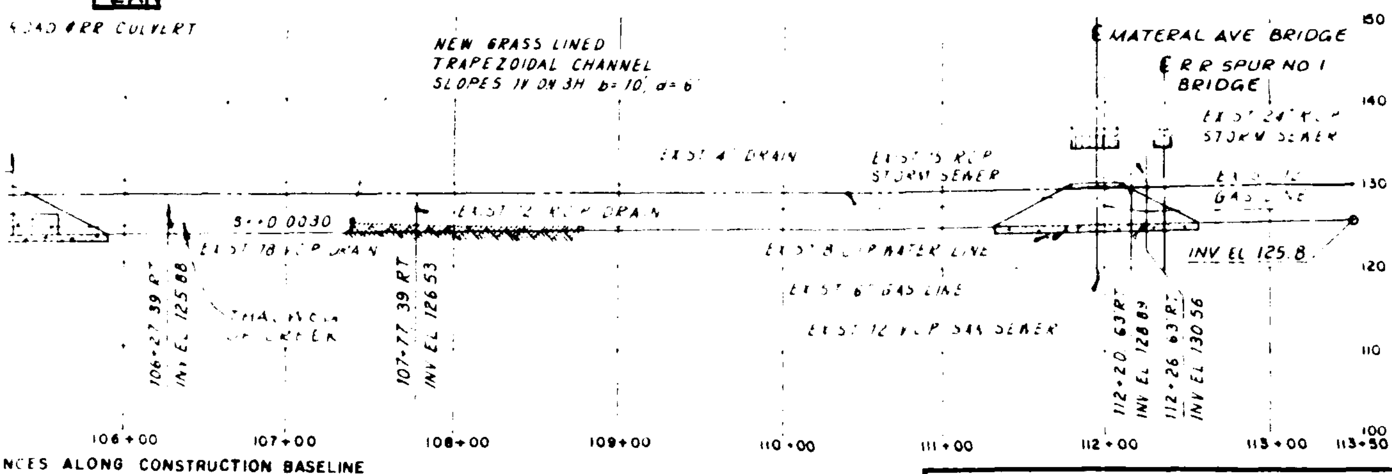
3 | 2 | 1 | **PLATE 10**



NOTES
1 ALL EXISTING UTILITIES CONFLICTING WITH THE NEW CHANNEL ARE TO BE RELOCATED



PLAN



PROFILE

...ISTING UTILITIES CONFLICTING ...THE NEW CHANNEL ARE TO BE ...ATED

REFERENCES.
1 FOR GENERAL PLAN AND PROFILE NOTES, SEE PLATE 2
2 FOR TYPICAL SECTIONS, SEE PLATE 21
3 FOR LOGS OF BORINGS, SEE PLATE 19
4 FOR SEWER DETAILS SEE PLATE 35
5 FOR CHANNEL SECTIONS AT EXIST BRIDGES, SEE PLATES 25 & 26
6 FOR NEW BRIDGE PROFILES, SEE PLATE 23

0' 50' 100' 150'

Symbol	Revisions Descriptions	Date	Approved

U S ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

PLAN AND PROFILE
STA. 98+50 TO STA. 113+50

Scale: 1"=50.0
Date:
Drawing Code:
Sheet reference number:
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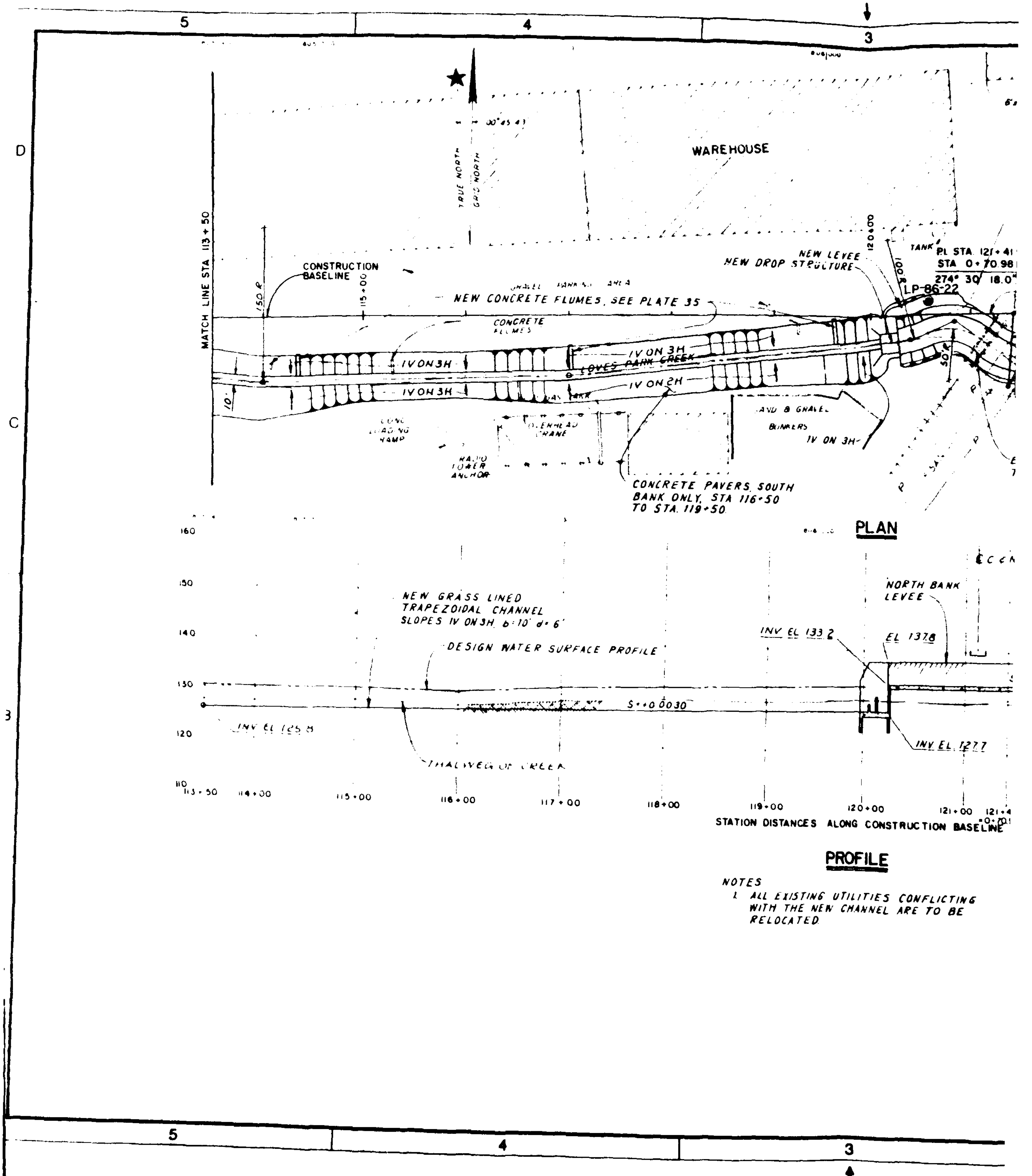
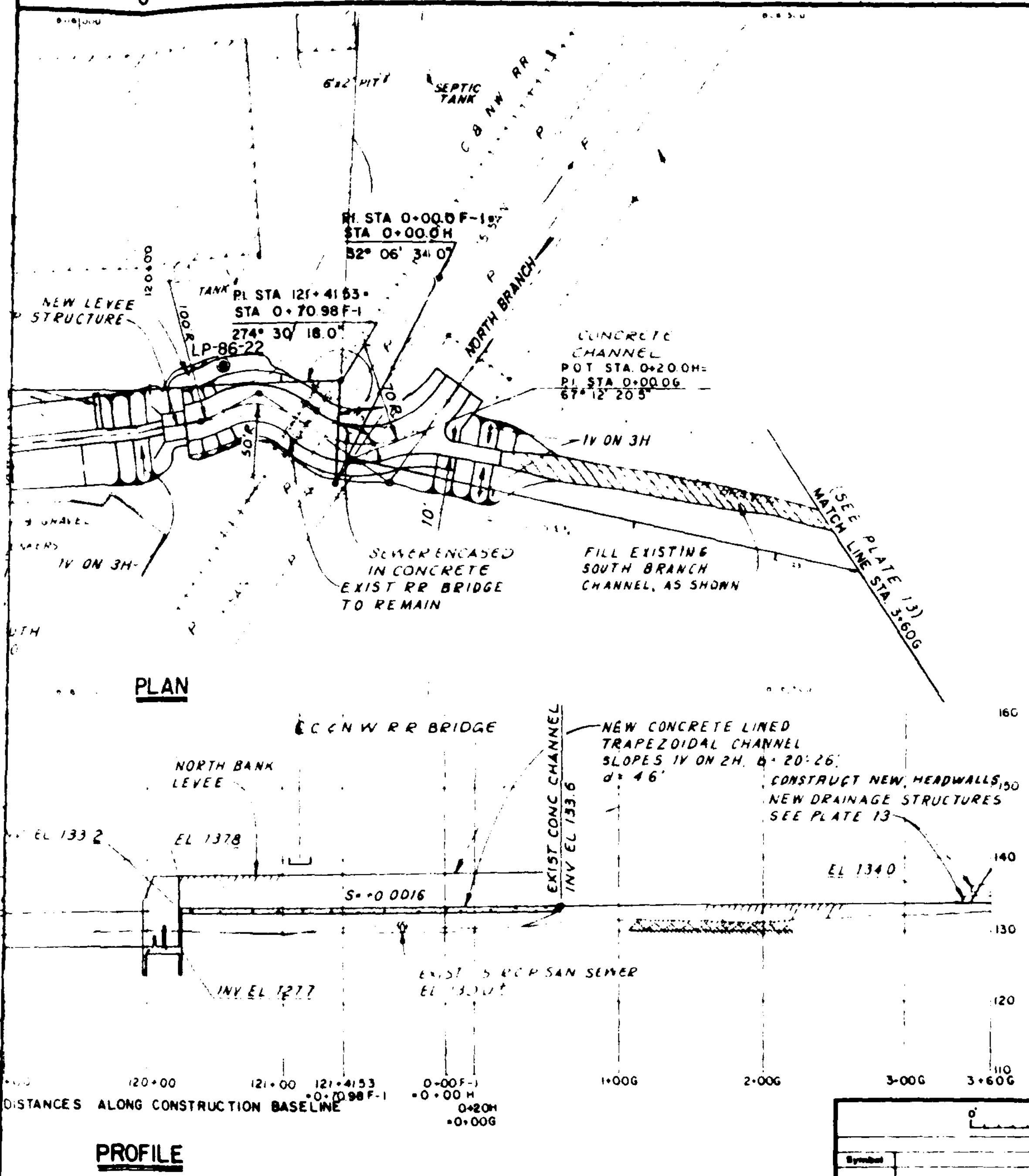


NOTES
1. ALL EXISTING UTILITIES CONFLICTING WITH THE NEW CHANNEL ARE TO BE RELOCATED.



PROFILE

ALL EXISTING UTILITIES CONFLICTING WITH THE NEW CHANNEL ARE TO BE RELOCATED

REFERENCES

1. FOR GENERAL PLAN AND PROFILE NOTES SEE PLATE 2
2. FOR TYPICAL SECTIONS, SEE PLATE 21.
3. FOR LOGS OF BORINGS, SEE PLATE 19
4. FOR SEWER DETAILS, SEE PLATE 35.
5. FOR CHANNEL SECTIONS AT EXIST BRIDGES, SEE PLATE 26
6. FOR DETAILS OF DROP STRUCTURE AT STA 120+25, SEE PLATE 28.

0' 50' 100' 150'

Symbol	Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

PLAN AND PROFILE
STA. 113+50 TO STA. 3+50H

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Drawn by:
Checked by:
Reviewed by:
Approved by:
Scale: 1"=50.0
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Drawing Code:
Sheet reference number:
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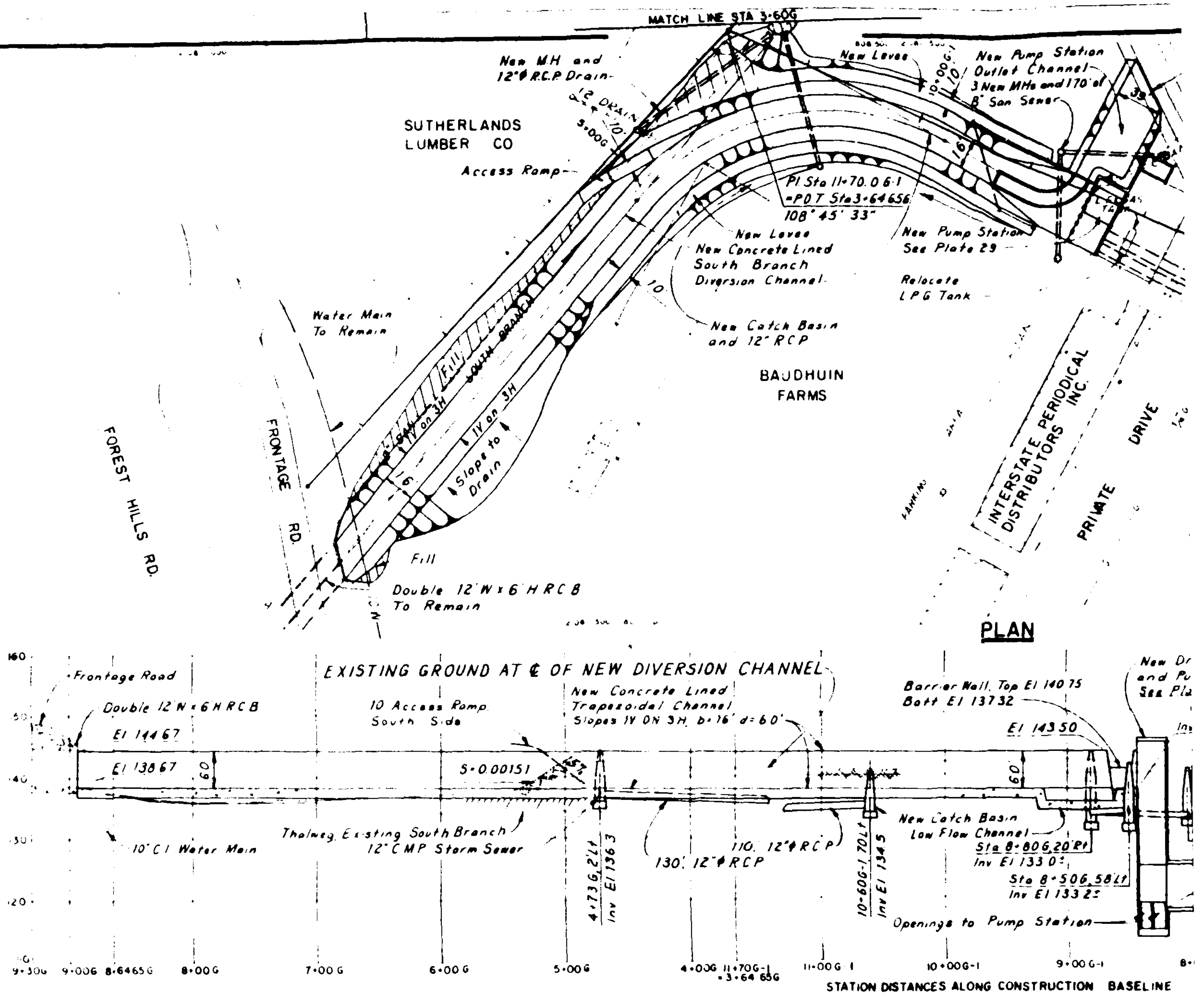
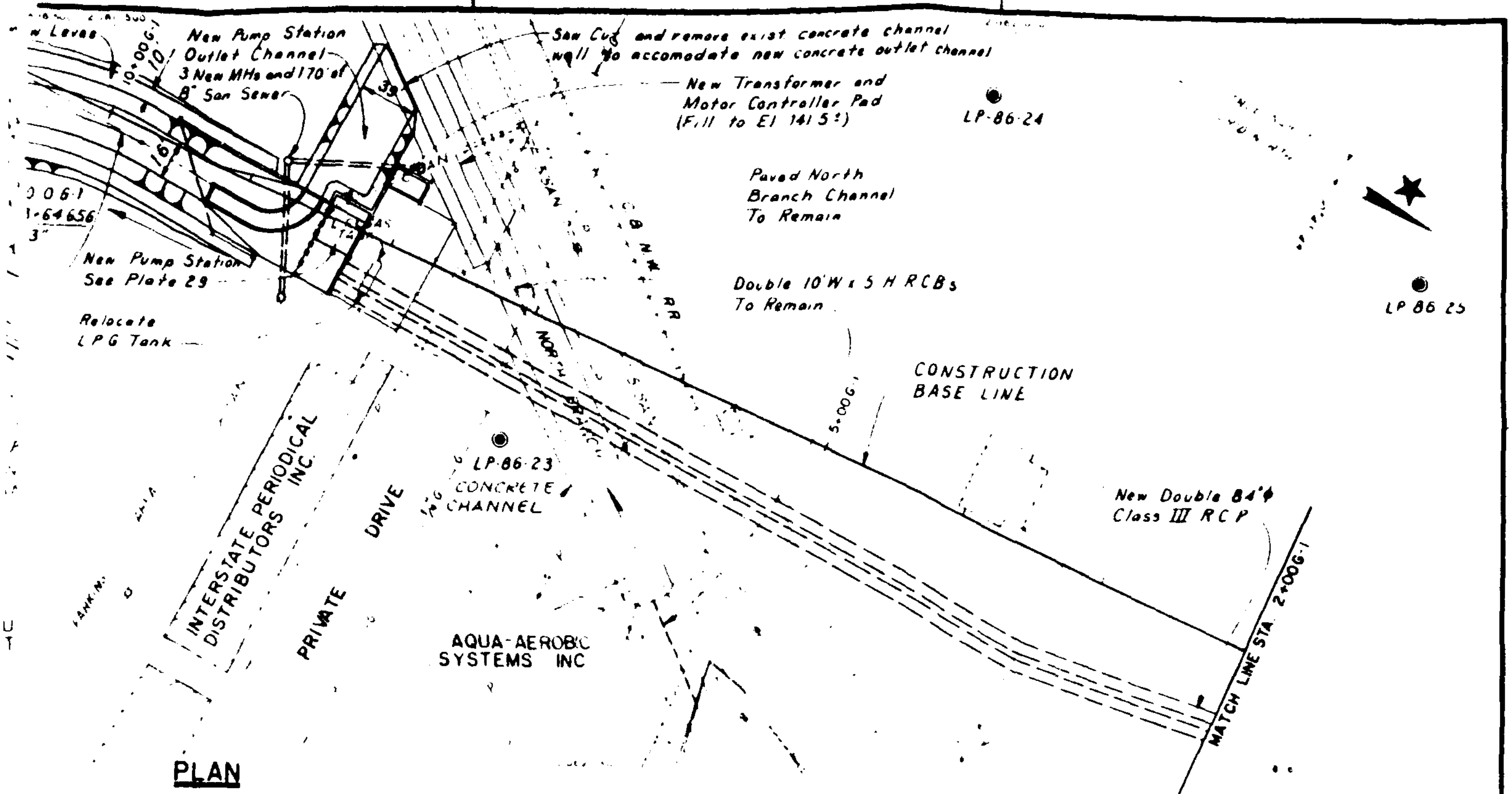
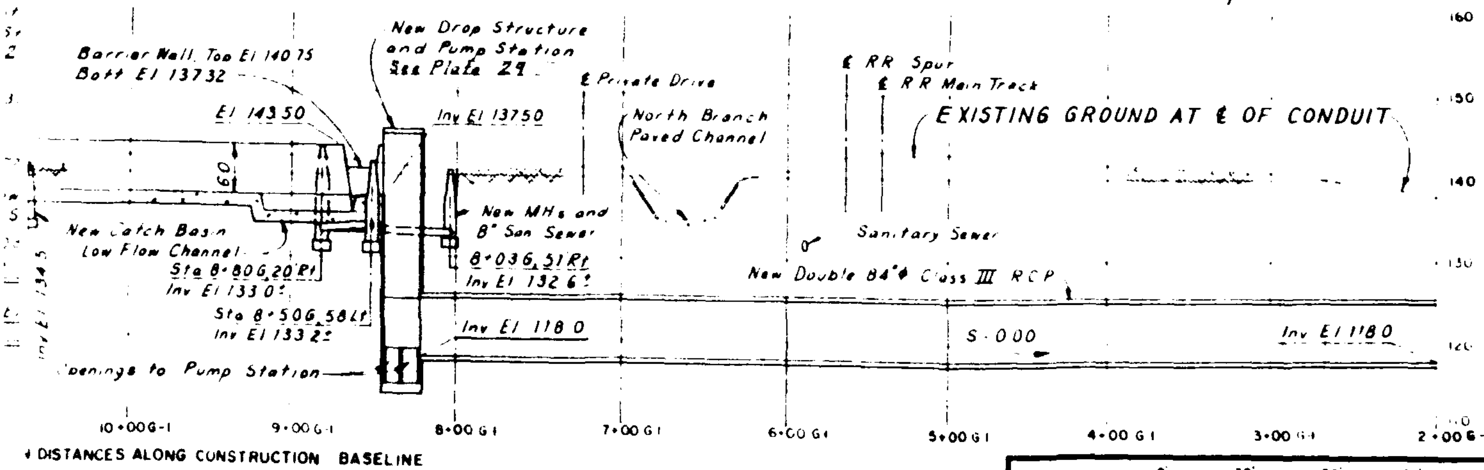


NOTES:
1. All existing utilities conflicting with the new channel are to be relocated.



PLAN



PROFILE

NOTES

existing utilities conflicting with the new channel are to be relocated

REFERENCES
1. For General Plan and Profile Notes see Plate 2.
2. For Typical Sections see Plate 29
3. For Logs of Borings see Plate 19
4. For Sewer Details see Plate 35

0' 50' 100' 150'

Revisions			
Symbol	Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

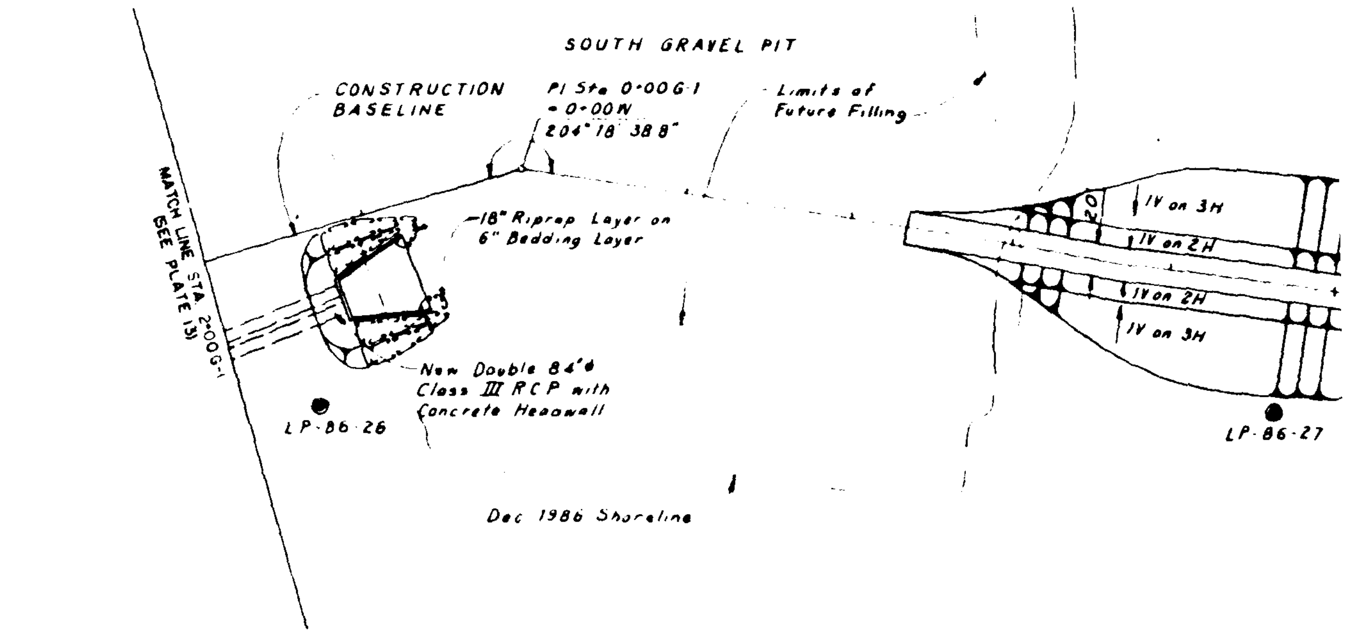
PLAN AND PROFILE
STA. 17+00G-2 TO STA. 2+00G-1

Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:
Scale: 1"=50'
Date:
Drawing Code:
Sheet reference number:
Sheet ___ of ___

PLATE 13

5 4 3

D



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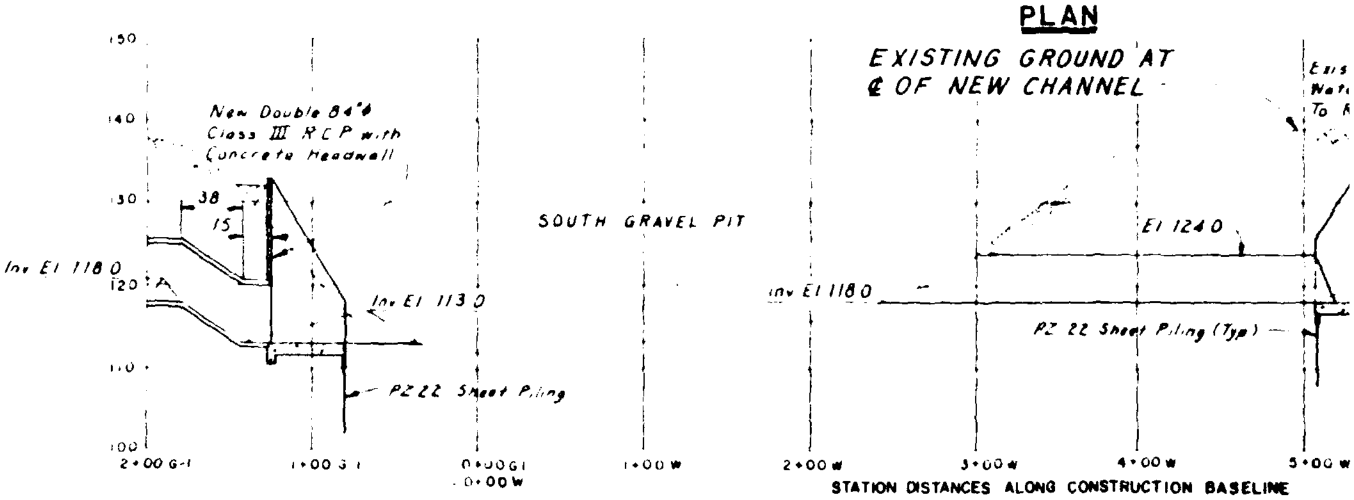
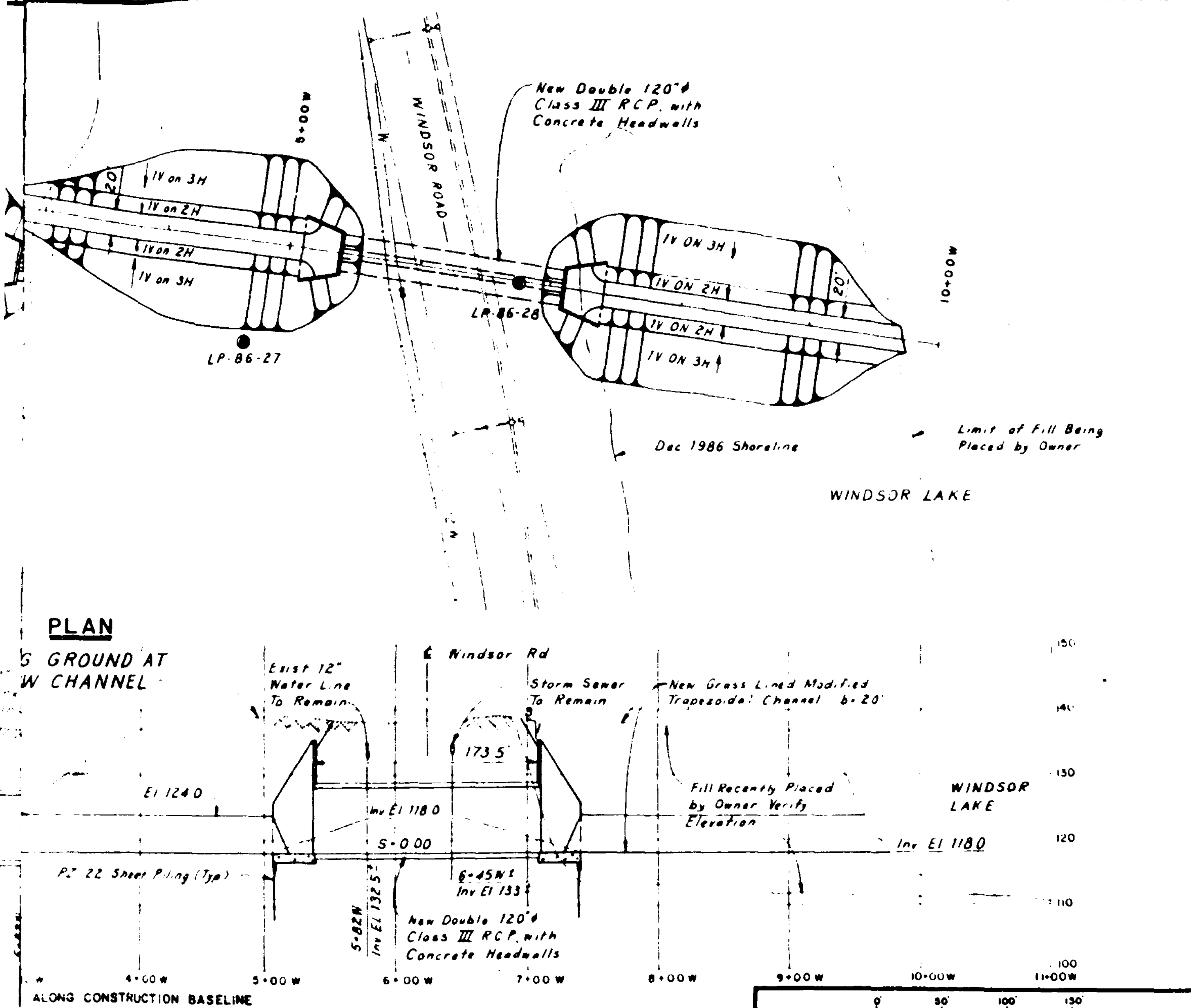


PROFILE

NOTES

1. All existing utilities conflicting with the new channel are to be relocated

5 4 3



...existing utilities conflicting ...h the new channel are to be ...ocated

REFERENCES
1. For General Plan and Profile Notes, see Plate 2
2. For Typical Section, see Plate 31
3. For Logs of Borings, see Plate 19
4. For Concrete Headwall Details, see Plates 30 & 31

0' 50' 100' 150'

Symbol	Descriptions	Date	Approved

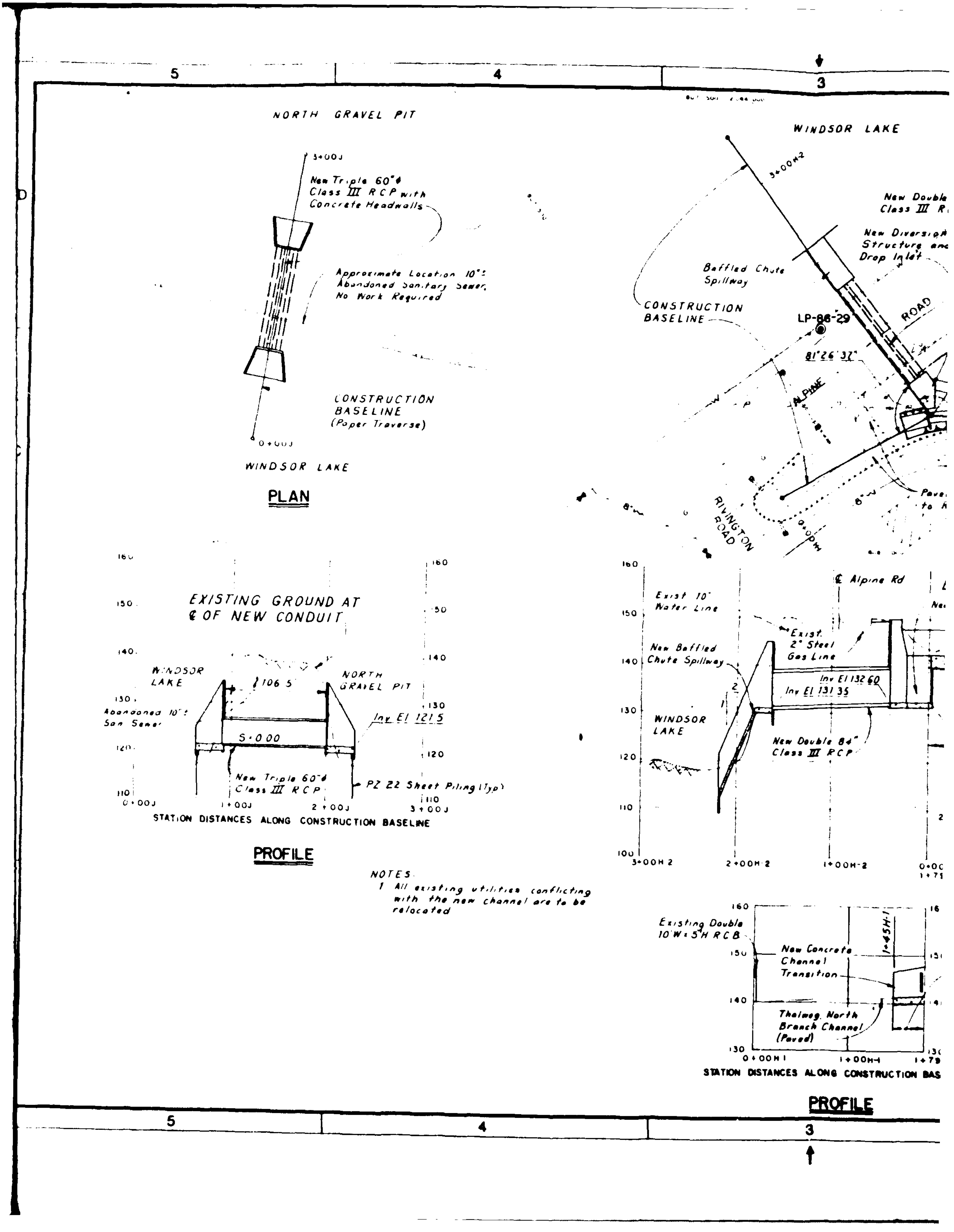
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

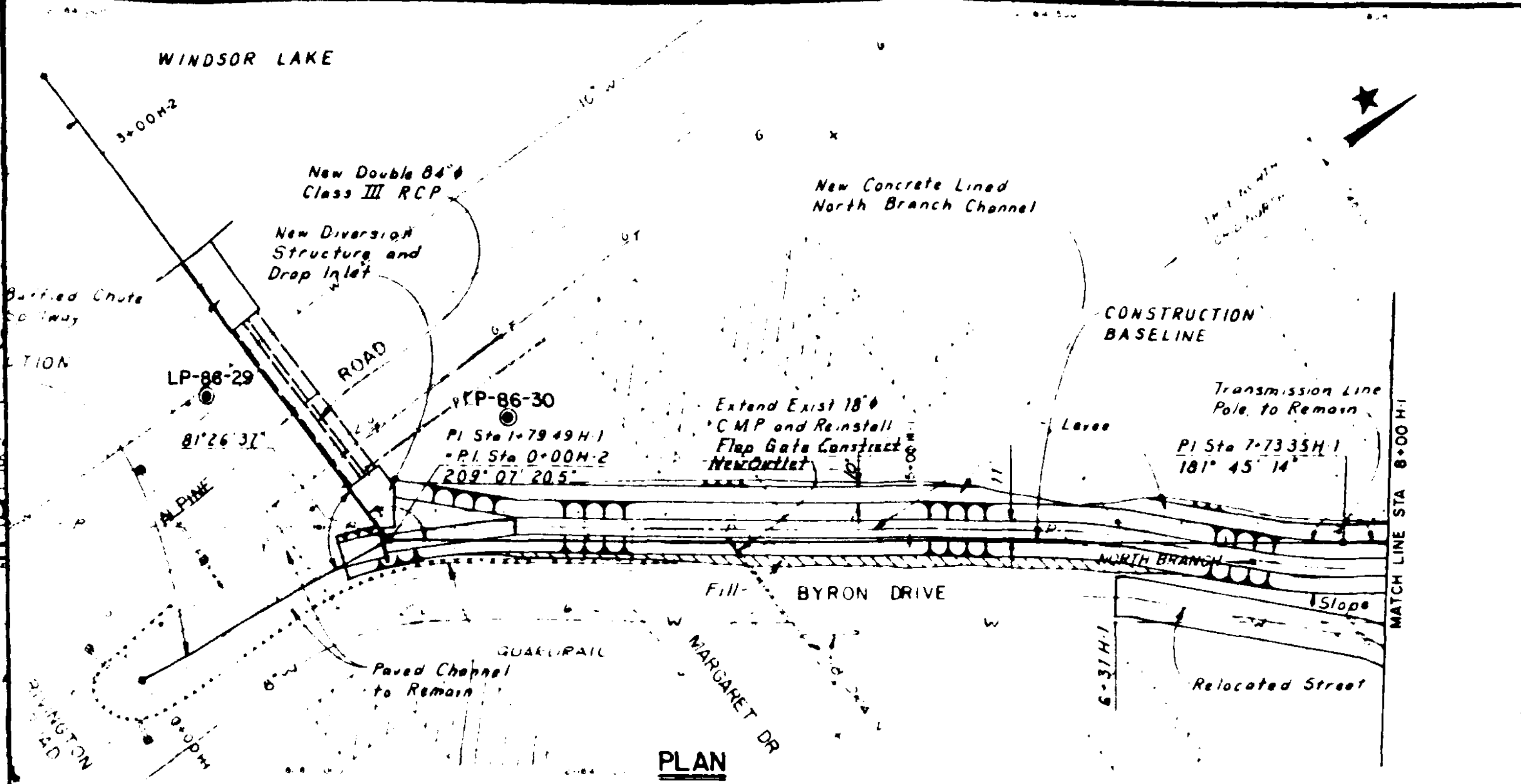
PLAN AND PROFILE
STA. 2+00G-1 TO STA. 9+00W

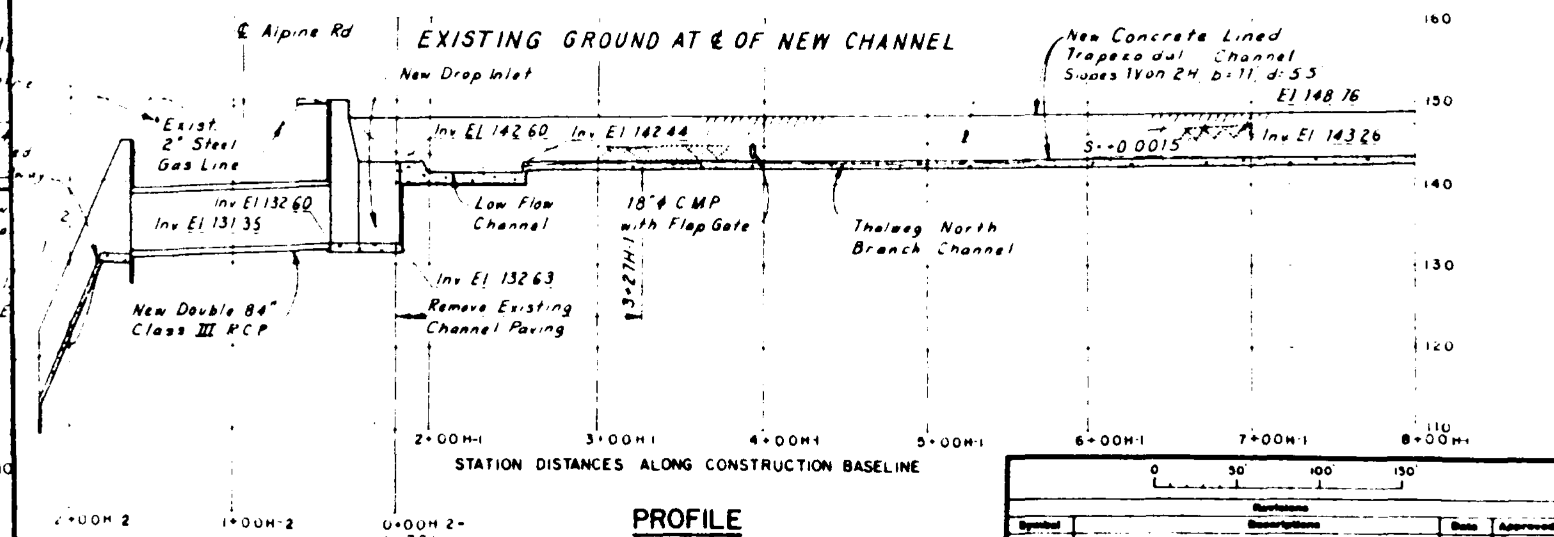
Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:
Scale: 1"=50'
Date:
Drawing Code:
Sheet reference number:
Sheet _ of _

PLATE 14



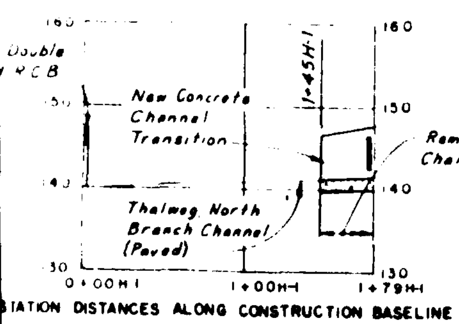
NORTH GRAVEL PIT
3+00J
New Triple 60"ϕ Class III RCP with Concrete Headwalls
Approximate Location 10"± Abandoned Sanitary Sewer, No Work Required
CONSTRUCTION BASELINE (Paper Traverse)
0+00J
WINDSOR LAKE
PLAN
EXISTING GROUND AT ℄ OF NEW CONDUIT
WINDSOR LAKE
NORTH GRAVEL PIT
106.5
Abandoned 10"± San Sewer
S=0.00
Inv El 121.5
New Triple 60"ϕ Class III RCP
PZ 22 Sheet Piling (Typ)
STATION DISTANCES ALONG CONSTRUCTION BASELINE
PROFILE
NOTES
1 All existing utilities conflicting with the new channel are to be relocated
WINDSOR LAKE
3+00H-2
New Double
Class III R
New Diversion Structure and Drop Inlet
Baffled Chute Spillway
CONSTRUCTION BASELINE
LP-88-29
81°26'32"
ROAD
ALPINE
RIVINGTON ROAD
0+00H
℄ Alpine Rd
Exist 10" Water Line
Exist. 2" Steel Gas Line
New Baffled Chute Spillway
Inv El 132.60
Inv El 131.35
WINDSOR LAKE
New Double 84" Class III RCP
3+00H-2
2+00H-2
1+00H-2
Existing Double 10'W×5'H RCB
New Concrete Channel Transition
Thalweg North Branch Channel (Paved)
0+00H-1
1+00H-1
STATION DISTANCES ALONG CONSTRUCTION BAS
PROFILE





PROFILE

REFERENCES:
1. For General Plan and Profile Notes, see Plate 2
2. For Typical Sections see Plate 22
3. For Logs of Borings see Plate 20
4. For Concrete Headwall Details, see Plate 30
5. For Drop Inlet Details, see Plate 32
6. For Spillway Details, see Plate 33



PROFILE

Symbol	Descriptions	Date	Approved

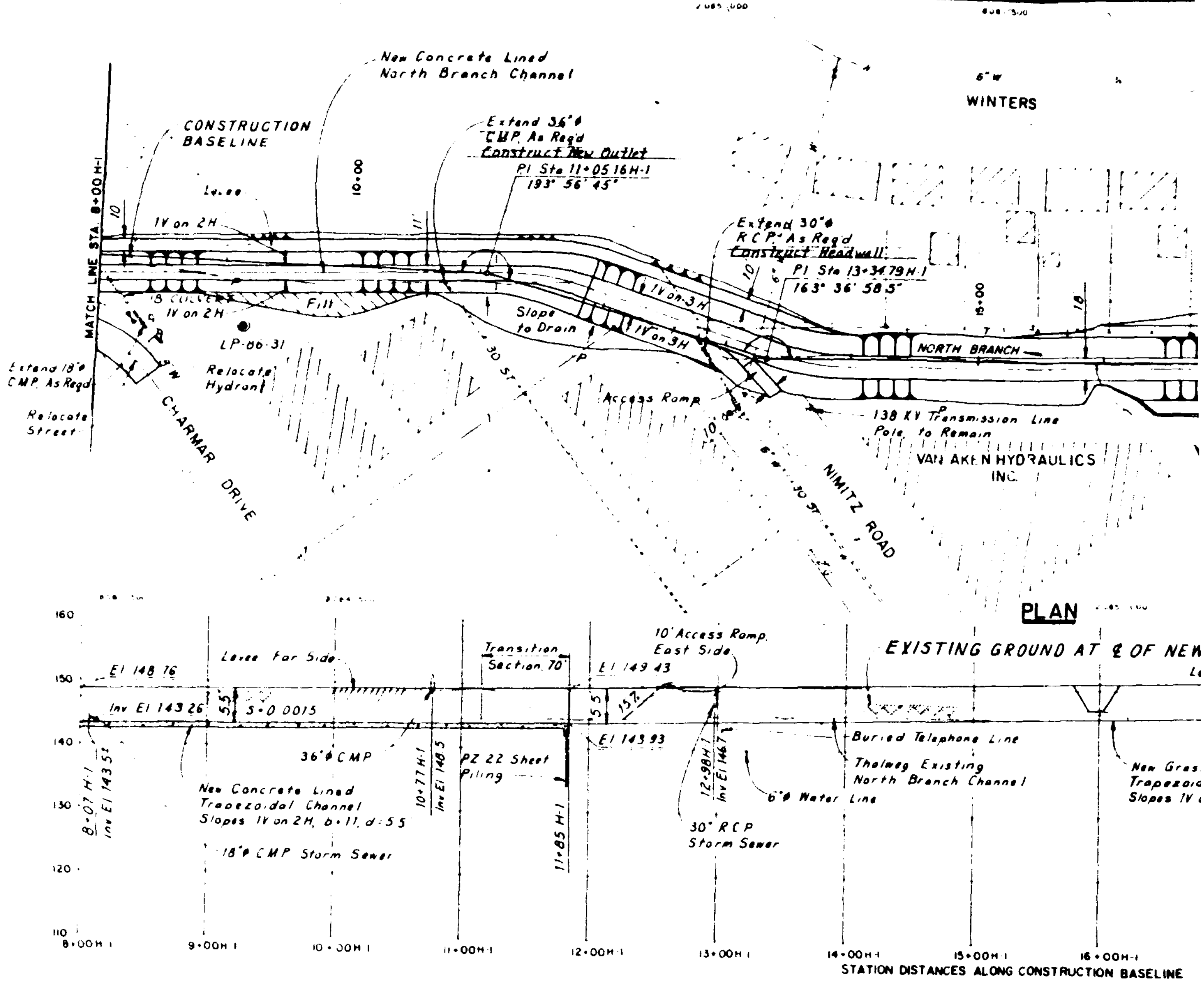
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

PLAN AND PROFILE
STA. 3+00H-2 TO STA. 8+00H-1

Designed by: | Drawn by: | Checked by: | Reviewed by: | Approved by:
Scale: 1"=50'0"
Date:
Drawing Code:
Sheet reference number:
Sheet __ of __

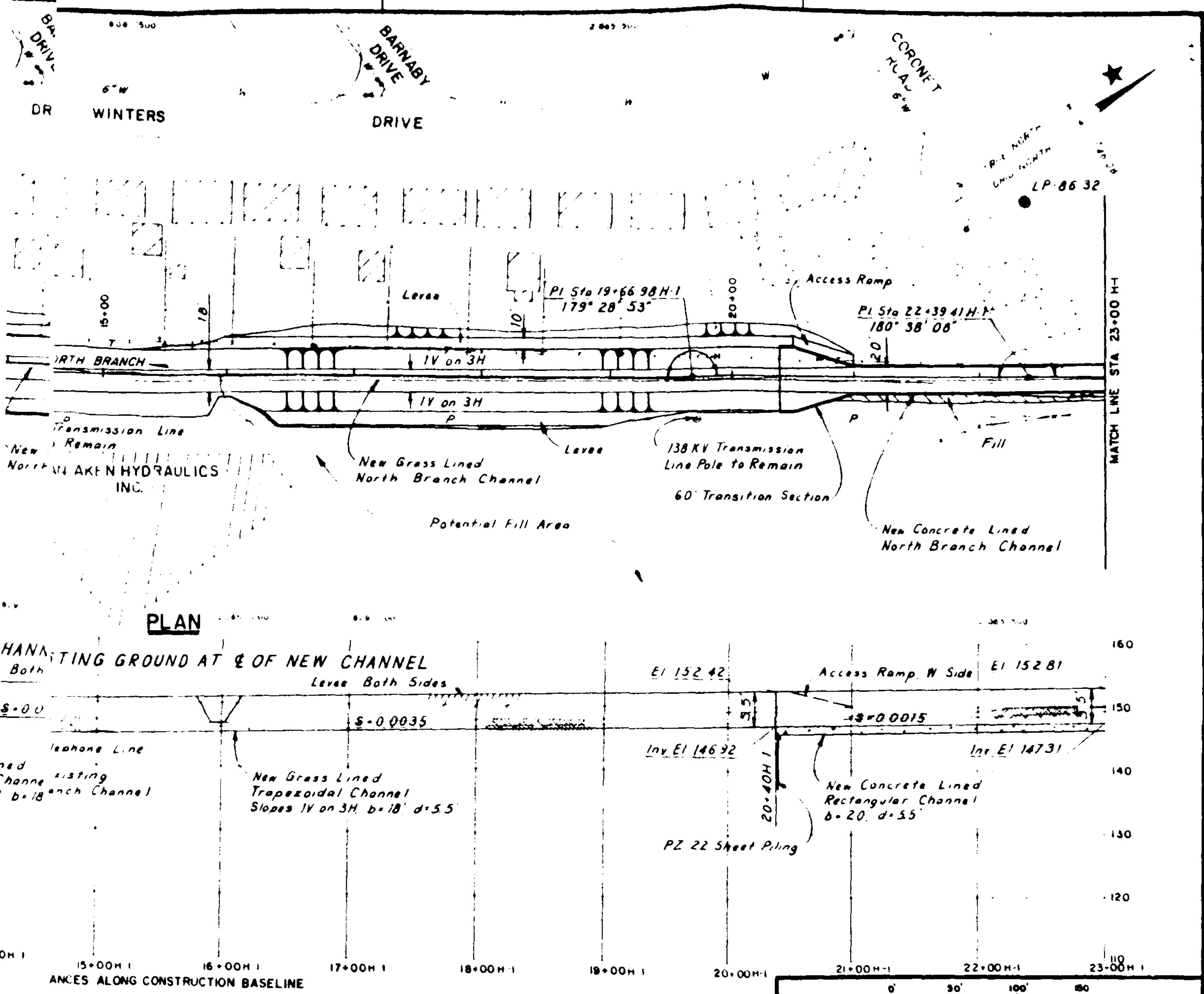
PLATE 15



PROFILE

NOTES:

1. All existing utilities conflicting with the new channel are to be relocated



PROFILE

REFERENCES

1. For General Plan and Profile Notes, see Plate 2
2. For Typical Sections, see Plate 22
3. For Logs of Borings, see Plate 20
4. For Details of Transition Sections, see Plate 34

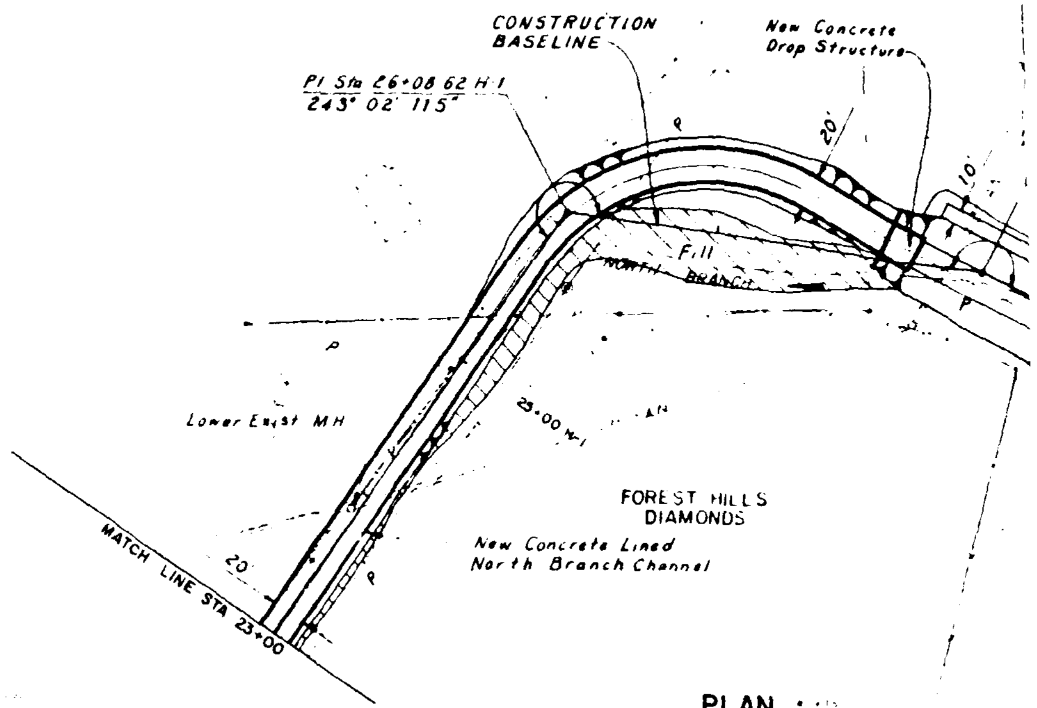
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

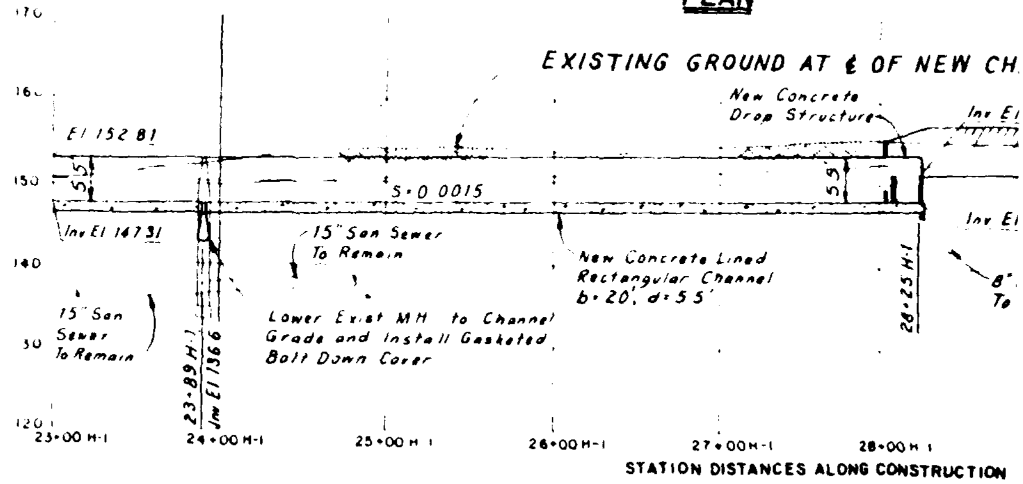
PLAN AND PROFILE
STA. 8+00H-1 TO STA. 23+00H-1

Scale: 1"=50.0'

PLATE 16



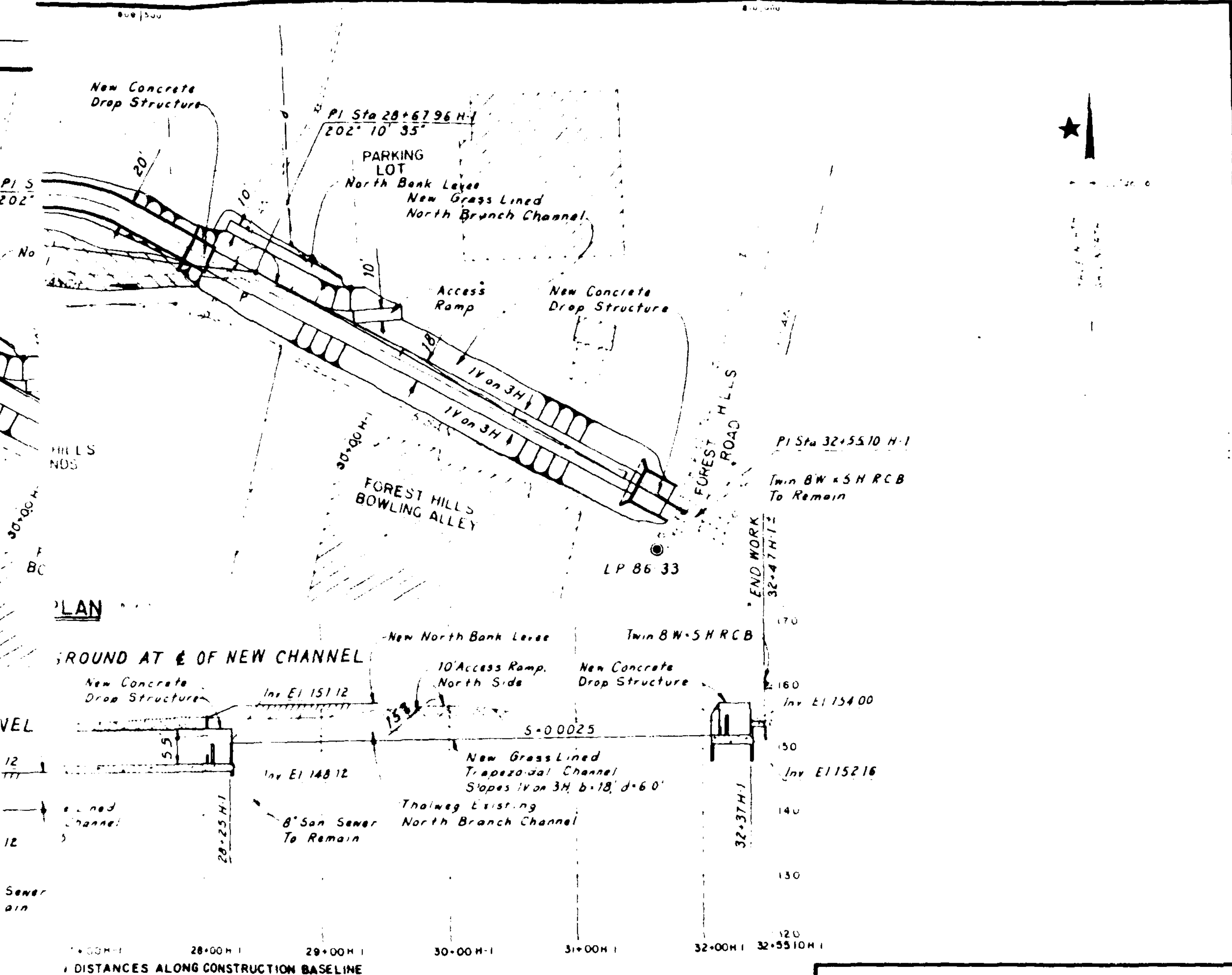
PLAN



PROFILE

NOTES

1 All existing utilities conflicting with the new channel are to b relocated



PROFILE

All existing utilities conflicting with the new channel are to be relocated.

REFERENCES

1. For General Plan and Profile Notes see Plate 2
2. For Typical Sections see Plate 22
3. For Logs of Borings see Plate 20
4. For Details of Drop Structures see Plate 34.

Symbol	Descriptions	Date	Approved

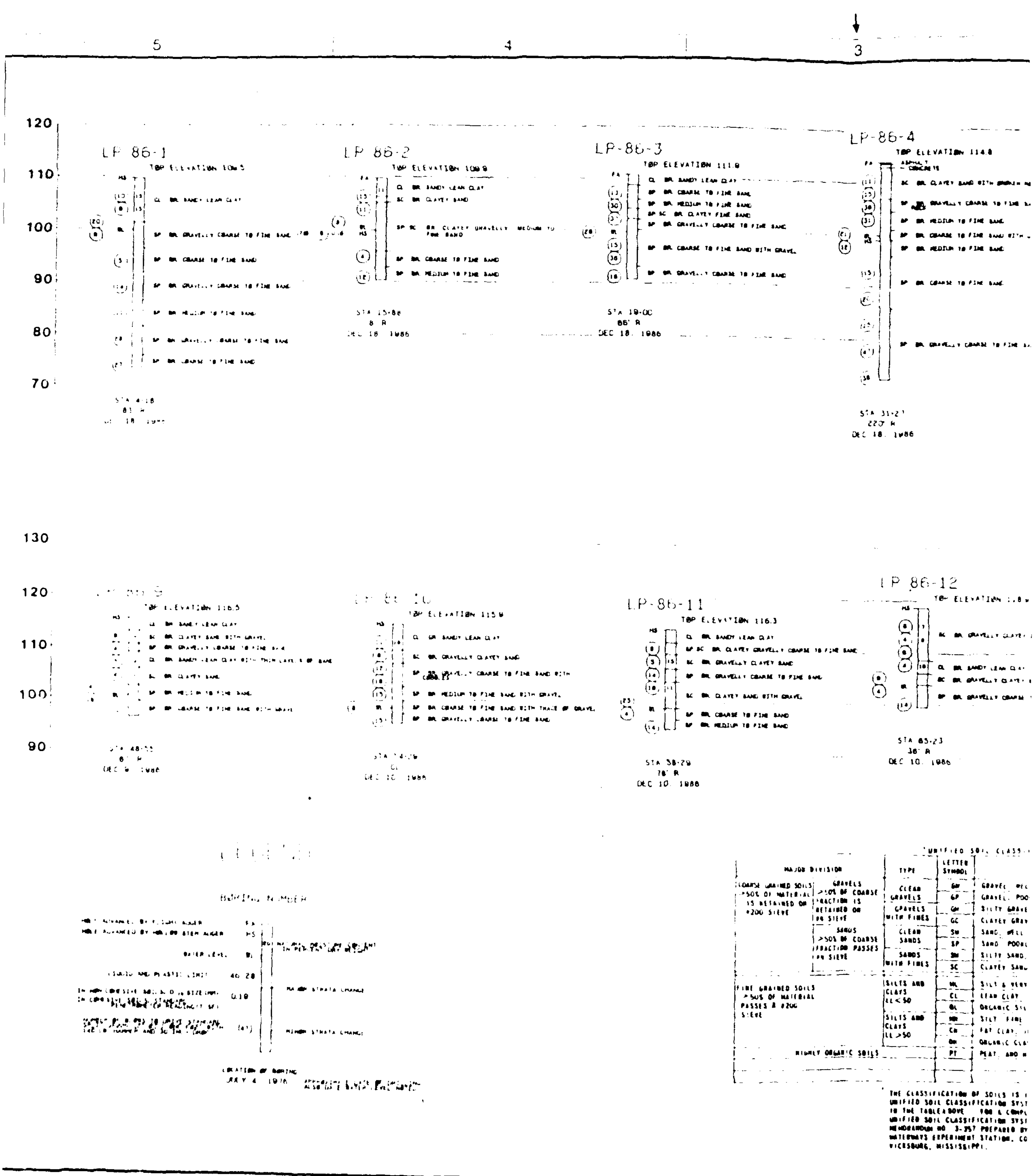
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

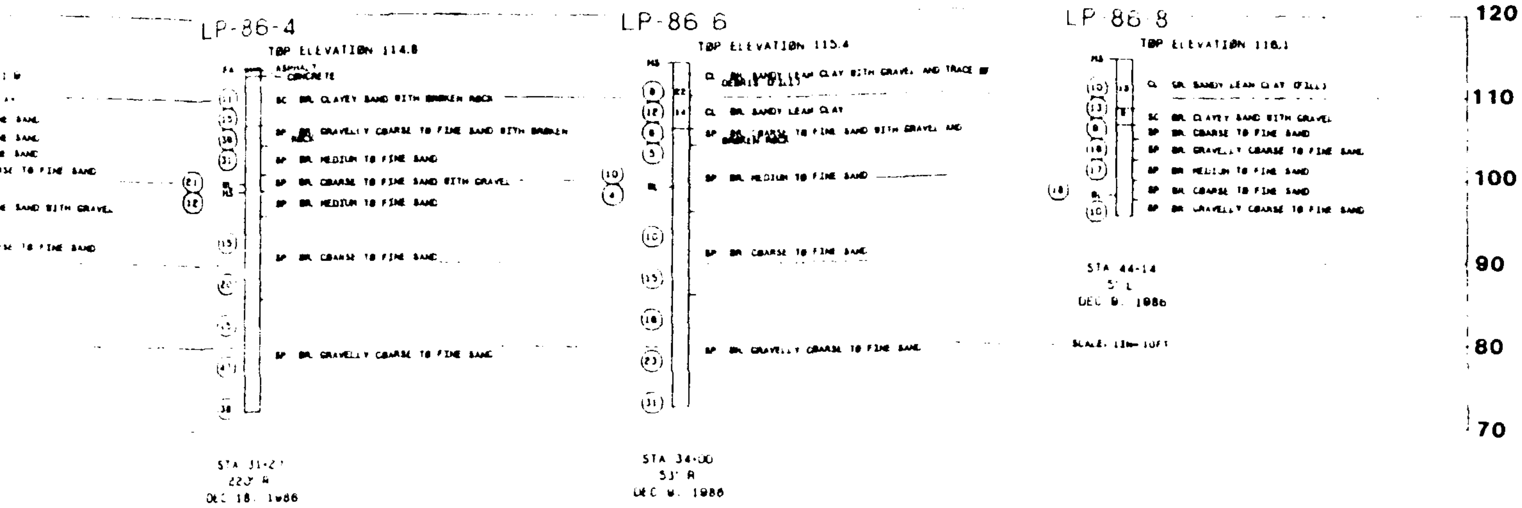
PLAN AND PROFILE
STA. 23+00H-1 TO STA. 32+55.1H-1

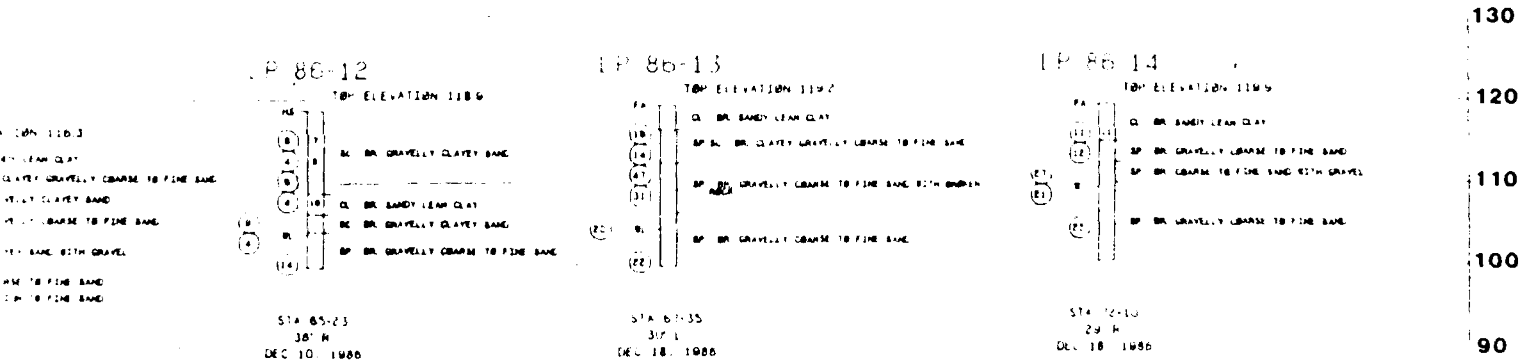
Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:
Scale:
Date:
Drawing Code:
Sheet reference number:
Sheet _ of _

PLATE 17



5
4
3
120
110
100
90
80
70
LP 86-1
TOP ELEVATION 109.5
CL BR SANDY LEAN CLAY
SP BR GRAVELLY COARSE TO FINE SAND
SP BR COARSE TO FINE SAND
SP BR GRAVELLY COARSE TO FINE SAND
SP BR MEDIUM TO FINE SAND
SP BR GRAVELLY COARSE TO FINE SAND
SP BR COARSE TO FINE SAND
LP 86-2
TOP ELEVATION 109.9
CL BR SANDY LEAN CLAY
SC BR CLAYEY SAND
SP SC BR CLAYEY GRAVELLY MEDIUM TO FINE SAND
SP BR COARSE TO FINE SAND
SP BR MEDIUM TO FINE SAND
STA 15+88
8' R
DEC 18, 1986
LP-86-3
TOP ELEVATION 111.0
CL BR SANDY LEAN CLAY
SP BR COARSE TO FINE SAND
SP BR MEDIUM TO FINE SAND
SP SC BR CLAYEY FINE SAND
SP BR GRAVELLY COARSE TO FINE SAND
SP BR COARSE TO FINE SAND WITH GRAVEL
SP BR GRAVELLY COARSE TO FINE SAND
STA 19+00
86' R
DEC 18, 1986
LP-86-4
TOP ELEVATION 114.8
ASPHALT
CONCRETE
SC BR CLAYEY SAND
SP BR MEDIUM TO FINE SAND
SP BR MEDIUM TO FINE SAND
SP BR COARSE TO FINE SAND
SP BR GRAVELLY COARSE TO FINE SAND
STA 31+21
220' R
DEC 18, 1986
130
120
110
100
90
TOP ELEVATION 116.5
CL BR SANDY LEAN CLAY
SC BR CLAYEY SAND WITH GRAVEL
SC BR CLAYEY SAND
SP BR MEDIUM TO FINE SAND
TOP ELEVATION 115.9
CL BR SANDY LEAN CLAY
SC BR GRAVELLY CLAYEY SAND
SP BR MEDIUM TO FINE SAND WITH GRAVEL
SP BR COARSE TO FINE SAND WITH TRACE OF GRAVEL
LP-86-11
TOP ELEVATION 116.3
CL BR SANDY LEAN CLAY
SC BR GRAVELLY CLAYEY SAND
SP BR GRAVELLY COARSE TO FINE SAND
SC BR CLAYEY SAND WITH GRAVEL
SP BR COARSE TO FINE SAND
SP BR MEDIUM TO FINE SAND
STA 58+29
78' R
DEC 10, 1986
LP 86-12
CL BR SANDY LEAN CLAY
STA 65+23
36' R
DEC 10, 1986
BORING NUMBER
WATER LEVEL
MAJOR STRATA CHANGE
MINOR STRATA CHANGE
LOCATION OF BORING
UNIFIED SOIL CLASS
MAJOR DIVISION
TYPE
LETTER SYMBOL
COARSE GRAINED SOILS >50% OF MATERIAL IS RETAINED ON #200 SIEVE
GRAVELS >50% OF COARSE FRACTION IS RETAINED ON #4 SIEVE
SANDS >50% OF COARSE FRACTION PASSES #4 SIEVE
CLEAN GRAVELS
GRAVELS WITH FINES
CLEAN SANDS
SANDS WITH FINES
GW
GP
GM
GC
SW
SP
SM
SC
FINE GRAINED SOILS >50% OF MATERIAL PASSES #200 SIEVE
SILTS AND CLAYS LL<50
SILTS AND CLAYS LL>50
ML
CL
OL
MH
CH
OH
HIGHLY ORGANIC SOILS
PT
THE CLASSIFICATION OF SOILS IS
UNIFIED SOIL CLASSIFICATION SYST
MEMORANDUM NO. 3-357 PREPARED BY
WATERWAYS EXPERIMENT STATION, CO
VICKSBURG, MISSISSIPPI.





UNIFIED SOIL CLASSIFICATION

MAJOR DIVISION		TYPE	LETTER SYMBOL	TYPICAL NAMES
... GRAINED SOILS ... OF MATERIAL ... RETAINED ON #200 SIEVE	GRAVELS >50% OF COARSE FRACTION IS RETAINED ON #4 SIEVE	CLEAN GRAVELS	GW	GRAVEL, WELL GRADED, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	GRAVEL, POORLY GRADED, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES	GM	SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVEL, GRAVEL-SAND-CLAY MIXTURES
	SANDS >50% OF COARSE FRACTION PASSES #4 SIEVE	CLEAN SANDS	SW	SAND, WELL GRADED, GRAVELLY SANDS
			SP	SAND, POORLY GRADED, GRAVELLY SANDS
		SANDS WITH FINES	SM	SILTY SAND, SAND-SILT MIXTURES
			SC	CLAYEY SAND, SAND-CLAY MIXTURES
... GRAINED SOILS ... OF MATERIAL PASSES # #200 ...EVE		SILTS AND CLAYS LL<50	ML	SILT & VERY FINE SAND, SILTY OR CLAYEY FINE SAND OR CLAYEY SILT
			CL	LEAN CLAY, SANDY CLAY, SILTY CLAY, OF LOW TO MEDIUM PLASTICITY
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
		SILTS AND CLAYS LL>50	MH	SILT, FINE SANDY OR SILTY SOIL WITH HIGH PLASTICITY
			CH	FAT CLAY, INORGANIC CLAY OF HIGH PLASTICITY
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, AND HIGHLY ORGANIC SOIL

THE CLASSIFICATION OF SOILS IS IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM BRIEFLY PRESENTED IN THE TABLE ABOVE. FOR A COMPLETE DESCRIPTION OF THE UNIFIED SOIL CLASSIFICATION SYSTEM REFER TO TECHNICAL MEMORANDUM NO. 3-357 PREPARED BY THE U. S. ARMY ENGINEER WATERWAYS EXPERIMENT STATION, CORPS OF ENGINEERS, VICKSBURG, MISSISSIPPI.

Symbol	Revisions Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

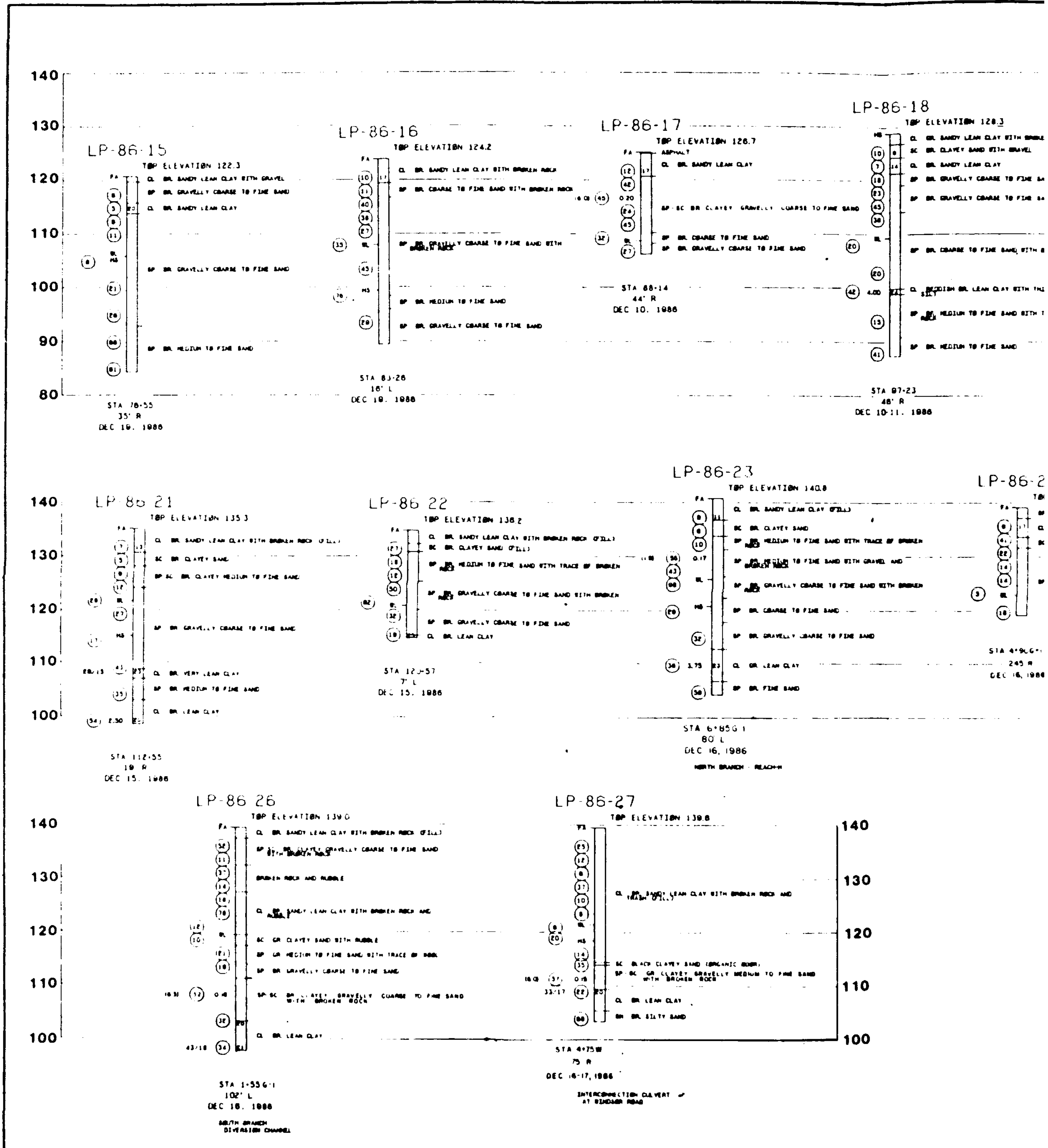
LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

BORING LOGS I

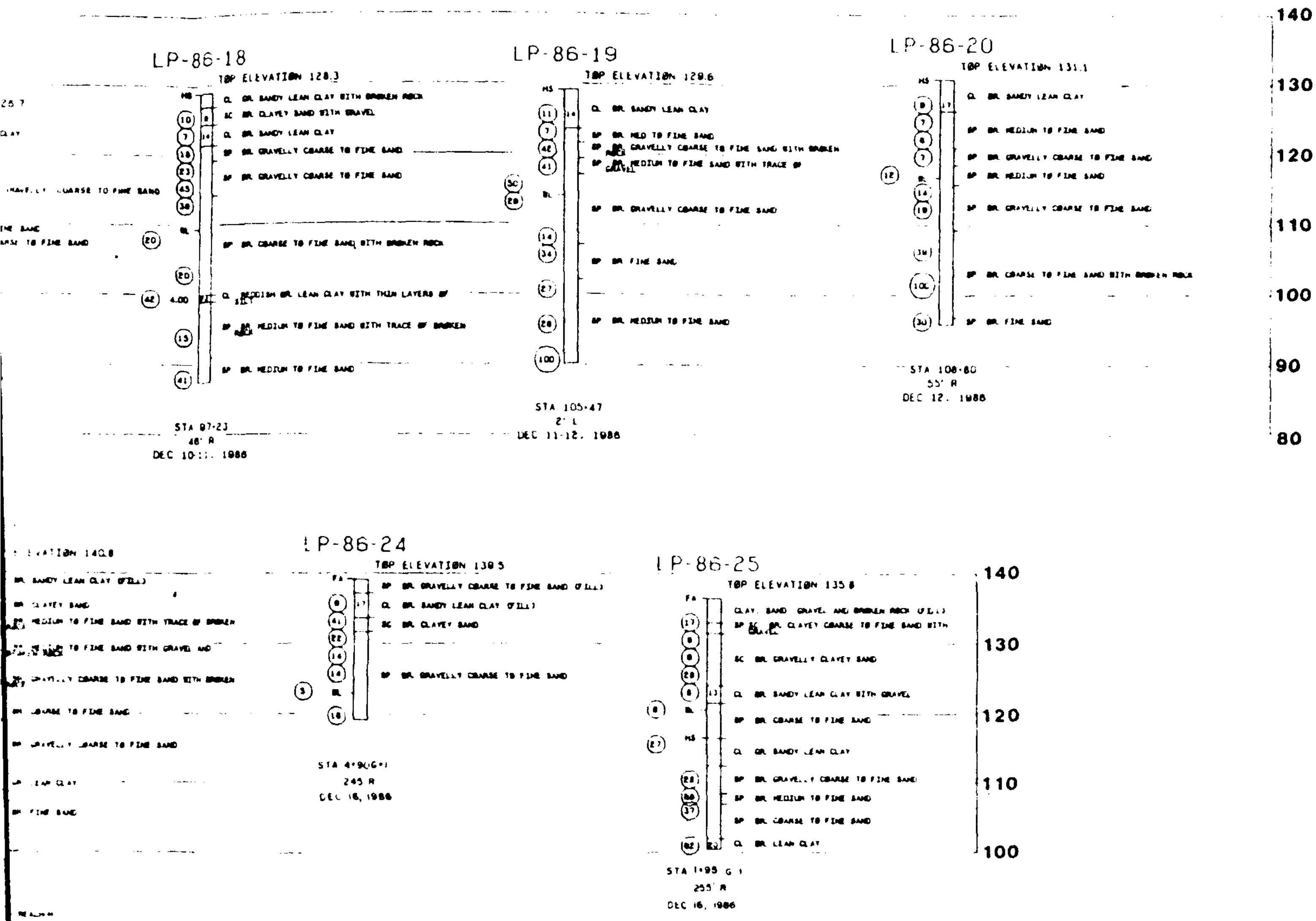
Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:
Scale: AS SHOWN
Date:
Drawing Code
Sheet reference number:
Sheet ___ of ___

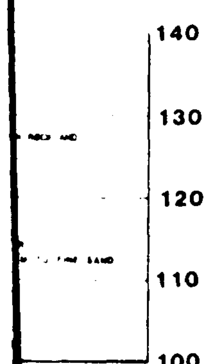
PLATE 18

5 4 3


LP-86-15
TOP ELEVATION 122.3
CL BR. SANDY LEAN CLAY WITH GRAVEL
SP BR. GRAVELLY COARSE TO FINE SAND
CL BR. SANDY LEAN CLAY
SP BR. GRAVELLY COARSE TO FINE SAND
SP BR. MEDIUM TO FINE SAND
STA 78+55
35' R
DEC 19, 1986
LP-86-16
TOP ELEVATION 124.2
CL BR. SANDY LEAN CLAY WITH BROKEN ROCK
SP BR. COARSE TO FINE SAND WITH BROKEN ROCK
SP BR. GRAVELLY COARSE TO FINE SAND WITH BROKEN ROCK
SP BR. MEDIUM TO FINE SAND
SP BR. GRAVELLY COARSE TO FINE SAND
STA 83+26
16' L
DEC 18, 1986
LP-86-17
TOP ELEVATION 126.7
ASPHALT
CL BR. SANDY LEAN CLAY
SP-SC BR. CLAYEY GRAVELLY COARSE TO FINE SAND
SP BR. COARSE TO FINE SAND
SP BR. GRAVELLY COARSE TO FINE SAND
STA 88+14
44' R
DEC 10, 1986
LP-86-18
TOP ELEVATION 128.3
STA 97+23
46' R
DEC 10-11, 1986
140
130
120
110
100
90
80
LP-86-21
TOP ELEVATION 135.3
CL BR. SANDY LEAN CLAY WITH BROKEN ROCK (FILL)
SC BR. CLAYEY SAND
SP-SC BR. CLAYEY MEDIUM TO FINE SAND
SP BR. GRAVELLY COARSE TO FINE SAND
CL BR. VERY LEAN CLAY
SP BR. MEDIUM TO FINE SAND
CL BR. LEAN CLAY
STA 112+55
19' R
DEC 15, 1986
LP-86-22
TOP ELEVATION 136.2
CL BR. SANDY LEAN CLAY WITH BROKEN ROCK (FILL)
SC BR. CLAYEY SAND (FILL)
SP BR. MEDIUM TO FINE SAND WITH TRACE OF BROKEN ROCK
SP BR. GRAVELLY COARSE TO FINE SAND WITH BROKEN ROCK
SP BR. GRAVELLY COARSE TO FINE SAND
CL BR. LEAN CLAY
STA 123+57
7' L
DEC 15, 1986
LP-86-23
TOP ELEVATION 140.8
CL BR. SANDY LEAN CLAY (FILL)
SC BR. CLAYEY SAND
SP BR. MEDIUM TO FINE SAND WITH TRACE OF BROKEN ROCK
SP BR. MEDIUM TO FINE SAND WITH GRAVEL AND BROKEN ROCK
SP BR. GRAVELLY COARSE TO FINE SAND WITH BROKEN ROCK
SP BR. COARSE TO FINE SAND
SP BR. GRAVELLY COARSE TO FINE SAND
CL GR. LEAN CLAY
SP BR. FINE SAND
STA 6+85G-1
80' L
DEC 16, 1986
NORTH BRANCH - REACH-H
LP-86-26
TOP ELEVATION 139.0
CL BR. SANDY LEAN CLAY WITH BROKEN ROCK (FILL)
BROKEN ROCK AND RUBBLE
SC GR. CLAYEY SAND WITH RUBBLE
SP GR. MEDIUM TO FINE SAND WITH TRACE OF ROCK
SP BR. GRAVELLY COARSE TO FINE SAND
SP-SC BR. CLAYEY GRAVELLY COARSE TO FINE SAND WITH BROKEN ROCK
CL BR. LEAN CLAY
STA 1+55G-1
102' L
DEC 18, 1986
SOUTH BRANCH DIVERSION CHANNEL
LP-86-27
TOP ELEVATION 139.8
SC BLACK CLAYEY SAND (ORGANIC ODOR)
SP-SC GR. CLAYEY GRAVELLY MEDIUM TO FINE SAND WITH BROKEN ROCK
CL BR. LEAN CLAY
SM BR. SILTY SAND
STA 4+75W
75' R
DEC 16-17, 1986
INTERCONNECTION CULVERT AT BINDAGR ROAD

5 4 3





Symbol	Revisions Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

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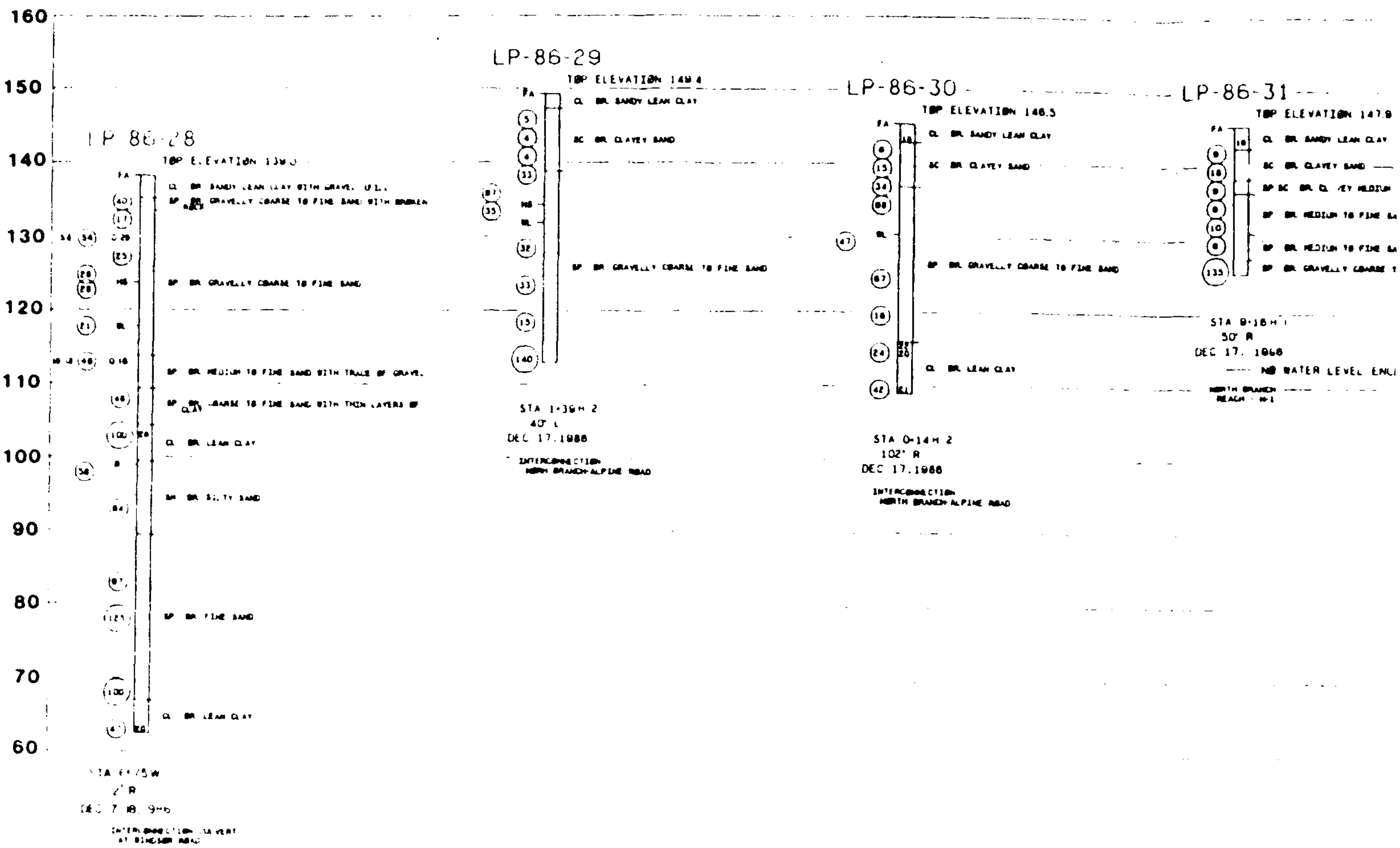
Drawn by:
Checked by:
Reviewed by:
Approved by:

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

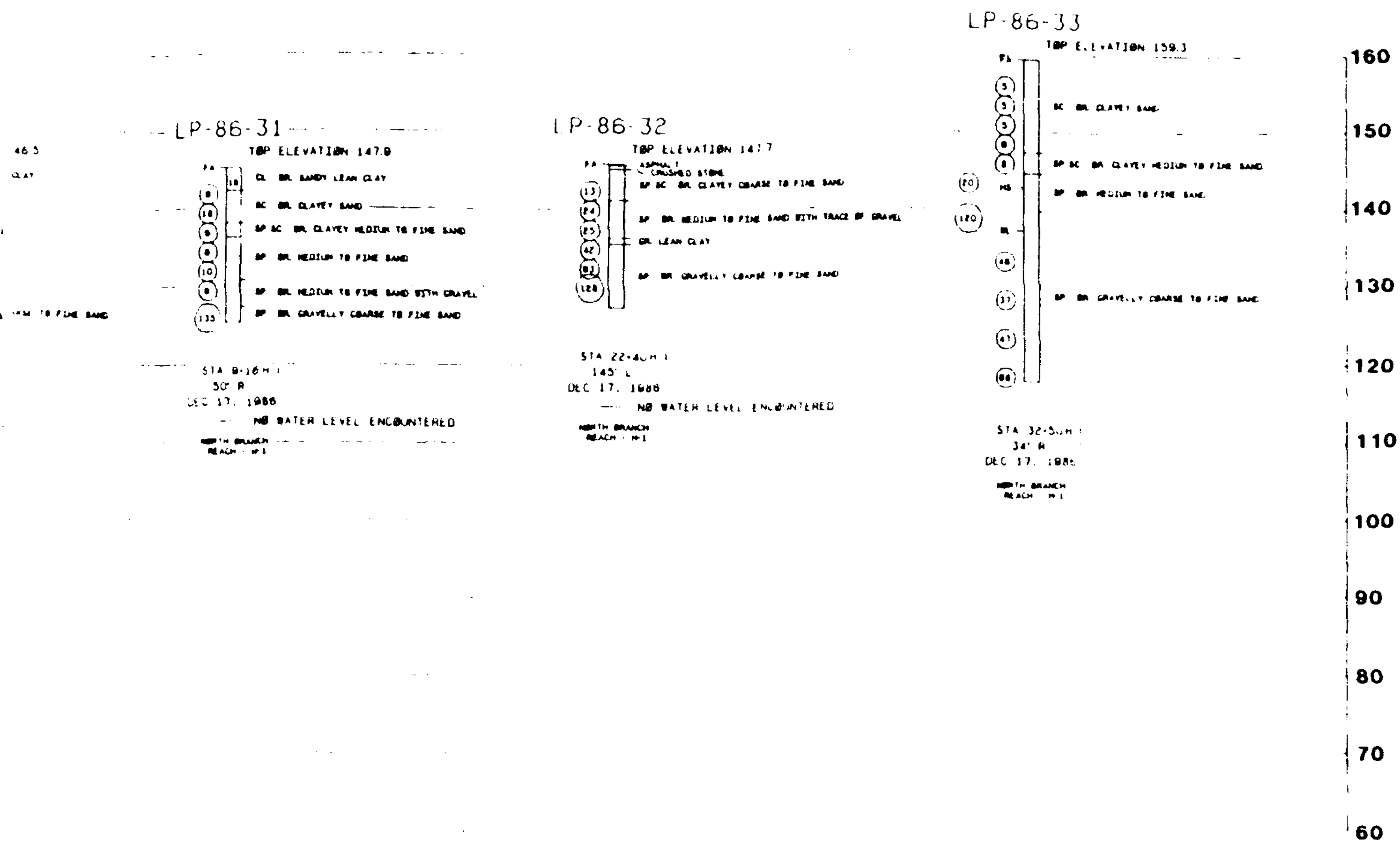
BORING LOGS II

Scale: AS SHOWN
Date:
Drawing Code:
Sheet reference number:
Sheet _ of _

PLATE 19



LP-86-29
TOP ELEVATION 149.4
CL BR SANDY LEAN CLAY
SC BR CLAYEY SAND
SP BR GRAVELLY COARSE TO FINE SAND
STA 1+39H 2
40' L
DEC 17.1986
INTERCONNECTION NORTH BRANCH-ALPINE ROAD
LP-86-30
TOP ELEVATION 146.5
CL BR SANDY LEAN CLAY
SC BR CLAYEY SAND
SP BR GRAVELLY COARSE TO FINE SAND
CL BR LEAN CLAY
STA 0+14H 2
102' R
DEC 17.1986
INTERCONNECTION NORTH BRANCH-ALPINE ROAD
LP-86-31
TOP ELEVATION 147.9
CL BR SANDY LEAN CLAY
SC BR CLAYEY SAND
SP BR MEDIUM TO FINE SA
SP BR GRAVELLY COARSE T
STA 9+18H 1
50' R
DEC 17. 1986
NO WATER LEVEL ENC
NORTH BRANCH REACH H-1
LP 86-28
CL BR SANDY LEAN CLAY WITH GRAVEL
SP BR GRAVELLY COARSE TO FINE SAND
SP BR MEDIUM TO FINE SAND WITH TRACE OF GRAVEL
CL BR LEAN CLAY
SM BR SILTY SAND
SP BR FINE SAND
CL BR LEAN CLAY
160
150
140
130
120
110
100
90
80
70
60



Revisions			
Symbol	Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

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Approved by:

US Army Corps of Engineers

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

BORING LOGS III

Scale: AS SHOWN
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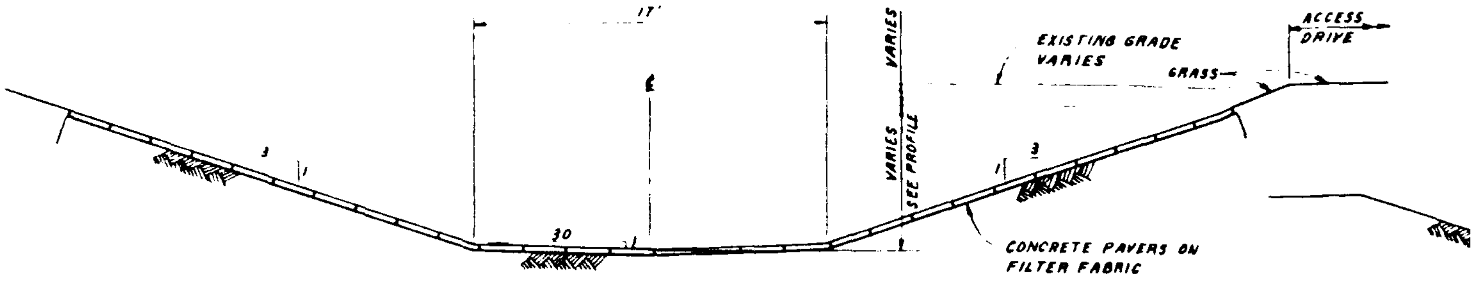
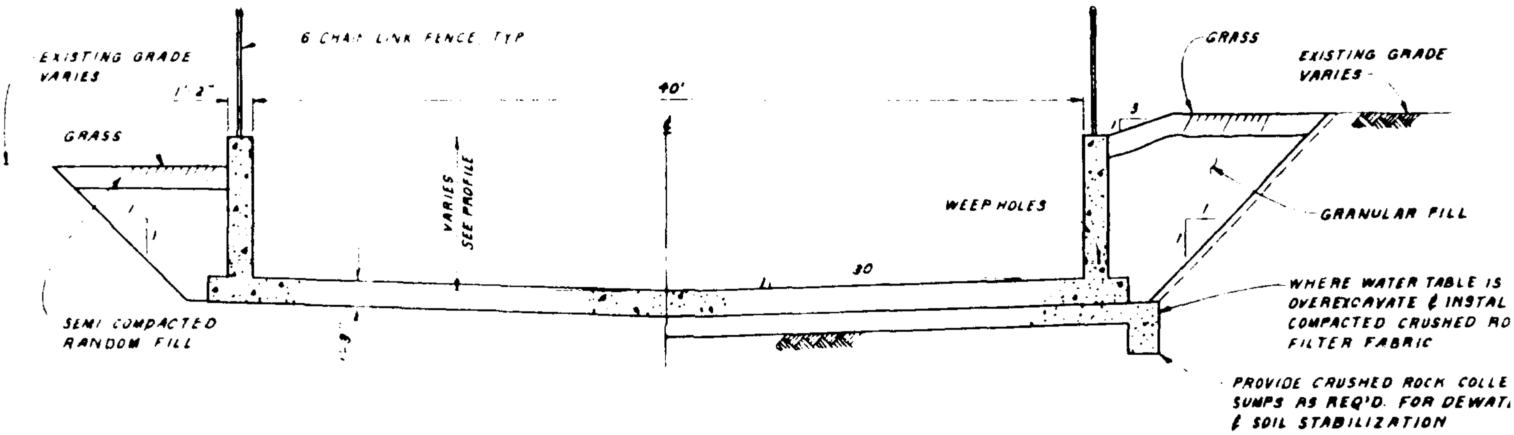
Drawing Code:
Sheet reference number:
Sheet ___ of ___

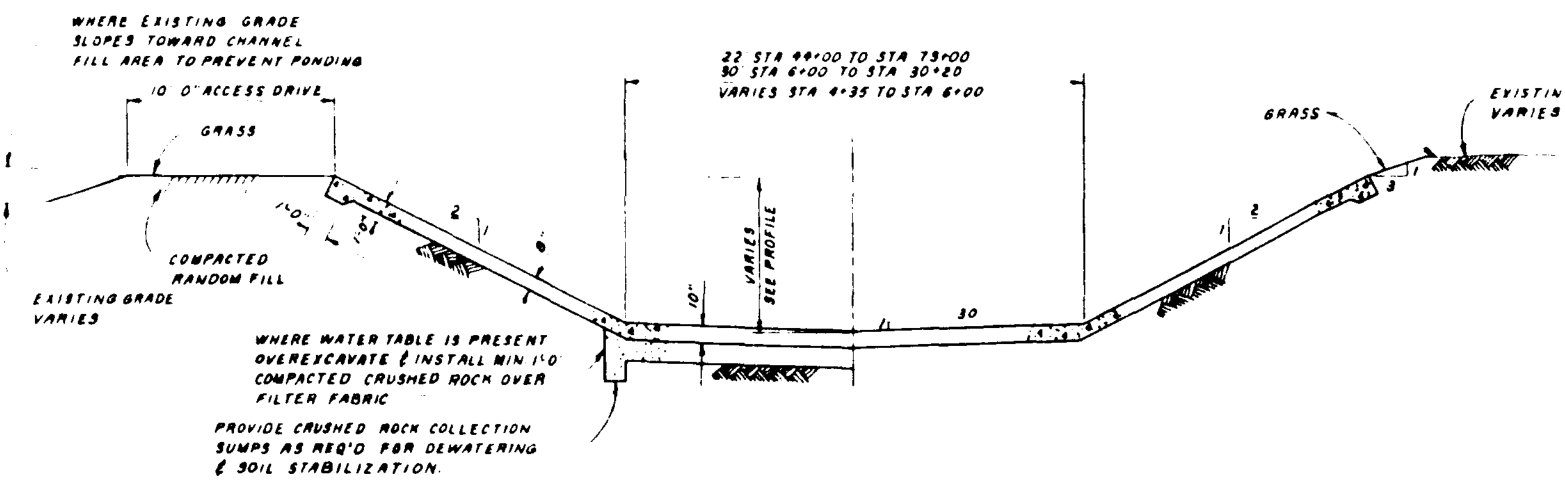
PLATE 20



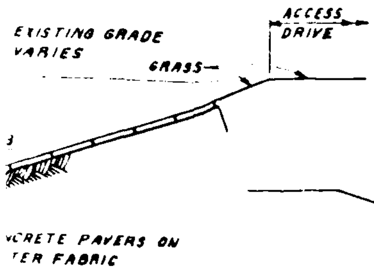
TYPICAL CONCRETE PAVER LINED CHANNEL

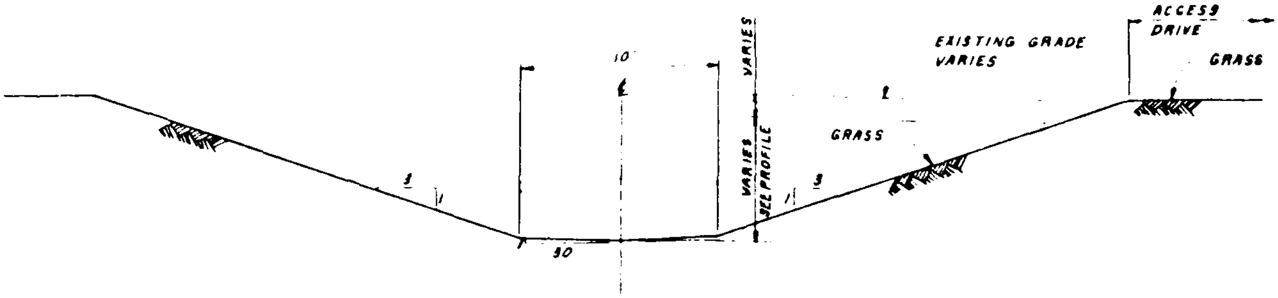


TYPICAL RECTANGULAR CONCRETE CHANNEL

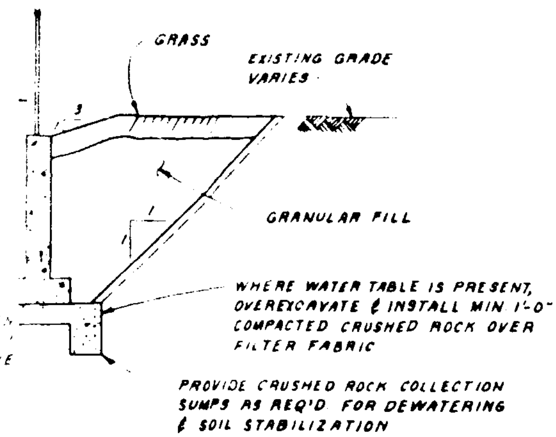


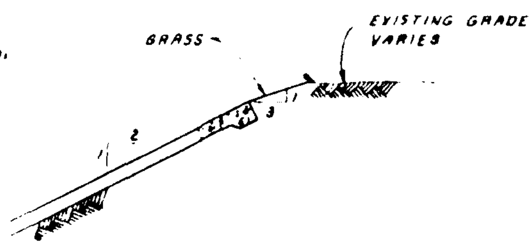
TYPICAL CONCRETE LINED TRAPEZOIDAL CHANNEL





TYPICAL GRASS LINED CHANNEL





Symbol	Revisions Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

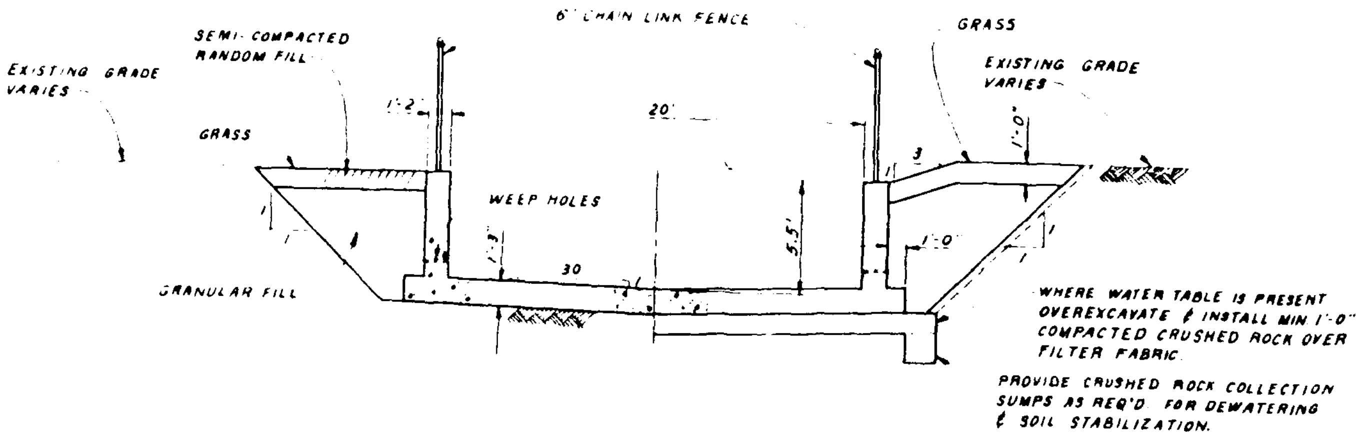
LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

TYPICAL CHANNEL SECTIONS I

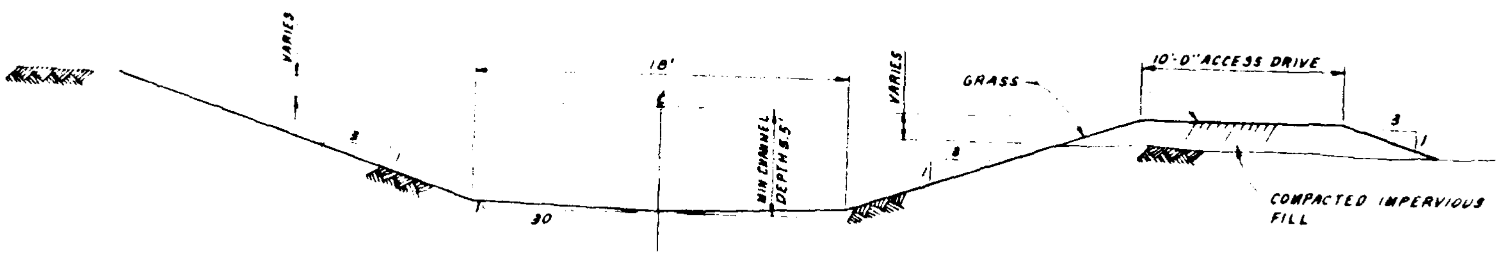
Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:

Scale: 1/4"-1'-0"
Date:
Drawing Code:
Sheet reference number:
Sheet _ of _

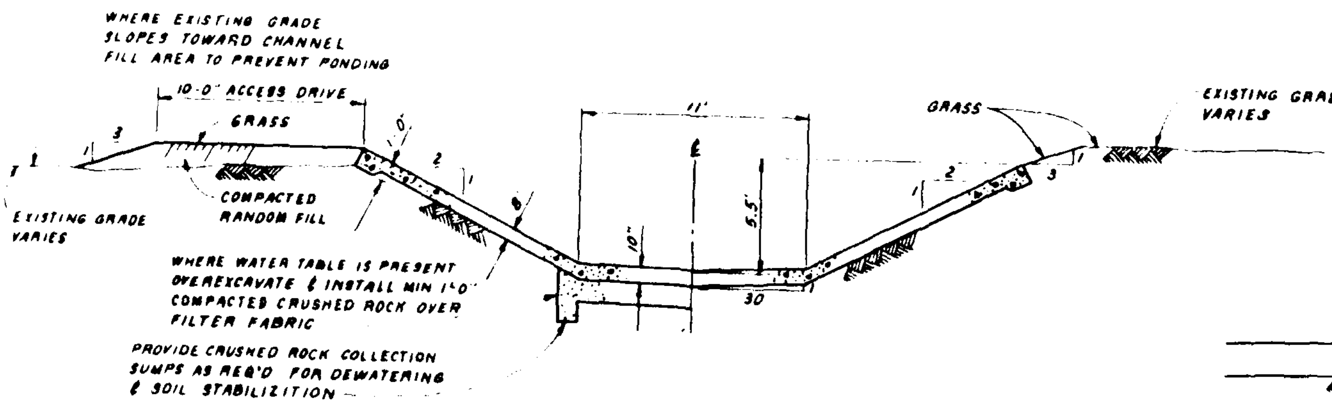
PLATE 21



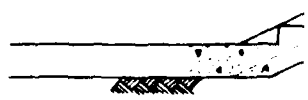
TYPICAL RECTANGULAR CONCRETE CHANNEL



TYPICAL GRASS LINED CHANNEL

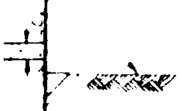


TYPICAL CONCRETE LINED TRAPEZOIDAL CHANNEL



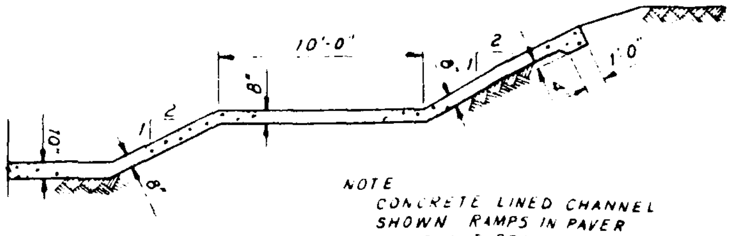
TYPICAL STAIR DETAIL FOR C(

3 | 2 | 1



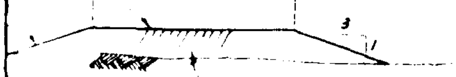
...ERE WATER TABLE IS PRESENT
...EREXCAVATE & INSTALL MIN 1'-0"
...MPACTED CRUSHED ROCK OVER
...TER FABRIC

...E CRUSHED ROCK COLLECTION
...AS REQ'D FOR DEWATERING
...STABILIZATION.

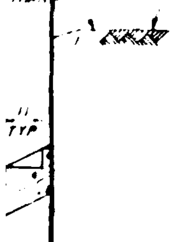


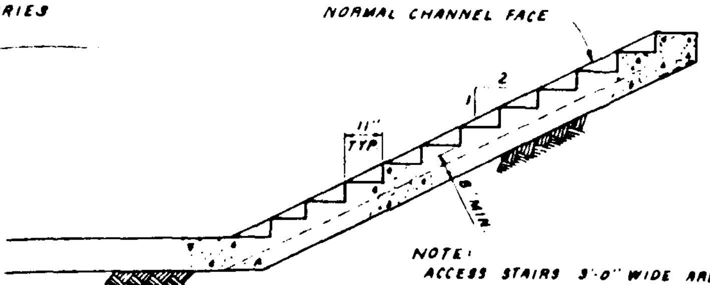
NOTE
CONCRETE LINED CHANNEL SHOWN. RAMPS IN PAVER LINED AND GRASS LINED CHANNELS ARE SIMILAR

TYPICAL ACCESS RAMP



COMPACTED IMPERVIOUS FILL





NOTE:
ACCESS STAIRS 3'-0" WIDE ARE REQUIRED ON BOTH SIDES OF THE TRAPEZOIDAL CONCRETE CHANNEL DOWNSTREAM FROM EACH BRIDGE AND AT 300' CENTERS ON ALTERNATE SIDES THROUGHOUT THE REMAINDER OF THE TRAPEZOIDAL CONCRETE CHANNELS

...RETE

TYPICAL STAIR DETAIL FOR CONCRETE LINED TRAPEZOIDAL CHANNELS

0' 4' 8' 12'

Symbol	Revisions Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

TYPICAL CHANNEL SECTIONS II

Designed by:	
Drawn by:	
Checked by:	
Reviewed by:	Scale: 1/4"=1'-0"
Approved by:	Date:
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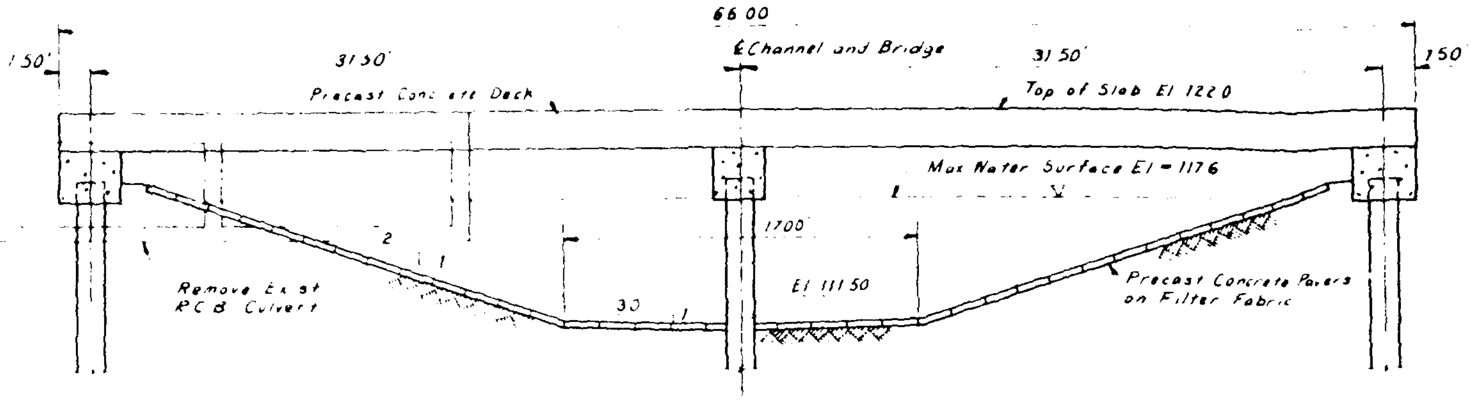
Sheet _ of _	

3 | 2 | 1

PLATE 22

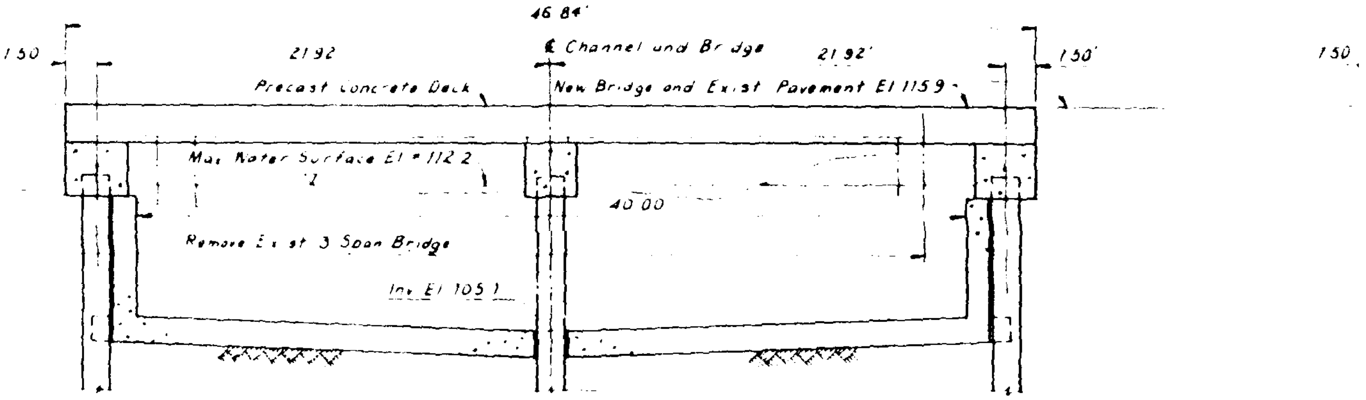
5 4 3



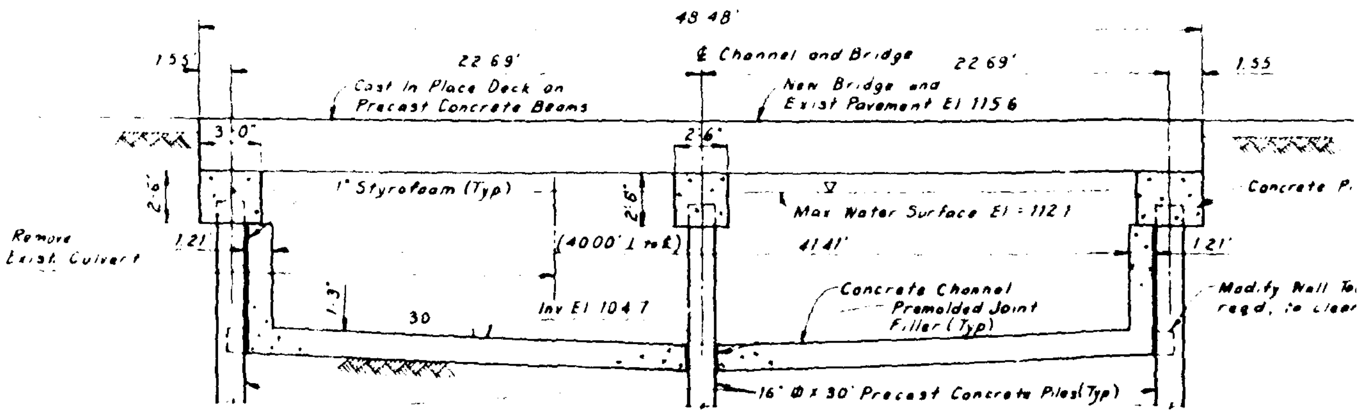
WALKER AVE.

(ELM ST. SIMILAR)

(PEDESTRIAN AT BROWNS PARKWAY - SIMILAR CHANNEL)

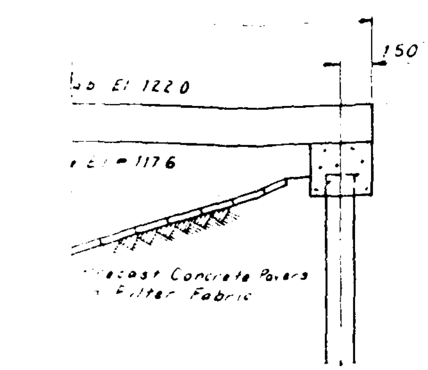


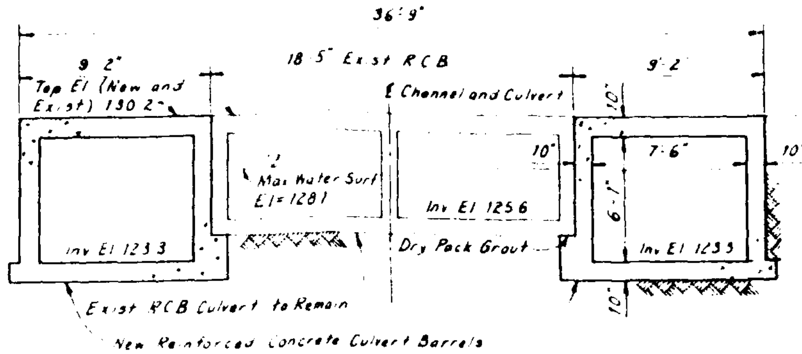
RIVER LANE



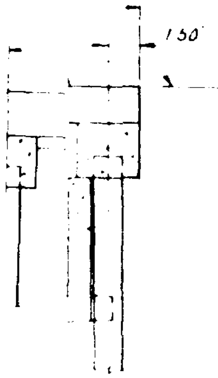
NORTH 2ND. ST.

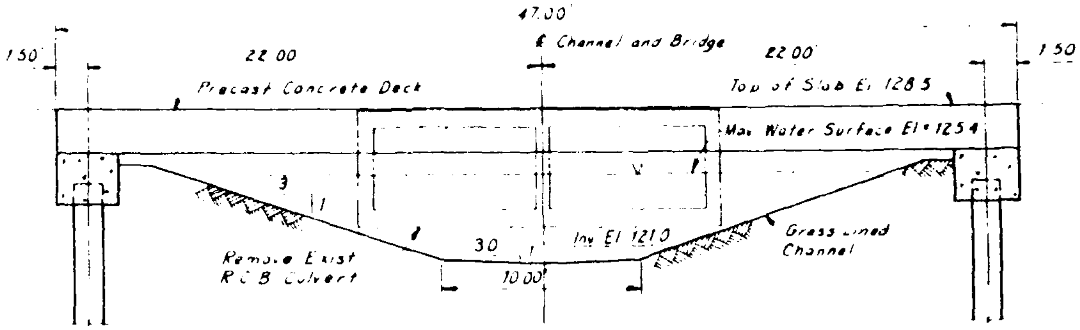
5 4 3





PRIVATE ROAD AND RR. BRIDGE AT STA. 105+17

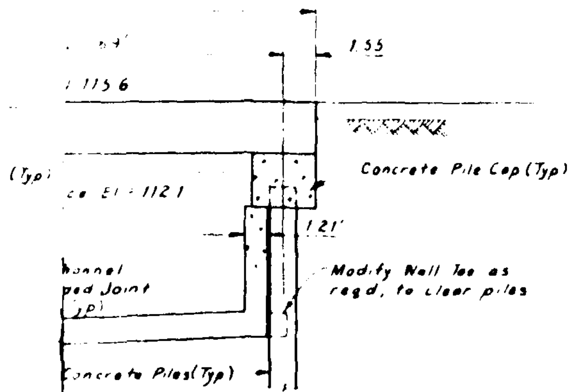




PRIVATE BRIDGE AT STA. 97+69

(PEDESTRIAN BRIDGE AT STA. 101+26 SIMILAR, BUT 5' WIDE)

REFERENCES
1. For Locations of Bridges, see Plates 6, 9, 10 & 11.
2. For Logs of Borings see Plates 18, 19 & 20



NOTES
1. Profiles are along ℄ of the new bridges and may not be perpendicular to channel.
2. Curbs, sidewalks and handrails are required, but are not shown here for clarity.
3. Existing underground utilities, not shown here, crossing the channel within the street rights of way will be relocated on the new bridges.

0' 4' 8' 12'

Symbol	Revisions Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

NEW BRIDGE PROFILES

Designed by:	
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Checked by:	
Reviewed by:	Scale: 1/4"=1'-0"
Approved by:	Date:
	Drawing Code:

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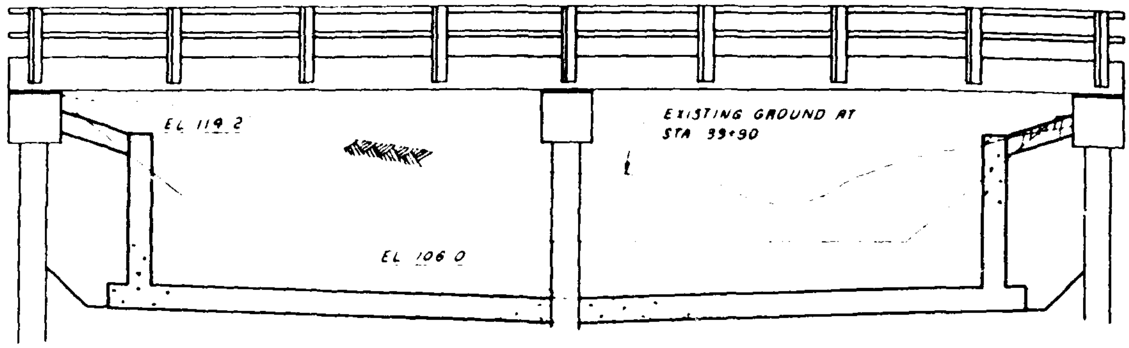
Sheet _ of _

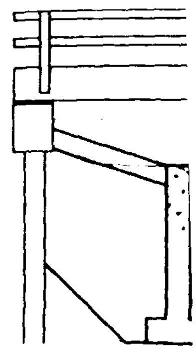
3 2 1

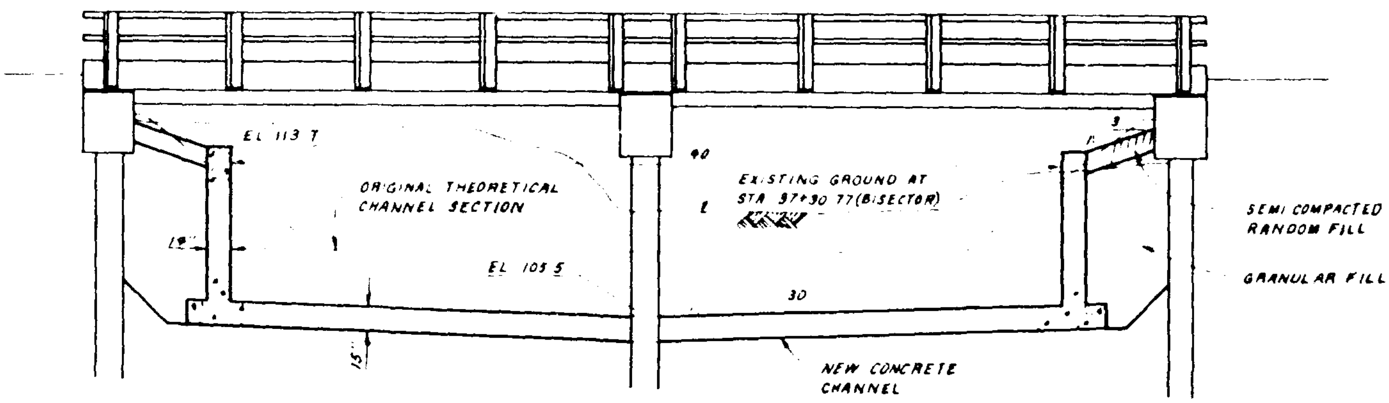
PLATE 23

5 4 3

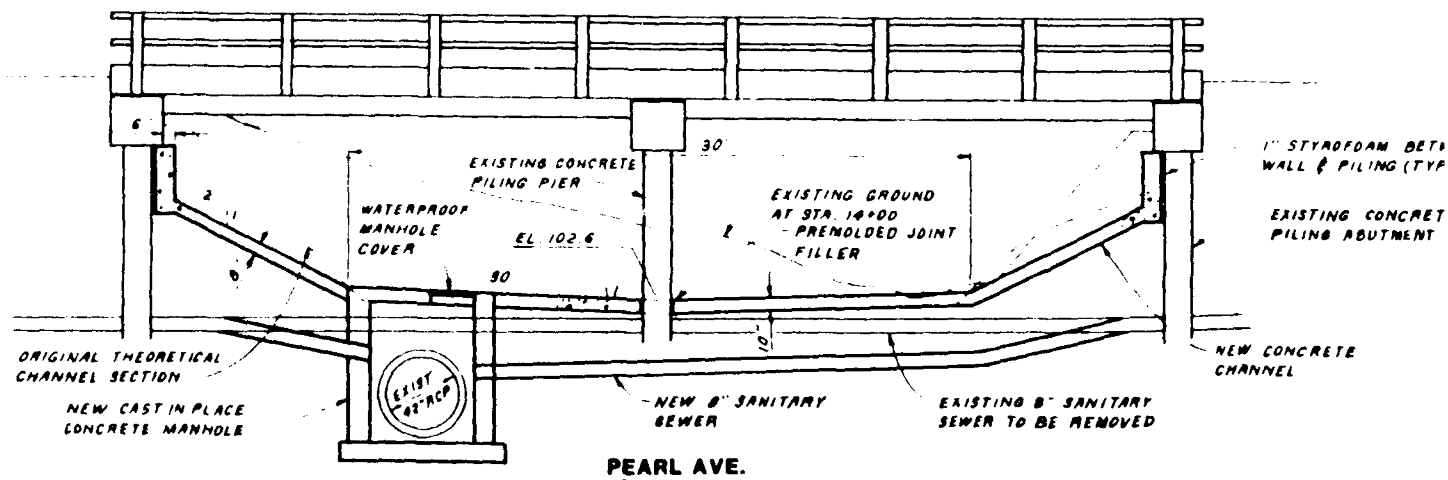


GRAND AVE.
STA. 40+24



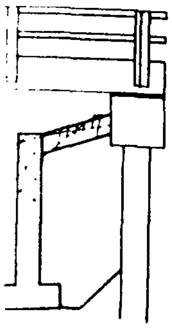


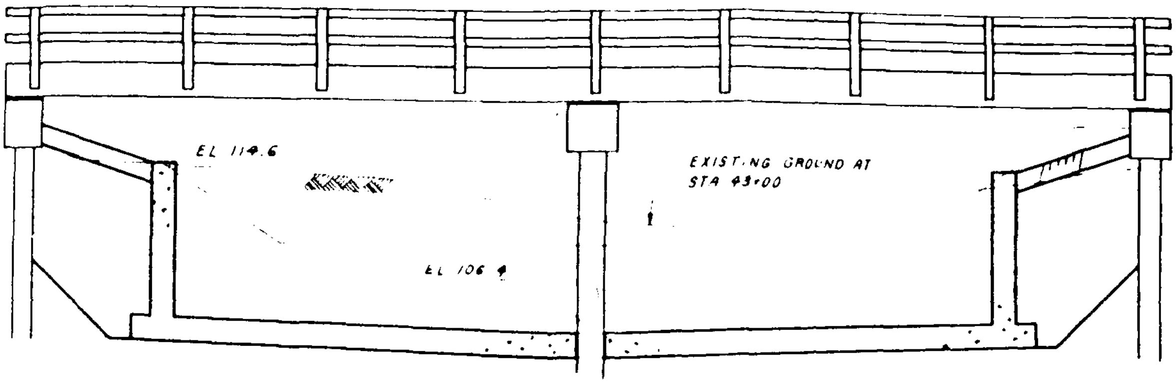
MERRILL AVE.
STA. 36+54



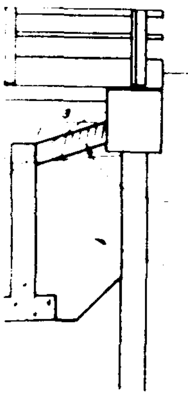
PEARL AVE.
STA. 13+73

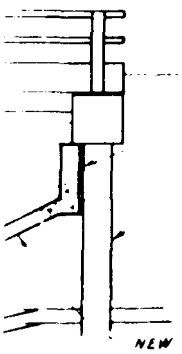
5 4 3





LOVES PARK DR.
STA. 43+87





REFERENCES:

1 FOR LOCATION OF BRIDGES, SEE PLATES 5, 6, ¢ 7
2 FOR LOGS OF BORINGS, SEE PLATE 18.

Symbol	Revisions Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

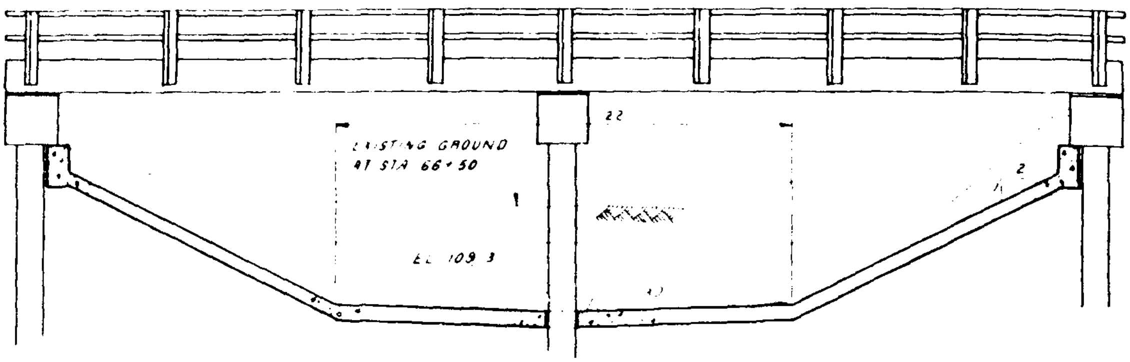
LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

CHANNEL AT EXISTING BRIDGES I

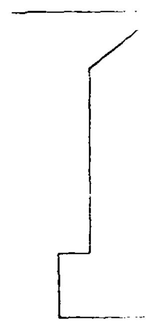
Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:
Scale: 1/4"=1'-0"
Date:
Drawing Code:
Sheet reference number:
Sheet _ of _

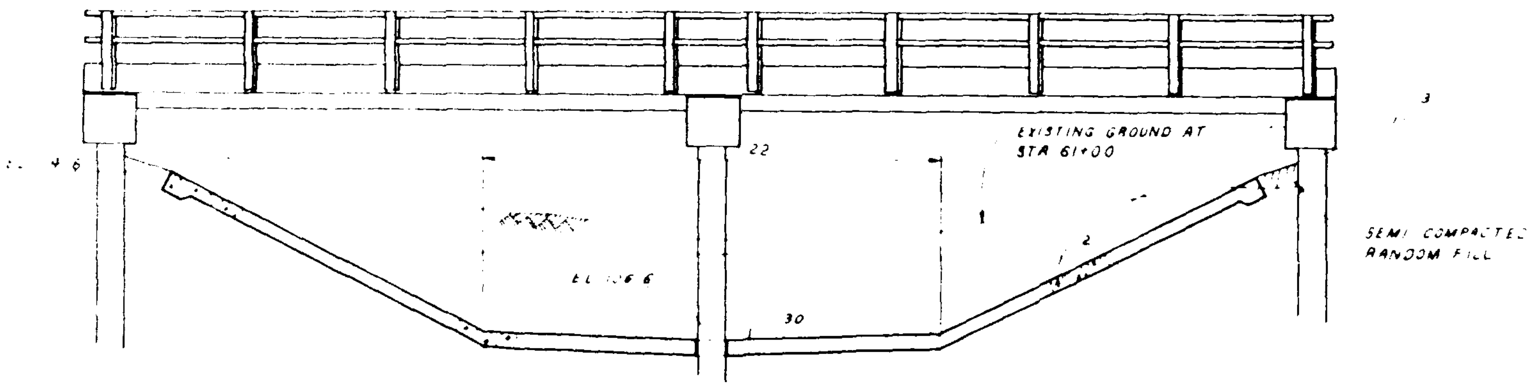
PLATE 24

5 4 3

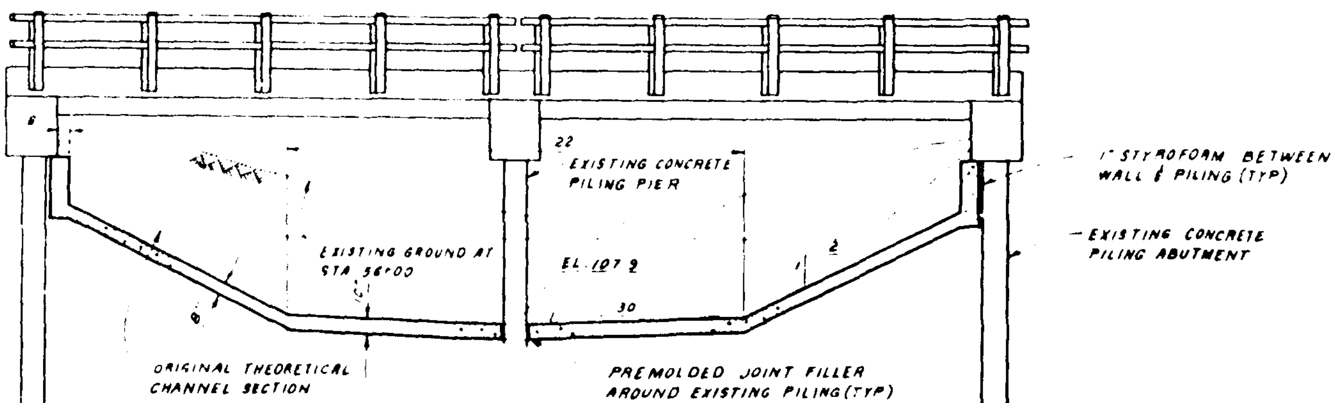


CLIFFORD AVE.
STA 65 + 95



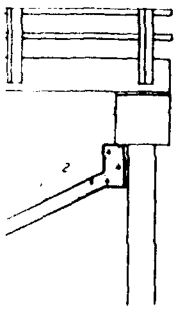


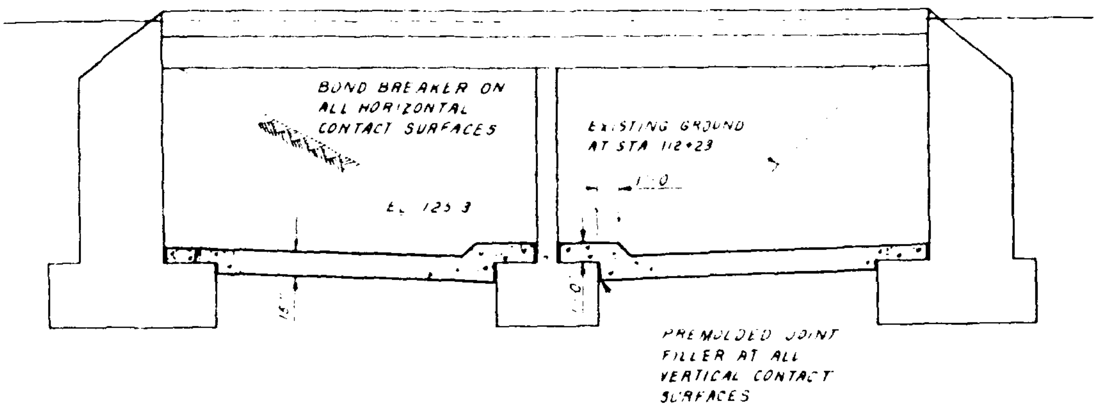
GARDEN PLAIN AVE.
STA 60 + 75



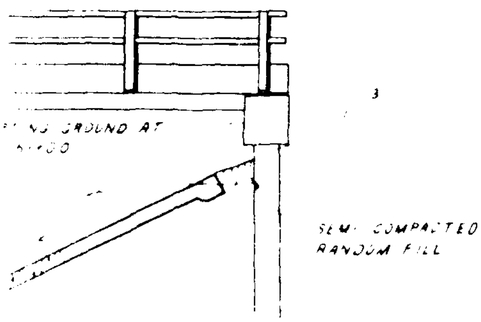
RIVERSIDE BLVD.
STA 55 + 22

5 4 3



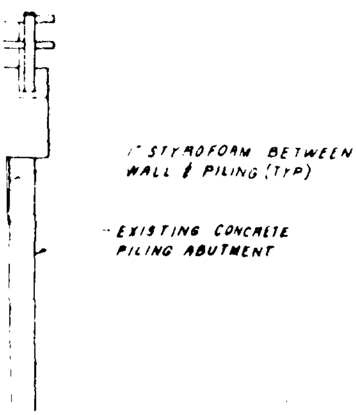


MATERIAL AVE.
STA 111 + 98



REFERENCES:

1. FOR LOCATION OF BRIDGES, SEE PLATES 7, 8, & 11
2. FOR LOGS OF BORINGS, SEE PLATES 18 & 19



0' 4' 8' 12'

Revisions

Symbol	Descriptions	Date	Approved

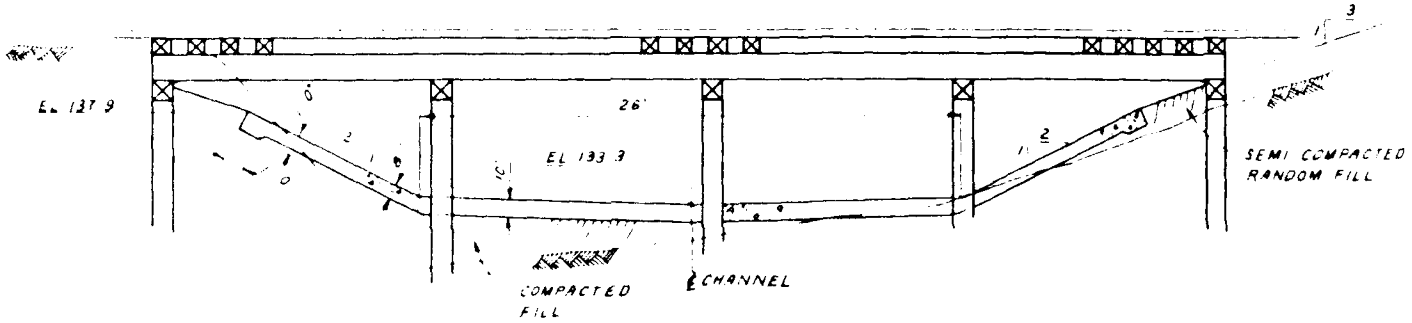
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:

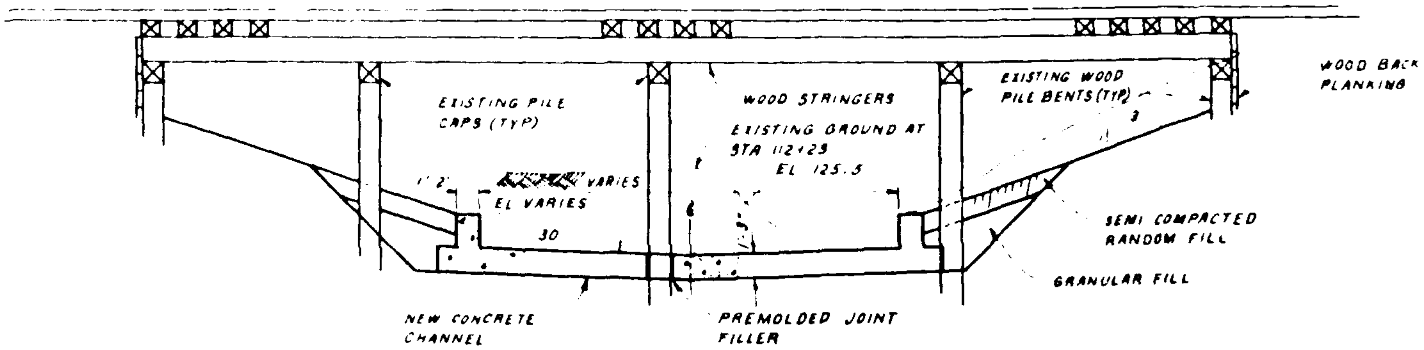
LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

CHANNEL AT EXISTING BRIDGES II

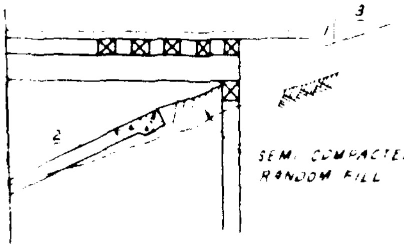
Scale: 1/4"=1'-0"
Date:
Drawing Code:
Sheet reference number:
Sheet _ of _



C.N.W. RY. BRIDGE
STA. 121+34

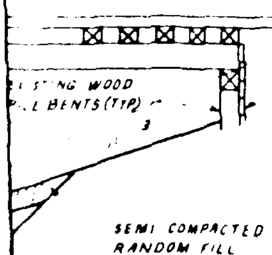


C.N.W. RY. BRIDGE
STA. 112+39



REFERENCES:

1 FOR LOCATION OF BRIDGES, SEE PLATES 11 & 12
2 FOR LOGS OF BORINGS, SEE PLATE 19.



NOTES:

1 CHANNEL DIMENSIONS SHOWN HERE ARE AT ℄ OF BRIDGES, AND VARY BEYOND THESE SPECIFIC LOCATIONS.

0' 4' 8' 12'

Symbol	Revisions Descriptions	Date	Approved

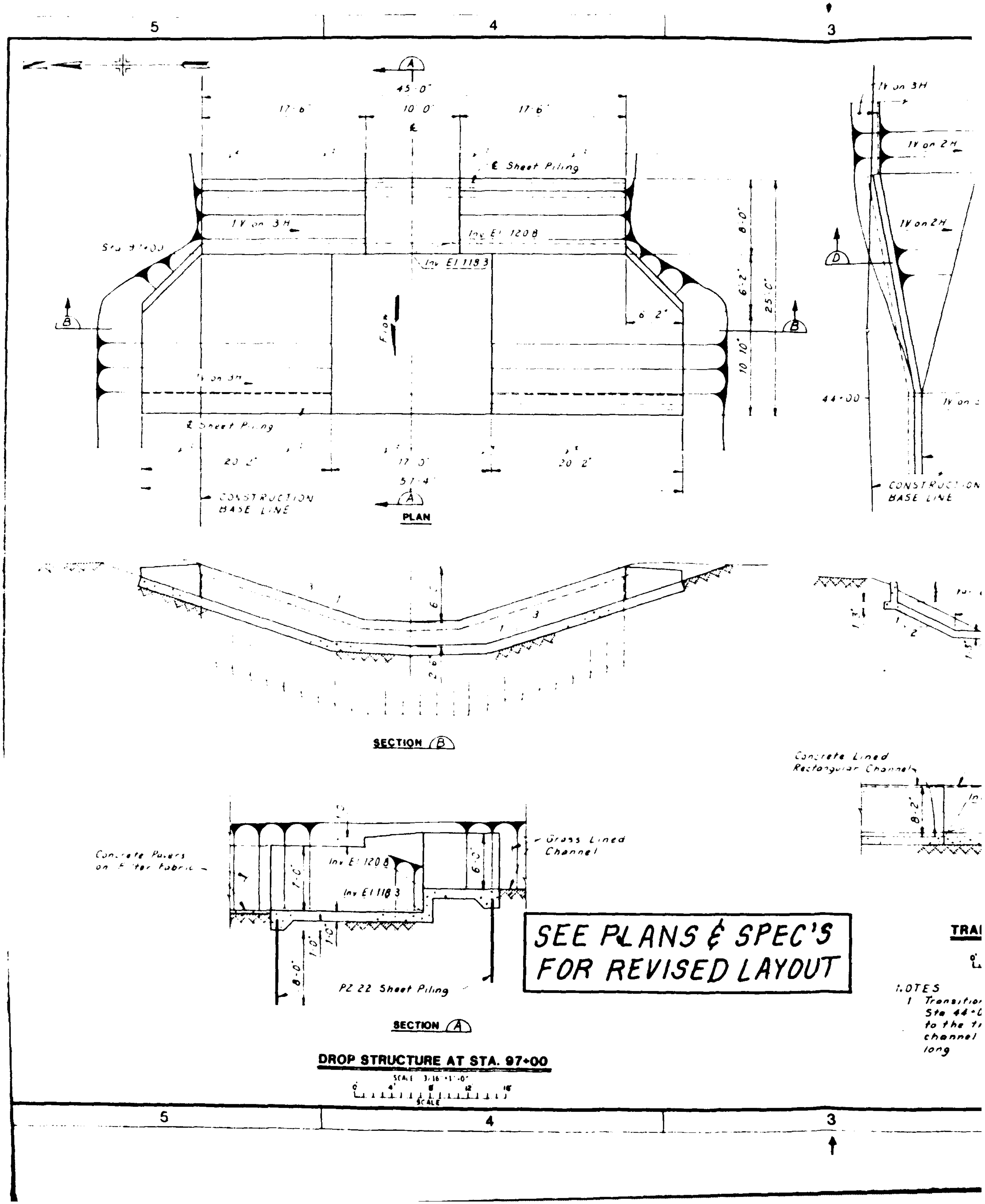
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

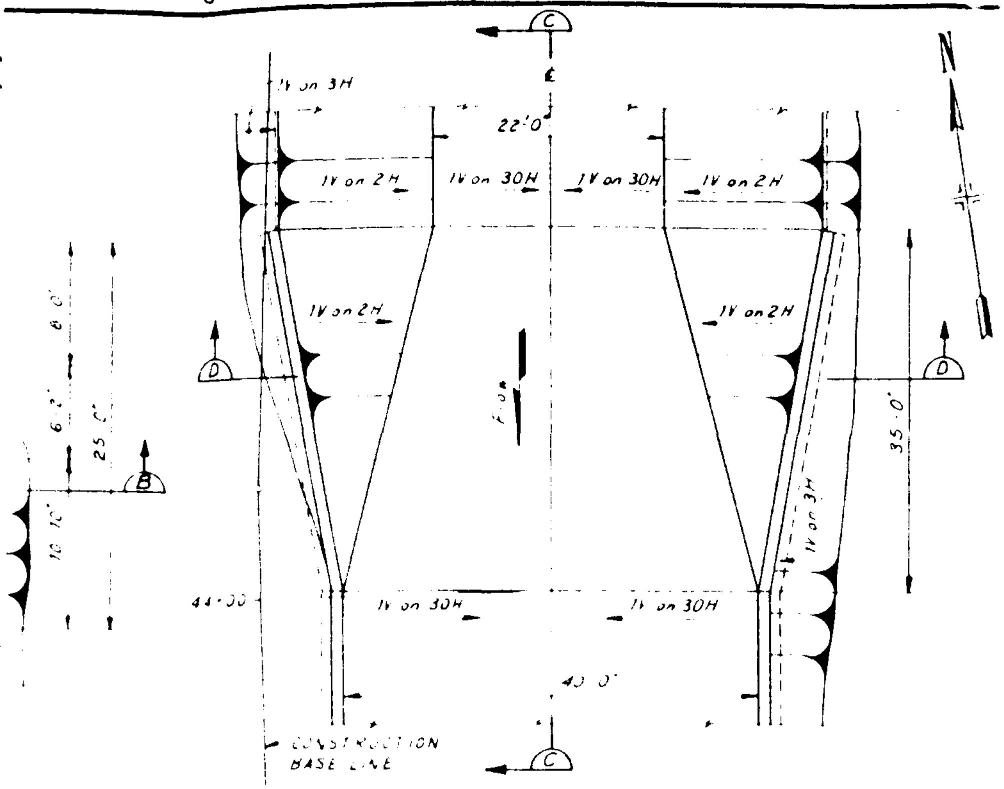
CHANNEL AT EXISTING BRIDGES III

Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:
Scale: 1/4"=1'-0"
Date:
Drawing Code:
Sheet reference number:
Sheet ___ of ___

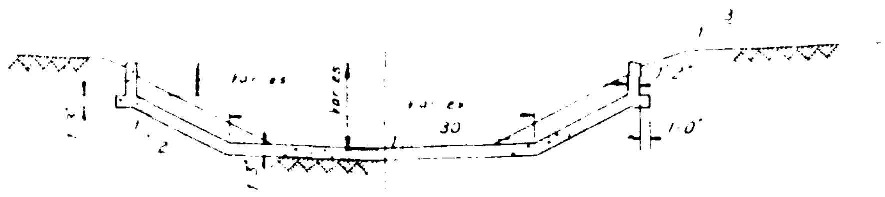
PLATE 26



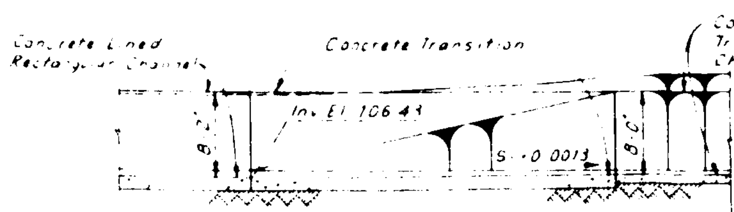
5
4
3
45'-0"
17'-6"
10'-0"
17'-6"
℄ Sheet Piling
1V on 3H
Inv El 120.8
Inv El 118.3
Flow
8'-0"
6'-2"
25'-0"
10'-10"
6'-2"
℄ Sheet Piling
20'-2"
17'-0"
20'-2"
57'-4"
CONSTRUCTION BASE LINE
PLAN
1V on 3H
1V on 2H
1V on 2H
44+00
CONSTRUCTION BASE LINE
SECTION B
Concrete Lined Rectangular Channels
Concrete Pavers on Filter Fabric
Inv El 120.8
Inv El 118.3
Grass Lined Channel
7'-0"
6'-0"
1'-0"
1'-0"
8'-0"
PZ 22 Sheet Piling
SEE PLANS & SPEC'S FOR REVISED LAYOUT
SECTION A
DROP STRUCTURE AT STA. 97+00
SCALE 3/16"=1'-0"
0
4'
8'
12'
16'
SCALE
NOTES
1 Transition
Sta 44+0
to the t
channel
long



PLAN



SECTION (D)



SECTION (C)

REFERENCES
1. For location of these structures see Plates 7&10
2. For Typical Sections see Plate 21
3. For Logs of Borings see Plates 18&19

TRANSITION AT STA. 44+00

1/8" = 1'-0"

0' 8' 16' 24'
SCALE

NOTES
1. Transition at Sta 30+19 is similar to the one at Sta 44+00 except, flow is from the rectangular to the trapezoidal channel, the trapezoidal channel is 30 wide, and the structure is 20 long

SPEC'S LAYOUT

Symbol	Revisions Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

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Drawn by:
Checked by:
Reviewed by:
Approved by:

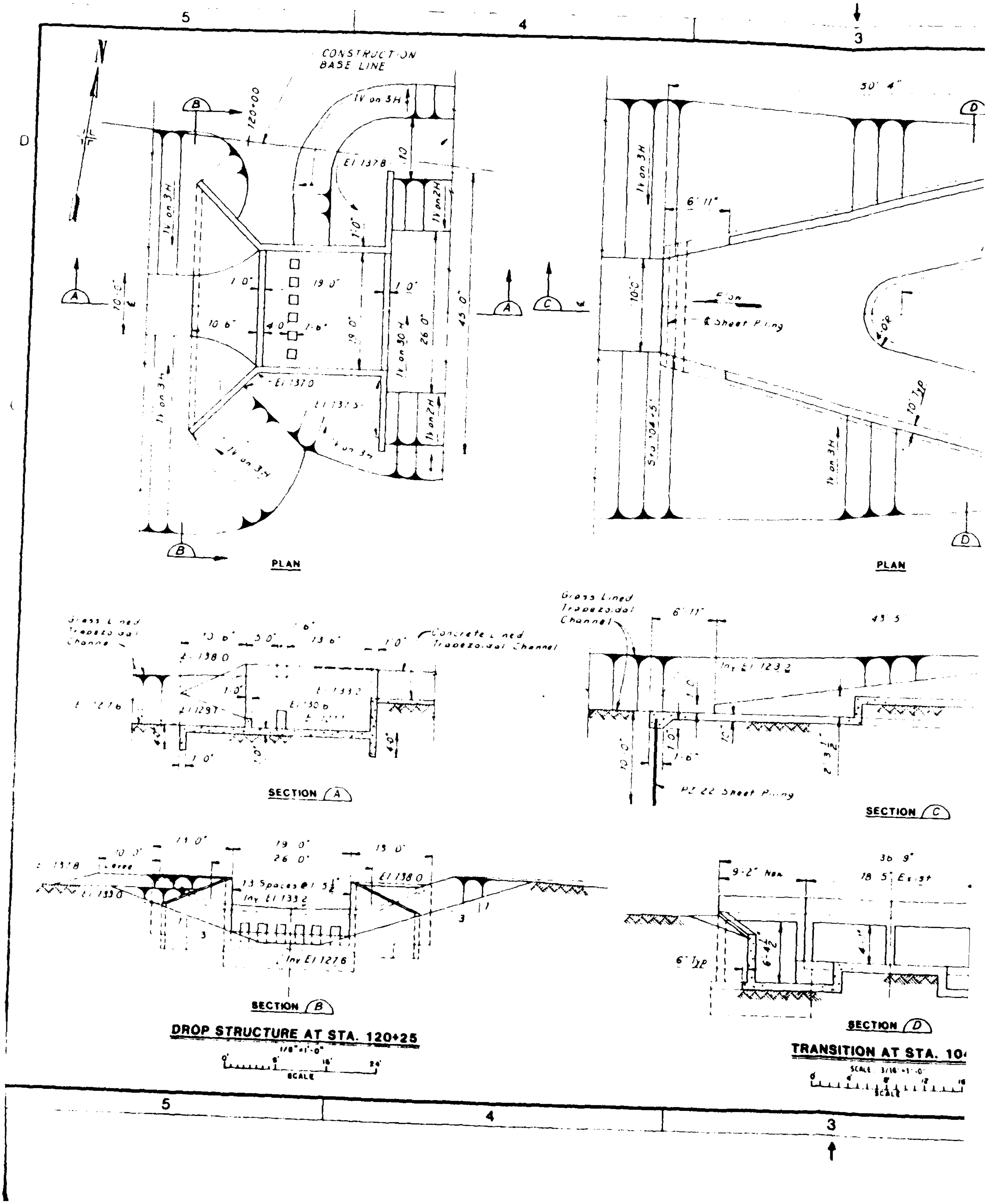
US Army Corps of Engineers

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

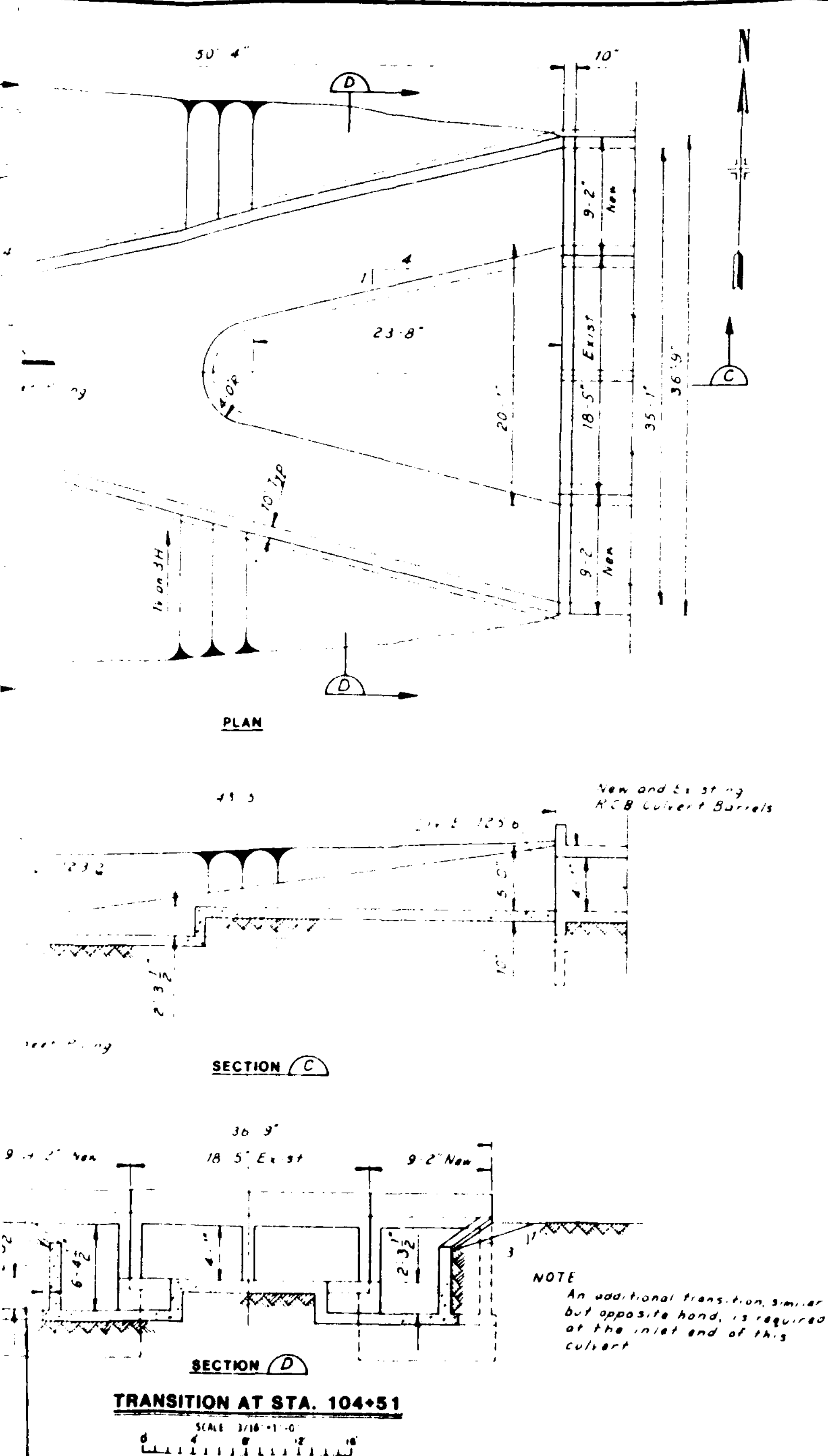
TRANSITIONS
AND DROP STRUCTURES I

Scale: AS SHOWN
Date:
Drawing Code:
Sheet reference number:
Sheet _ of _

PLATE 27



CONSTRUCTION BASE LINE
120+00
1V on 3H
1V on 2H
1V on 3H
El 137.8
El 137.0
El 137.5
19.0"
1.0"
10.6"
4.0"
7.6"
19.0"
26.0"
45.0"
10.0"
PLAN
50' 4"
6' 11"
Flow
℄ Sheet Piling
10' Typ
PLAN
Grass Lined Trapezoidal Channel
Concrete Lined Trapezoidal Channel
El 138.0
El 129.7
El 130.6
SECTION A
Grass Lined Trapezoidal Channel
6' 11"
Inv El 123.2
PZ 22 Sheet Piling
SECTION C
11.0"
19.0"
26.0"
13.0"
13 Spaces @ 1' 5½"
Inv El 133.2
El 138.0
El 133.0
Inv El 127.6
SECTION B
DROP STRUCTURE AT STA. 120+25
1/8"=1'-0"
SCALE
36' 9"
9'-2" Nom
18' 5" Exist
6" Typ
SECTION D
TRANSITION AT STA. 10
SCALE 3/16"=1'-0"
SCALE
5
4
3



TRANSITION AT STA. 104+51

REFERENCES
1. For location of these structures see Plates 11 and 12
2. For Typical Sections of Channel see Plate 21
3. For Logs of Borings see Plate 19

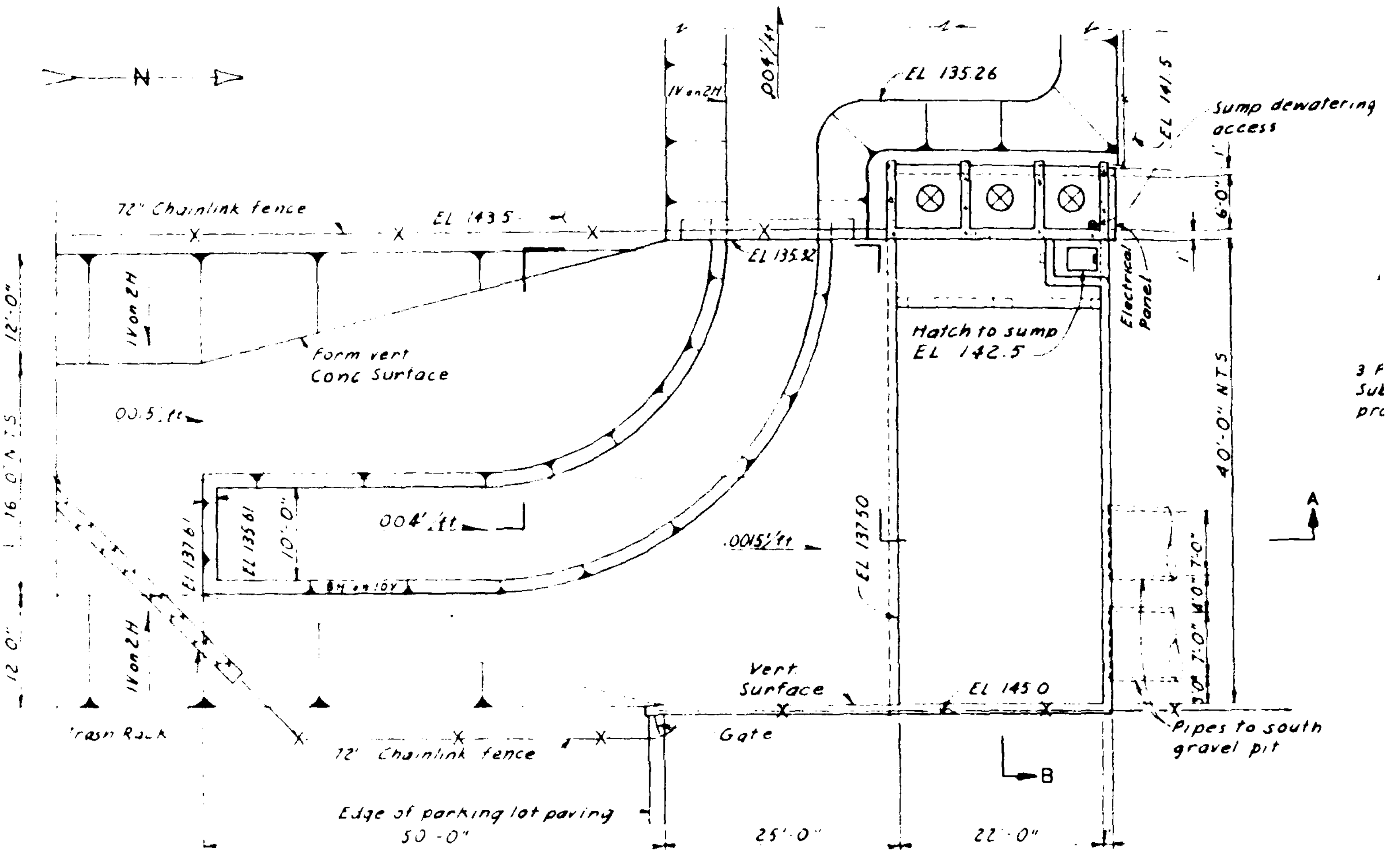
Symbol	Revisions Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

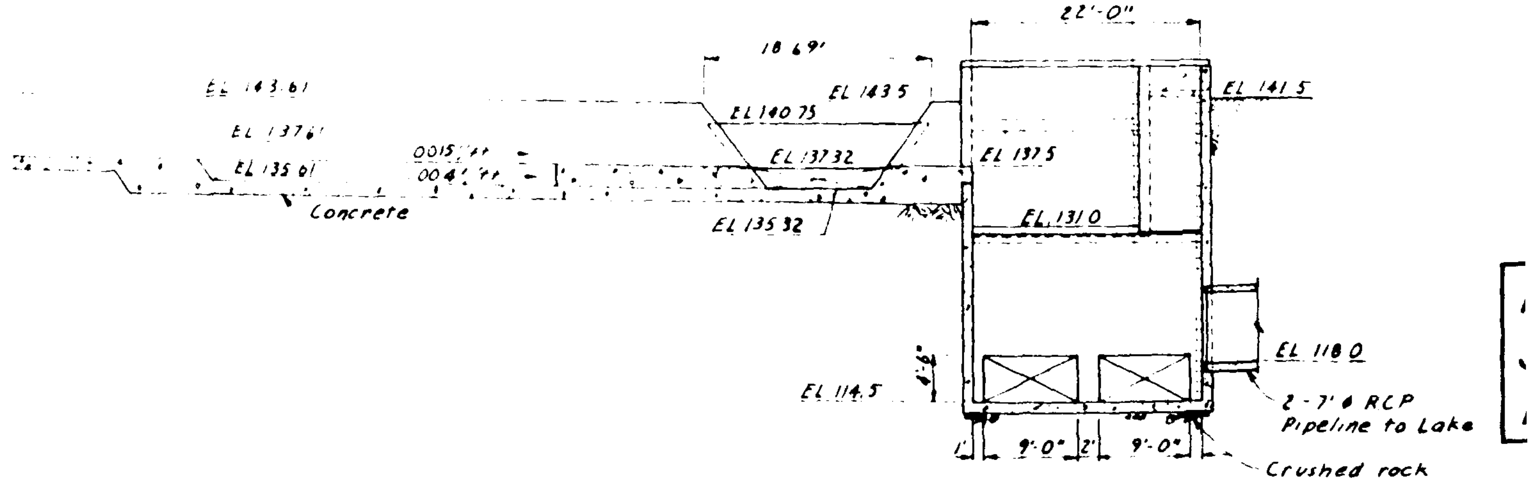
Designed by:	LOVES PARK CREEK LOVES PARK, ILLINOIS LOCAL FLOOD PROTECTION
Drawn by:	
Checked by:	TRANSITIONS AND DROP STRUCTURES II
Reviewed by:	Scale: AS SHOWN — Sheet reference number:
Approved by:	Date: — Drawing Code: — Sheet _ of _

PLATE 28

5 4 3

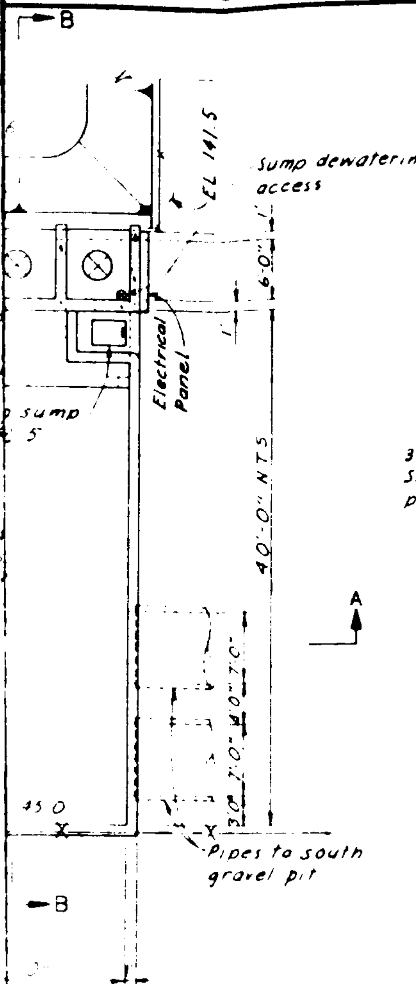


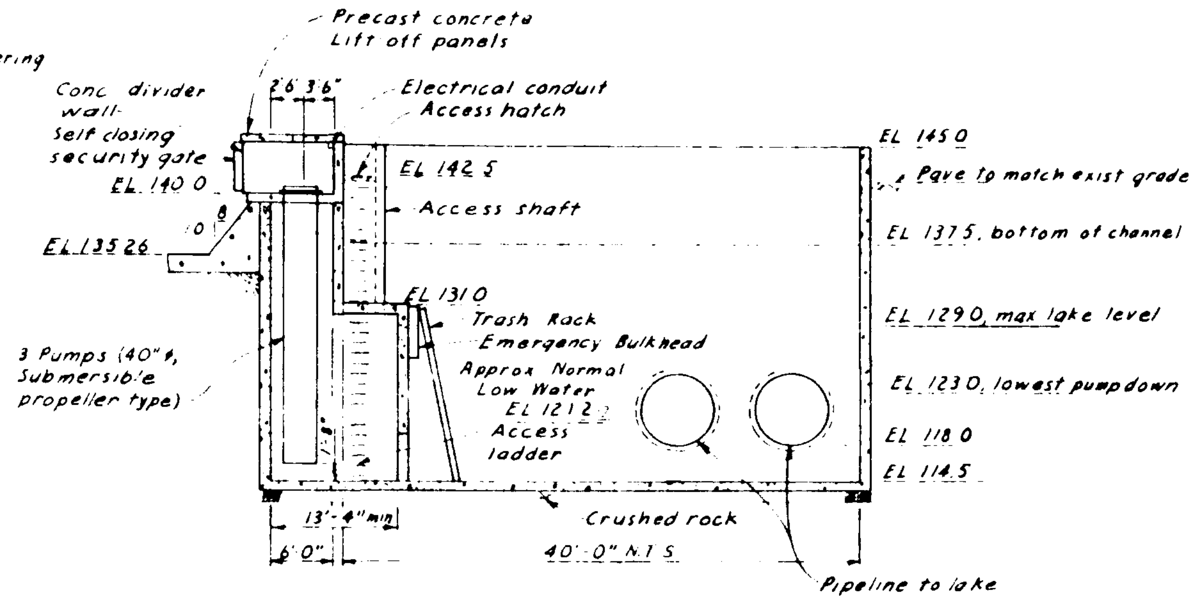
PLAN



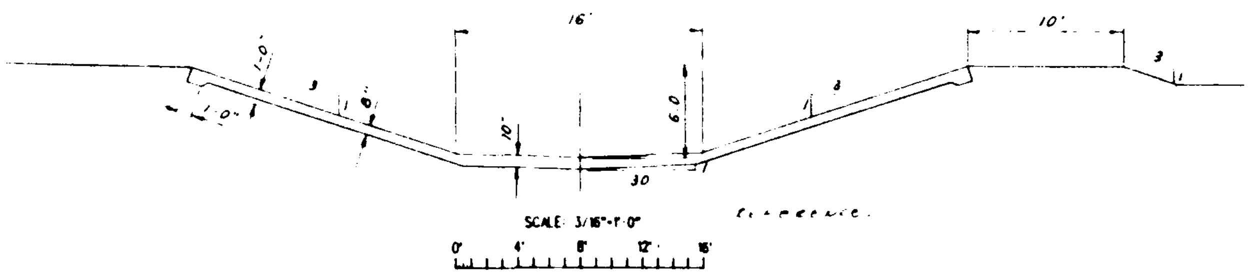
SECTION A-A

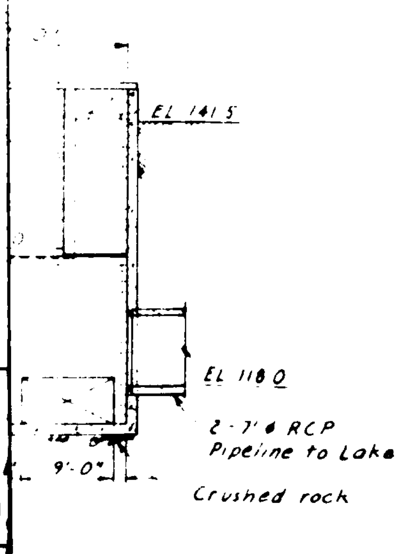
5 4 3





SECTION B-B





FOR REVISED LAYOUT
SEE FDM PUMP STATION
PLATE 4

Symbol	Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

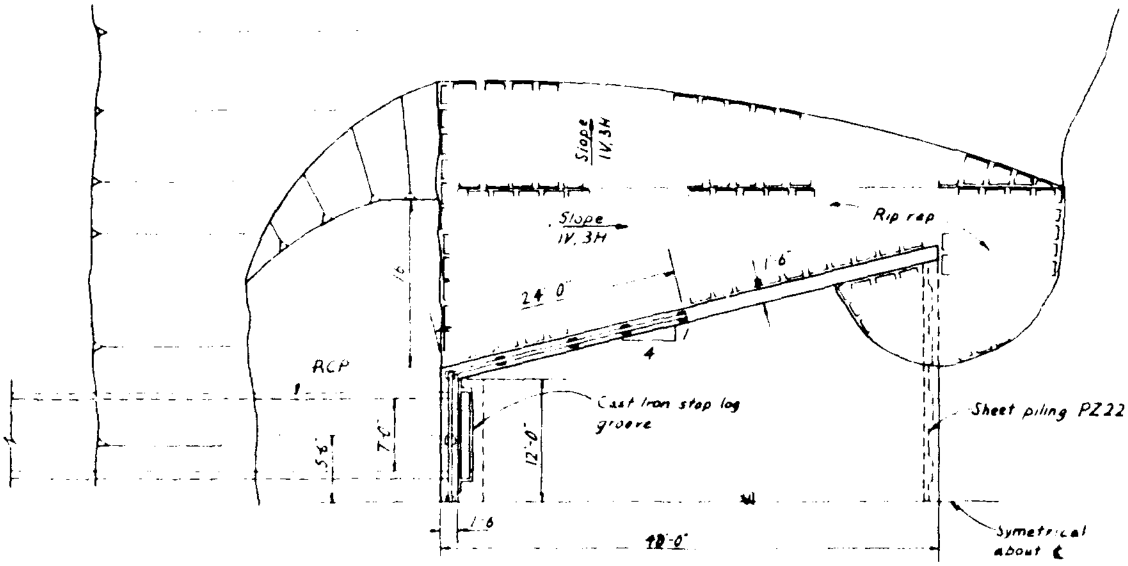
PUMP STATION & DROP STRUCTURE

Designed by:	
Drawn by:	
Checked by:	
Reviewed by:	Scale: 1/8"=1'-0"
Approved by:	Date:
	Drawing Code:

Sheet reference number:

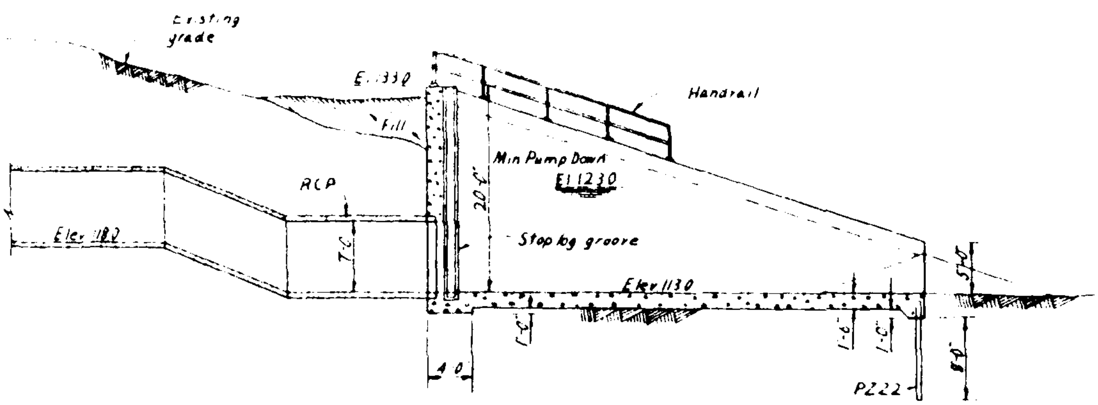
Sheet _ of _

5 4 3



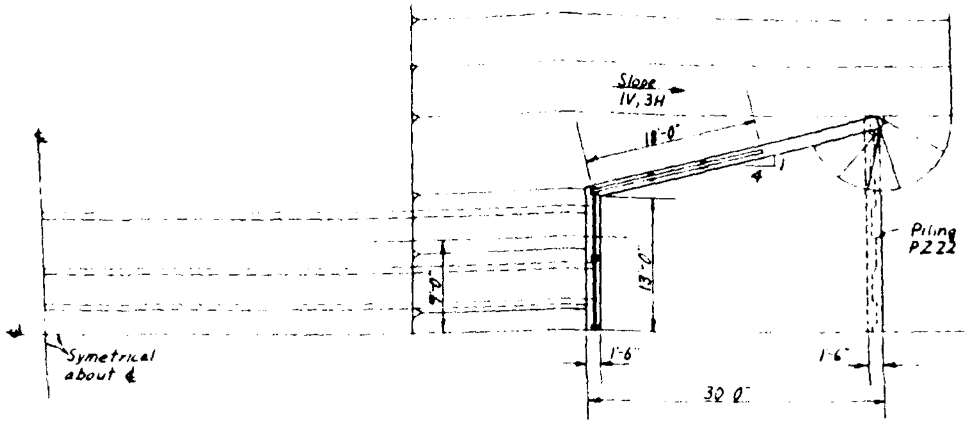
HALF PLAN

SOUTH BRANCH OUTLET STRUCTURE @ SOUTH GRAVEL PIT



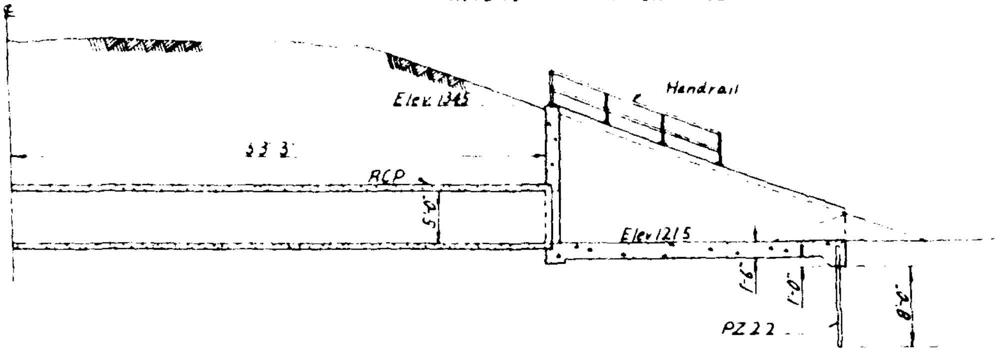
SECTION A-A

5 4 3



QUARTER PLAN

WINDSOR LAKE TO NORTH GRAVEL PIT
INTERCONNECTING CHANNEL



SECTION B-B

SCALE 0 8 16 24		
Symbol	Revisions Descriptions	Date / Approved

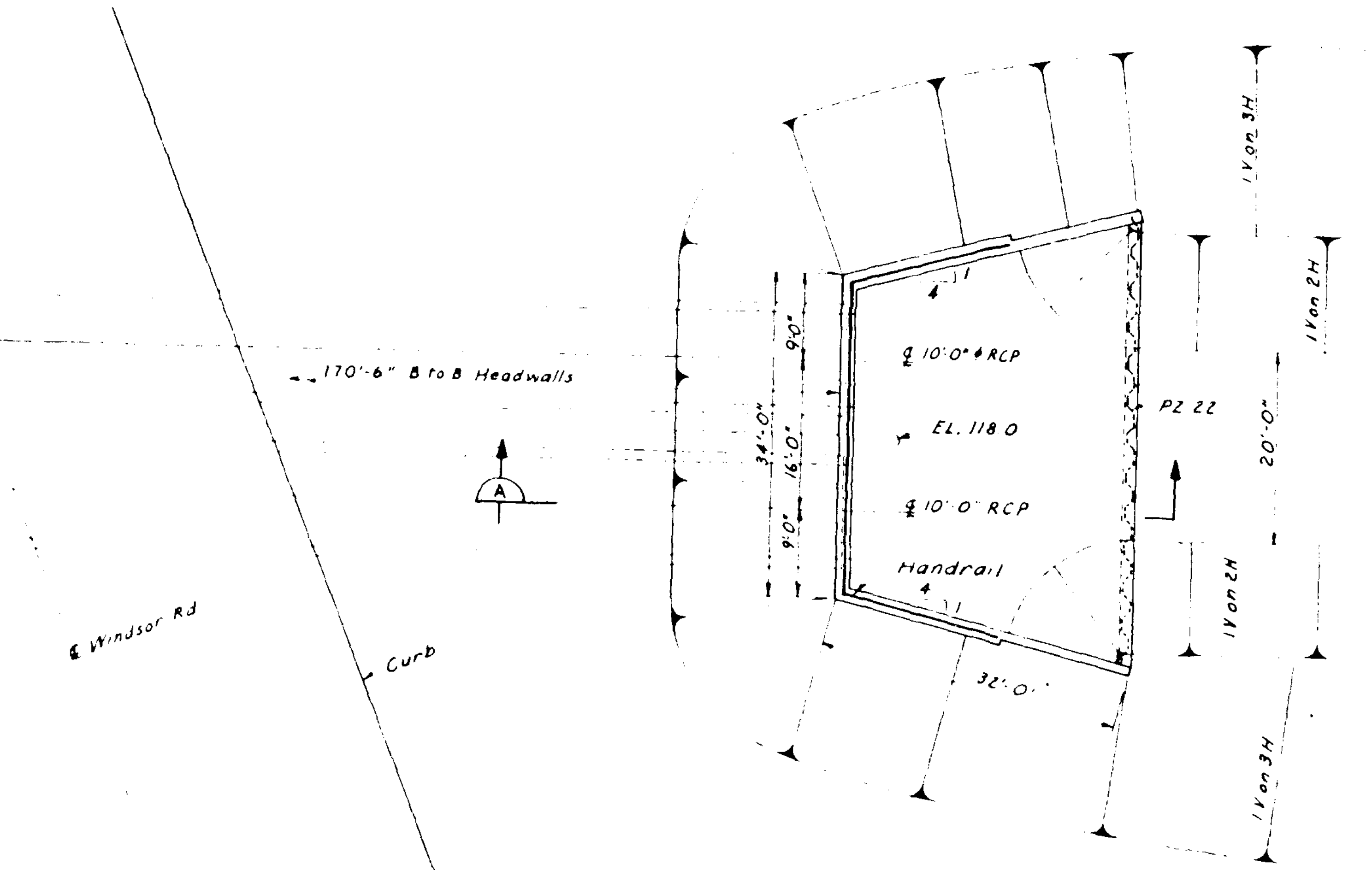
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

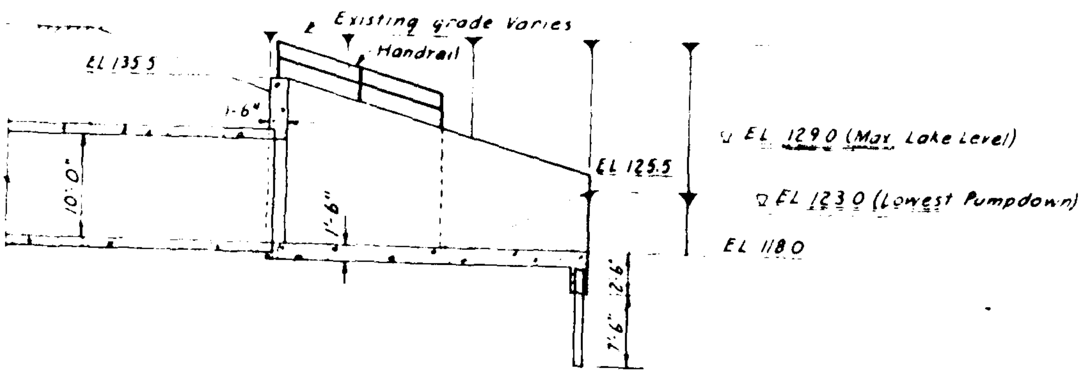
LAKE OUTLET STRUCTURES

Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:
Scale: 1/8" = 1'-0"
Date:
Drawing Code:
Sheet reference number:
Sheet __ of __

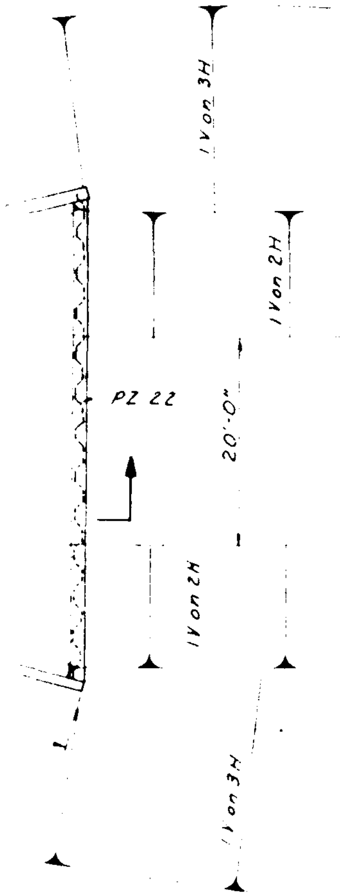
PLATE 3

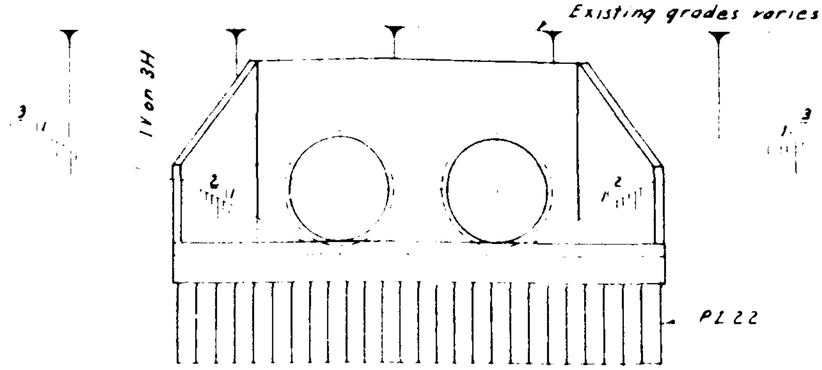


HALF PLAN

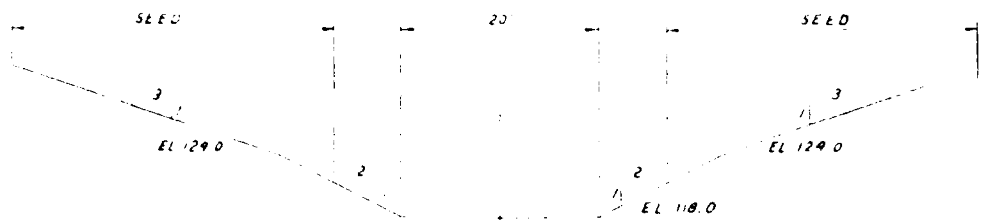


SECTION A





ELEVATION



TYPICAL CHANNEL SECTION

Max. Lake Level)

) (Lowest Pumpdown)

SCALE 0 8 16 24

Symbol	Revisions Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

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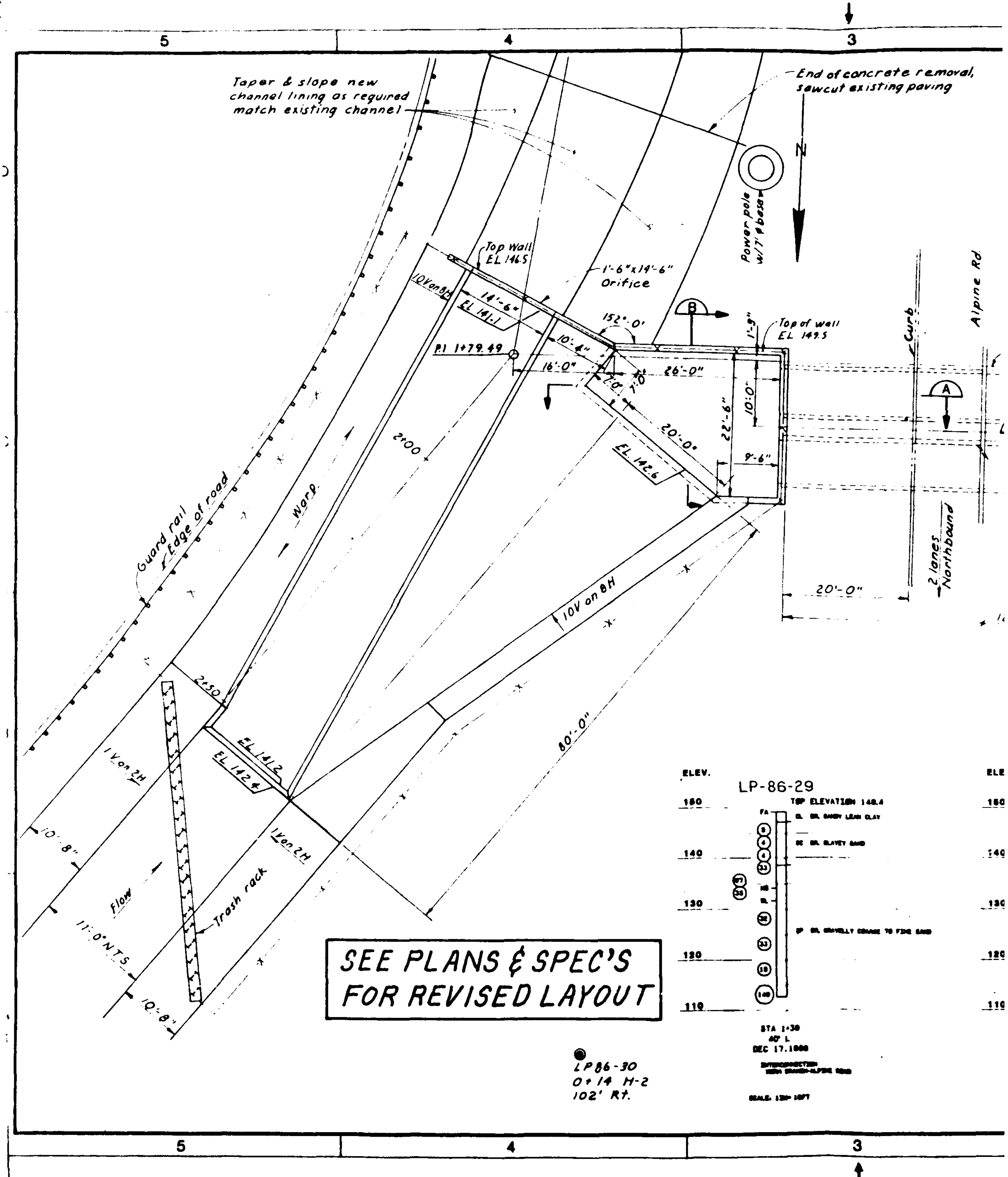
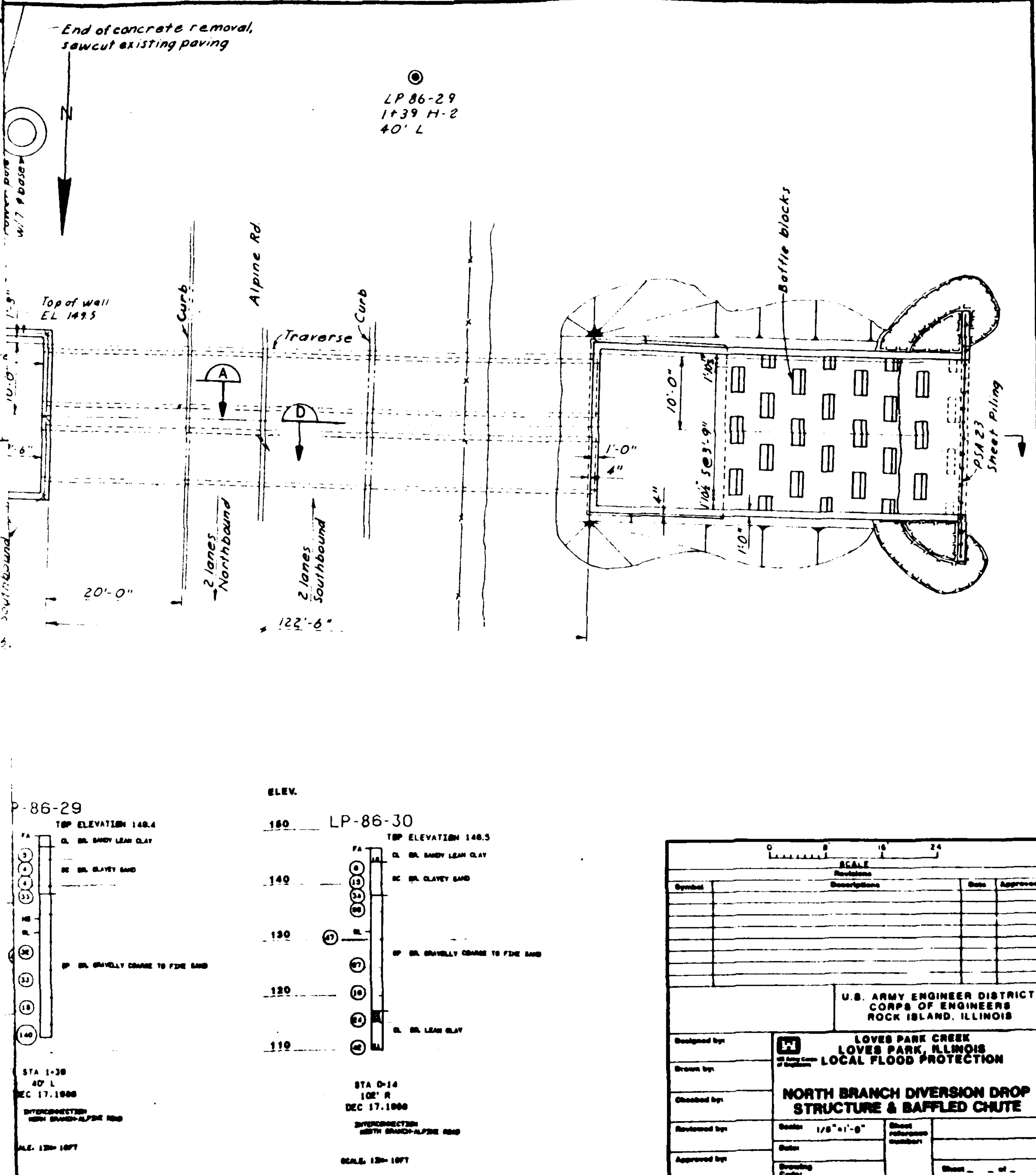
LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

SOUTH PIT TO WINDSOR LAKE INTERCONNECTING CHANNEL

Scale: 1/8"=1'-0"
Date:
Drawing Code:
Sheet reference number:
Sheet _ of _



5
4
3
Taper & slope new channel lining as required match existing channel
End of concrete removal, sawcut existing paving
Power pole w/7' ϕ base
N
Top Wall EL 146.5
1'-6"x14'-6" Orifice
10V on 8H
14'-6"
EL 141.1
10'-4"
152°-0'
B
1'-9"
Top of wall EL 149.5
Curb
Alpine Rd.
P.I. 1+79.49
16'-0"
26'-0"
7'-0"
7'-0"
A
22'-6"
10'-0"
20'-0"
EL 142.6
9'-6"
2+00
Warp
Guard rail
℄ Edge of road
2 lanes Northbound
20'-0"
10V on 8H
2+50
80'-0"
EL 141.2
EL 142.4
1V on 2H
1V on 2H
10'-8"
Flow
Trash rack
11'-0" NTS
10'-8"
SEE PLANS & SPEC'S FOR REVISED LAYOUT
LP 86-30
0+14 H-2
102' Rt.
ELEV.
LP-86-29
TOP ELEVATION 148.4
160
150
140
130
120
110
STA 1+30
40' L
DEC 17.1986



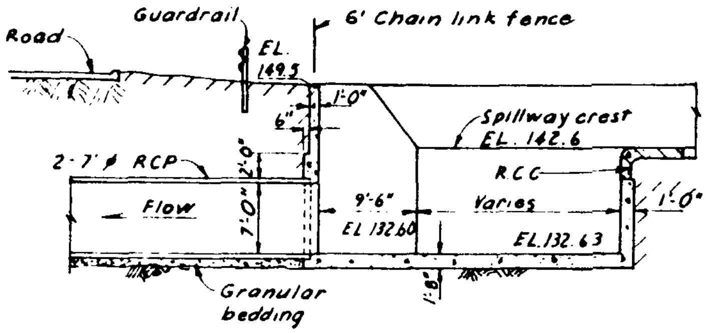
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

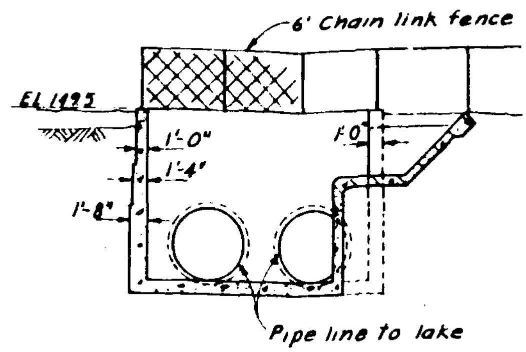
NORTH BRANCH DIVERSION DROP STRUCTURE & BAFFLED CHUTE

Scale: 1/8" = 1'-0"

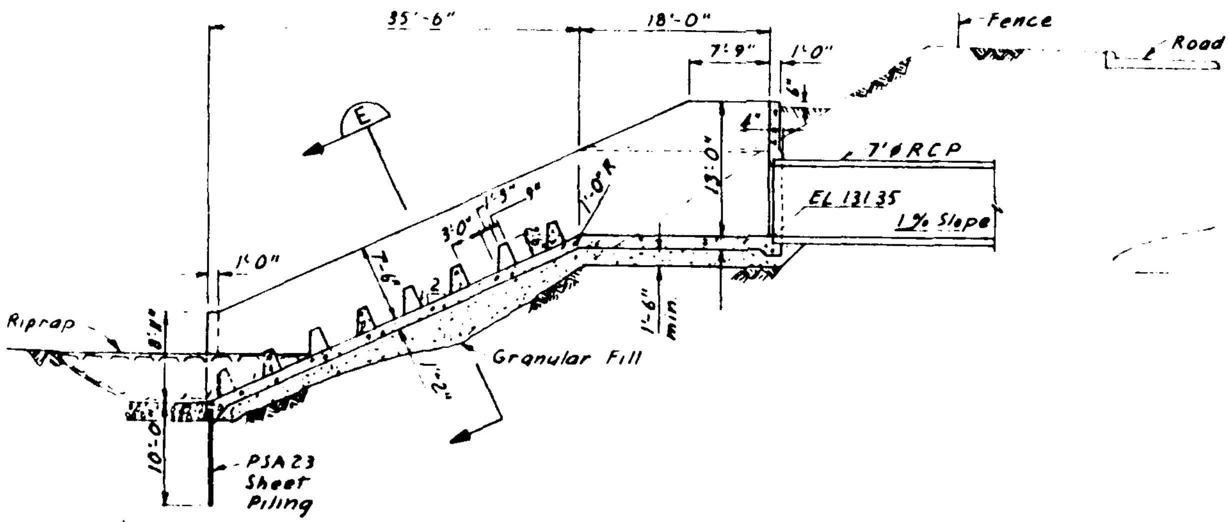
PLATE 32



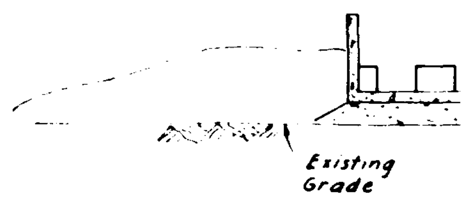
SECTION (A)



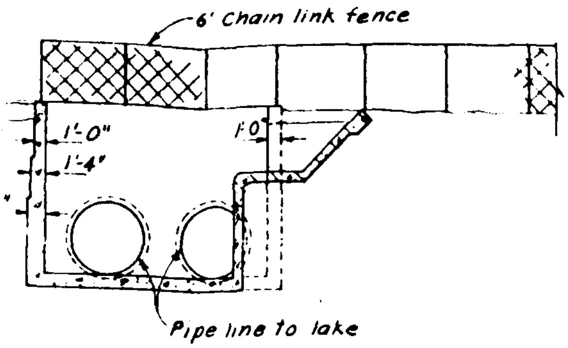
SECTION (B)



SECTION (D)

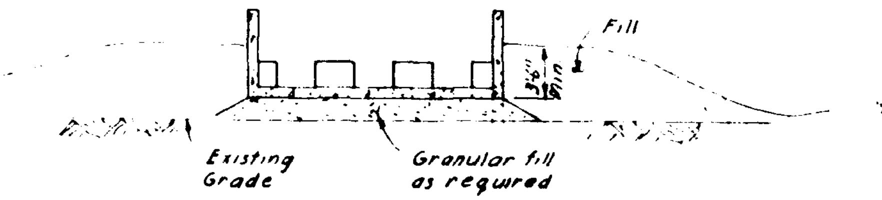


SECT



SECTION (B)

Road



SECTION (E)

SCALE

Revisions

Symbol	Descriptions	Date	Approved

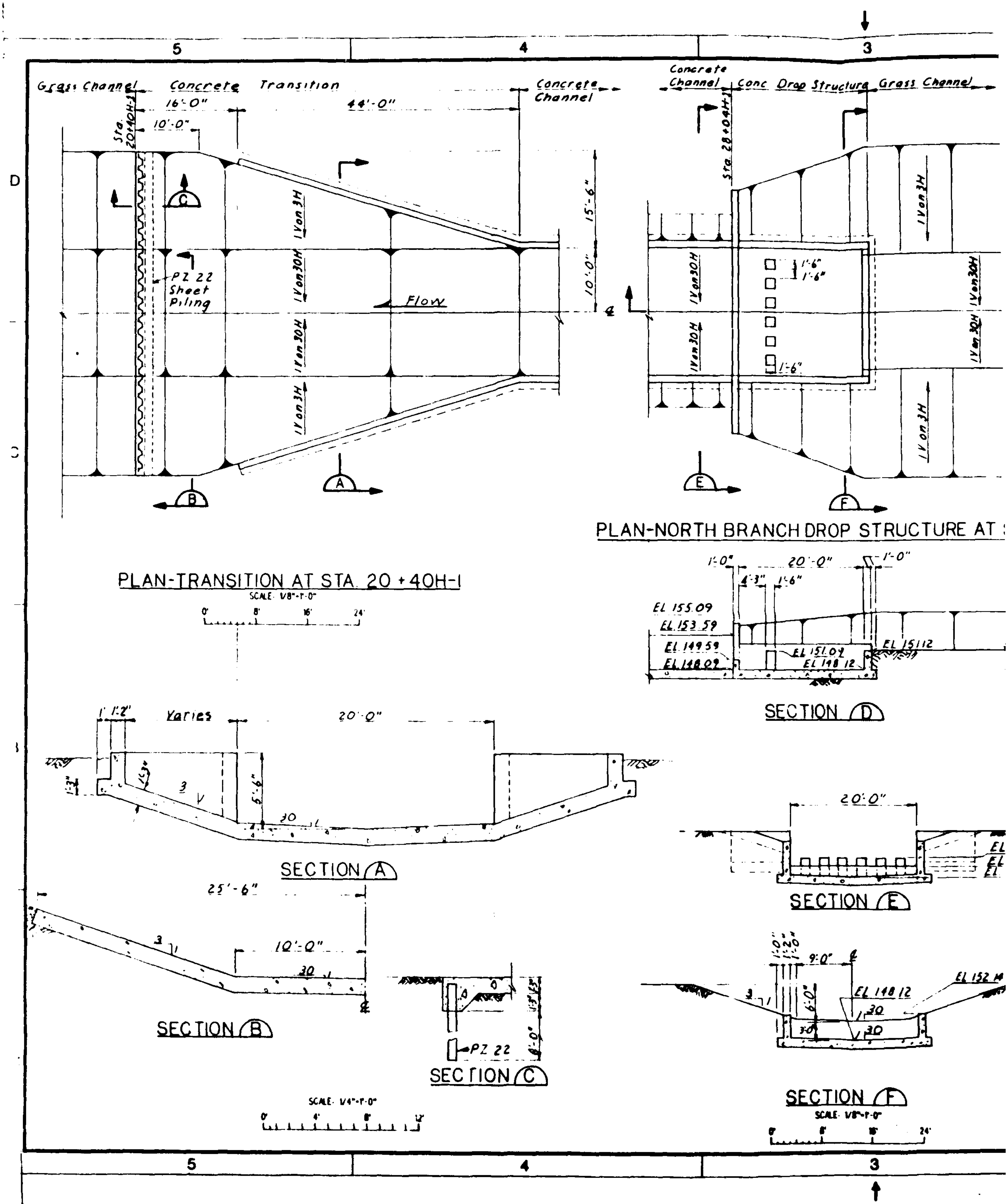
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

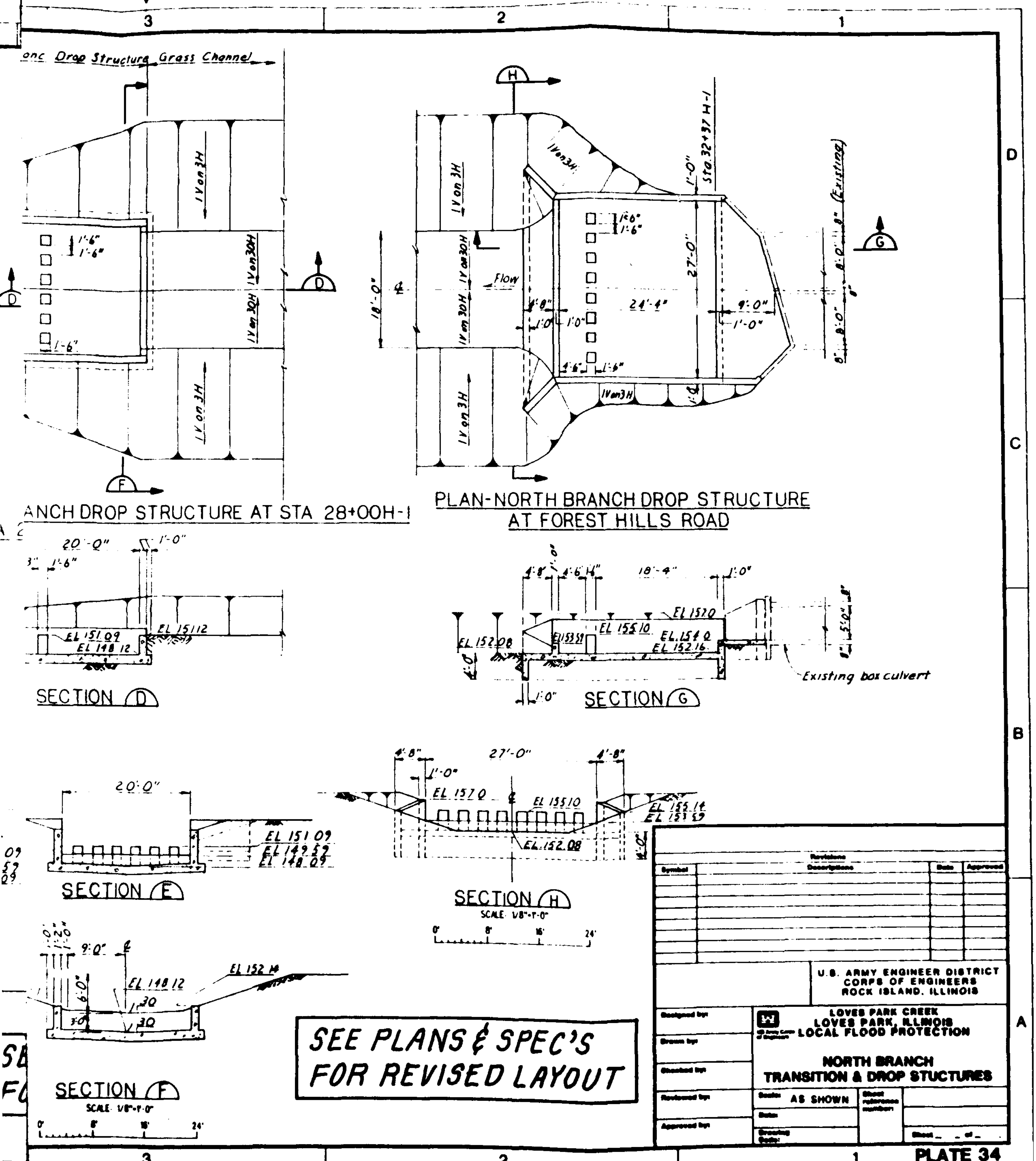
LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

NORTH BRANCH BAFFLED CHUTE & DIVERSION DETAILS

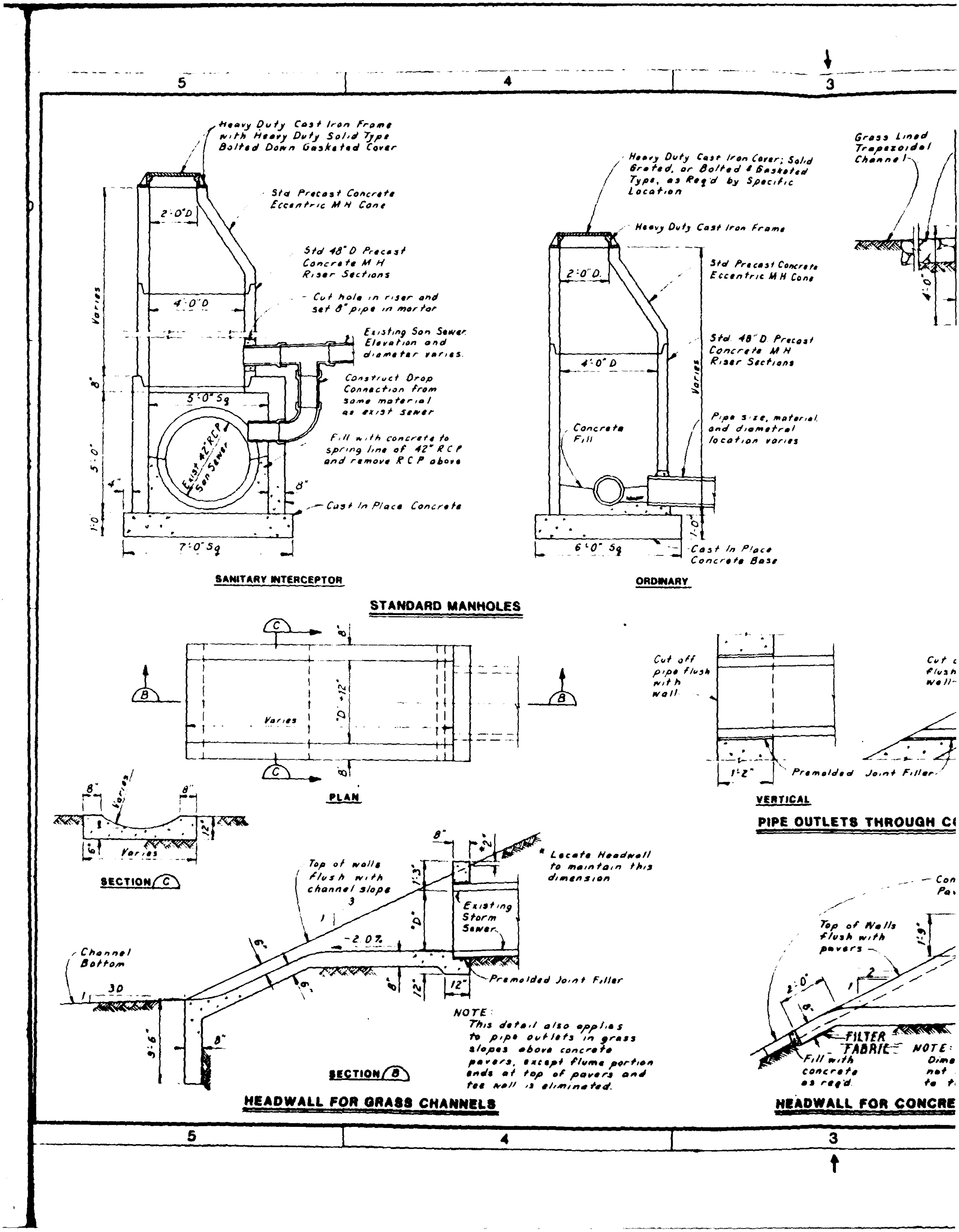
Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:
Scale: 1/8" = 1'-0"
Date:
Drawing Code:
Sheet reference number:
Sheet _ of _

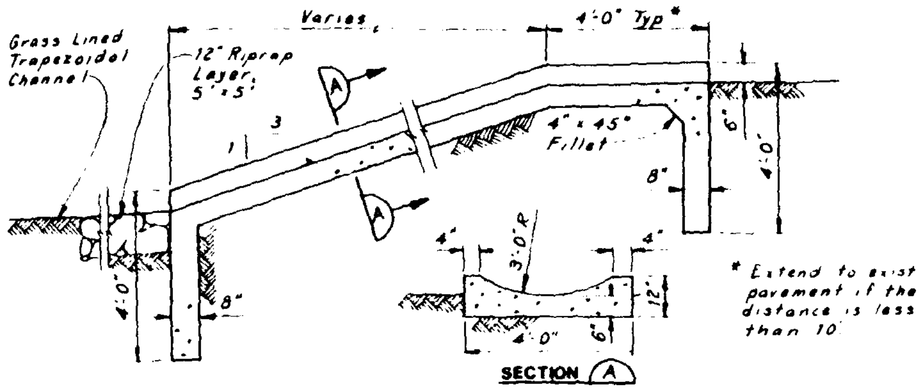
PLATE 33


5
4
3
Grass Channel
Concrete Transition
16'-0"
10'-0"
44'-0"
Concrete Channel
Sta. 20+40H-1
PZ 22 Sheet Piling
1V on 3H
1V on 30H
Flow
15'-6"
10'-0"
Concrete Channel
Conc Drop Structure
Grass Channel
Sta. 28+04H-1
1'-6"
PLAN-TRANSITION AT STA. 20+40H-1
SCALE: 1/8"=1'-0"
0' 8' 16' 24'
PLAN-NORTH BRANCH DROP STRUCTURE AT
1'-0"
20'-0"
4'-3"
1'-6"
EL 155.09
EL 153.59
EL 149.59
EL 148.09
EL 151.09
EL 148.12
EL 151.12
SECTION D
1' 1'-2"
Varies
20'-0"
5'-6"
1'-3"
SECTION A
25'-6"
10'-0"
SECTION B
PZ 22
SECTION C
SCALE: 1/4"=1'-0"
0' 4' 8' 12'
20'-0"
SECTION E
9'-0"
6'-0"
EL 148.12
EL 152.14
SECTION F
SCALE: 1/8"=1'-0"
0' 8' 16' 24'
D
C
B

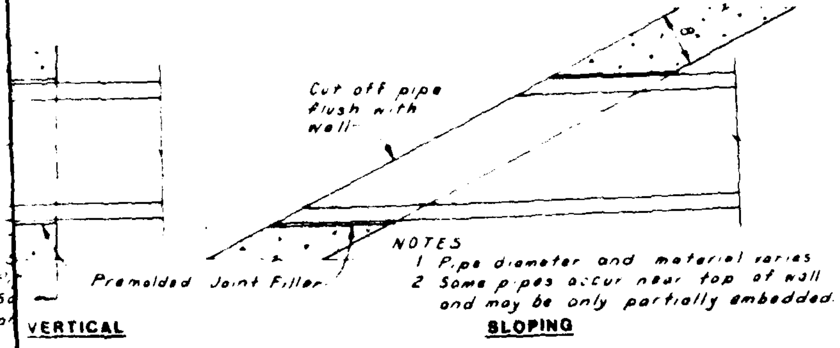


Conc Drop Structure Grass Channel
PLAN-NORTH BRANCH DROP STRUCTURE
AT FOREST HILLS ROAD
ANCH DROP STRUCTURE AT STA 28+00H-1
Sta. 32+37 H-1
Flow
1V on 3H
1V on 30H
(Existing)
SECTION D
SECTION G
Existing box culvert
SECTION E
SECTION H
SCALE 1/8"=1'-0"
SECTION F
SCALE 1/8"=1'-0"
EL 151.09
EL 148.12
EL 151.12
EL 152.08
EL 155.10
EL 157.0
EL 154.0
EL 152.16
EL 149.52
EL 148.09
EL 155.14
EL 152.14
SEE PLANS & SPEC'S
FOR REVISED LAYOUT
Revisions
Symbol
Descriptions
Date
Approved
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS
LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
NORTH BRANCH
TRANSITION & DROP STUCTURES
Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:
Scale: AS SHOWN
Sheet reference number:
Date:
Drawing Code:
Sheet ___ of ___
PLATE 34

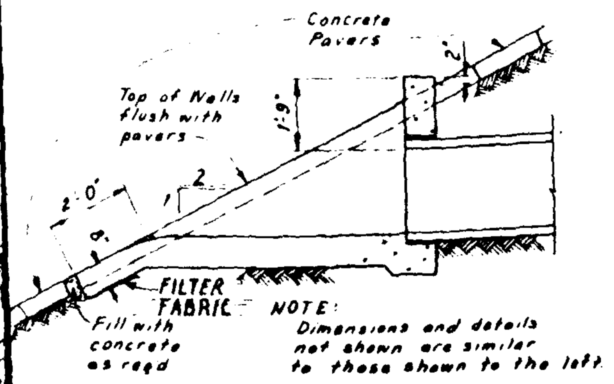

5
4
3
Heavy Duty Cast Iron Frame with Heavy Duty Solid Type Bolted Down Gasketed Cover
Std Precast Concrete Eccentric M H Cone
2'-0" D
Std 48" D Precast Concrete M H Riser Sections
4'-0" D
Cut hole in riser and set 8" pipe in mortar
Varies
Existing San Sewer. Elevation and diameter varies.
8'
Construct Drop Connection from same material as exist sewer
5'-0" Sq
Fill with concrete to spring line of 42" RCP and remove RCP above
Exist 42" RCP San Sewer
5'-0"
4"
8"
Cast In Place Concrete
1'-0"
7'-0" Sq
SANITARY INTERCEPTOR
Heavy Duty Cast Iron Cover; Solid Grated, or Bolted & Gasketed Type, as Req'd by Specific Location
Heavy Duty Cast Iron Frame
2'-0" D
Std Precast Concrete Eccentric M H Cone
Std. 48" D Precast Concrete M H Riser Sections
4'-0" D
Varies
Concrete Fill
Pipe size, material, and diametral location varies
1'-0"
6'-0" Sq
Cast In Place Concrete Base
ORDINARY
STANDARD MANHOLES
Grass Lined Trapezoidal Channel
4'-0"
C
B
8"
"D"+12"
Varies
PLAN
Cut off pipe flush with wall
1'-2"
Premolded Joint Filler
VERTICAL
Cut off flush wall
PIPE OUTLETS THROUGH C
8"
Varies
8"
12"
6"
Varies
SECTION C
8"
2"
* Locate Headwall to maintain this dimension
Top of walls flush with channel slope
1'-3"
3
1
"D"
Existing Storm Sewer
-2.0%
Channel Bottom
1
3D
6"
6"
8"
12"
12"
Premolded Joint Filler
9'-6"
8"
NOTE:
This detail also applies to pipe outlets in grass slopes above concrete pavers, except flume portion ends at top of pavers and toe wall is eliminated.
SECTION B
HEADWALL FOR GRASS CHANNELS
Con Pa
Top of Walls flush with pavers
1'-9"
2
1
2'-0"
8"
FILTER FABRIC
Fill with concrete as req'd.
NOTE:
HEADWALL FOR CONCRE
5
4
3



SURFACE DRAINAGE FLUMES



PIPE OUTLETS THROUGH CONCRETE WALLS



HEADWALL FOR CONCRETE PAVER SLOPES

Symbol	Revisions Descriptions	Date	Approved

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

Designed by:
Drawn by:
Checked by:
Reviewed by:
Approved by:

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION

MISCELLANEOUS DETAILS

Scale:
Date:
Drawing Code:
Sheet reference number:
Sheet _ of _

PLATE 35

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX A

HYDROLOGIC AND HYDRAULIC ANALYSIS

ROCK ISLAND DISTRICT
CORPS OF ENGINEERS
CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS 61201

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX A
HYDROLOGIC AND HYDRAULIC APPENDIX

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*Revised September 1989

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LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX A
HYDROLOGIC AND HYDRAULIC APPENDIX

INTRODUCTION

GENERAL

Reevaluation of the Loves Park Creek indicated that diverting peak flood discharges from tributaries and constructing concrete channels on the main stem would substantially reduce flood damages in Loves Park, Illinois.

BASIN DESCRIPTION

Loves Park Creek has a drainage area of 7.8 square miles. Part of the area along the Main Stem is urban or industrial. Most of the basin, however, is residential. Only a few small areas have yet to be developed.

The North Branch tributary drains 1.6 square miles; the South Branch tributary drains 2.7 square miles. Most flood problems occur on the Main Stem formed where the tributaries join upstream of the C&NW railroad bridge. This creek is 2.5 miles long and flows under 17 bridges.

Pebble Creek Dam was built on the South Branch Tributary in 1984. This earth dam has a drainage area of 1.64 square miles. The structure is 21 feet high and stores 242 acre-feet of water (2.7 inches of runoff). The outflow from this dam is not regulated; the discharge is a function of the water elevation at the outlet structure.

The dam outlet structure consists of a box with an 18-inch low-flow pipe at center line elevation 223.5, a 3-foot-high by 6-foot-wide orifice at invert elevation 231.5, and an 8-foot by 24-foot overflow weir at crest elevation 236.0. All elevations are in Rockford Datum (RD) which is 602.9 feet below the 1929 USGS elevation. The outlet structure is connected to an 8-foot-diameter concrete pipe which empties into a riprap plunge pool. The principal spillway is designed for the 100-year event. The grass emergency spillway is designed to handle 50 percent of the Probable Maximum Flood.

PROJECT DESCRIPTION

SIZE CRITERIA

Discharges for the one-percent probability event were used to size channels. This corresponds to a flood with a recurrence interval of 100 years. However, discharges equal to or exceeding this event could happen at any time during the life of the project.

ELEMENTS

North Branch Tributary: This design memorandum proposes that flood discharges exceeding 100 cubic feet per second ft^3/s on the North Branch tributary be diverted into Windsor Lake. The creek would be channelized from Forest Hills Road to Alpine Road. The diversion structure would be built upstream of Alpine Road. Flood discharges would be diverted under Alpine Road, down a baffled chute spillway, and into Windsor Lake. Low flows (below 100 ft^3/s) would continue downstream in the existing concrete channel.

South Branch Tributary: Flood discharges exceeding 150 ft^3/s on a part of the South Branch tributary would be diverted into the South Gravel Pit. A channel rerouting the existing creek would be built from Alpine Road to 700 feet southeast of the South Gravel Pit. A diversion structure at this point would divert flood discharges into the South gravel pit through two 7-foot-diameter culverts. Low flows (below 150 ft^3/s) would be directed to the existing North Branch concrete-lined channel and, hence, to the Main Stem.

Gravel Pit Detention Storage: Three existing gravel pits would be interconnected with culverts to form a detention pond. After the flood waters recede, the stored water would be pumped back into the Main Stem. A pump station at the South Branch diversion structure would withdraw water from the pond using the two 7-foot-diameter culverts.

The Main Stem: The existing creek would be converted to a concrete-lined channel. Sections would be rectangular or trapezoidal, depending upon available space. Existing bridges would either be replaced or modified with transition sections.

HYDROLOGIC STUDIES

DISCHARGE DETERMINATION

METHOD USED

Discharge values were computed using the HEC-1 computer program. Computer modeling was selected because no historic records exist for Loves Park Creek basin. Synthetic method was the only way to compute discharge frequency values. Computer modeling also allowed for simulation of Pebble Creek Dam, proposed diversion structures, and proposed detention storage ponds.

RAINFALL

The computed discharges depend upon assumptions made in constructing the model. These assumptions include rainfall amounts and rainfall distribution. Rainfall amounts were from Technical Paper 40 Rainfall Frequency Atlas of the United States (TP 40) for the 6-hour storm. This source was selected in the earlier report stages and retained for this report. Other sources of hypothetical rainfall exist; for example, Technical Letter 13 (TL 13) Illinois State Water Survey. The use of TP 40 rainfall data results in smaller peak discharges than those obtained using TL 13.

The rainfall pattern was taken from the feasibility report. This pattern, which appears on plate A-1, was developed statistically from data for Rockford. Peak discharges are influenced by rainfall pattern. The effect on performance and operation can vary depending upon the actual rainfall pattern.

** In November 1989, during review of this report, it was determined that the use
** of Bulletin 70 rainfalls would be required for regulatory mapping purposes.
** The effects of the Bulletin 70 rainfalls on the project has been studied. It
** was found that the 100-year event would exceed the channel capacity onnly in
** the area between Station 97+00 and 111+00 on the Main Stem. The channel
** design has been modified in that area to contain all Bulletin 70 flows. That
** portion of the channel will now be a grass lined trapezoidal channel with a 13
** foot bottom width instead of the 10 feet now shown on plates 10 and 11.
** Corrections will be made to the drawings during the preparation of plans and
** specifications. In all other areas, the floodwater will be contained within
** the limits of the channel banks.

RUNOFF MODEL

A map of the 16 subbasins in the HEC-1 model appears on plate A-2. The HEC-1 subbasin parameters are listed in table A-1; where it was applicable, values were taken from the feasibility report. Snyder's Cp coefficient was determined using the Wright-McLaughlin Urban Stormage Drainage Criteria Manual. The time of concentration for each subbasin was the sum of overland time of concentration and major storm sewer travel times. Cp values were varied in the HEC-1 model until computed and calculated tc values agreed. There is no subbasin B15 in the model since this subbasin was found to contribute to a different creek. The cumulative area at selected node points is also shown in table A-2. For Clark's tc values time of concentration (tc) was estimated using the Kirpich Equation. The Clark attenuation constant (R) was developed from regional criteria for similar basins.

**Revised June 1990

TABLE A-1

Snyder or Clark
Unit Hydrograph Parameters Used in Design Model

Subbasin	tp	Cp	tc	R	Square Miles
B1	.12	.5			.11
B2	.08	.45			.06
B3	.61	.5			.39
B4-5	.65	.5			.486
B6	.15	.5			.088
B7	.13	.5			.173
B8	1.3	.5			.759
B9	.12	.5			.222
B11	.34	.5			.67
B10			.38	.5	.22
B14a			.75	.5	1.03
B14b			1.2	.5	1.64
B12			.91	.6	.24
B13			.55	.36	.13
B16a			.5	.3	.53
B16b			.62	.41	.72

The North Branch (drainage area 1.62 square miles) is modeled with 4 subbasins. Runoff from the most upstream subarea, B16b, is routed through an existing quarry. As floodwater continues downstream, it can leave this tributary at three locations. In the with-project model, water leaves the creek only at the North Branch diversion structure. These features were modeled with flow diversions.

An area of 1.38 square miles drains to the North Branch diversion structure. This structure allows discharges below 100 ft^3/s to continue downstream. During a flood, most of the water is diverted into Windsor Lake. At flood time, more than 100 ft^3/s will continue downstream; this is because water levels in the channel produce higher heads across the diversion orifice. For example, the 100-year discharge at the structure is 759 ft^3/s; A flow of 138 ft^3/s continues downstream with the remainder going into Windsor Lake.

The South Branch (2.89 square miles) is modeled with three subbasins. The runoff from B14b is routed to simulate Pebble Creek Dam. Storage and discharge information at various elevations for this existing dam appear on plate A-3. The data are from the 1983 dam design report prepared by Owen Ayres and Associates. 100-year inflow and outflow hydrographs obtained from this modified Puls routing also appear on the same plate. A second routing was used for flow through subbasin B14a.

With the project, water is diverted into the South Gravel Pit by the South Branch diversion structure. The drainage area above the south branch diversion structure is 2.67 square miles. This structure allows discharges below 150 ft^3/s to continue downstream. Most of the flood discharges are diverted into the South Gravel Pit. During floods, flows of more than 150 ft^3/s will flow downstream. For example, the 100-year discharge is 1145 ft^3/s; a flow of 210 ft^3/s continues downstream with the remainder being diverted into South Gravel Pit.

* The drainage area that contributes direct runoff to the gravel pits is 0.28 square miles. This includes the area of the gravel pits and is included in the HEC-1 model.

For the with-project case, no routings or diversions were used in the HEC-1 model for the Main Stem.

It was assumed that no storm sewers will be built leading to Loves Park Creek. The construction of a storm sewer system would reduce travel times of water through subbasins. This would alter hydrograph parameters and increase peak discharges. New sewers will go to the Rock River.

The initial loss was assumed to be 0.79 inches, and the hourly loss rate was 0.4 inches. Development within the basin was assumed to be small to moderate. Extensive development would decrease loss rates and increase peak discharges.

DISCHARGE SUMMARY

* Design discharges are listed in table A-2 and Plate A-24. The HEC-1 discharges at unrouted locations on the tributaries were compared with results from 1977 Illinois regression equations. The answers were in agreement.

Federal flood control can only address water-damage problems downstream from the point where the flood discharge is greater than 800 ft^3/s for the 10-percent flood. The without-project discharge for this event at the confluence of the North and South tributaries is 890 ft^3/s. The most effective and economical way to reduce damages downstream of this point is to construct diversion works on both tributaries. This approach conforms to ER 1105-2-20.

STANDARD PROJECT FLOOD

Standard Project Storm (SPS) rainfall values were based on EM 1110-2-1411. A summary of the distribution is shown on plate A-4. The 96 hourly values were divided by four to obtain 15-minute values used in the HEC-1 model. Rainfall excess values were based on an initial loss of 1.0 inch and a uniform loss rate of 0.10 inch per hour.

Peak discharges are shown on table A-3. Because the Standard Project Flood fills the detention ponds, there is little difference between without-project and with-project discharges. Due to increased channel capacity near the mouth, diversions down city streets to the Rock River were less for the with-project case. Water levels near the mouth, however, were about the same. Upstream, the project decreased water levels for the SPF by less than a foot.

* Revised September 1989

TABLE A-2

With-Project Discharges in Cubic Feet Per Second
at Various Points Along Loves Park Creek

HEC-1 Node Point	---(Recurrence Interval (in Years)--- --------Existing-------- 10-Yr	50-Yr	100-Yr	Area (sq. mi.)	Location
(Main)					
90	1,837	2,425	2,723	7.47	Mouth
85	1,756	2,319	2,603	7.36	Pearl St.
80	1,721	2,271	2,549	7.30	
75	1,569	2,059	2,307	6.91	River Lane D/S
70	1,397	1,817	2,028	6.42	Loves Park Dr.
60	1,333	1,732	1,933	6.33	Riverside Blvd.
55	1,214	1,571	1,751	6.16	Clifford Ave.
50	951	1,215	1,348	5.18	Between Elm & Material
45	518	633	692	4.51	D/S Confluence Tributaries
(South Branch)					
DIVERT	(356)	(758)	(936)	2.67	Diverted to South Gravel Pits
PASSED	173	198	210		D/S of Diversion Structure
40	322	390	424	2.69	Mouth at South Branch
35	528	956	1,145	2.67	Alpine Dr.
(North Branch)					
30	220	276	305	1.62	No. Into Confluence
DIVERT	330	511	(622)	1.38	Diverted to Windsor Lake
PASSED	120	131	138		D/S of Diversion Structure
25	450	642	759	1.38	U/S Alpine Diversion
X123	376	581	695	1.25	Forest Hills Rd.

( ) Flows Are Diverted and Do Not Pass Downstream

TABLE A-3

Standard Project Flood Flow at
Various Points Along Loves Park Creek

Location	HEC-1 Node	Discharge (ft^3/s)
Main Branch of Loves Park Creek		
Above Material Ave.	45	4,750
Above Brown's Parkway	RB11	5,250
Above Clifford Ave.	55	6,410
Above Riverside Blvd.	60	6,540
Above Loves Dr.	70	6,600
Above Grand Ave.	None	5,900
Above Merrill Ave.	None	5,300
Above River Lane	75	4,710
Above Pearl Ave.	85	3,960
Above the Mouth	90	4,050
South Branch of Loves Park Creek		
Above Alpine Road	35	3,950
U/S Confluence	40	4,220
North Branch of Loves Park Creek		
Downstream of Forest Hills Rd.	X123	2,120
Above Alpine Road	None	1,910
U/S Confluence	30	500

FLOW DURATION

Since discharges on Loves Park Creek are not recorded, flow-duration data were estimated using a previous District study for Illinois. This study was based on a least-squares regression method, which correlated flow with drainage area at 104 gaging stations in Illinois. See plate A-7 for flow-duration curves at diversion sites on the North Branch and South Branch tributaries.

GENERAL HYDROLOGIC AND HYDRAULIC CONSIDERATION

WATER QUALITY AND GROUND WATER CONDITIONS

Water quality concerns are discussed in the Environmental Appendix E. Generally, in intermittent streams the water at the beginning of a flood washes away pollutants that have collected in the streambed since the last flood. To prevent pollutants from being washed into the detention ponds, diversion structures on both tributaries allow low flow discharges to continue downstream instead of being diverted into the detention ponds. Trash racks upstream of the diversion structures will prevent large debris from entering either the detention ponds or the channel project.

The detention ponds are abandoned gravel pits. There is an exchange between water in these pits and groundwater. The influence on the groundwater table is discussed in the Geotechnical Appendix B.

SEDIMENTATION

The long-term annual sediment yield from the basins draining the North Branch and South Branch tributaries is 200 tons per square mile. This estimate was taken from the Kent Creek, Rockford, Illinois, General Design Memorandum. This creek is not only near the project site but is similar to it. The total area draining to the detention pond storage is 4.05 square miles. Thus, the * annual load available at the diversion structures for deposit in the detention ponds would be 810 tons.

The volume of the deposited sediment depends upon its specific weight. This weight, in turn, depends upon the reservoir level. Fluctuations in the water level usually allow sediment to dry and consolidate. However, sediment deposited in the detention ponds will always be under water and will not consolidate. For this reason an average specific weight of 60 pounds per cubic foot was used.

* The yearly volume available for deposit in the detention ponds will average .619 acre-feet. Over the 100-year project life, 61.9 acre-feet of sediment * would be available for deposit in the ponds. The proposed diversion method takes pass-through flows from the bottom of the diversion channels. This design feature will reduce the amount of sediment going into the ponds by routing sediments downstream in the channel.

* Over the life of the project, sediment will accumulate primarily near the * culverts entering the South Gravel Pit and the spillway entering Windsor Lake. * Much less sediment will find its way into the North Gravel Pit. Periodic * maintenance dredging of the lakes will be required.

*Revised September 1989

Sediment entering the Main Stem will continue to the Rock River. There will be no change in conditions between the existing and the with-project case. The city must periodically clean out bridges and transition structures.

SUBCRITICAL VS SUPERCRITICAL CHANNEL

The change in elevation along the Main Stem is not steep enough to design a supercritical channel with a stable Froude number (greater than 1.13). The proposed project is based upon subcritical channels with a Froude number less than 0.85.

FREEBOARD

Freeboard was determined in compliance with ER 1110-2-1405 and Civil Works Engineer Bulletin 54-14. The project does contain levees or floodwalls on the tributaries. Using higher freeboard in these short reaches would increase the severity of overtop damage. Most of the channels are concrete. These channels will be durable for the life of the project, producing stable water-surface profiles. There will be some alteration of profiles as the concrete ages and the "n" value increases. For this reason, one foot of freeboard was used for all channels.

Increases in water-surface levels at bridges because of debris is not expected to happen. Trash racks upstream of each diversion structure will prevent trash from entering the channel system. Loss factors for bridges were based on the Yarnell equation using a square nosed pier coefficient of 1.25. This factor will tend to overestimate losses due to piers.

SUPERELEVATION

The increase in water-surface level for the transverse slope around each curve was computed using EM 1110-2-1601. The superelevation formula coefficient of 0.5 for tranquil flow at rectangular and trapezoidal cross sections was used. If the computed water-surface level was less than 0.5 feet, no correction was made. If the level exceeded 0.5 foot, wall heights were increased.

RESIDUAL FLOODING

This study is authorized to examine overbank flooding from Loves Park Creek. While the Federal Government can and will help with overbank flooding, problems due to storm runoff are a responsibility of the city government. Parts of Loves Park are flat and not drained by storm sewers.

Storm runoff may cause damages in these areas as storm water travels to Loves Park Creek. To eliminate or reduce these problems the city would have to build storm sewers emptying directly into the Rock River. Storm sewers emptying into Loves Park Creek are not recommended since they would shorten the timing of flood hydrographs. This change would increase flood discharges and reduce the effectiveness of the channel improvements.

In addition to problems from storm interior drainage, flooding will also occur along Loves Park Creek during events producing discharges that exceed design discharges (table A-2). The SPF (Standard Project Flood) represents discharges that may be expected from the most severe combination of meteorologic and hydrologic conditions that are considered reasonably characteristic of the region. A flood of this magnitude will greatly exceed the capacity of the improved channels. Therefore flooding can still occur even with the project in place.

The time for a flood to travel down Loves Park Creek is about 2.9 hours. This time is too short to provide a practical warning by monitoring rainfall within the basin. Useful warning time will depend upon the ability of meteorologists to predict the intensity and duration of storm fronts passing over the basin.

The standard project flood would inundate Loves Park for about 7 hours. Channel velocities range from 5.0 to 15.0 feet per second while average overbank velocities range from 0.5 to 2.0 feet per second. Overbank velocities near the channel or occurring around obstructions could approach overbank velocities. Estimates of areas flooded without the project (plates A-5&6) and with the project (plates A-8&9) appear at the end of this appendix.

PRE AND POST PROJECT INUNDATION LIMITS

Two sets of inundation maps appear in this appendix. The first set shown of plates A-5 and A-6 show without project conditions. The second set shows the with-project case; see plates A-8 and A-9. Readers should be cautioned that these maps are drawn from two-foot contour lines. Much of the land adjacent to the creek is very near the elevation of the creek banks. In some cases, the elevation of adjacent ground is actually at a lower elevation than the creek banks. These factors make estimating flow paths and areas flooded very difficult.

PROJECT PERFORMANCE

During most days of the year, discharges on the tributaries will be below the threshold which causes diversion into the gravel pits. Operation under this condition will be unregulated. Water will flow down the improved channels and eventually enter the Rock River.

During floods, discharges on the tributaries will exceed the threshold, causing diversion into the gravel pits. It is difficult to determine the number of days water will be diverted into either the South Gravel Pit or
* Windsor Lake. However, as discussed in paragraph 28 titled Lake Sedimentation
* in the Main Report, diversion of floodwater into lake storage can be expected
* to occur from one to two times a year. Another study was made using the 20-year period of record for Cedar Creek near Winslow, Illinois (DA-1.29 square miles). The Cedar basin is similar in area and slope to the tributaries. Adjusting this data to the North and South Branch tributaries, it appears that major diversions would occur during at least 10 days over a 20-year period.

Channel improvements on both tributaries start downstream of culverts under
* Forest Hills Road. Both of these culverts are capable of passing the design flow. In neither case does water flow over the roadway so that it would not enter the channel improvement downstream. On the North Branch tributary the capacity of the natural creek upstream of the bridge culvert is not sufficient to carry the design flow. Clearing and snagging of the creek in this region
* might be an option the city would wish to pursue.However, the project is
* designed to handle flows from upstream areas without any special maintenance
* requirements for those areas.

After the storm front has passed over the Loves Park Creek basin, discharges will recede on the tributaries. As discharges on the tributaries decrease, the diversions into the gravel pits will stop. When the pass-through flow in the South Branch at the diversion structure has dropped below flood conditions, pumps will be started. The number of pumps used to evacuate the detention pond storage will depend upon the volume of water.

To operate the gravel pit detention ponds, it is necessary to know the status of the detention ponds and diversion structures. A water level indicator at the South Branch diversion structure will detect when diversion occurs. Another water level indicator in the gravel pit will measure the detention pond water surface elevation. The gravel pit level will be used to monitor the base water level and to compute the volume of detention pond storage water.

A detailed explanation of the pump facilities and operation will be published separately in a feature design memorandum.

HYDRAULIC STUDIES

METHOD USED

Water-surface elevations were computed using the HEC-2 computer program. Computer modeling was used to compute both with- and without-project conditions during the general reevaluation. Profiles were computed for floods with recurrence intervals of 10, 50, and 100 years and the SPF. Neither observed discharges nor observed water levels existed for calibrating the model.

*Revised September 1989

ASSUMPTIONS

The without-project data decks were done for flood insurance studies. The decks had a total of 120 cross sections. Channel "n" values varied from .02 to .05 while values for the overbank ranged from 0.04 to 0.08. Contraction coefficients varied from 0.1 to 0.3; expansion coefficients varied from 0.3 to 0.5. Most water levels were started at coincident stages on the Rock River. Water levels exceeding the 100-year recurrence interval were started at the 100-year Rock River stage.

The with-project data deck was made by adding channel improvement (CI) cards to the without-project data deck. All bridges were modeled using the special bridge routine. Trial channel sizes for CI cards were obtained using the Manning equation. All channels were designed so that the Froude number was less than or equal to 0.85. Channel "n" values for concrete, concrete pavers,
* and grass were 0.014, 0.025, and 0.032, respectively. The contraction and expansion coefficients were 0.1 and 0.3. The method of starting water levels was identical to the without-project case. Energy losses through bridges were modeled using the special bridge option (Yarnell equation) with a square nose pier coefficient of 1.25.

RESULTS SUMMARY

Water-surface profiles for the without-project case appear on plates A-10 through A-16. The with-project 100-year and SPF profiles appear on plates A-
* 17 through A-20. See plate A-24 for Final gravel pit water levels after
* diversion at various frequency floods.

PROJECT FEATURES

NORTH BRANCH TRIBUTARY

CHANNEL SIZES

Improvements for the North Branch tributary extend from Forest Hills Road downstream to Alpine Road. See plates 15, 16, and 17 of the main report. The design channel will have concrete and grass segments. All segments were sized to carry 759 ft^3/s and conform to criteria from EM 1110-2-1601. Design dimensions are summarized in table A-4. The "n" value used for concrete was 0.014; the value for grass was 0.035. Channel improvements will end 200 feet upstream of Alpine Road at the North Branch Diversion Structure. Low flows will continue downstream of the diversion structure in the existing concrete channel.

*Revised September 1989

TABLE A-4

Design Information for North Branch Channel Segments

Station from (to)	Bottom Slope ft/ft	Side Slope (V:H)	'N' Value	Bottom Width (ft)	Depth* (ft)	Velocity (ft/s)	Froude Number
0+00 (1+45)	EXISTING CONCRETE CHANNEL						
1+45 (11+85)	.0015	1:2	.014	11	5.5	8.4	.84
11+85 (20+40)	.0035	1:3	.035	18	5.5	5.3	.52
20+40 (28+25)	.0015	VERT.	.014	20	5.5	8.7	.73
28+25 (32+37)	.0025	1:3	.035	18	6.0	4.7	.45

* Depth is water depth plus 1 ft. freeboard

There is little chance of erosion problems in the grass channels. Grass at the bottom of the channel will not be killed by water. In fact, flows in the channel will equal or exceed one cubic foot per second only about 10-percent of the time.

DROP AND TRANSITION STRUCTURES

A drop structure immediately downstream of the twin box culverts under Forest Hills Road will reduce the water velocity leaving the culverts and allow the channel bottom to fall 1.8 feet. For details, see plate 34 of the Main Report. A second drop structure at station 28+00 will provide a drop of three feet. For details, see plate 34 of the Main Report. Both structures have
* been re-designed using procedures from Corps of Engineers Hydraulic Design
* Criteria 623. Rating curves for both structures appear on Plate A-25.

The grass channel from station 11+85 to station 20+40 has a different cross section than the adjacent concrete channels. Two transition structures, one at each end, will prevent turbulence and erosion as the water changes velocity. For details, see plate 34 of the Main Report.

*Revised September 1989

DIVERSION STRUCTURE

Details of the North Branch Diversion Structure appear on plate 32 of the Main Report. The structure was designed to pass at least 100 ft^3/s downstream. It was also designed to divert up to 659 ft^3/s into Windsor Lake.

* A trash rack across the diversion structure prevents large trash from entering either Windsor Lake or the lower North Branch channel. Low flows collect in a sunken channel sized for 100 ft^3/s. The low flow goes through an exit orifice with the same cross-sectional area and bottom eleva-tion as the low flow channel and continues downstream to the Main Stem. Flows that exceed the capacity of the sunken channel fall over a weir into a rectan-gular channel that terminates in two 7-foot-diameter reinforced concrete pipes. During floods, flows of more than 100 ft^3/s are passed downstream. As discussed in the Runoff Model section, this occurs because of the head differential across
* the orifice. The increase in flow passed downstream is small and not detrimental to project operation.

The cross-sectional area of the trash rack was based upon Waterways Experiment Station chart 010-7 titled Open Channel Flow Trash Rack Losses. Head losses
* across the rack were kept to less that 0.2 feet. The diversion weir was designed using the standard weir equation for a discharge of 659 cfs and a weir coefficient of 3.0. The culverts under Alpine Road were sized with a Rock Island District computer program assuming a square-edged entrance with head wall and parallel wing walls. The "n" value for concrete was 0.014.
* Rating curves for the North Branch diversion structure appear on plate A-26.

BAFFLED CHUTE DROP STRUCTURE

Water levels in Windsor Lake will vary in elevation from 123 ft. (RD) to 129 ft. (RD). Since the culvert outlet is 131.35, the baffled chute drops the water up to 8.35 feet. A baffled chute was selected because it can reliably function during variations in discharge and drop height. The structure was designed for a discharge of 659 ft^3/s. The design procedure was from <u>Hydraulic Design of Stilling Basins and Energy Dissipators</u> published by the United States Department of the Interior Bureau of Reclamation.

SOUTH BRANCH TRIBUTARY

CHANNEL SIZE

South Branch tributary improvements include relocating the existing channel downstream of Forest Hills Road. The new channel will carry water from the culverts crossing Forest Hills Road to the South Branch Diversion structure. The new route is shown on plate 13 of the Main Report. This concrete

*Revised September 1989

trapezoidal channel was sized to carry 1145 ft^3/s using criteria from EM 1110-2-1601. Design information is summarized in table A-5. The channel will be about 760 feet long. Low flows on the South Branch will pass through the diversion structure and enter the existing North Branch concrete channel. From this point, low flows from both tributaries will continue downstream together.

TABLE A-5

Design Information for South Branch Channel

BOTTOM SLOPE FT/FT	SIDE SLOPE (V:H)	'N' VALUE	BOTTOM WIDTH (FT)	DEPTH* (FT)	VELOCITY (FT/S)	FROUDE NUMBER
.0015	1:2	.014	16	6	9.16	.85

*DEPTH IS WATER DEPTH PLUS 1 FT FREEBOARD

DIVERSION STRUCTURE

The diversion structure is shown on plate 13 of the Main Report. The diversion structure consists of the trash rack, sunken low flow channel, and drop structure. Each of these features is discussed below.

TRASH RACK

A trash rack at the entrance to the diversion structure prevents debris from entering or blocking the pump station or the low flow orifice. Head losses across the rack were limited to 0.3 feet. The cross-sectional area of the trash rack was based upon Waterways Experiment Station chart 010-7 titled, "Open Channel Flow Trash Rack Losses".

SUNKEN CHANNEL

Low flows spread across the bottom of channel in the diversion structure and collect in a sunken channel, shown on Plate 13 of the Main report. The sunken channel was designed using the Manning equation to carry a flow of 150 ft^3/s. These low flows are transported directly to the North Branch. These details
* can be seen on plate 29. The sunken channel also ensures that major portion
* of the sediment continues downstream in the existing North Branch. The exit orifice has the same

*Revised September 1989

cross section as the sunken channel and thereby blocks flows that exceed the depth of the sunken channel. At flood flows, the orifice will pass flows up to 200 ft^3/s, but this variation is acceptable to the operation of the project.

DROP STRUCTURE

As discharges exceed the capacity of the sunken channel, they spread across the bottom of the diversion structure and spill into the drop structure. Therefore, the starting water depth in the diversion structure is determined by the critical depth of the high-flow discharge. The capacity of the drop structure exceeds the capacity of the incoming trapezoidal channel. Thus, the capacity of the trapezoidal channel controls. Water exits the drop structure through conduits that run to the south gravel pit.

Water levels in the South Gravel Pit will vary in elevation from 123 ft. (RD) to 129 ft. (RD). The lip of the drop structure is at elevation 137.56 ft. (RD), so the water falls up to 14.5 feet. See plate A-27 for rating curves.

CONDUITS TO GRAVEL PITS

The conduits to the gravel pits were sized using a Rock Island District computer program assuming a square-edged entrance with head wall and parallel wing walls. The twin 84-inch RCP's were designed assuming full flow in the culverts. The Manning's "n" value for the concrete was 0.014. The design flow was 995 cfs. See plate A-27 for rating curves.

Since water must flow both ways in the conduits, the conduit will be installed with zero slope. (These same conduits are used to drain the gravel pits during pump out.) An exception is the last 44 feet of the conduit. This last leg is sloped into the gravel pit to ensure submergence of the outlet and to prevent floating debris or ice from entering the conduits during pumpdown.

<u>GRAVEL PIT DETENTION POND STRUCTURES</u>

THREE GRAVEL PITS COMBINED

Earlier designs connected the South Gravel Pit and Windsor Lake to store flood discharges. However, the owners plan to fill parts of the pits to increase the value of their property. This change will reduce the total surface area from 65 to 43 acres.

The project is designed to store about 330 Ac-Ft of floodwater. This diversion volume is produced from a 6-hour flood with a recurrence interval of 100 years.
The proposed configuration combines the South Gravel Pit, Windsor Lake, and North Gravel Pit for detention storage. The total surface area for the three

pits is 55.5 acres. See table A-6 for a breakdown of the surface and drainage areas of each pit. There is little variation of surface area with elevation.
* The maximum discharges through the inter-connecting culverts for the 100 year
* event are as follows:
* South Pit to Windsor Lake 985 cfs w/ 1 foot head
* Windsor Lake to North Pit 352 cfs w/ 1 foot head

TABLE A-6

Area Information for Gravel Pits

Pit Name	Pit Surface Area (Ac.)	Land Drainage (Ac.)	Total Area (Ac.)
South	8.0	13.3	21.3
Windsor	35.0	41.9	76.9
North	12.5	68.7	81.2
Total	55.5	123.9	179.4

After flood diversion into the pits the water level in the pits will be pumped to elevation 123 ft. (RD). During parts of the year the water level could drop below this elevation. This elevation is consistent with data observed between March, 1978, and September, 1982. The water level for the three combined pits will be about 121.7 ft. (RD). Table A-7 shows lowest, average, and highest elevations over the observation period. The same information is plotted on page 6 of the main report.

TABLE A-7

Base Water Surface Levels in Gravel Pits

Pit Name	Elevations in feet		
	Lowest	Average	Highest
South	119.6	122.8	125.3
Windsor	118.1	121.7	124.8
North	116.5	121.6	123.7

*Revised September 1989

ELEVATION-AREA-VOLUME RELATIONSHIP

The elevation-area-volume relationship for the three combined pits is shown on plate A-21. The design water-surface elevation required to store 330 Ac-ft is 128.7 ft. (RD). This elevation allows 2.3 feet of freeboard, since the ground west of the South Gravel Pit is at elevation 131.0 ft. (RD).

Water will rise about six feet in 4 hours. The average gravel pit detention pond elevation as a function of time is plotted on plate A-22. The 10-, 50-, and 100-year events are shown. Inflow hydrographs from the two diversion structures appear on plate A-23. The hydrographs are associated with an event with a recurrence interval of 100 years.

PUMP STATION

* The pump station has been redesigned in the Feature Design Memorandum date July 1989. Factors considered in sizing the pumps included: ground water infiltration, local surface runoff, diversion volumes, interval between storms and experiences with other reservoirs. Two identical 24-inch submersible propeller pumps each with a discharge of about 8000 GPM will empty the pits. This size will pumpout the 100-year diversion volume in about 5 days.

* Diversion volumes and gravel pit water surface levels at the start of pumping for various recurrence intervals storms are summarized on plate A-24. Gravel pit drawdown curves for the same flood events appear on plate A-30. The computations do not include groundwater or water stored in graverl adjacent to the lake.

* Several sources of information were examined to determine pump capacity. An in-house analysis was made of rainfall at Rockford (gage 7382), Illinois, from 1959 through 1985. In the 27 years of record it appears that diversion into the gravel pits would have occurred about 42 times. Six of these events occurred within days of each other. The average time separating historic sotrms was about 60 hours.

* Another source of information was <u>Review of Hydrologic and Hydraulic Requirements: North Branch Chicago River (Extract)</u>, published in 1985. A part of the document summarized data on existing off-line reservoirs. Most of the 17 reservoirs on the North Branch were designed to be emptied in 2 to 5 days.

* <u>Hydrometeorological Characteristics of Severe Rainstorms in Illinois</u> published in 1989 by Floyd Huff has a section that addresses antecedent rainfall for major storm events. Part of this table concerning small drainage areas is reproduced after this paragraph. The data show that the chances of significant rainfall one day before a major storm are slim but that chances of rainfall ten days before a storm are fairly certain. The data support the belief that a one day pump down is not necessary but that a ten day pumpdown would not be prudent.

*Revised September 1989

Probability Distributions
of Antecedent Rainfall for a 10 square mile area

		--Average Rainfall (in.) for Antecedent Period--				
	Probability	1 Day	2 Day	3 Day	5 Day	10 Day
*	5%	1.05	1.5	1.65	2.00	3.10
*	10%	0.60	0.96	1.12	1.48	2.40
*	20%	0.22	0.41	0.57	0.97	1.70
*	30%	0.08	0.14	0.29	0.66	1.30
*	40%			0.13	0.42	1.00
*	50%				0.24	0.75

INTERCONNECTING CULVERTS

The project will connect the South Gravel Pit with Windsor Lake and Windsor Lake with the North Gravel Pit.

A combination of channel and culvert will be used to connect the South Gravel Pit with Windsor Lake. Two 120-inch-diameter culverts 173 feet long will pass under Windsor Road. Two grass trapezoidal channels will run from the each culvert head wall to the gravel pit. The channels will have identical dimensions. Each will have a 20-foot bottom width, a side slope of 2:1 (horizontal:vertical), and an invert elevation of 118.0 ft. (RD). The slope above the water line is 3:1. The South Pit channel will be 300 feet long; the Windsor Lake channel will be 260 feet long. (See plate 31.)

The Windsor Road culvert size was dependent on the peak South Branch diversion discharge and on the South Gravel Pit storage volume. Because the South Gravel Pit storage is small, the pit fills before the peak diversion from the South Branch enters the pit. For this reason, the capacity of the Windsor Road culvert should pass most of the peak, or 900 ft^3/s, under a head of one foot. Design calculations used a District computer program. The entrance shape was assumed to have a square edge with a head wall and parallel wing walls. An "n" value of 0.014 was used for concrete. The total discharge
* capacity computed for a head of one foot was 985 ft^3/s. See plate A-28 for
* rating curve.

The North Gravel Pit will be connected to Windsor Lake with three 60-inch-diameter culverts. Each reinforced concrete pipe will be 106 feet long with an invert at 121.5 ft. (RD). Since water will flow in both directions, the pipe will have no slope.

In order for the pits to function as a unit, the culvert to the North Branch Gravel Pit should allow a rate of water surface-level increase similar to that of Windsor Lake. This condition is met if the culvert can pass about 400 ft^3/s with a head loss of one foot. Design calculations used a District computer program. The entrance shape was assumed to have a square edge with a head wall and parallel wing walls. An "n" value of 0.014 was used for concrete. The total design discharge when flowing full under a head of one

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In order for the pits to function as a unit, the culvert to the North Branch Gravel Pit should allow a rate of water surface-level increase similar to that of Windsor Lake. This condition is met if the culvert can pass about 400 ft^3/s with a head loss of one foot. Design calculations used a District computer program. The entrance shape was assumed to have a square edge with a head wall and parallel wing walls. An "n" value of 0.014 was used for concrete. The total design discharge when flowing full under a head of one foot is 352 ft^3/s. The 50 ft^3/s difference between target and design is
* acceptable. See plate A-28 for ratng curves.

MAIN STEM

CHANNEL SIZES

* The Main Stem runs from the confluence of the North and South branches to the
* Rock River. Channel improvements do not extend to the Rock River. They start
* upstream of Station 4+00. Main Stem improvements are shown on plates 4 through 12 of the Main Report.

The Main Stem is made up of five channel segments. Listed by channel material, they include three concrete segments, one concrete paver segment, and one grass segment.

Channel designs were made using EM 1110-2-1601. Design discharges and dimensions appear in table A-8. The "n" values were 0.014 for concrete, 0.025 for concrete pavers, and 0.031 for grass. One portion of the grass channel (200 feet long) around station 118+00 has unsymmetrical channel side slopes. This modification was made to accommodate existing structures.

*Revised September 1989

TABLE A-8

Design Information for Main Stem Channel Segments

STATION TO (FROM)	DESIGN Q	BOTTOM SLOPE FT/FT	SIDE SLOPE (V:H)	'N' VALUE	BOTTOM WIDTH (FT)	DEPTH* (FT)	VELOCITY (FT/S)	FROUDE NUMBER	OTHER*
4+35 (30+40)	2723	.0013	1:2	.014	30	7.5	10.5	.85	T.C
30+40 (44+00)	2549	.0013	VERT	.014	40	8	10.6	.76	R.C
44+00 (73+00)	2028	.0013	1:2	.014	22	8	10.0	.83	T.C
73+00 (97+00)	1750	.0035	1:3	.025	17	6-8	8.6	.76	T.P
97+00 (120+00)	692	.0030	1:3	.031	10	6	5.5	.55	T.G

*DEPTH EQUALS WATER DEPTH PLUS 1 FT FREEBOARD
EXPLANATION: T Trapezoidal, R Rectangular,
C concrete, P Concrete Pavers, G Grass.

There is little danger from erosion in the grass channel. The grass at the bottom of the channel will not be killed by water. Flows in the channel will equal or exceed 2.5 ft3/s only about 20-percent of the time.

DOWNSTREAM END OF CHANNEL IMPROVEMENT

* The existing creek will be left as it is from its confluence with the Rock
* River to station 4+00. Improvements were avoided for environmental reasons. However, during floods substantial scour will occur along the natural creek. The project has increased the channel capacity, so erosion will be more severe than the without-project case.

At station 4+40, the downstream most part of the concrete channel is flared to reduce the water velocity, (see plate 4 Main Report). Riprap will be placed downstream for another 40 feet to protect the end of the concrete channel.

*Revised September 1989

DROP AND TRANSITION STRUCTURES

Structures are described in the order that they would be encountered going upstream.

Between 30+20 and 30+40, a concrete transition helps reduce turbulence where the water flows from a rectangular channel into a trapezoidal one. This structure appears on plate 6 of the Main Report.

Another transition at 44+00 to 44+40 shifts the flow from a trapezoidal channel into a rectangular channel (plate 7 Main Report).

Station 73+00 to station 74+00 locates another transition. This structure shown on plate 9 of the Main report directs the water leaving the concrete paver trapezoidal drained into a concrete trapezoidal channel.

* Drop structures have been redesigned using Corps of Engineers Hydraulic Design Criteria 623. Final designs will appear in plans and specifications.

Between stations 96+83 and 97+00, water drops from a grass trapezoidal channel into a concrete paver trapezoidal channel. See plate 10 in Main Report. The
* drop is 2.5 feet. See plate A-29 for rating curves.

At the straight drop structure between stations 120+00 and 119+95, water drops three feet. In addition to dissipating energy, the structure allows for a change from a concrete trapezoidal channel to a grass trapezoidal channel. The plan view appears on plate 12 of the main report while details are on
* plate 28. See plate A-29 for rating curve.

BRIDGE LOSSES

Energy losses through bridges were computed by HEC-2 using the Yarnell energy equation. Calculations for computing the change in water-surface elevation through a bridge used a coefficient of 1.25 (pier with square nose and tail). Usually the channels were not constricted at the bridges. For this reason, contraction or expansion energy losses were not increased at bridges.

The computed losses through bridges are listed on table A-9.

*Revised September 1989

TABLE A-9

Bridge Losses for Proposed Loves Park Design

Bridge Name	Bridge Length	Head Loss (Ft)
Pearl Ave.		.71
N. Second	100	.40
River Ln.	40	.35
Merrill Ave.	40	.60
Grand Ave.	39	.21
Loves Pk. Dr.	35	.21
E. Riverside Blvd.	59	.68
Garden Plaines Ave.	37	.15
Clifford Ave.	40	.50
Walker Ave.	37	.33
Elm St.	37	.34
Private	32	.84
C & NW	10	.14
Material	28	.02
C & NW	13	.06
C & NW	26	.52

* The maximum water surface (100 year event) and bottom of superstructure
* elevations are noted for the existing bridges as follows:

*	Location	Maximum Water Surface	Bottom of Superstructure
*	Pearl Ave.	109.5	111.8
*	Merrill Ave.	112.8	115.2
*	Grand Ave.	113.3	116.4
*	Loves Park Dr.	113.5	117.0
*	Riverside Blvd.	115.3	116.8
*	Garden Plain Ave. (1)	115.8	118.8
*	Clifford Ave.	116.7	119.9
*	Material Ave.	130.1	134.4
*	R.R. at Station 112+39	130.2	134.6
*	R.R. at Station 121+34	137.3	139.5

* (1) Top and bottom of channel elevations at the Garden Plain Ave. bridge
* shown on Plate 25 should be corrected to 116.6 and 108.6 respectively.

*Revised September 1989

RAINFALL PATTERN
FOR 10, 50, AND
100-YR STORM

6-HOUR STORM

HR	MIN.	RAIN
0	15	.065
	30	.065
	45	.065
1	00	.066
	15	.174
	30	.174
	45	.174
2	00	.174
	15	.214
	30	.571
	45	.785
3	00	.214
	15	.25
	30	.25
	45	.25
4	00	.25
	15	.12
	30	.12
	45	.12
5	00	.119
	15	.033
	30	.033
	45	.032
6	00	.032

LOVES PARK CREEK

HEC-1 SUBBASIN MAP

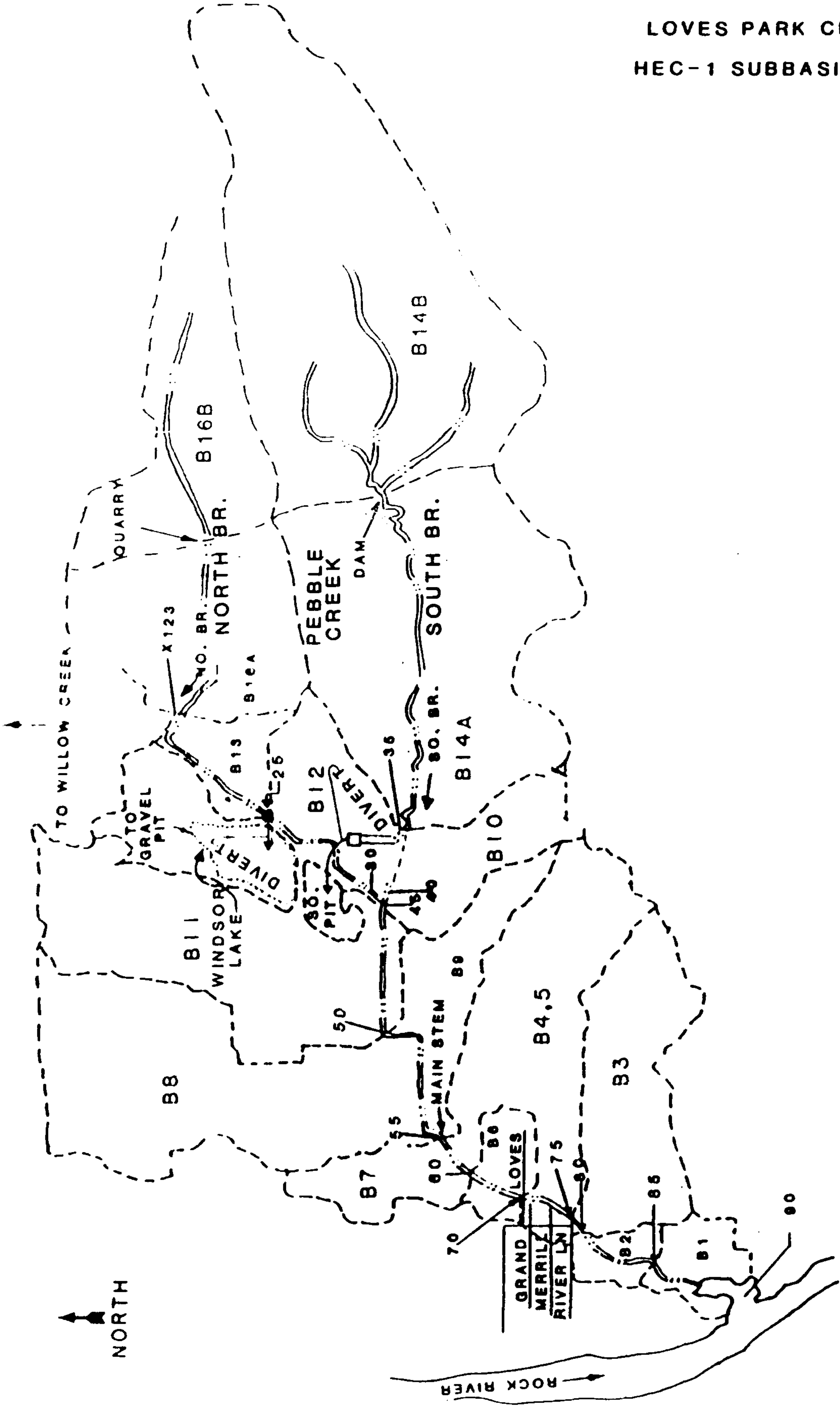
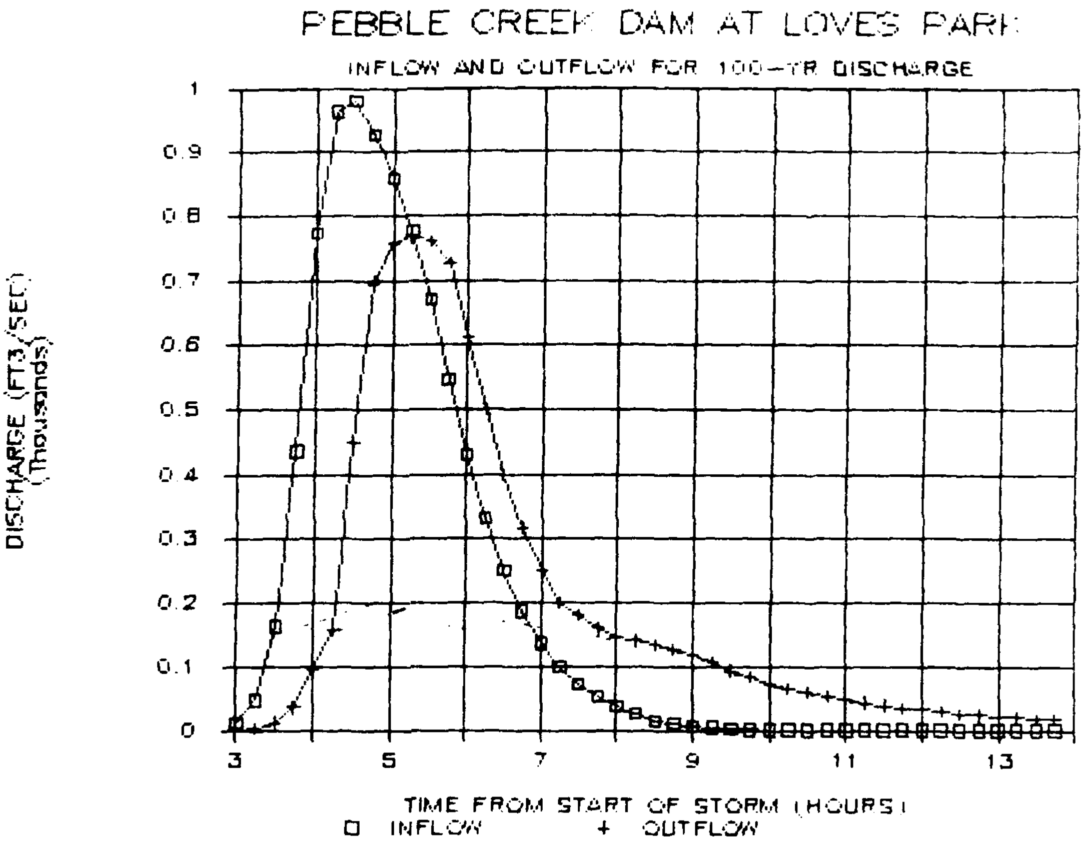


PLATE A-2



Combined Outlet Rating Curve

Elevation (feet)	Discharge (cfs)
222.5	0.0
231.5	0.2
233.0	34.
234.0	74.
235.0	123.
236.0	150.
236.5	205.
237.0	365.
238.0	738.
238.2	802.
239.0	840.
240.0	878.
240.8	910.
241.5	1131.
242.0	1399.
243.0	2106.
244.0	3031.
245.0	4141.
246.0	5433.
247.0	6900.

Reservoir Storage Data

Elevation (feet)	Volume (ac.-ft.)	Storage Area (acres)
222.5	0.0	0.0
224	0.1	0.14
228	2.77	1.20
234	27.7	7.12
240	99.6	16.84
246	227.1	25.66
247	257.8	35.80

Elevations for local datum, add 602.9 for USGS 1929 adj.

STANDARD PROJECT
STORM RAINFALL
FOR LOVES PARK CREEK

```
****************************************************
* DATE: 24 MAR 86                                  *
* LP 8PS                                           *
*                                                  *
* DRAINAGE AREA                          7.80 SQ MI *
* INDEX RAINFALL                        11.00 INCHES*
* INITIAL LOSS                           1.00 INCHES*
* UNIFORM LOSS                           0.10 IN/TI *
* TIME INTERVAL FOR BREAKDOWN            1.00 HOURS *
* AVG % FROM ISOHYETAL PATTERN         140.00       *
****************************************************
```

INDEX RAINFALL PERCENTAGES

DURATION HOURS	% OF R.F.	MAX R.F. INCHES	24 HR INCR.	ARR. 24	% 24 HR RF
24	118.00	12.98	12.98	0.33	0.02
48	132.00	14.52	1.54	1.54	0.10
72	139.00	15.29	0.77	12.98	0.83
96	140.00	15.40	0.11	0.77	0.05
			15.40		

AVG RAINFALL ON BASIN FOR 96 HR STORM = 15.40

DAILY DISTRIBUTION OF 96 HR RAINFALL

HOURS	24	48	72	96
RF (IN)	0.33	1.52	12.80	0.76

SIX HR % FROM PLATE 10 USING INDEX RAINFALL

HOURS	6	12	24	48
PERCENT	4.27	12.37	75.81	7.47

RAINFALL SUMMARY

PERIOD	RAINFALL	EXCESS
1	0.00	0.00
2	0.00	0.00
3	0.00	0.00
4	0.01	0.00
5	0.00	0.00
6	0.00	0.00
7	0.00	0.00
8	0.00	0.00
9	0.01	0.00
10	0.02	0.00
11	0.01	0.00
12	0.00	0.00
13	0.02	0.00
14	0.03	0.00
15	0.04	0.00
16	0.00	0.00
17	0.03	0.00
18	0.03	0.00
19	0.00	0.00
20	0.00	0.00
21	0.00	0.00
22	0.01	0.00
23	0.00	0.00
24	0.00	0.00
25	0.01	0.00
26	0.01	0.00
27	0.01	0.00
28	0.02	0.00
29	0.01	0.00
30	0.01	0.00
31	0.02	0.00
32	0.02	0.00
33	0.03	0.00
34	0.07	0.00
35	0.03	0.00
36	0.02	0.00
37	0.12	0.00
38	0.14	0.00
39	0.17	0.00
40	0.44	0.34
41	0.16	0.06
42	0.13	0.03
43	0.01	0.00
44	0.01	0.00
45	0.02	0.00
46	0.04	0.00
47	0.02	0.00
48	0.01	0.00

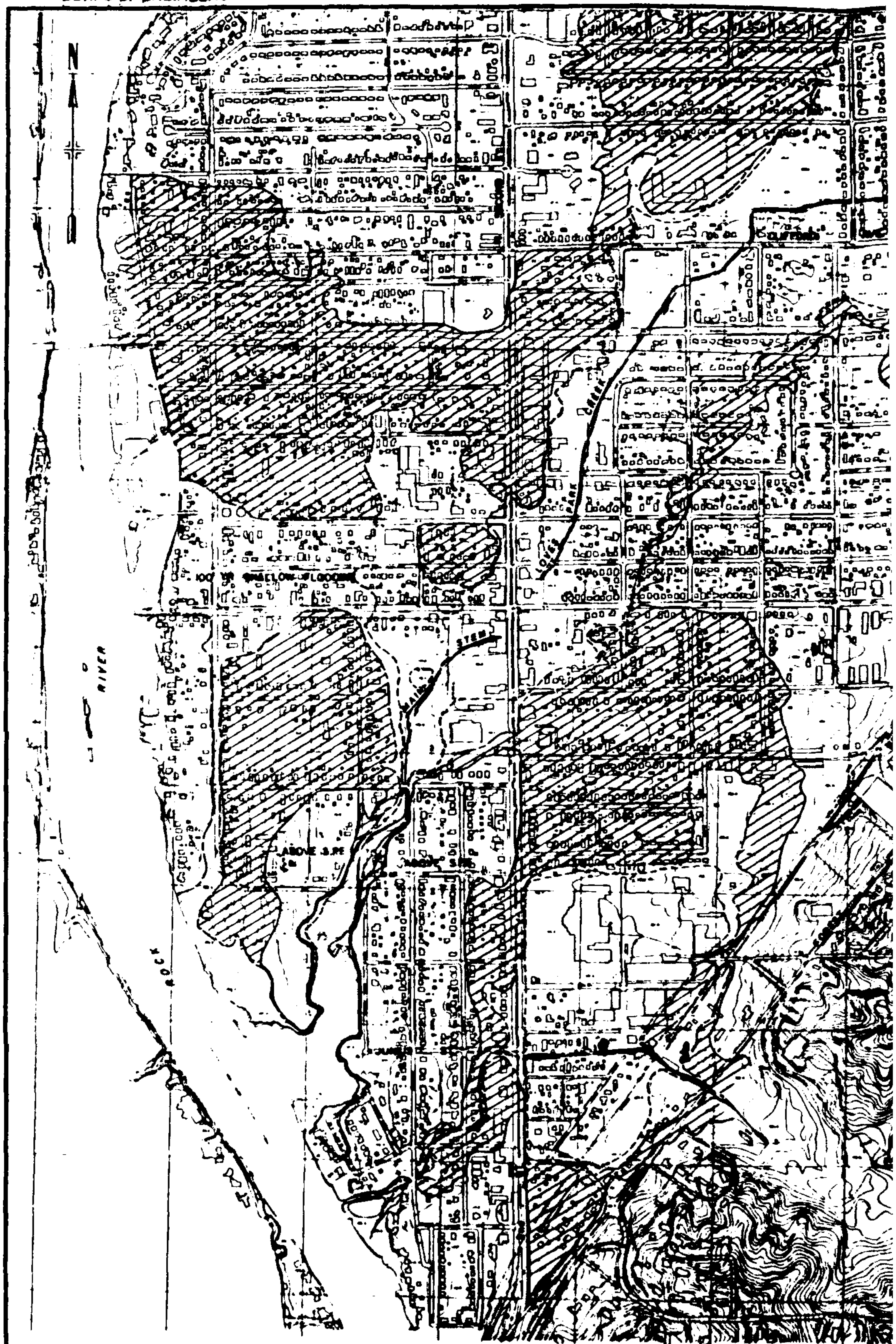
RAINFALL SUMMARY

PERIOD	RAINFALL	EXCESS
49	0.05	0.00
50	0.07	0.00
51	0.08	0.00
52	0.21	0.11
53	0.08	0.00
54	0.06	0.00
55	0.16	0.06
56	0.10	0.00
57	0.24	0.14
58	0.60	0.50
59	0.22	0.12
60	0.17	0.07
61	0.97	0.87
62	1.16	1.06
63	1.46	1.36
64	3.69	3.59
65	1.36	1.26
66	1.07	0.97
67	0.10	0.00
68	0.11	0.01
69	0.14	0.04
70	0.36	0.26
71	0.13	0.03
72	0.11	0.01
73	0.00	0.00
74	0.00	0.00
75	0.00	0.00
76	0.01	0.00
77	0.00	0.00
78	0.00	0.00
79	0.01	0.00
80	0.01	0.00
81	0.01	0.00
82	0.04	0.00
83	0.01	0.00
84	0.01	0.00
85	0.06	0.00
86	0.07	0.00
87	0.09	0.00
88	0.22	0.12
89	0.08	0.00
90	0.06	0.00
91	0.01	0.00
92	0.01	0.00
93	0.01	0.00
94	0.02	0.00
95	0.01	0.00
96	0.01	0.00

TOTAL RAINFALL 15.39
EXCESS RAINFALL 11.10
% SRO 72.12

PLATE A-4

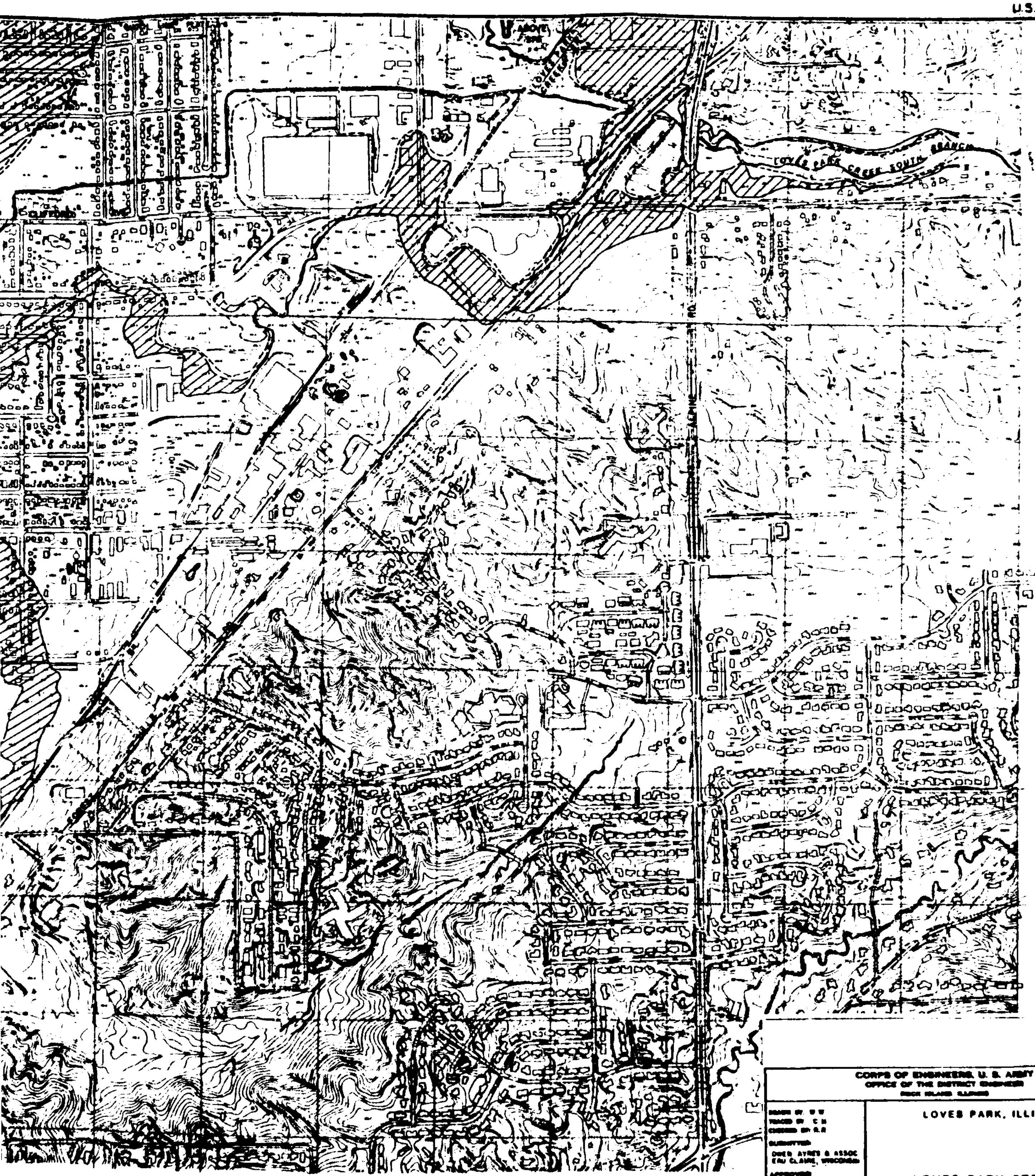
CORPS OF ENGINEERS



NOTE: FLOODPLAIN DELINEATION FOR 50 YEAR EVENT IS NOT SHOWN DUE TO CLOSENESS OF WATER SURFACE PROFILES

INUNDATION LIMITS
- - - - - 10 YEAR FLOOD
— - — 100 YEAR FLOOD
———— SPF (STANDARD PROJEC

U.S. ARMY



UNDATION LIMITS
— 10 YEAR FLOOD
— 100 YEAR FLOOD
— SPF (STANDARD PROJECT FLOOD)

SCALE
0 200 400 800 1600 FEET

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER

OWEN AYRES & ASSOC
EAU CLAIRE, WISCONSIN

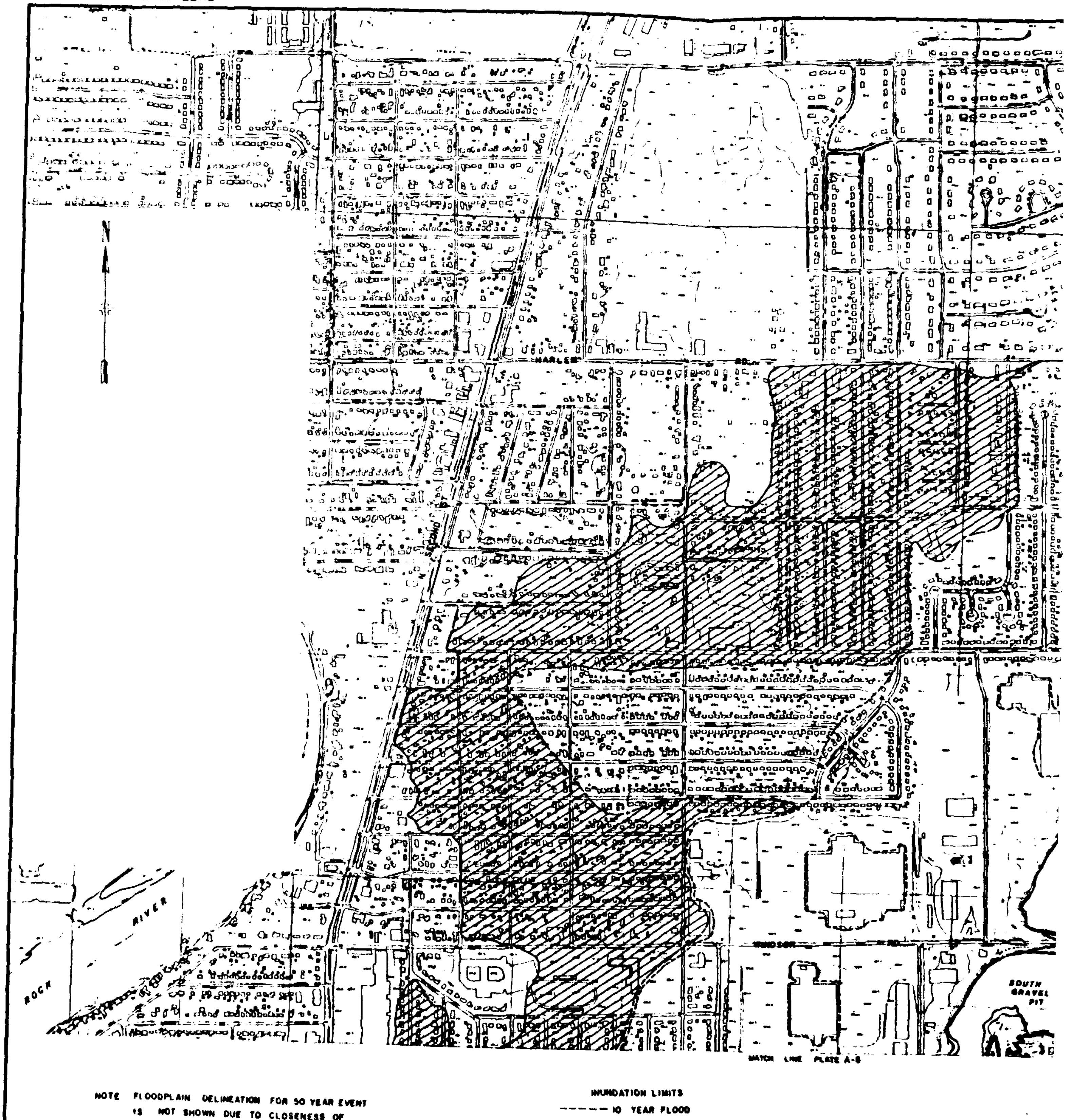
DATE

LOVES PARK, ILLINOIS

LOVES PARK CREEK
APPROXIMATE
FLOODPLAIN DELINEATION
WITHOUT PROJECT

PLATE A-5

CORPS OF ENGINEERS

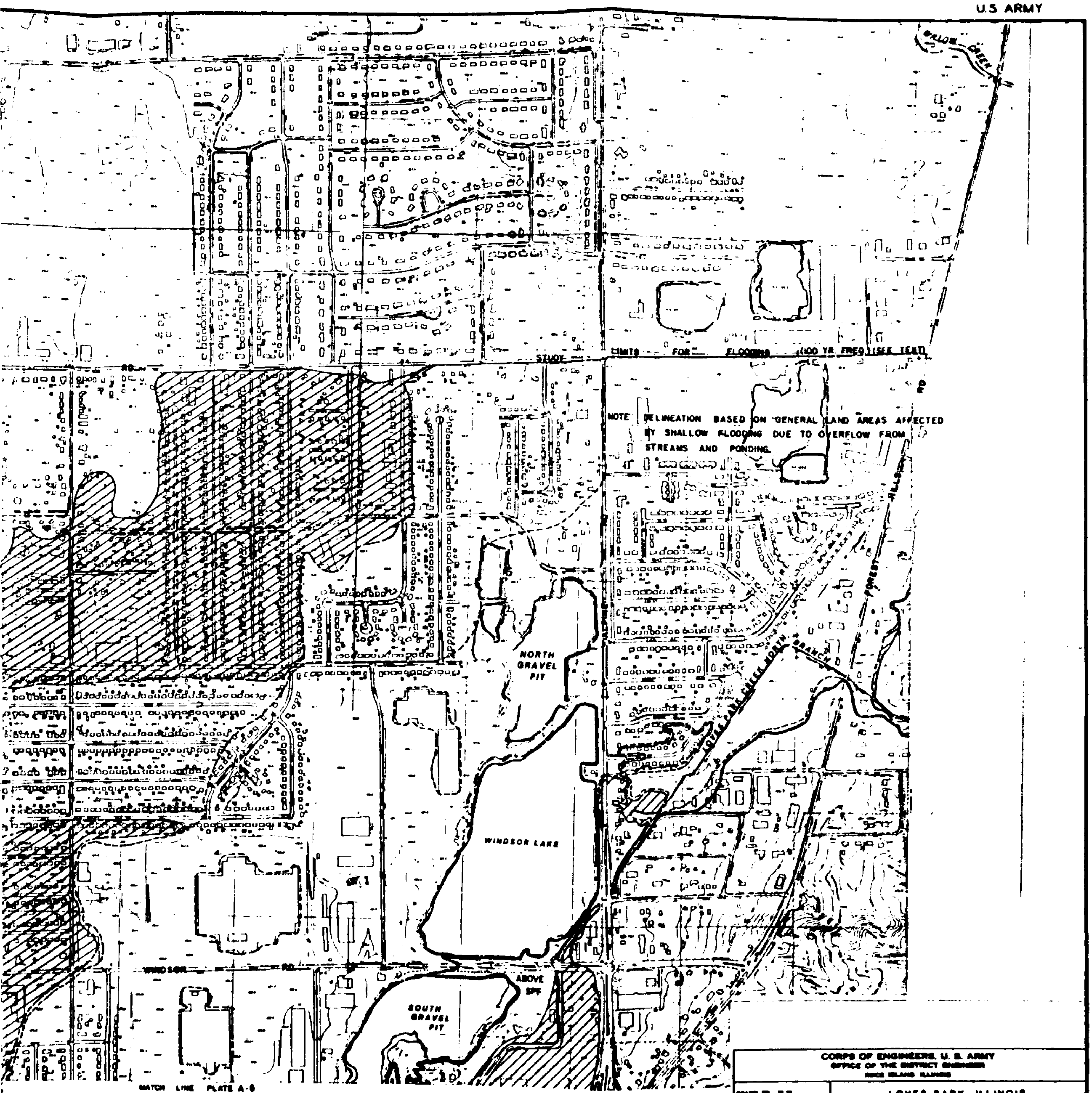


NOTE: FLOODPLAIN DELINEATION FOR 50 YEAR EVENT IS NOT SHOWN DUE TO CLOSENESS OF WATER SURFACE PROFILES

INUNDATION LIMITS

- 10 YEAR FLOOD
- 100 YEAR FLOOD
- SPF (STANDARD PROJECT FLOOD)

U.S. ARMY



ATION LIMITS
D YEAR FLOOD
0 YEAR FLOOD
PF (STANDARD PROJECT FLOOD)

SCALE
0 200 400 800 1200 FEET

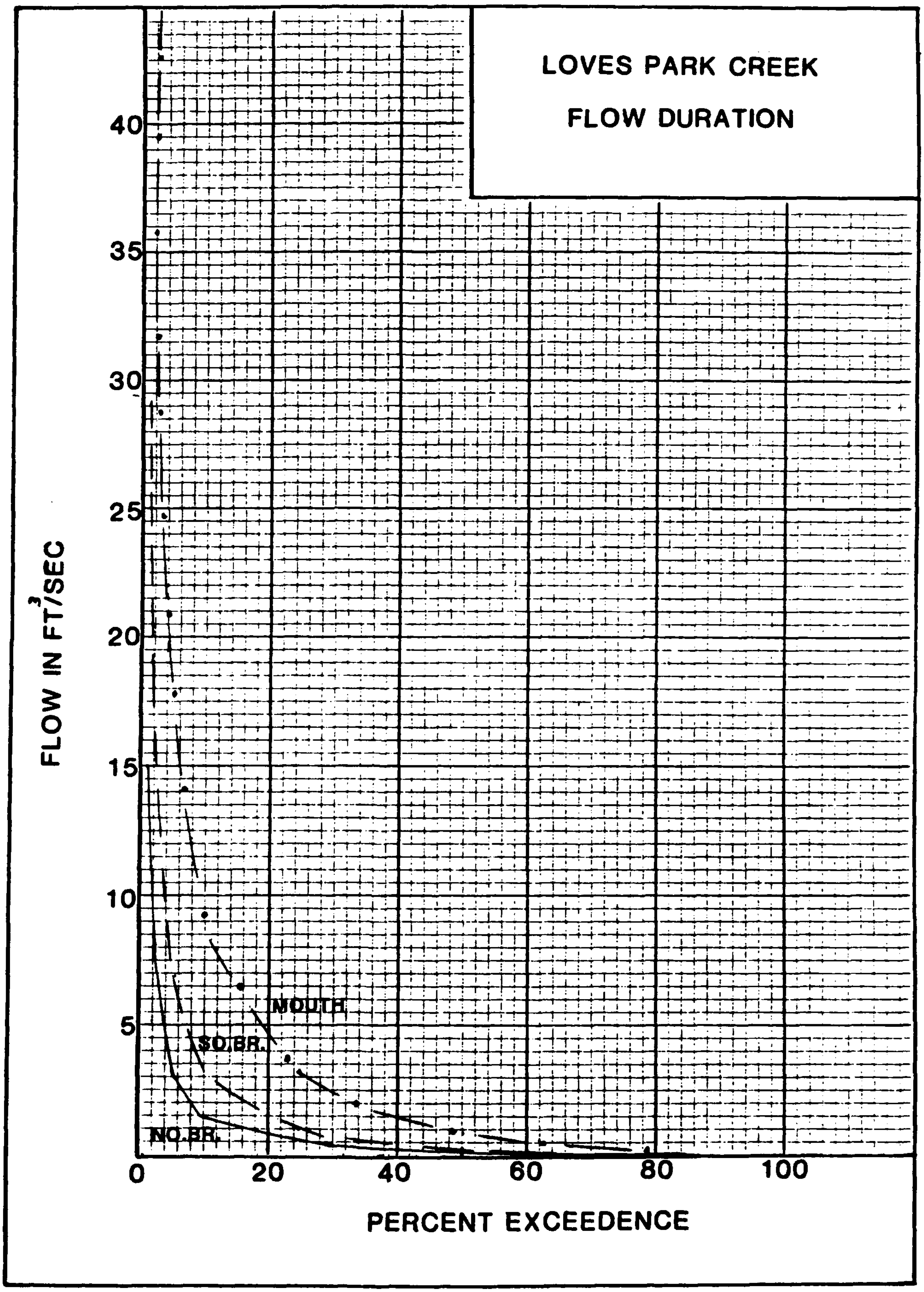
CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
ROCK ISLAND ILLINOIS

DRAWN BY W.W.
TRACED BY C.H.
CHECKED BY R.P.
SUBMITTED
OWEN AYRES & ASSOC.
EAU CLAIRE, WISCONSIN
APPROVED
CHIEF ENGINEERING DIVISION
DATE

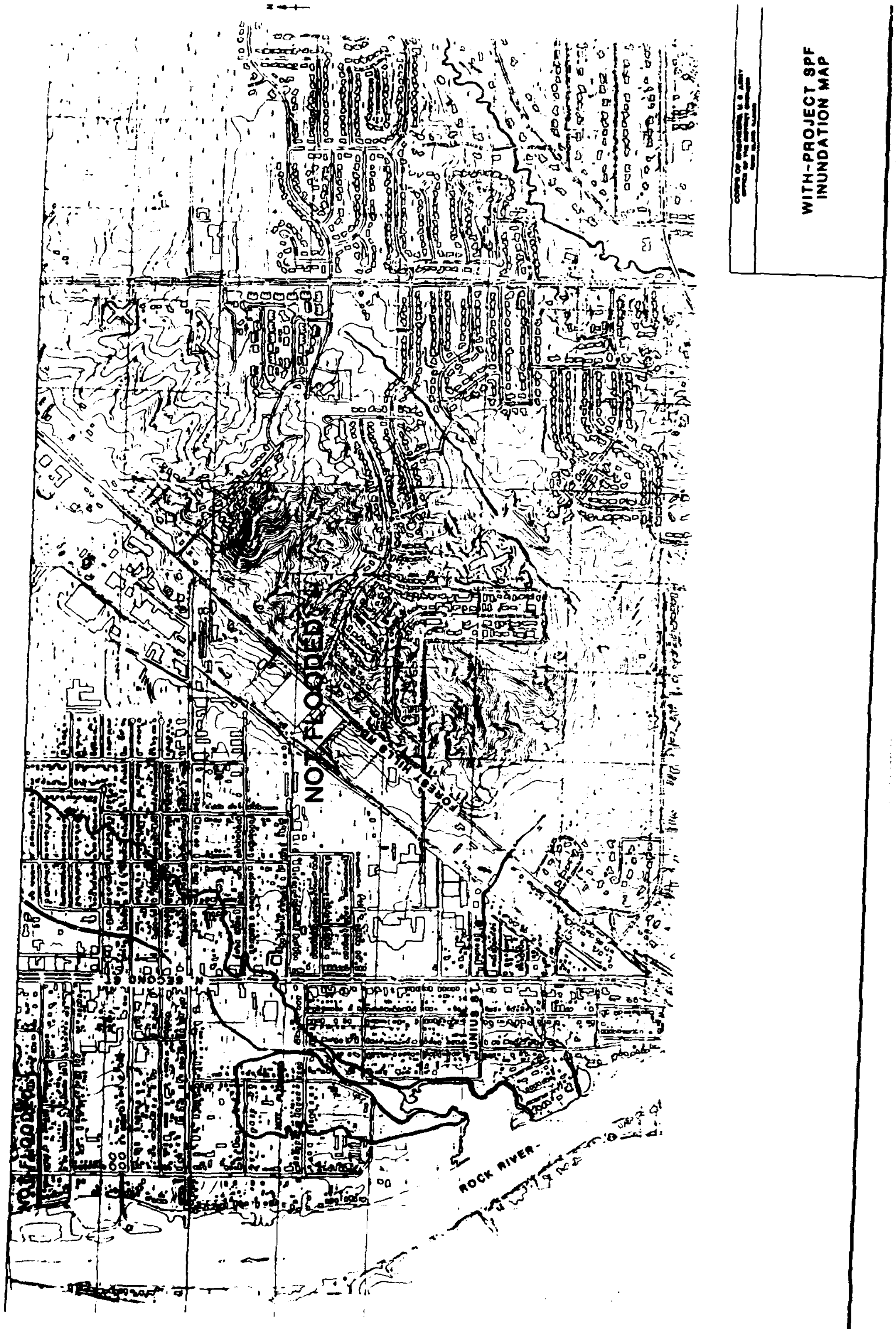
LOVES PARK, ILLINOIS

LOVES PARK CREEK
APPROXIMATE
FLOODPLAIN DELINEATION
WITHOUT PROJECT

PLATE A6

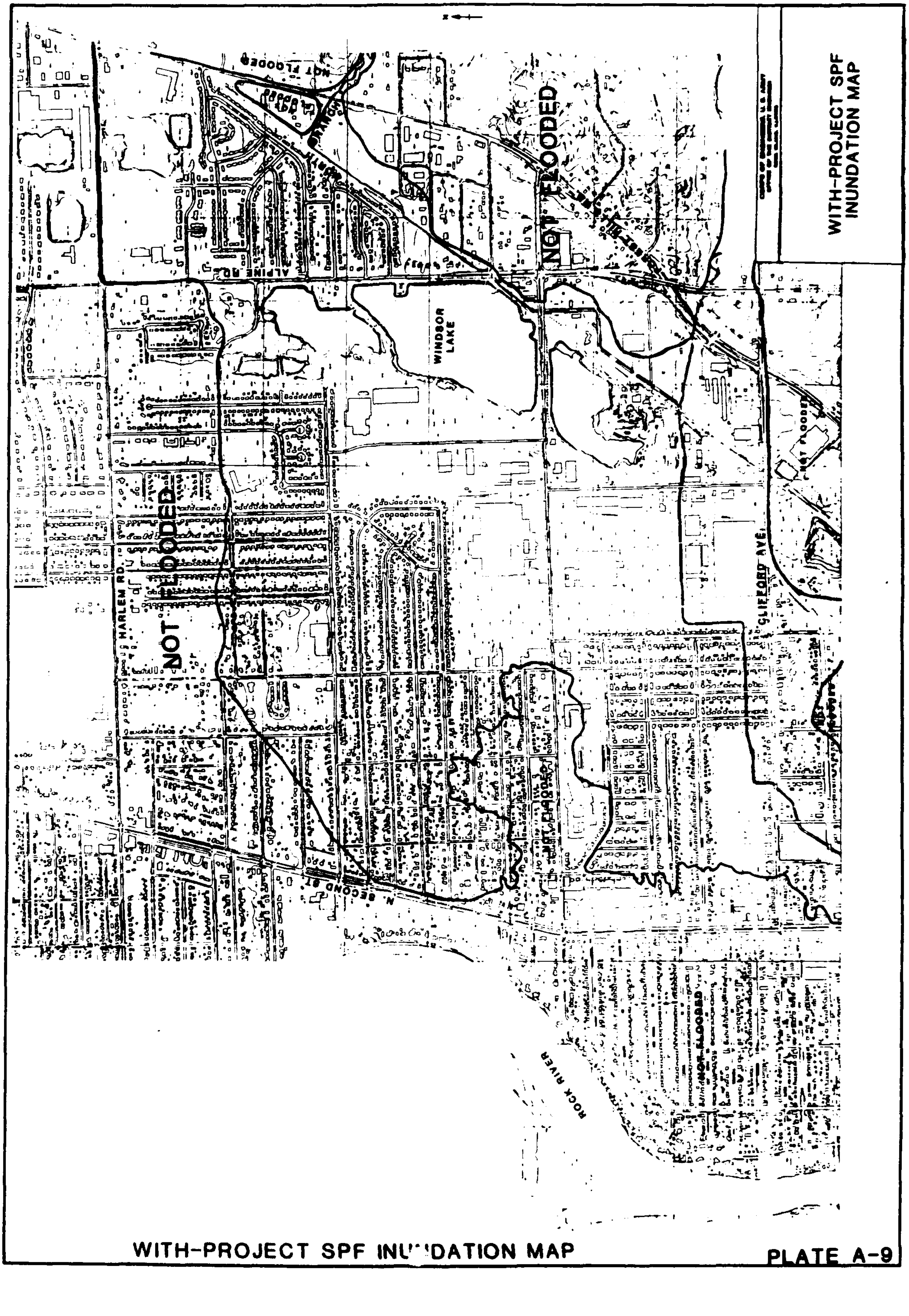


LOVES PARK CREEK
FLOW DURATION
FLOW IN FT³/SEC
40
35
30
25
20
15
10
5
MOUTH
SO.BR.
NO.BR.
0
20
40
60
80
100
PERCENT EXCEEDENCE



WITH-PROJECT SPF INUNDATION MAP

PLATE A-8



WITH-PROJECT SPF INU''DATION MAP

PLATE A-9

WITHOUT PROJECT EXISTING CASE WATER SURFACE PROFILES

LOVES PARK CREEK-MAIN STEM

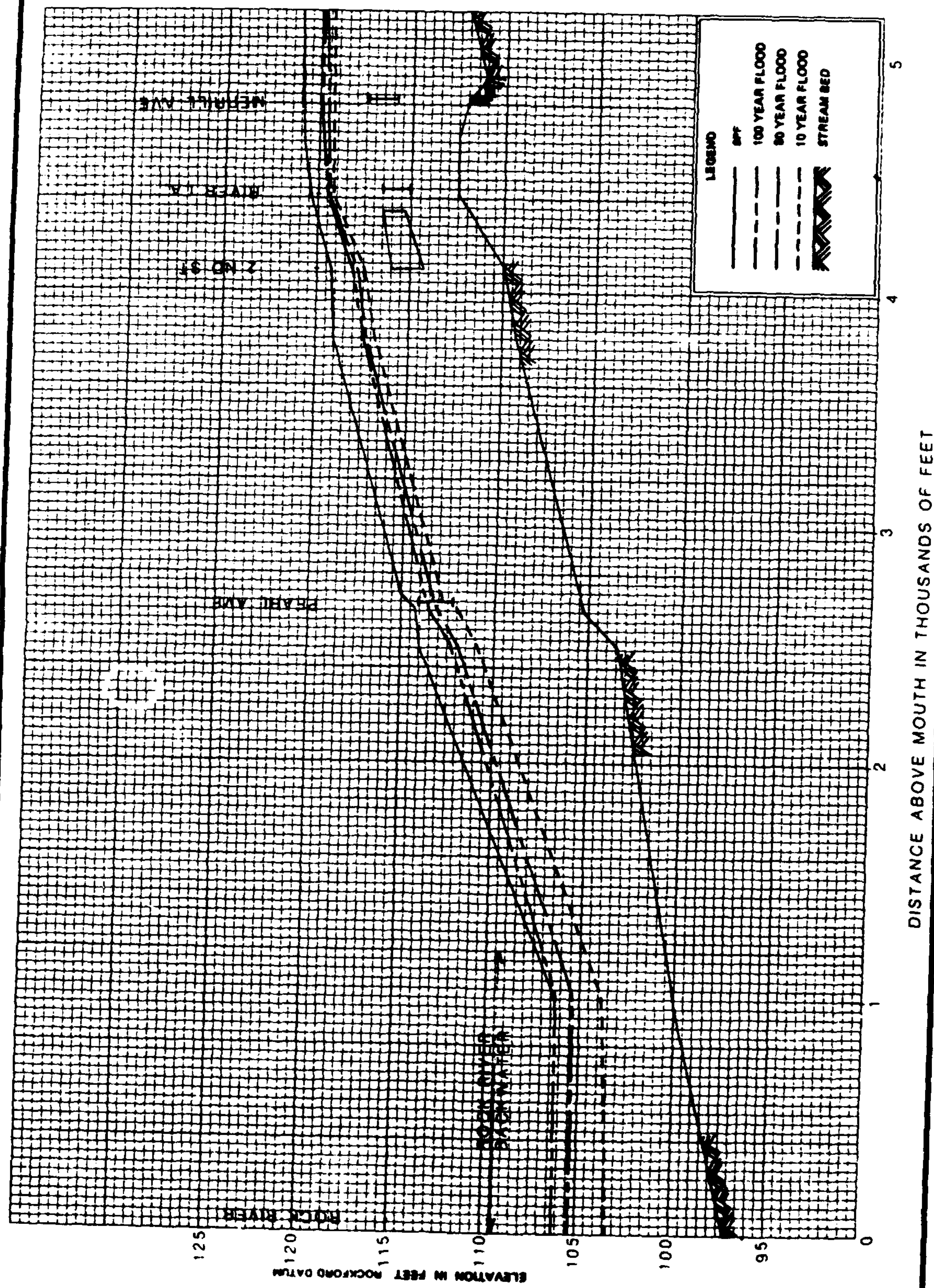


PLATE A-10

WITHOUT PROJECT EXISTING CASE WATER SURFACE PROFILES

LOVES PARK CREEK-MAIN STEM

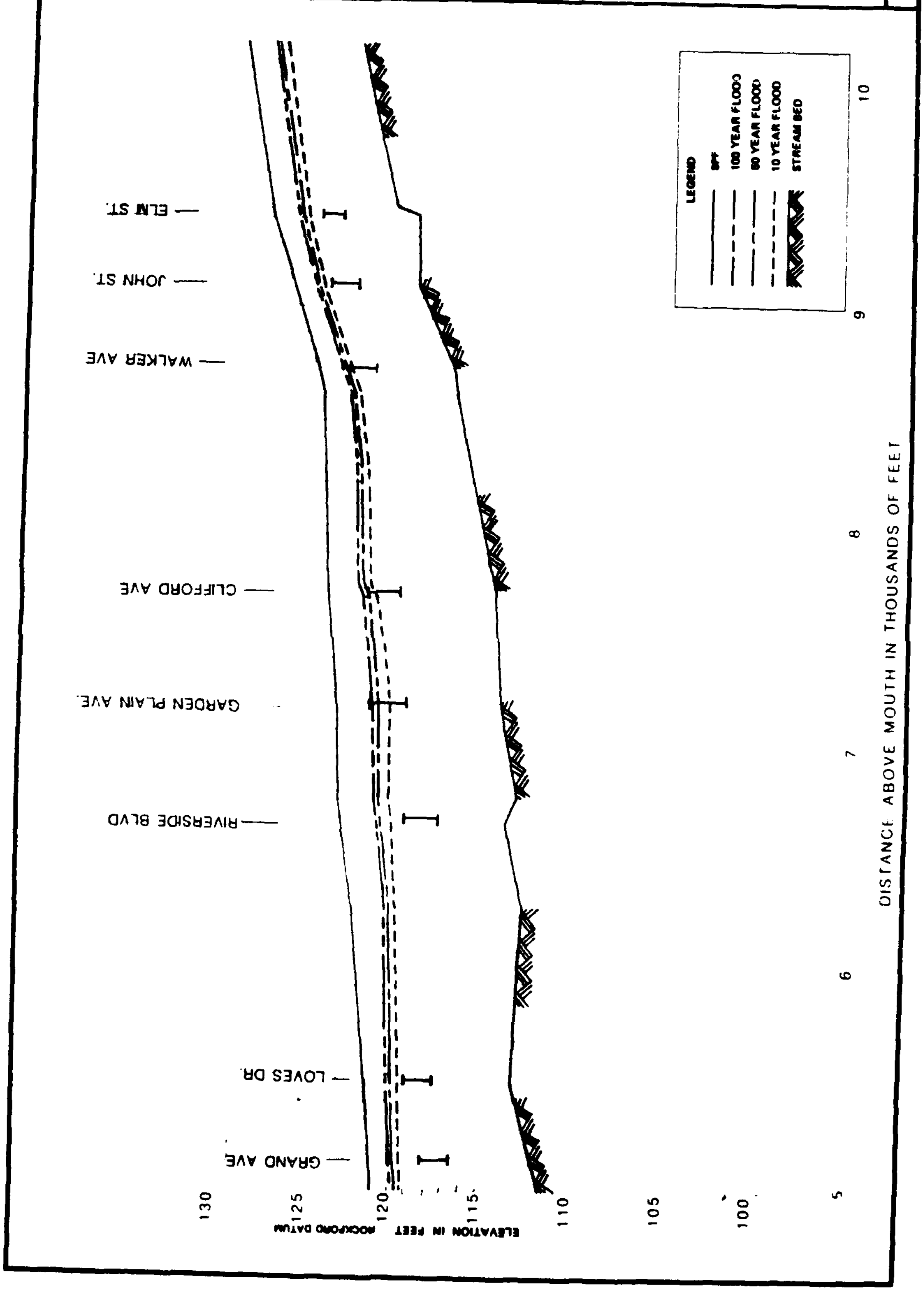


PLATE A-11

WITHOUT PROJECT EXISTING CASE WATER SURFACE PROFILES

LOVES PARK CREEK-MAIN STEM

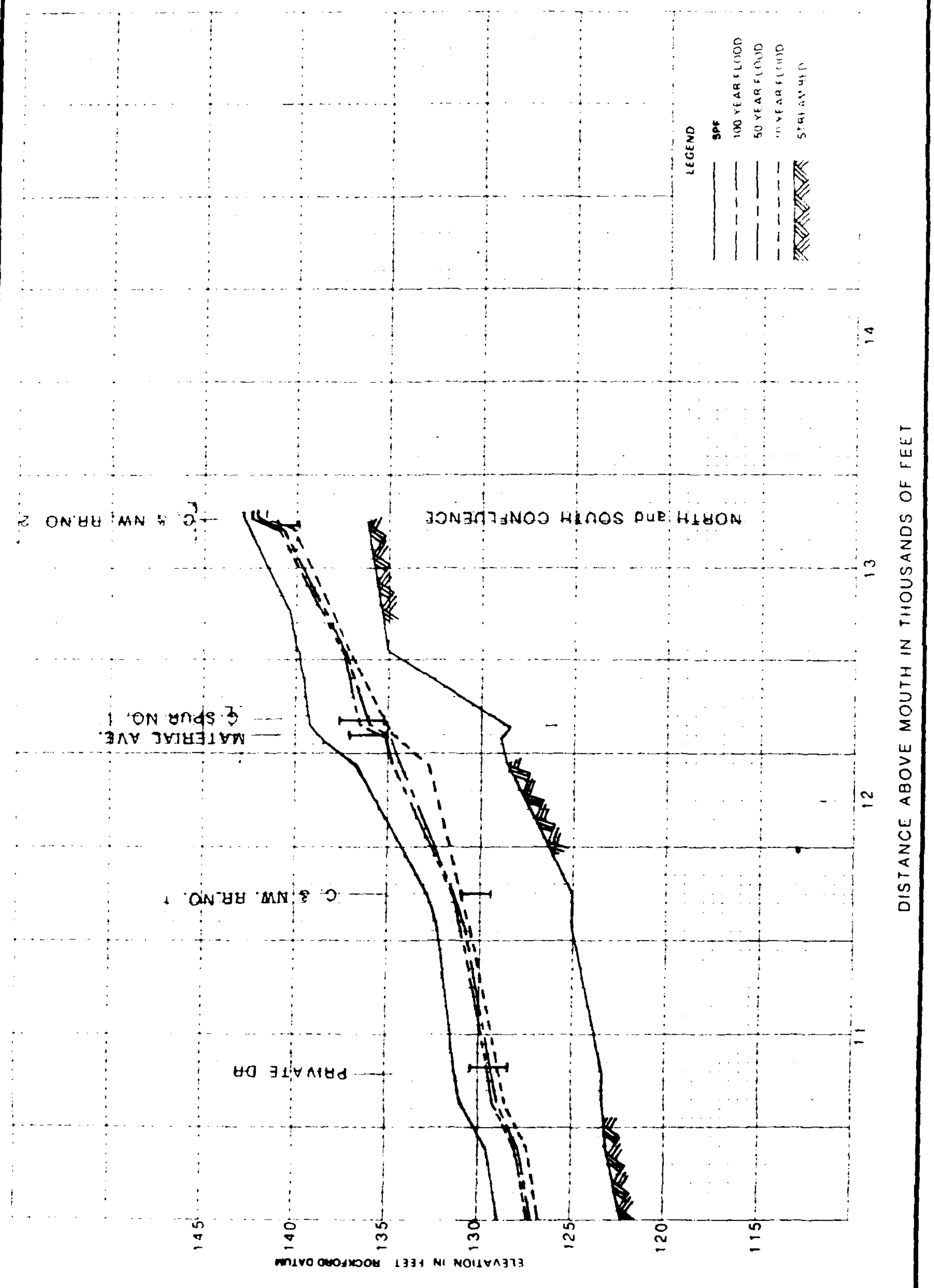


PLATE A-12

WITHOUT PROJECT EXISTING CASE WATER SURFACE PROFILES

S: LOVES PARK CREEK-NORTH BRANCH

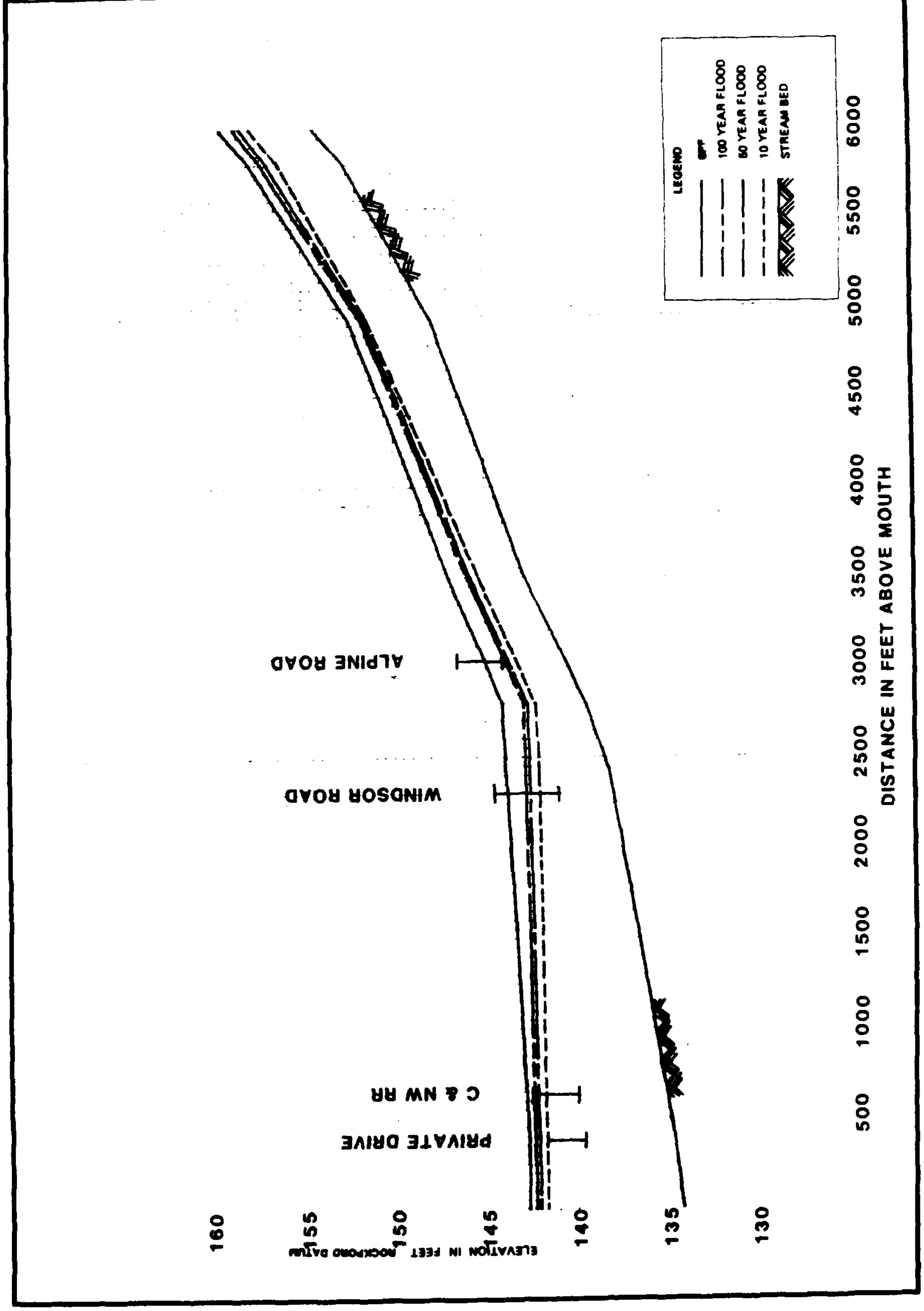
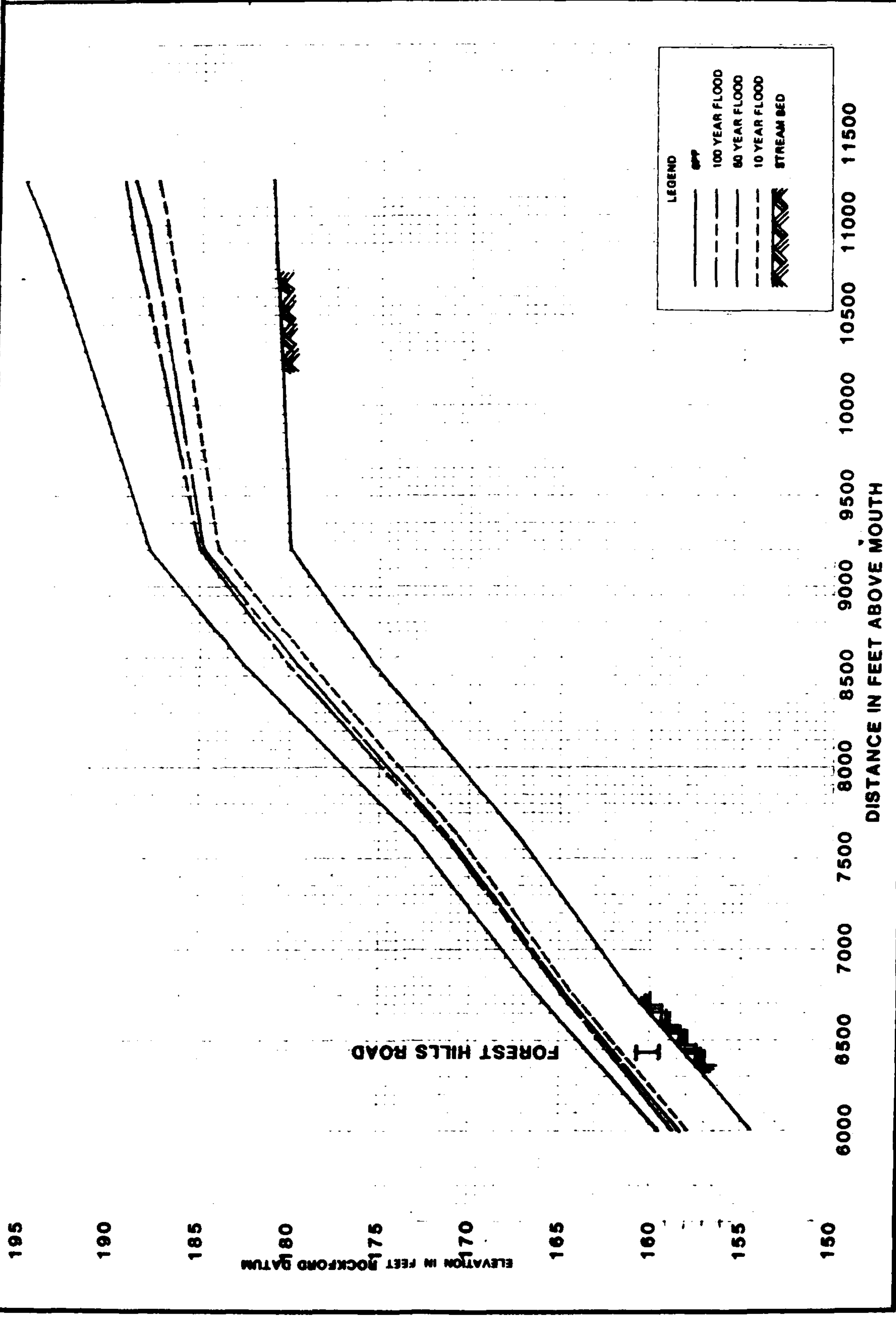


PLATE A-13

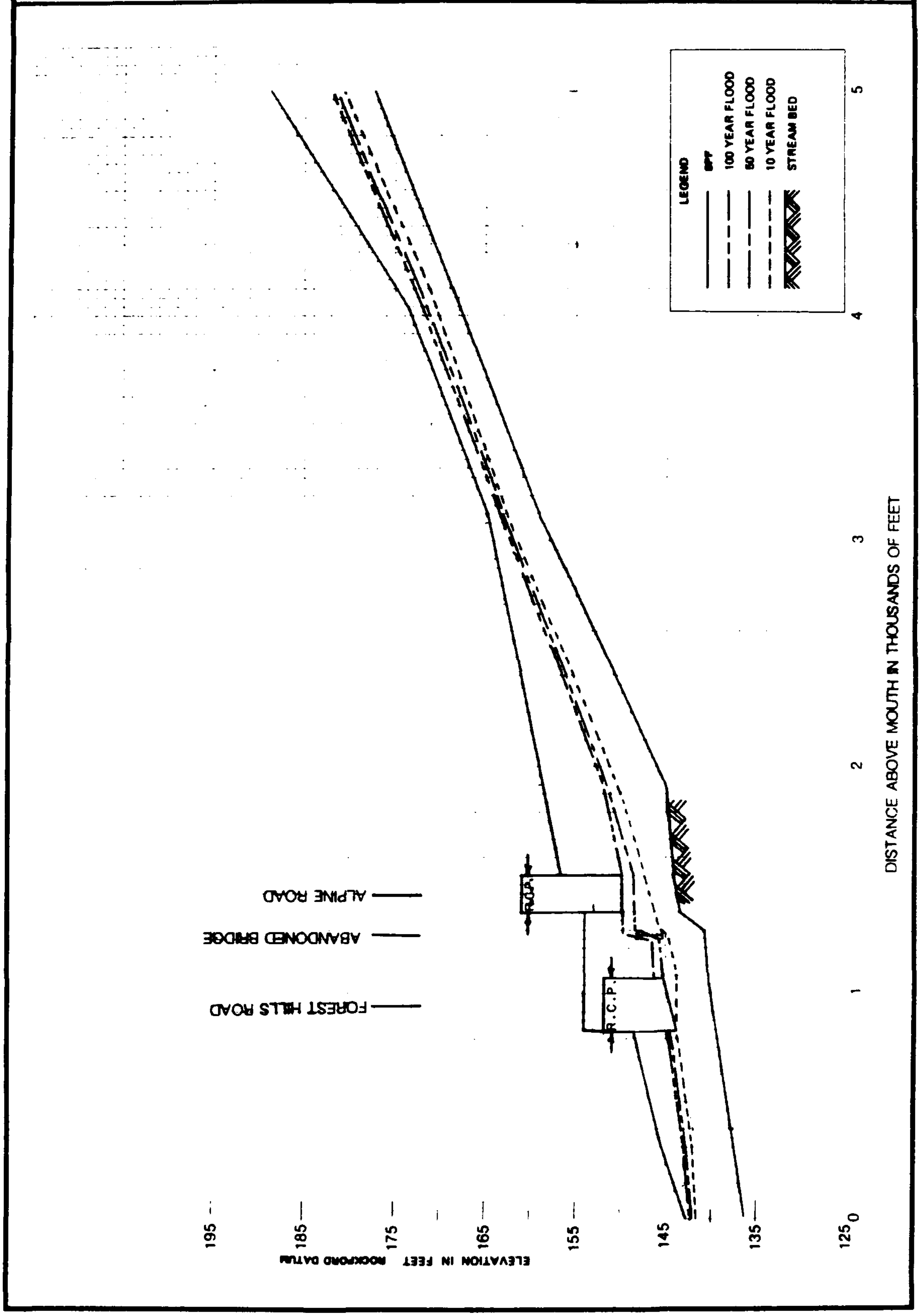
WITHOUT PROJECT EXISTING CASE WATER SURFACE PROFILES

LOVES PARK CREEK-NORTH BRANCH



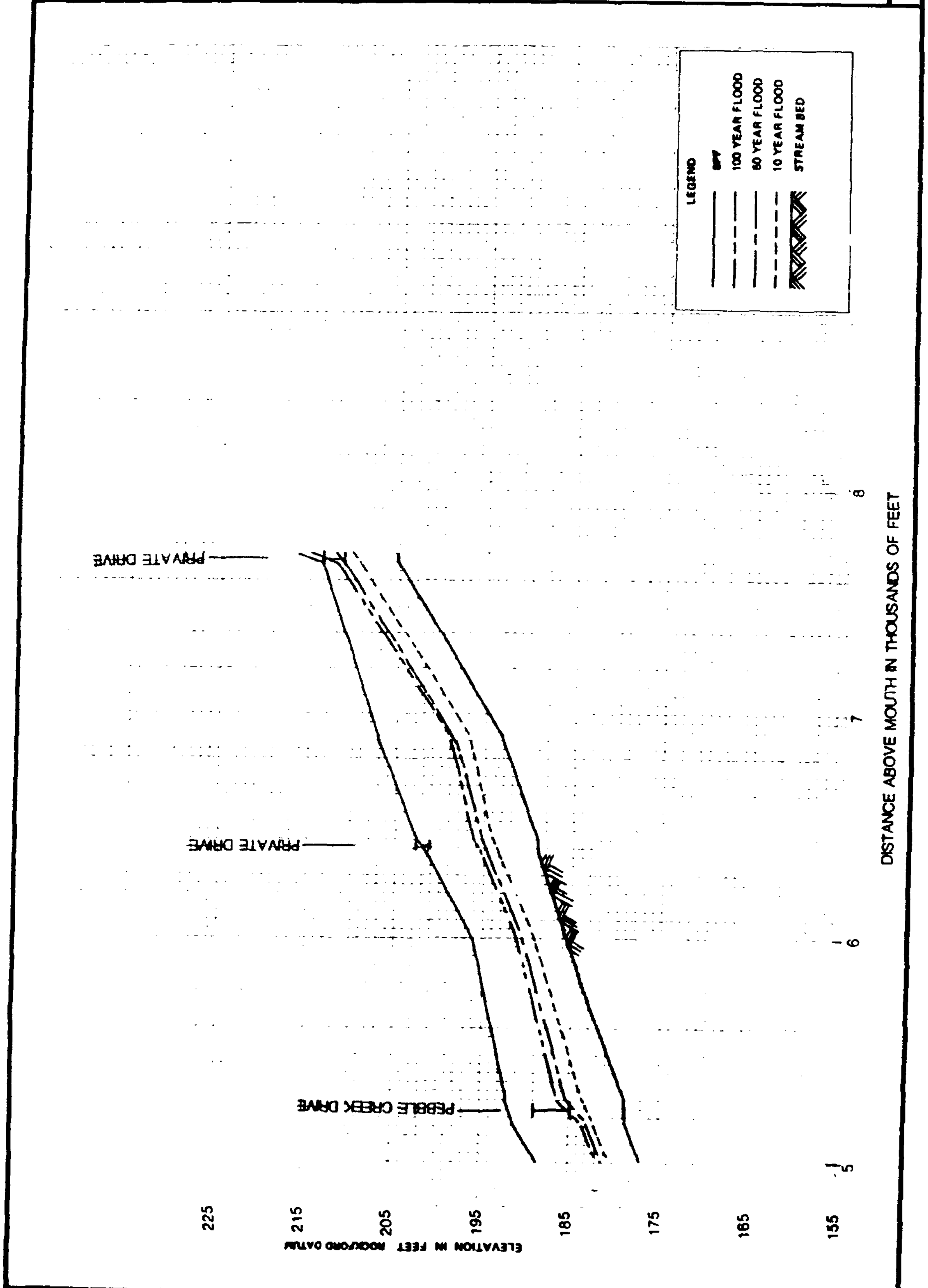
WITHOUT PROJECT EXISTING CASE WATER SURFACE PROFILES

LOVES PARK CREEK-SOUTH BRANCH



WITHOUT PROJECT EXISTING CASE WATER SURFACE PROFILES

LOVES PARK CREEK-SOUTH BRANCH



WITH PROJECT EXISTING CASE WATER SURFACE PROFILES

LOVES PARK CREEK-MAIN STEM

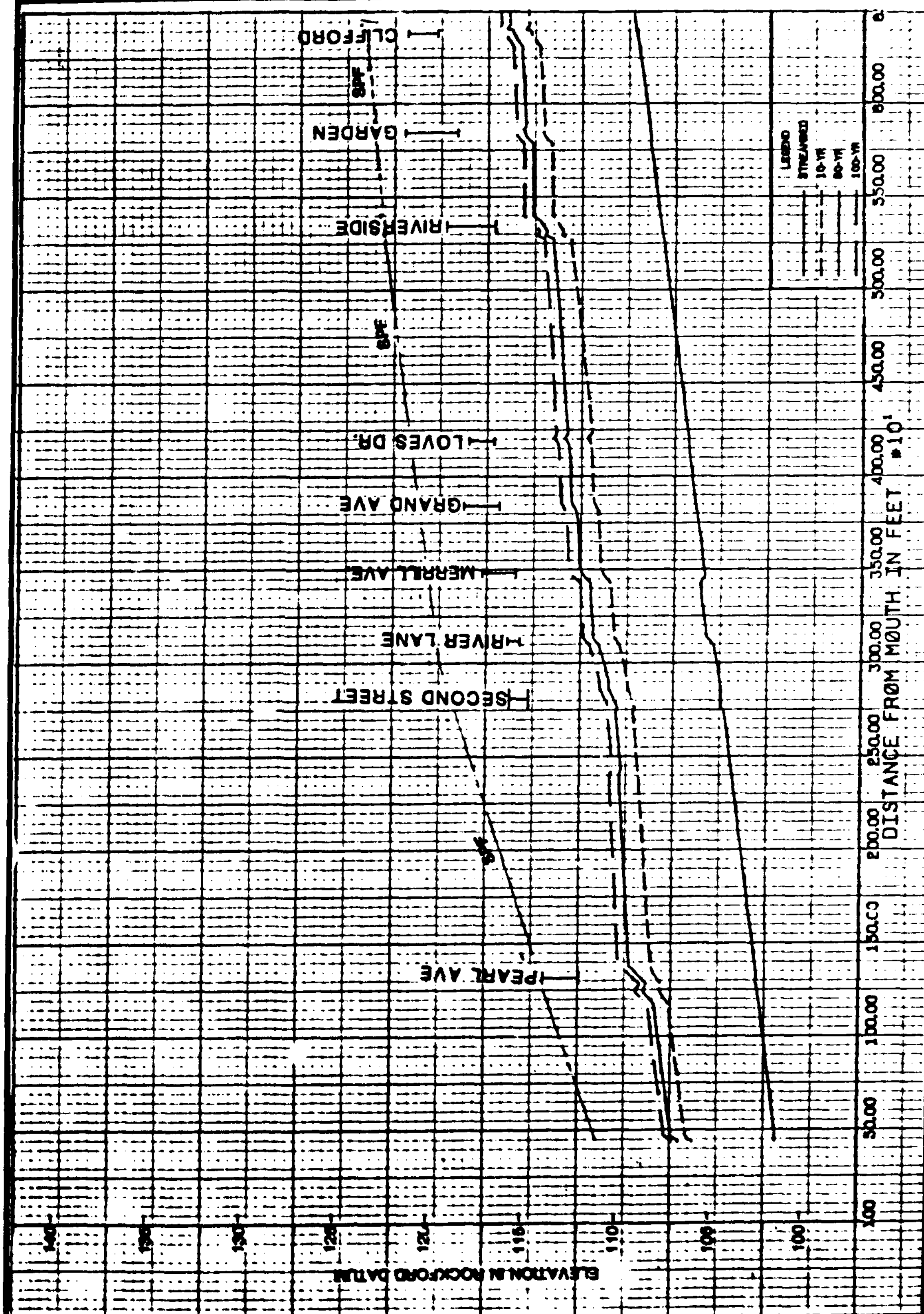


PLATE A-17

WITH PROJECT EXISTING CASE WATER SURFACE PROFILES

LOVES PARK CREEK-MAIN STEM

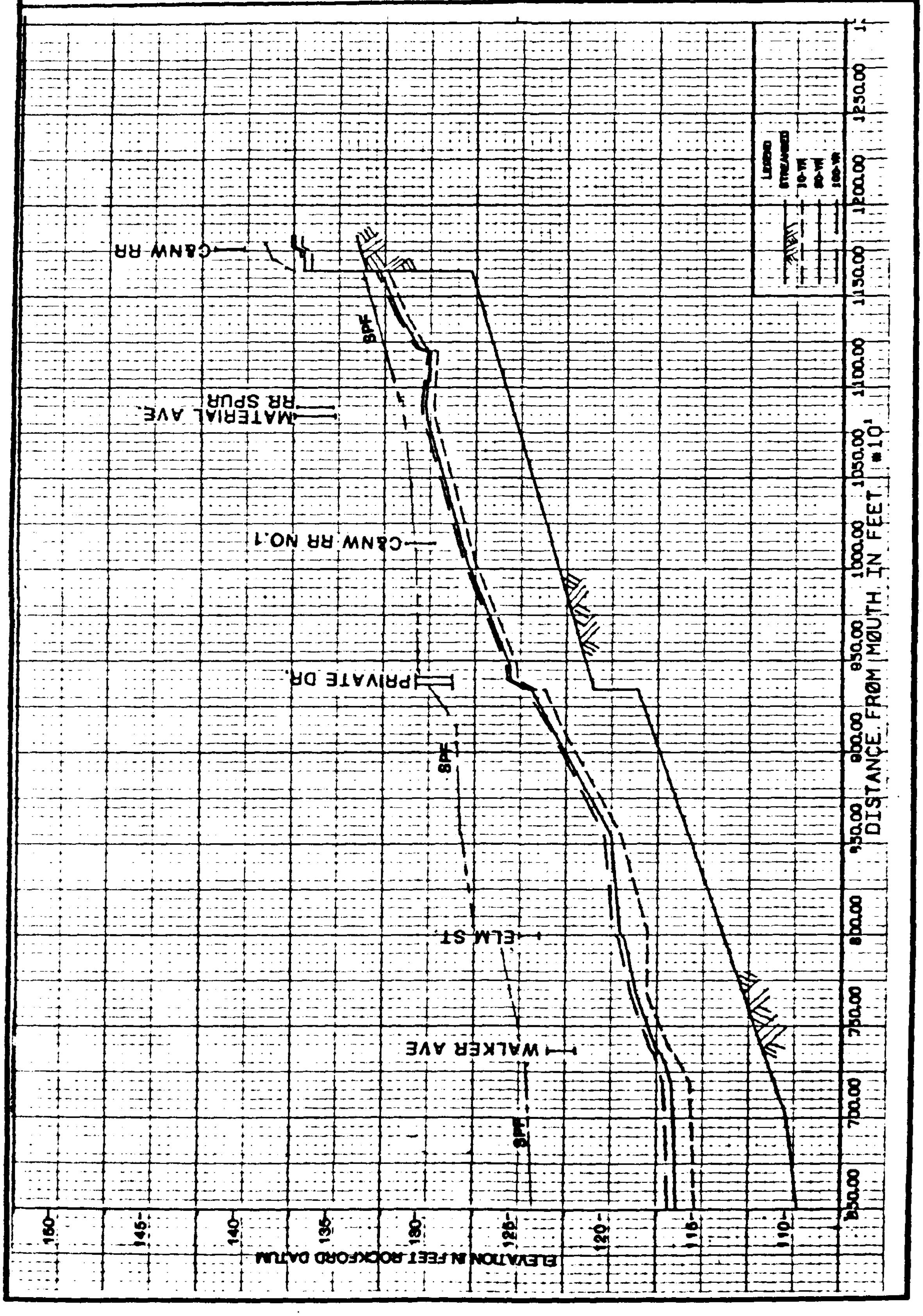
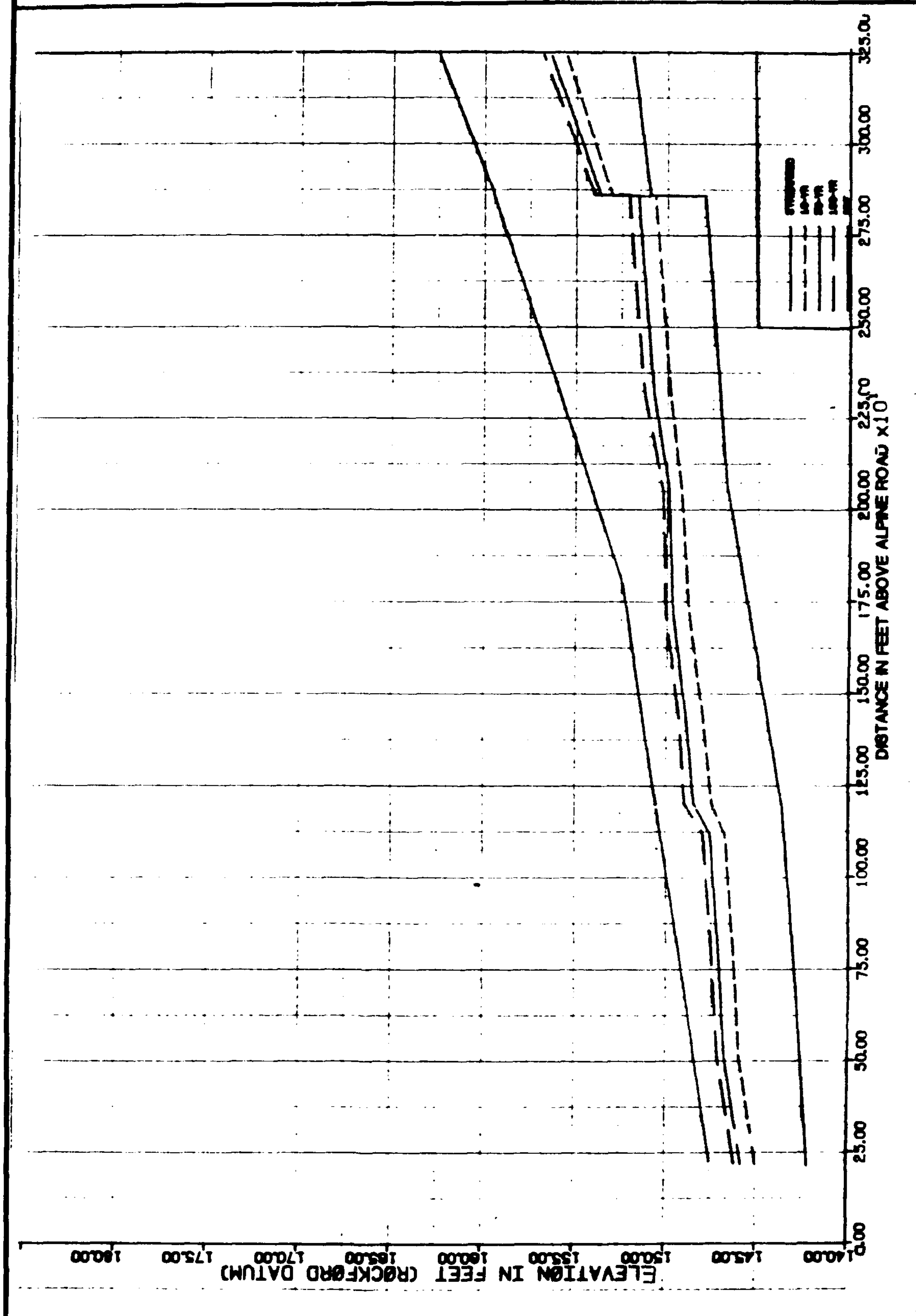


PLATE A-18

WITH PROJECT EXISTING CASE WATER SURFACE PROFILES

LOVES PARK CREEK– NORTH BRANCH



WITH PROJECT EXISTING CASE WATER SURFACE PROFILES

LOVES PARK CREEK-SOUTH BRANCH

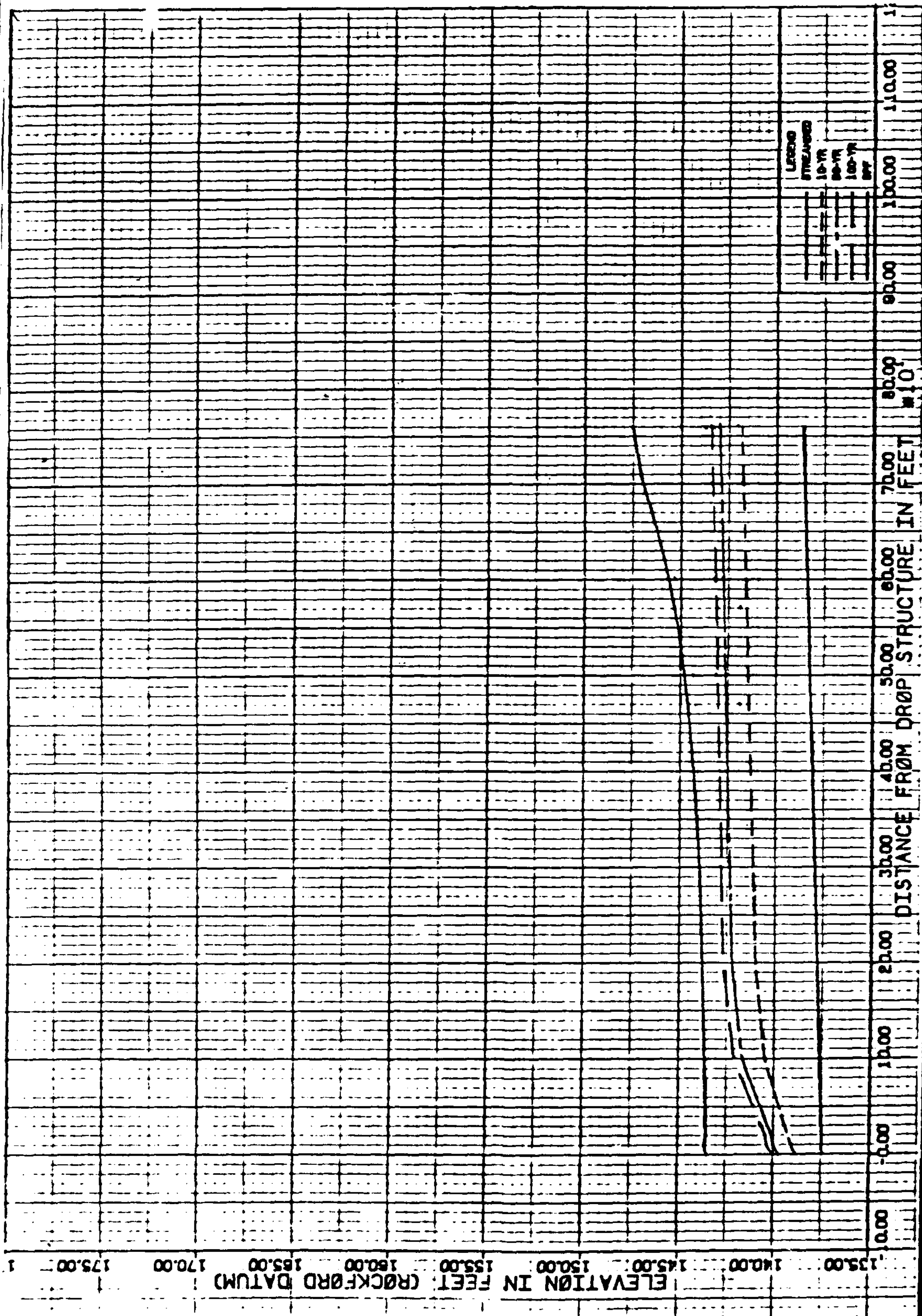


PLATE A-20

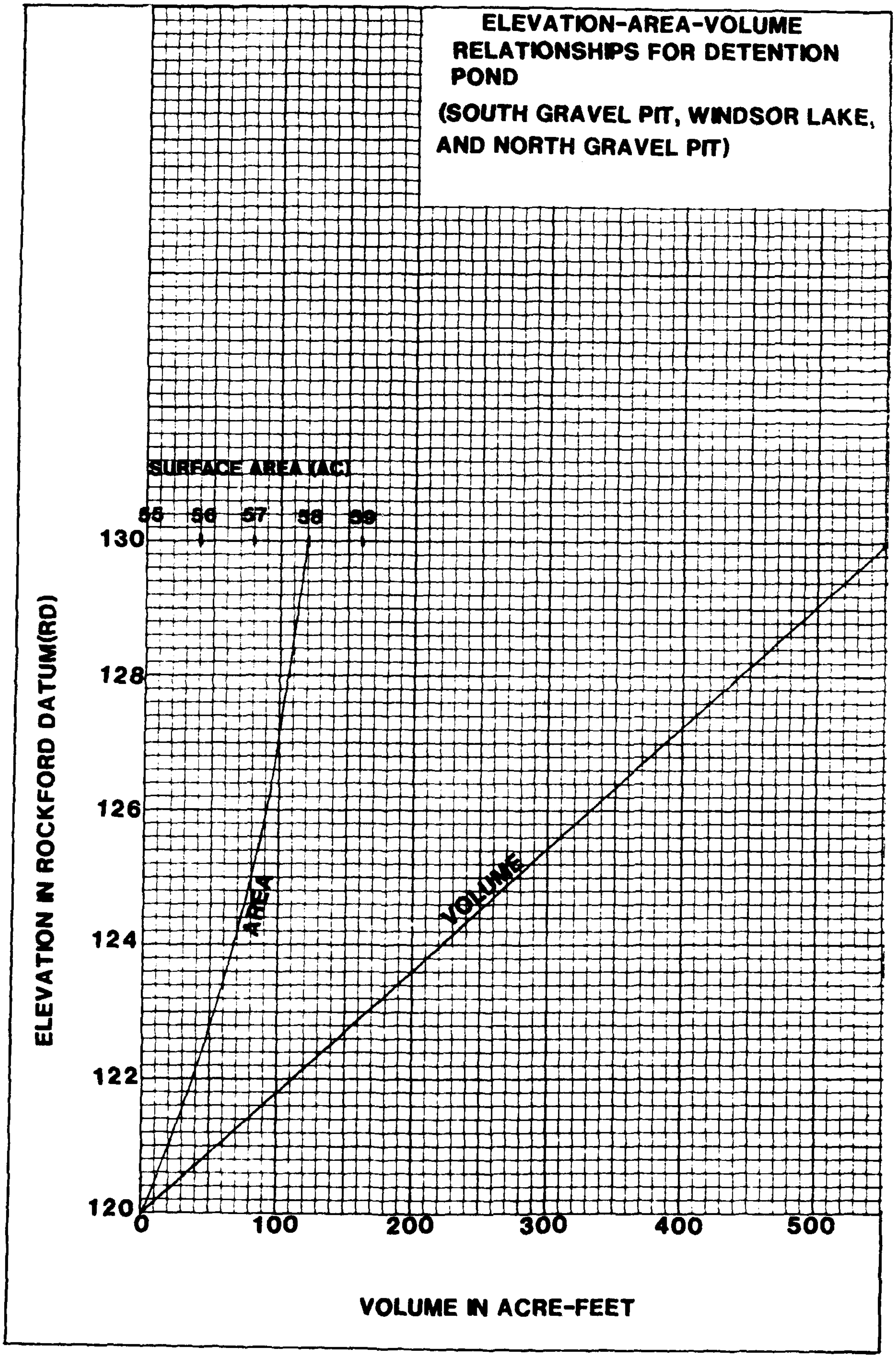
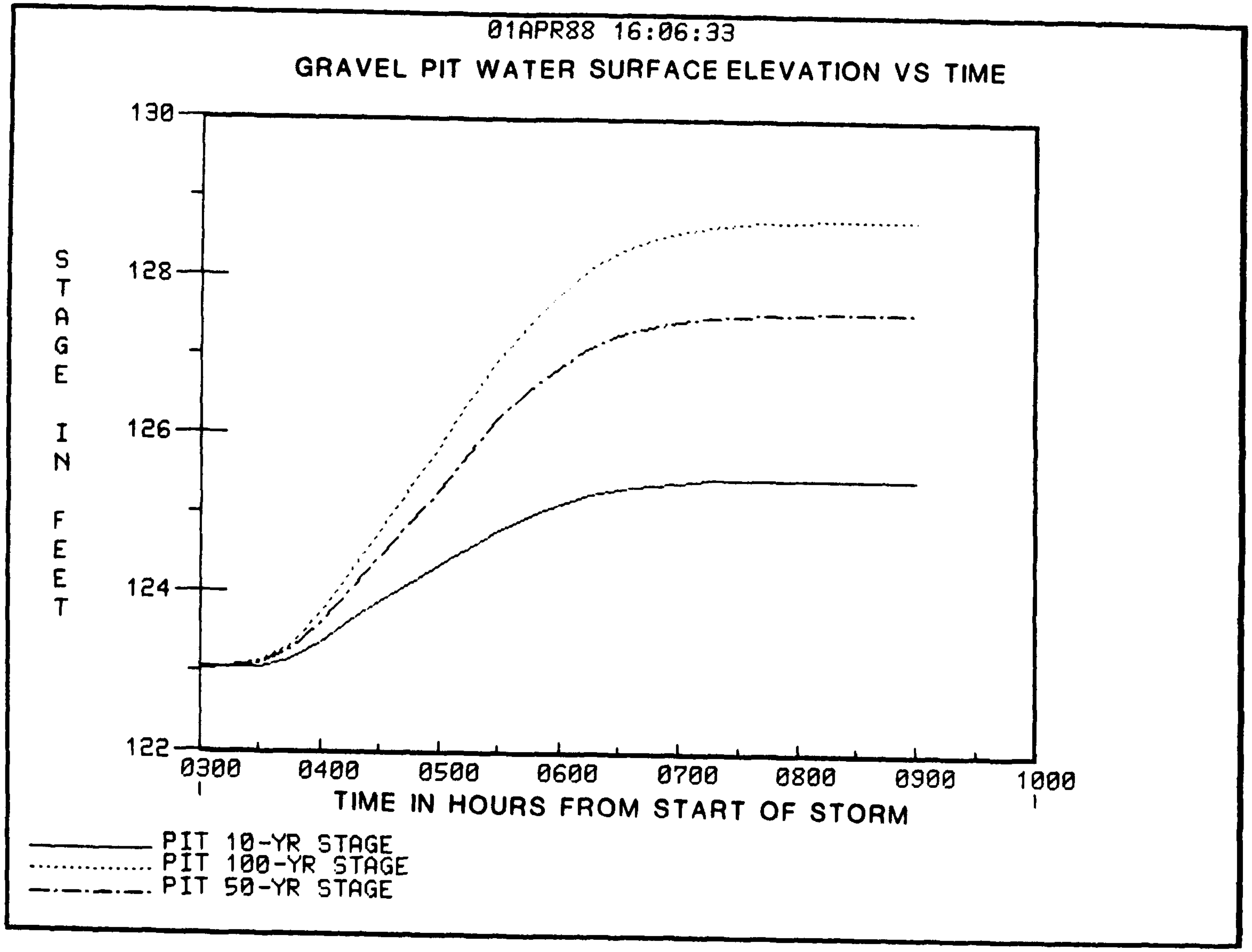
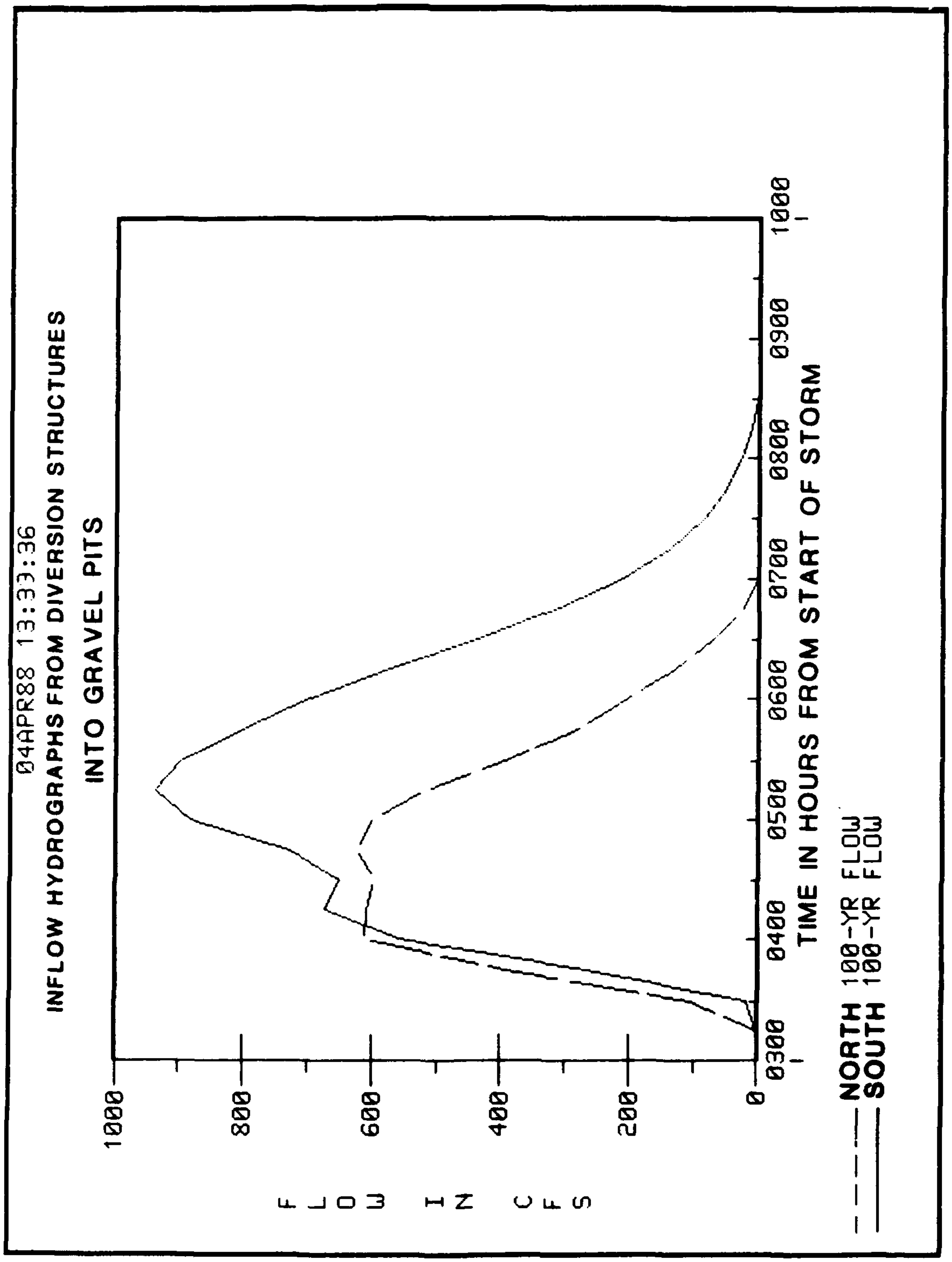

ELEVATION-AREA-VOLUME RELATIONSHIPS FOR DETENTION POND
(SOUTH GRAVEL PIT, WINDSOR LAKE, AND NORTH GRAVEL PIT)
SURFACE AREA (AC)
55
56
57
58
59
130
128
126
124
122
120
ELEVATION IN ROCKFORD DATUM(RD)
AREA
VOLUME
0
100
200
300
400
500
VOLUME IN ACRE-FEET

PLATE A-21



01APR88 16:06:33
GRAVEL PIT WATER SURFACE ELEVATION VS TIME
STAGE IN FEET
130
128
126
124
122
0300
0400
0500
0600
0700
0800
0900
1000
TIME IN HOURS FROM START OF STORM
PIT 10-YR STAGE
PIT 100-YR STAGE
PIT 50-YR STAGE

PLATE A-22

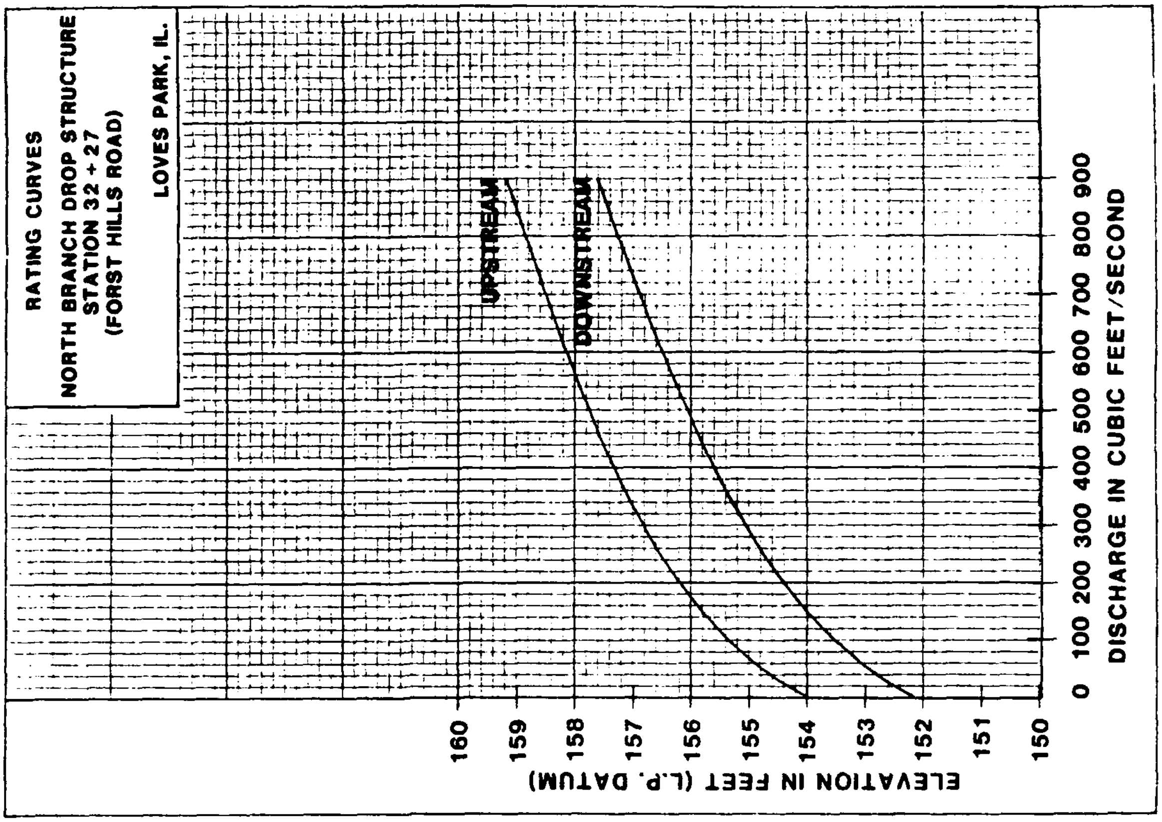

04APR88 13:33:36
INFLOW HYDROGRAPHS FROM DIVERSION STRUCTURES
INTO GRAVEL PITS
FLOW IN CFS
1000
800
600
400
200
0
0300
0400
0500
0600
0700
0800
0900
1000
TIME IN HOURS FROM START OF STORM
NORTH 100-YR FLOW
SOUTH 100-YR FLOW

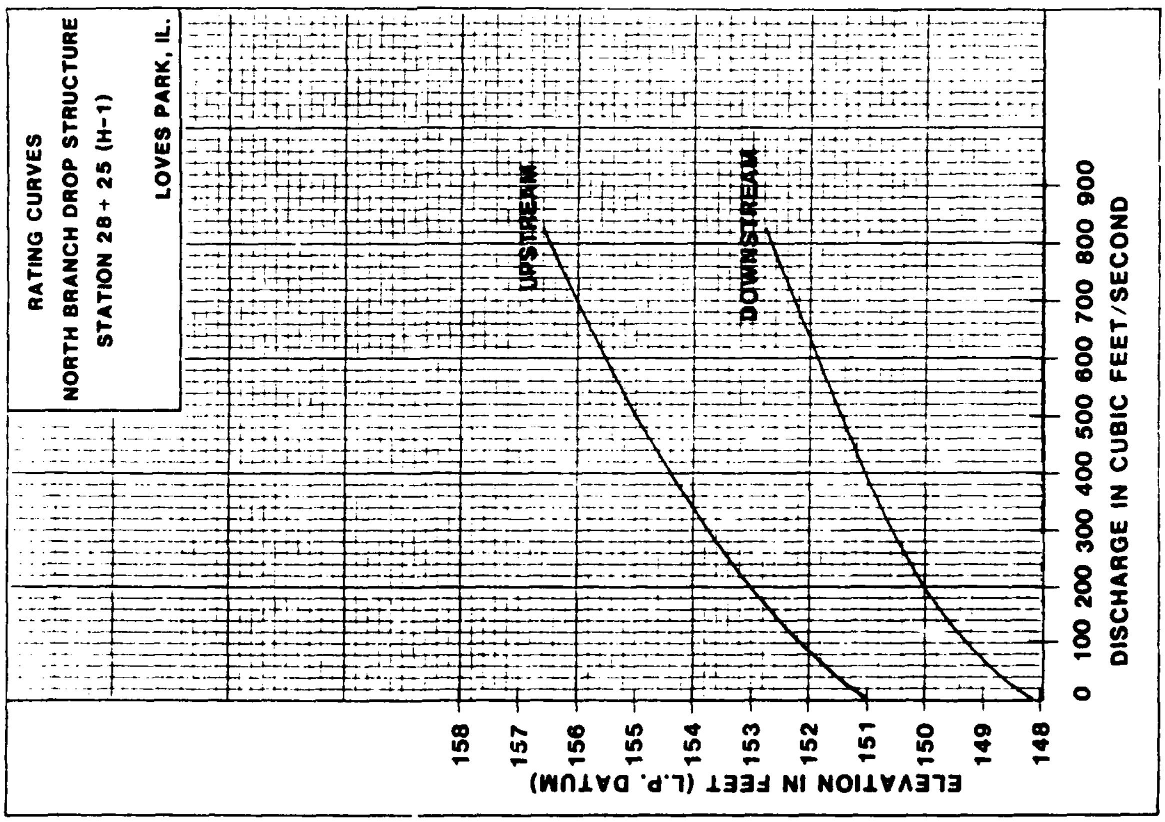
DIVERSION STRUCTURES
Division of Flows

Location	Stages and Discharges for Various Recurrence Intervals				
	10-YR	50-YR	100-YR	200-YR	SPF
North Branch					
Divert to Pit Storage (cfs)	330	511	622	674	1837
Continues Downstream (cfs)	120	131	138	211	550
South Branch					
Divert to Pit Storage (cfs)	356	758	936	954	1300
Reservoir	125.4	127.5	128.7	129.8	133.4

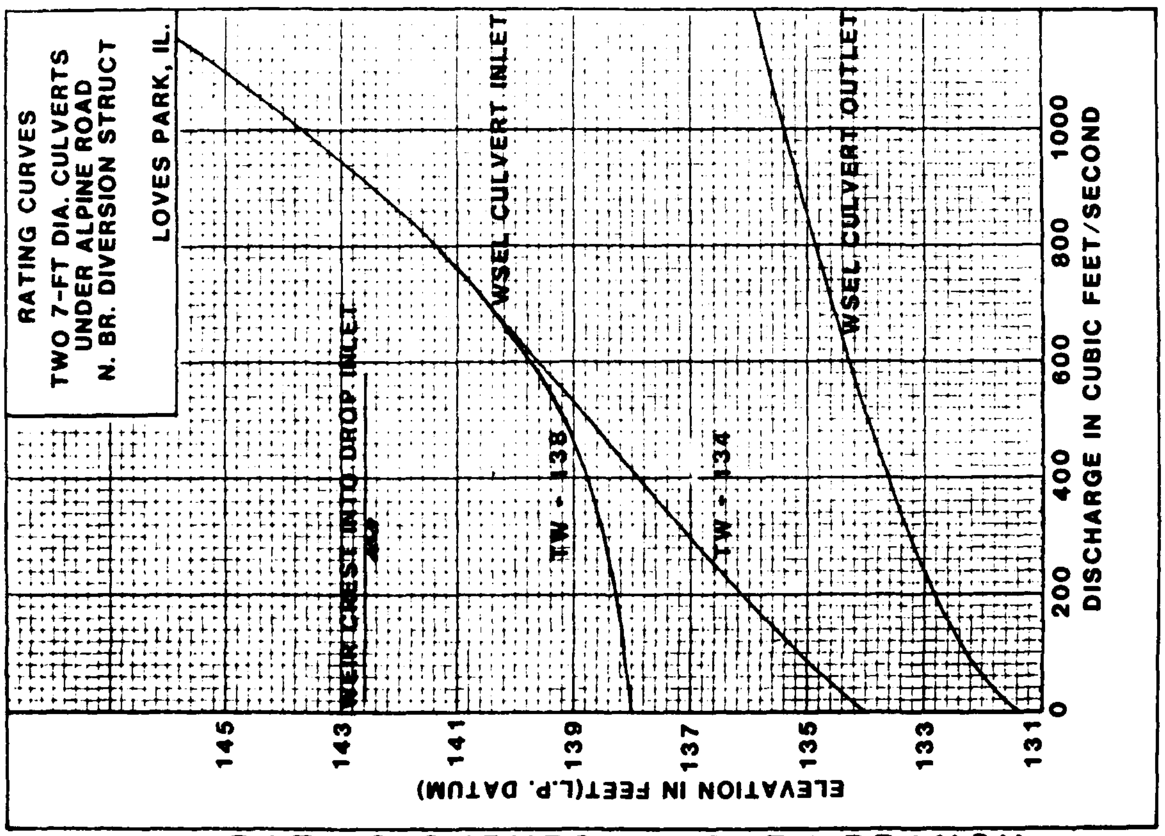
Location	Volumes in Ac-FT for Various Recurrence Intervals				
	10-YR	50-YR	100-YR	200-YR	SPF
North Branch					
Divert to Pit Storage	47	85	106	123	585
Continues Downstream	37	43	47	56	237
South Branch					
Divert to Pit Storage	69	143	184	222	801
Continues Downstream	92	103	109	121	783
Total North & South Diverted to Pit Storage	116	228	290	345	1386
Total into Pit (Includes Local Runoff	139	260	328	387	1518

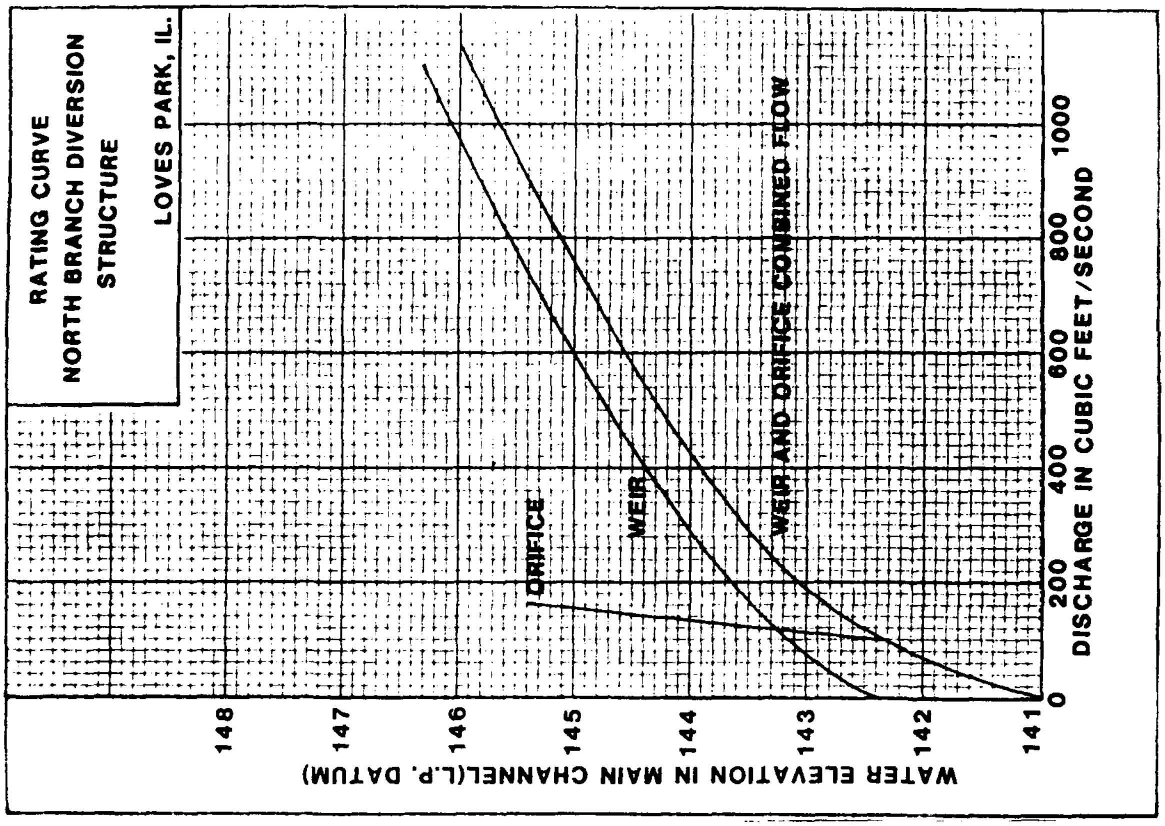
Added September 1989





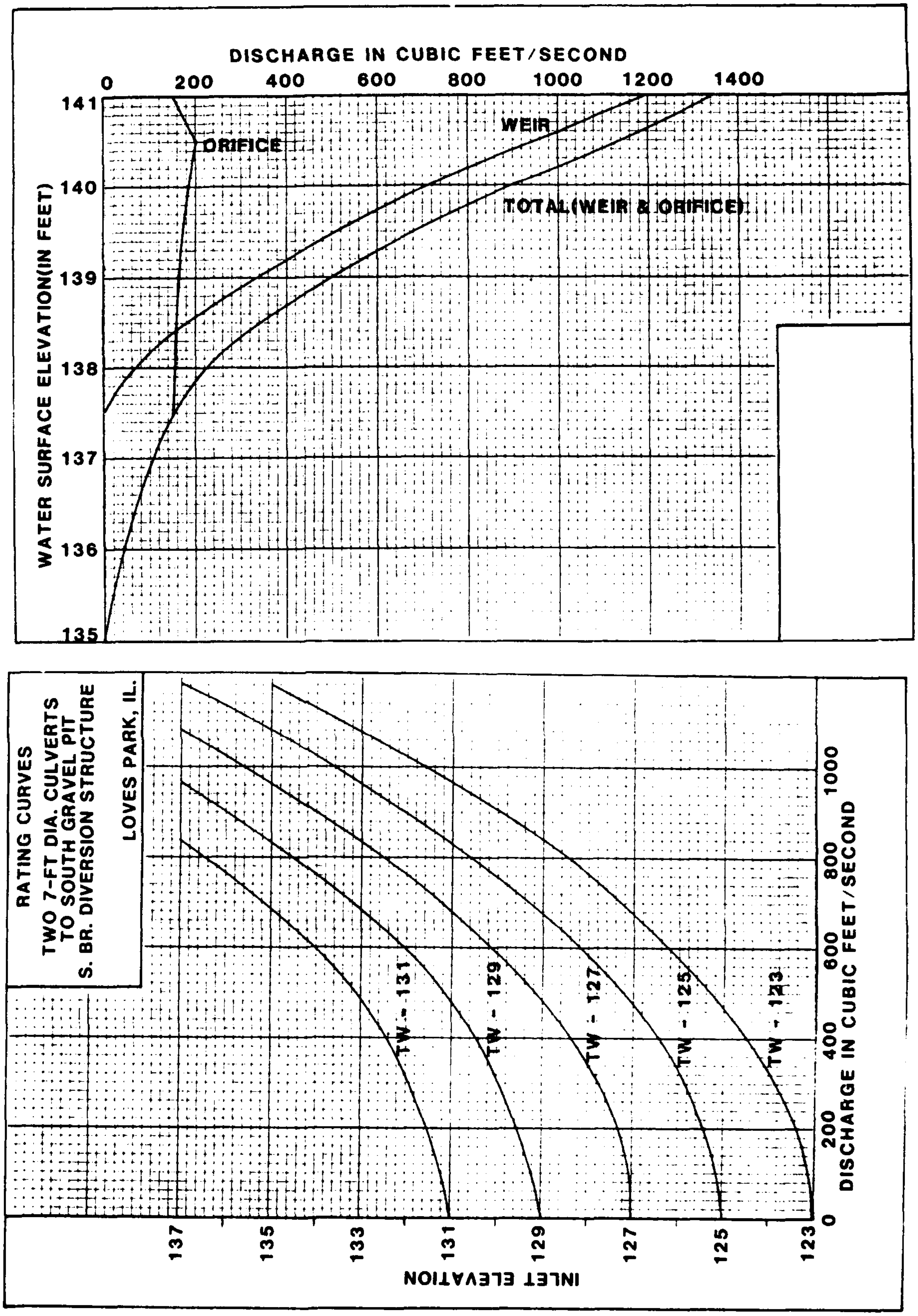
RATING CURVES - NORTH BRANCH DROP STRUCTURES





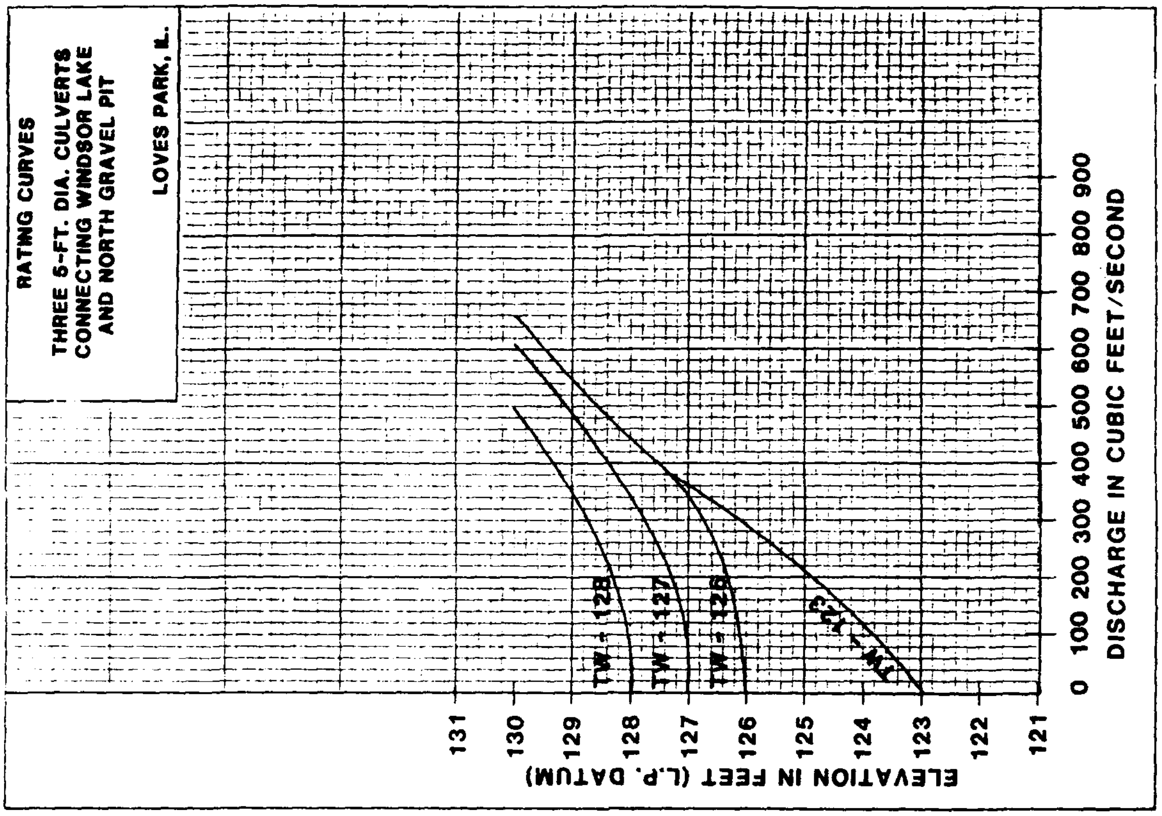
RATING CURVES - NORTH BRANCH DIVERSION STRUCTURE

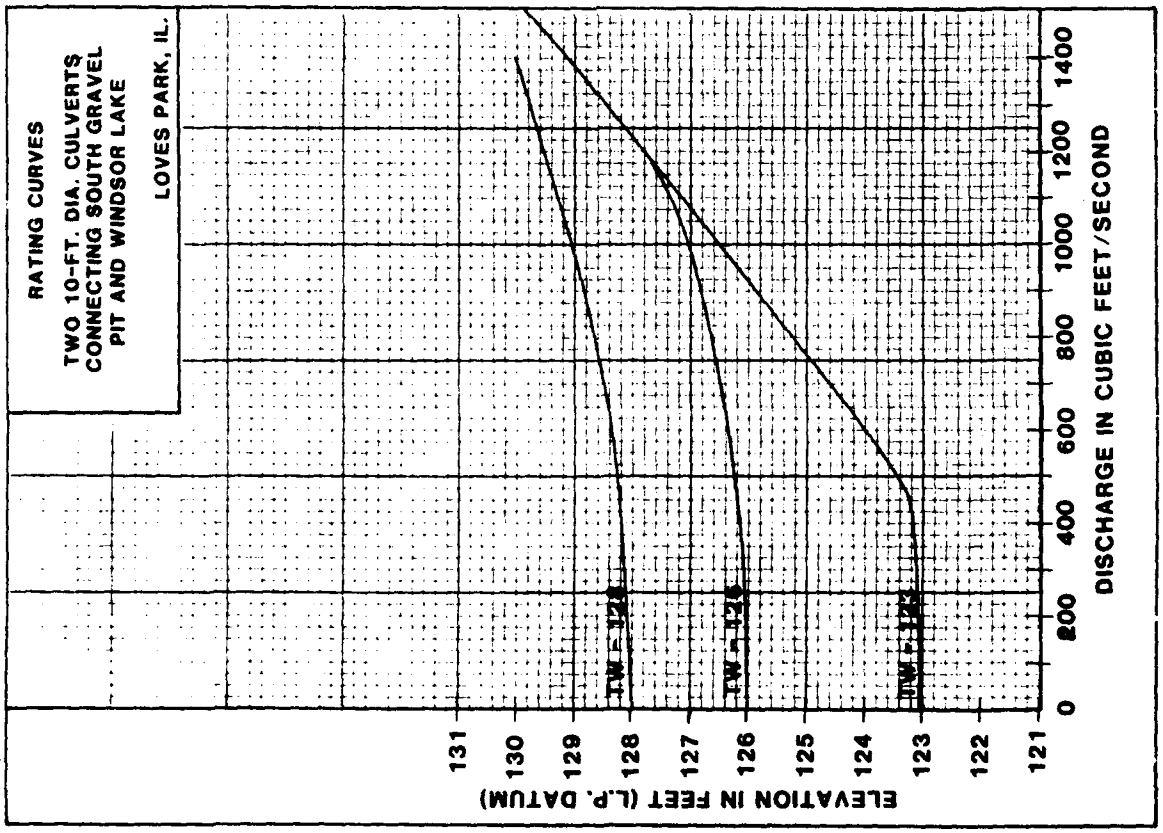
PLATE A-26



RATING CURVES - SOUTH BRANCH DIVERSION STRUCTURE

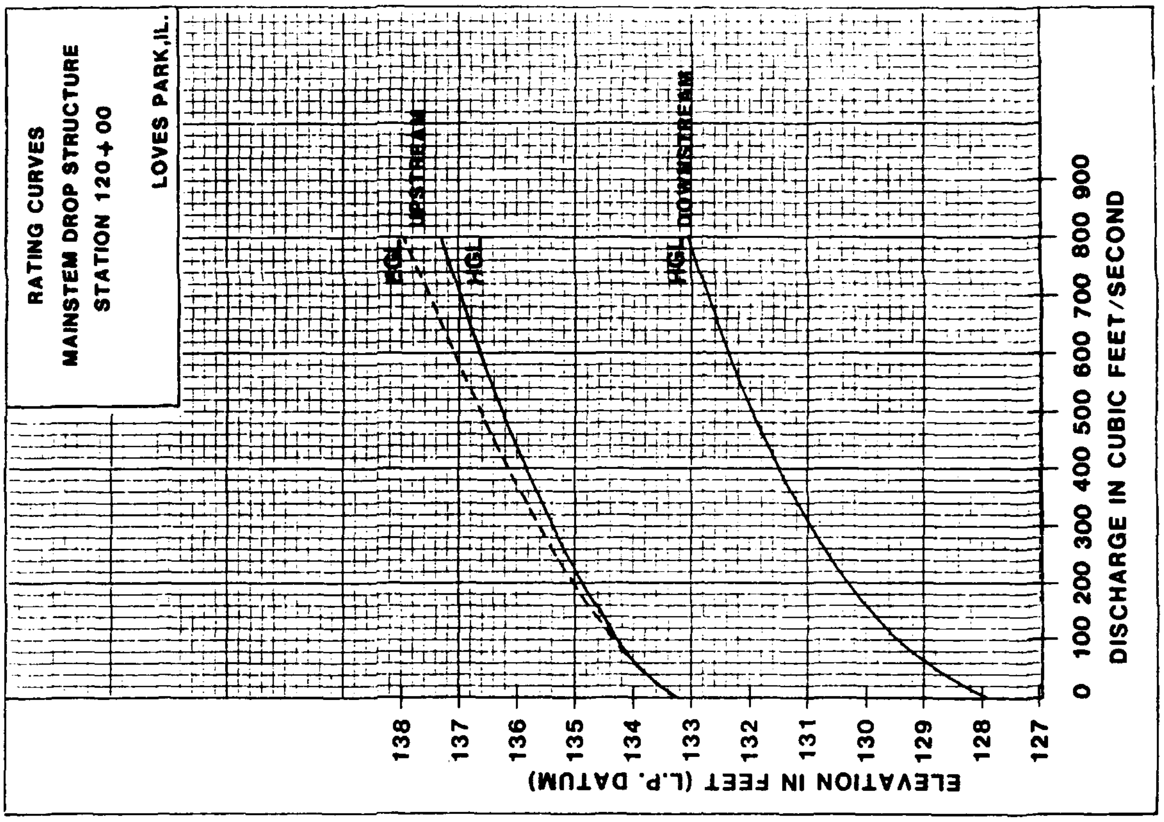
PLATE A-27

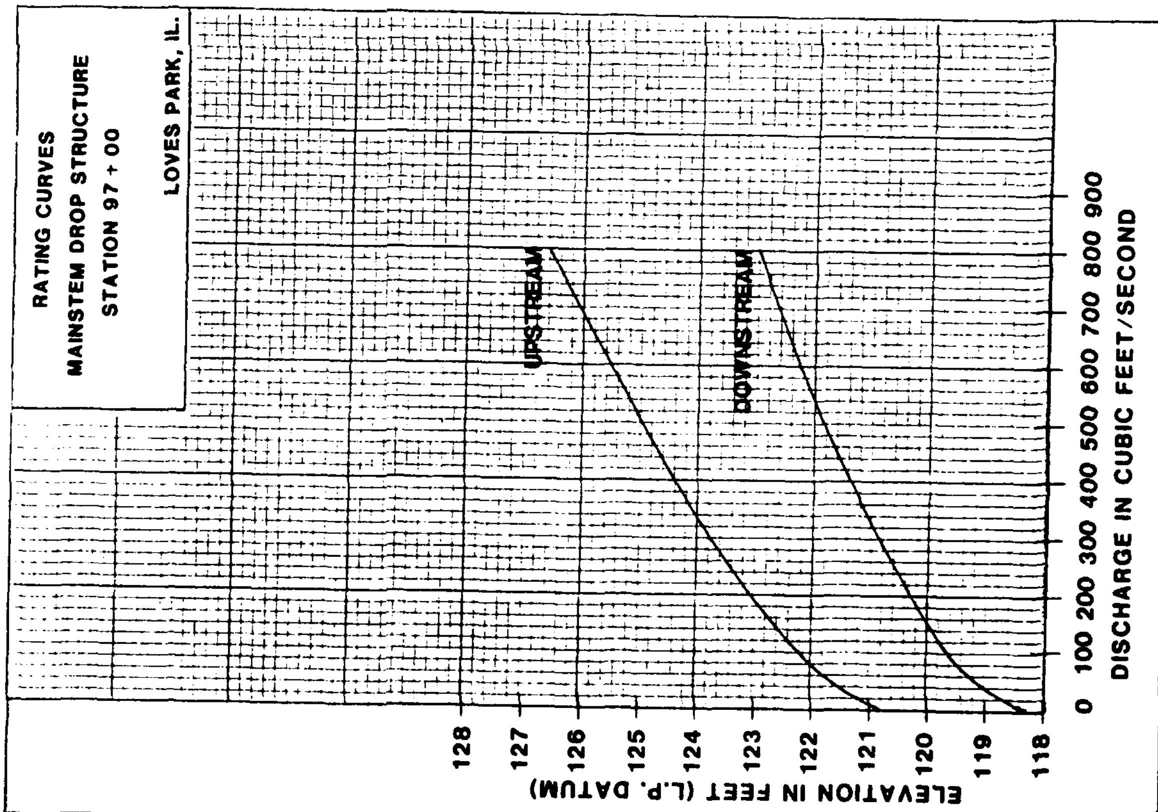




RATING CURVES - CONNECTING CULVERTS

PLATE A-28





RATING CURVES - MAINSTEM DROP STRUCTURES

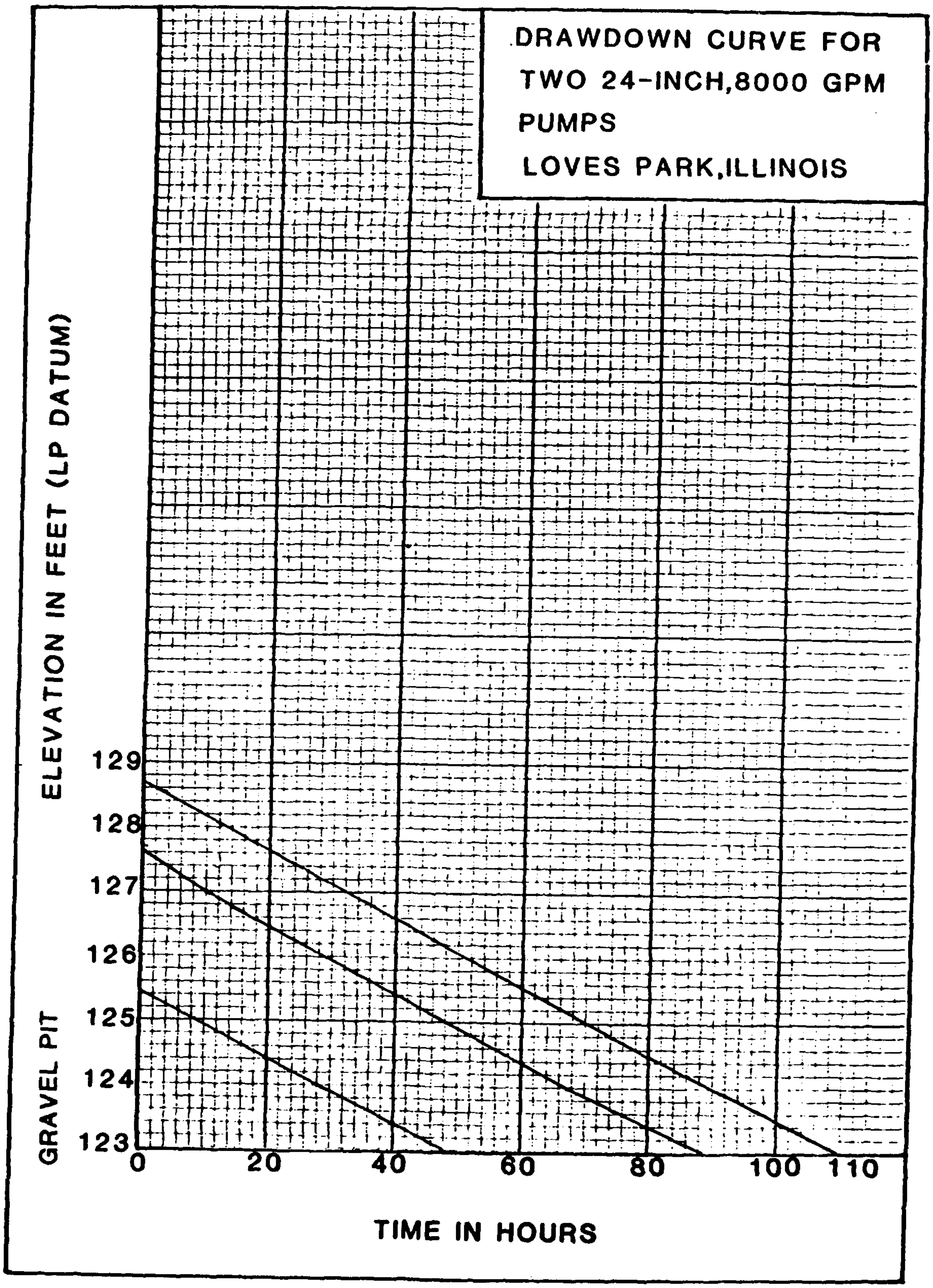

DRAWDOWN CURVE FOR
TWO 24-INCH,8000 GPM
PUMPS
LOVES PARK,ILLINOIS
ELEVATION IN FEET (LP DATUM)
GRAVEL PIT
129
128
127
126
125
124
123
0
20
40
60
80
100
110
TIME IN HOURS

PLATE A-30

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX B

GEOTECHNICAL ANALYSIS

ROCK ISLAND DISTRICT
CORPS OF ENGINEERS
CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS 61201

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX B
GEOTECHNICAL CONSIDERATIONS

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LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX B
GEOTECHNICAL CONSIDERATIONS

PHYSIOGRAPHY

Loves Park, Illinois, is located in East Central Winnebago County. It is a suburb on the north side of Rockford and lies immediately to the east of the Rock River. This area lies within the Till Plains section of the Central Lowlands, a division of the Interior Plains. Regionally the area consists of young till plains generally absent of morainic topography and with few lakes. Regional drainage is to the south via the Rock River which serves as a major dendritic artery whose limbs are primarily westerly flowing creeks and streams. Although present, tributary streams flowing into the Rock River from the west are generally not as large.

Topographic relief in the project area ranges very little with contours falling between elevations 109 at Windsor Lake to about 160 along the project alignment. Somewhat higher elevations occur to the northeast as one travels up out of the primary floodplain of the Rock River. Maximum elevations about *1-1/2 miles east are 240 feet.

PLEISTOCENE GEOLOGY

The subject area was most recently covered with advances during the Wisconsin glaciation. Ice sheets from the Lake Michigan lobe carried thick deposits of till and subsequent glacial drift. These unconsolidated materials consists of sands and gravels often intermixed with clay and clayey sands. Numerous sand and gravel mining operations in the immediate area testify to the presence of these regional glacial deposits. These materials are often greater than 50 feet thick laying on the underlying bedrock. Often times one will find 8 to 10 feet of wind blown silt or loess deposits resting atop these till soils.

Greater detail on soil types and engineering characteristics is presented in the following section of this report. Soil profiles are shown on plates B-1 to B-3.

*Revised September 1989

BEDROCK STRATIGRAPHY

Bedrock in the subject area consists of the Galena Dolomite which is Ordovician age rock. The surface of the bedrock in the project area lies at depth, in fact, of more than 30 borings taken, none encountered rock up to depths in excess of 50 feet. Preglacial and periglacial erosion of the bedrock surface, especially along the Rock River corridor, has resulted in buried gorges not uncommon to the waning edge of large glacial masses. Not far from the project area, about a mile east, rock has been quarried for commercial use. Other rock quarries in the Galena are common in the region.

SUBSURFACE INVESTIGATION

Thirty-one borings were taken along the proposed channel alignment to verify the soil stratigraphy and to evaluate the physical characteristics of subsurface materials with respect to the proposed channel modifications. Thirty of the thirty-one borings were drilled from 18 to 41 feet deep. Boring LP-86-28 was drilled to a depth of 75' to provide necessary structure information for open excavation or possible jacking of two 120" diameter interconnecting channel, concrete pipes. Location of drill holes and the longitudinal profile are located on plates 4 through 17 of the main report. The logs of borings can be seen on plates 18 through 20 of the main report.

Either a 4-inch flight auger or a 5-inch hollow stem auger was used to extend the holes. Standard split spoon sampling method was used to obtain jar samples at in most cases 2-1/2 foot intervals. Standard "N" penetration (blows per foot of a 140-pound hammer falling 30 inches on a 2-inch O.D. split spoon) were recorded as well as three pocket penetrometer readings.

SOIL TESTS

Laboratory soil tests were performed by Rock Island District Geotechnical Branch staff. Visual classifications were performed on each sample. Natural moisture contents were determined on all impervious, semi-impervious, and semi-pervious soils. Atterberg Limits tests were run on typical soils and are indicated on boring logs LP-86-21, 26, and 27.

Standard penetrometer readings were taken and results are shown on the boring logs (Plates 18 through 20). Gradation tests performed on representative samples were used to determine effective grain size. D_{10} sizes ranged up to .32 mm. Gradation curves are shown on plates B-4 through B-6.

PROPOSED CHANNELS

Several types of channel sections are proposed for the project area. The sections discussed in the following paragraphs include: concrete lined, grass channel with concrete pavers, grass-lined, interconnecting, and diversion channels.

A concrete lined channel will begin at the downstream end of the project Sta. 4+35 and continue to Sta. 74+00. In addition approximately 780 feet of concrete lined channel will compose the south branch of the creek Sta. 8+95G to Sta. 8+45G-1 and 1825 feet will compose the north branch Sta. 1+45 H-1 to 11+85 H-1 and Sta. 20+40 H-1 to 28+25 H-1. The proposed concrete channel will require excavation to depths of up to 10.5 feet and the bottom width will vary from 11 to 40 feet. Typical trapezoidal and rectangular sections for the concrete lined channel are shown on plates 21 and 22 of the main report.

Reach 74+00 to 96+83 is a grass channel with concrete pavers along the 1V on 3H side slopes. The bottom width of this section is 17 feet and excavation will be required to a depth of up to 11 feet. A typical section can be seen on plate 21 of the main report.

A reach of grass-lined channel will exist on the main stem of the creek at Sta. 97+08 to 120+00. In addition, two reaches of grass-lined channel are proposed on the north branch at Sta. 11+85 H-1 to 20+40 H-1 and Sta. 28+25 H-1 to 32+07 H-1. 1V on 3H slopes are specified for the grass-lined channel with a bottom width that varies between 10 and 18 feet. The proposed grass-lined channel will require excavation to a depth of up to 6 feet. A typical trapezoidal section of the grass-lined channel is shown on plate 21 and 22 of the main report.

An interconnecting channel will be placed between the South Gravel Pit and Windsor Lake as well as a similar section between Windsor Lake and the North Gravel Pit. The channel between the South Gravel Pit and Windsor Lake will consist of two 120-inch diameter reinforced concrete pipes 174 feet long and invert at elevation 118.0. A grass-lined open channel extends from each end of the pipe. It has a 20-foot base width, having 1V on 3H side slopes above elevation 124.0, and 1V on 2H side slopes below elevation 124.0. A typical section can be seen on plate 31 of the main report. The second interconnecting channel which is between Windsor Lake and the North Gravel Pit consists of three 60-inch diameter reinforced concrete pipes 107 feet long and invert elevation 121.5.

Two underground concrete pipes 84" in diameter will divert high flows from the south branch Sta. 8+44 G-1 into the South Gravel Pit. The pipes are 700 feet long and the invert elevation is 118.0. A second set of 84" RCP will be located upstream at approximately Sta. 0+40 H-2 for the diversion of high flows from the North Branch into Windsor Lake. The pipes are 124 feet long and have an invert elevation of 132.60 at the drop inlet and 131.35 at the entrance to Windsor Lake.

FOUNDATIONS FOR EARTH AND CONCRETE CHANNELS

A complete soil profile of the project area can be seen on plates B-1 through B-3. Borings LP-86-1 thru LP-86-22 were taken along the main stem of Loves Park Creek from Sta. 4+35 to Sta. 120+00. The top stratum is an impervious material ranging from 3-8 feet of sandy lean clay (CL). Traces of gravel and broken rock are found throughout this top layer. All borings indicate a pervious substratum ranging from 4 to 40 feet in thickness. Visual classification and gradation tests determined the substratum to be a brown gravelly coarse to fine sand and a brown medium to fine sand (SP). Occasional clay seams are seen throughout the substratum. Blow counts for the non-cohensive soils ranging from 5 to 47 indicate a density at loose to moderate material. Moisture contents ranged from 7 percent to 22 percent in the top stratum impervious soils and as high as 26 percent in the clay seams within the sand.

Borings LP-86-31, 32, 33 are located at the far upstream end of the project on the north branch of Loves Park Creek. Boring LP-86-31 depicts a 3 foot impervious top stratum of brown sandy lean clay (CL) followed by a 4-foot layer of clayey sand (SC). At seven feet below ground surface a brown clayey medium to fine sand (SP-SC) layer extends 2 feet to a depth of 9 feet below ground surface. At this point an 11-foot thick layer of medium to fine sand with gravel begins. Blow counts indicate a loose to medium dense material for the upper 20 feet of soil but below this elevation a blow count of 135 indicates very dense material.

Approximately 1400 feet upstream of LP-86-31 is the location of LP-86-32. The pervious top stratum consists of a 5-foot layer of clayey coarse to fine sand (SP-SC). The top 9 inches is composed of asphalt and crushed stone. Five feet below the ground surface a layer of medium to fine sand (SP) with traces of gravel extends for an additional five feet followed by a 1-foot layer of very dense lean clay (CL). Fifteen feet below ground surface a brown gravelly coarse to fine sand (SP) layer is encountered with blow counts of 93 and 128 indicating extremely dense material.

Approximately 900 feet upstream of LP-86-32 is boring No. LP-86-33 which is the boring located farthest upstream. A 12-foot semi-impervious top stratum of loose clayey sand (SC) is followed by a 3-foot layer of (SP-SC) brown clayey to medium to fine sand. Fifteen feet below ground surface begins a medium to fine sand and gravelly coarse to fine sand (SP) which extends 22 feet to the bottom of the hole. Blow counts depict a dense material.

FOUNDATIONS FOR OTHER STRUCTURES

The pump station and drop structure will rest in a dense sand layer 21 feet thick (blow counts as high as 98) underlain with a clay layer of considerable strength. A standard pocket penetrometer reading taken just several feet below the bottom of the proposed structures indicated an unconfined compressive strength (qu) of 3.75 tsf. Cohesive strength of the soil can be related as 1/2qu (Peck) yielding a value for cohesion of 3750 lb/ft2.

Borings LP-86-23 and 26 are located in the vicinity of the South Branch diversion channel. Boring LP-86-23, located near the drop structure and pump station, has a 4-foot top stratum of brown sandy lean clay (CL) followed by a 3-foot layer of clayey sand (SC), a 21-foot layer of medium to fine and gravelly coarse to fine sand (SP), a 6-foot layer of lean clay (CL), and a 2-foot layer of fine sand. Boring LP-86-26, located near the diversion channel outlet to the gravel pit, has a 2-foot top stratum of brown sandy lean clay (CL) followed by a 5-foot layer of clayey gravelly coarse to fine sand (SC-SP), a 5-foot layer of broken rock and rubble, and 8 foot layer of sandy lean clay (CL) with broken rock. Twenty feet below ground surface begins a 2-foot layer of clayey sand (SC) followed by a 14-foot layer of gray medium to fine sand and finally a 6-foot layer of brown lean clay (CL). Blow counts in the non-cohesive soils indicate a medium dense to very dense material. Blow counts for cohesive soils indicate a very stiff to hard material. The diversion channel will consist of (2) 84-inch RCP approximately 700 feet long with an invert elevation of 118.0 The pipes will rest in a very dense sand layer (blow counts 78 - 98). LP-86-23 depicts groundwater to be 15 feet below the ground surface at elevation 125.8. As a result dewatering during construction will be necessary. If jacking methods are used to place the pipe, it might be required to coat the pipe with an agent to reduce friction forces caused by the sand on the pipe.

Borings LP-86-27 and LP-86-28 were taken in the area where an interconnecting channel will exist connecting the South Gravel Pit to Windsor Lake. Boring LP-86-27 which is on the South Gravel Pit embankment indicates the top stratum to be an impervious material. A brown sandy lean clay (CL) with broken rock and trash fill extends 25 feet below the ground surface followed by a 1.5 foot layer of gray clayey gravelly coarse to fine sand (SP-SC). At 26.5 feet below the ground surface a gray coarse to fine sand (SP) layer extends for 3 feet to a depth of 29.5 feet below ground followed by 4 feet of brown lean clay (CL) and 2 feet of brown silty sand. Blow counts from the top impervious stratum indicate medium to stiff material. Boring LP-86-28 which is located on the Windsor Lake embankment was drilled to 75 feet below ground. Bedrock was not encountered. An impervious top stratum consisting of 3 feet of sandy lean clay (CL) is followed by 31 feet of gravelly coarse to fine sand and medium to fine sand (SP). Blow counts indicated dense material. Thirty-four feet below the ground surface a clay layer (CL) is encountered 5 feet thick. A blow count of 100 indicates hard material. Thirty-nine feet below ground surface is a 10 foot thick layer of brown silty sand (SM) followed by a 22 foot layer of dense brown fine sand (SP); blow counts ranging from 97 to 125 (extremely dense). Seventy one feet below ground surface is a 4-foot layer of brown lean clay (CL) of medium consistency. The interconnecting channel is made up of two 120-inch diameter reinforced concrete pipes 174 feet long which will lie approximately 20 feet below ground surface (invert El. 118.0). Excavation of the trench should be made down to firm material (25 feet or more) and backfilled with sand due to the trashfill found in the top stratum.

The interconnecting channel between Windsor Lake and the North Gravel Pit is composed of three (3) 60-inch diameter reinforced concrete pipes (invert elevation 121.5). The length of the channel is 107 feet. No borings were taken in this area; therefore, a soil profile cannot accurately be determined. It is recommended that borings be taken in this location before the plans and specifications stage of the project are completed.

LP-86-29 and LP-86-30 are located along the North Branch diversion channel at the upstream end of the project (Sta. 0+00 H-2). The diversion structure consists of two (2) 84-inch diameter reinforced concrete pipe 124 feet long. The pipes will lie in a brown gravelly coarse to fine sand (SP) layer. Because of limited space, jacking the pipes into place is a potential construction method. If the pipes are jacked into place considerable friction forces could result. It is recommended the pipes be coated with an agent that will reduce resistance. LP-86-29 shows an impervious top stratum of sandy lean clay (CL) 2 feet below the ground surface. A brown clayey sand (SC) follows for an additional 8.5 feet. At 10.5 feet below the ground surface a gravelly coarse to fine sand (SP) extends for an additional 26 feet. Blow counts taken for the clayey sand layer depict a very loose material (N=4, 5) underlain with a dense to very dense gravelly coarse to fine sand layer. Blow counts in this stratum range from 32 to 140. LP-87-30 has a 2.5 foot impervious top stratum of sandy lean clay (CL) followed by a 6-foot layer of clayey sand (SC) to a depth of 8.5 feet below ground surface. Blow counts indicate medium density of material. At 8.5 feet below ground surface a 21-foot layer of gravelly coarse to fine sand (SP) begins. Blow counts from 47 to 98 would indicate very dense material. At 29.5 feet below ground surface is a 7-foot layer of lean clay (CL). Blow counts indicated a very stiff to hard material.

PROPOSED LEVEE EMBANKMENT

The levee embankment along reach H-1 Sta. 7+00 to 14+00 H-1 and Sta. 16+00 H-1 to 21+00 H-1 will be constructed entirely of impervious (CL) soils obtained from selective borrowing of the channel excavation. Three to eight feet of clay material comprises the top stratum throughout most of the project area. The soil to be used in embankment construction will be removed from above groundwater level and will be in a moist condition.

The levee will be constructed on the left shoulder of the channel looking upstream with 1V on 3H side slopes both landside and riverside. The levee will have a 10-foot crown and a maximum base width of 20 feet. The maximum height of the levee is approximately 3 feet with the minimum being no levee at all. This levee section will accommodate the 100-year event with a freeboard of 1 foot. The levee will be composed of clay fill material obtained from selective borrowing of the channel excavation. Density of the fill will be controlled by uncompacted lift thickness and number of passes with compaction equipment. Moisture control should be $\pm 2\%$ of optimum. A typical levee and channel section can be seen on plate 22 of the main report. The right bank will be composed of random fill material where required to tie into high ground.

FOUNDATION FOR PROPOSED LEVEE EMBANKMENT

The entire foundation will be cleared, grubbed and stripped to a depth of 6 inches to remove objectional, obstructional, and unsuitable matter above and beneath the ground surface. The adjacent channel excavation will serve as the inspection trench. The area top stratum and pervious substratum are as described previously in this appendix in the paragraphs entitled "Foundations for Earth and Concrete Channels". The borings that most closely correlate with the location of the levee embankment are borings LP-86-31,32,33.

INSTRUMENTATION AND GROUNDWATER STUDY

In 1978 the Corps of Engineers contracted with the consulting firm STS Consultants Ltd. to partially maintain observation wells and record water elevations in those wells for the period from 19 September 1978 to 2 September 1982. A location plan of the wells can be seen on plate B-7. Also included in this appendix is a letter written to the Corps of Engineers by STS Consultants Ltd. outlining damages to the gages in Windsor Lake and the two gravel pits during this time period. Details of the repairs and new gage installations are outlined in the letter (plates B-8 to B-10). A Summary of Water Level Readings (plates B-11 to B-17) present the results of the water level elevation measurements made for this project during the study time period.

From the data collected, a random sample of lake elevations versus ground water elevations was chosen and plotted for each well. The plots can be seen on plates B-18 through B-21. From this data the groundwater elevation during the 100-year event was extrapolated knowing that the 100-year lake elevation is 129.0. Contour lines have been drawn on the location plan of wells (plate B-7) that indicate what the ground water elevation will be at the wells when the 100-year event occurs. The actual ground elevation is noted by each well.

The results from this analysis indicate the potential for inundation of any existing basements in certain areas. This can be seen on the location plan of wells where in the vicinities of LPO 1, 2 and 4 it is shown that the groundwater is approximately 8 feet below ground surface elevation. It should be noted here that without the project this area would be flooded during a 100-year event. See Appendix A, plates A-5 and A-6 for Floodplain Delineation. As shown in plates B-18 through B-21 the general trend was for the water elevation to be lower in wells 1-5 than in the lake. Although the groundwater elevations increase moving towards LPO 6, the ground surface elevation is at least 12 feet above the water table. This is considered a high ground area and the water table most likely will not encroach on any basements in the area. Contractor should attempt to reestablish the observation wells LPO 1-6 shown on plate B-7. If these wells can not be located, new wells should be placed in similar locations. Observation wells should be a minimum of 2 inches in diameter.

Groundwater levels indicated in borings LP-86-1 through 22 range from 9-18 ft below the ground surface. Groundwater that is 9 feet below the ground surface will still be 2 feet below the proposed channel bottom in this channel reach except for approximately 900 feet at the far downstream end Station 4+35 to Station 13+00 where the groundwater is less than 2 feet below the channel bottom. A dewatering system is shown on plates 21 and 22 of the main report and can be implemented here if the need would arise. Weep holes are recommended for the concrete lined channel to release water when uplift pressures increase due to long periods of heavy precipitation.

Groundwater levels indicated on the borings in the areas of the diversion channels and interconnecting channels indicate that dewatering will be required during construction. The elevation of the ground water at the downstream diversion channel decreases from 126 at the inlet to 119.0 at the outlet. The invert elevation of the RCP is 118.0; therefore, the pipe would be partially inundated under normal conditions. At the upstream diversion channel, which diverts water from the creek into Windsor Lake, the elevation of the ground water is 132.0. The elevation of the pipe invert is also approximately 132.0

The interconnecting channel between the South Gravel Pit and Windsor Lake has an invert elevation of 118.0. Groundwater levels shown on the boring logs indicate the groundwater varies between EL. 121.0 and 119.5. Borings were not taken at the interconnecting channel between Windsor Lake and the North Gravel Pit; therefore, groundwater levels could not be determined.

SLOPE STABILITY

A slope stability analysis was performed on the interconnecting channel between the South Gravel Pit and Windsor Lake. A grass-lined open channel extending from each end of 120-inch diameter reinforced concrete pipes comprises the interconnecting channel. The slope stability analysis was performed on the grass-lined portion of this channel in accordance with EM 1110-2-1802, Engineering and Design Stability of Earth and Rock Fill Dams.

Two different cases exist in the area of this interconnecting channel, and both were analyzed. Boring LP-86-27 indicated a clay top stratum underlain with a sand foundation. The factor of safety calculated was 1.46. Boring LP-

86-28 was composed of a sand top stratum and a clay foundation. The factor of safety calculated was 2.05. Both cases had a factor of safety higher than the minimum of 1.3 required; therefore, are considered safe. A summary of the analysis for both cases can be seen on plates B-22 and B-23.

A slope stability analysis was not required for the grass-lined channel to be placed at other locations within the project area due to the fact that the 1V on 3H side slopes should adequately accommodate a maximum water depth of 7 feet and the fact that the water table is several feet below the channel bottom. All construction trenches dug for placement of reinforced concrete pipe that will eventually be covered should have a minimum of 1V on 3H side slopes.

*A slope stability analysis was preformed on the existing slopes of the storage
*lakes taking into account rapid drawdown conditions. The exisitng slopes vary
*between 1 vertical to 1 horizontal and 1 vertical to 2.5 horizontal. The
*slopes have a vegetative cover consisting of grass, brush and trees. The
*analysis did not take into account the soil stabilization effects from the
*root system of the vegetative cover. The analysis indicates that the slopes
*would be considered stable at a slope of 1 vertical to 3 horizontal. It is
*proposed that sufficient right-of-way be obtained to accomodate 1 vertical to
*3 horizontal slopes and that there should be no adjustment in the existing
*slopes. Cutting the slopes down would require the removal of the existing
*vegetative cover and would take many years to replace. Sloughing of slopes
*that may occur would have little impact on the storage capacity of the lakes.
*Repairs of any sloughed areas would be required as a maintenance item.

THROUGH SEEPAGE

Through seepage is not expected to occur in the levee embankment because compacted impervious (CL) fill has been specified as the embankment material.

UNDERSEEPAGE

Underseepage is not a concern for this project. At its maximum height the levee is only 3 feet and considering that high-level flooding is a short duration (no more than 6 hours) it will not be necessary to provide protection against uplift and piping.

SLOPE PROTECTION

The grass-lined channel will have 1V on 3H side slopes and should be sufficiently flat and stable above normal water surface elevation to resist dramatic erosional distress during a flood event. Velocities are such that the slopes below normal water elevations could experience some erosion. Where erosion occurs repairs can be made with 4" size stone.

*Revised September 1989

AVAILABILITY OF CONSTRUCTION MATERIALS

Soil:

Borrow material will come from excavations of the main channel, interconnecting channels, and diversion channels. The boring logs indicate that pervious (SP) soils predominate the entire project area with limited amounts of impervious (CL soils) and semi-impervious (SC and SP-SC soils). During excavation of the channels the impervious material should be obtained and stored in an area separate from other borrow material. The impervious (CL) material will be used for construction of levee embankment on the north branch of the creek.

Concrete:

The concrete channel and other concrete structures will be subjected to freezing/thawing. The concrete will be air-entrained and produced using locally available durable aggregates. The aggregates have been evaluated using test data furnished by the State of Illinois Department of Transportation and test data from Missouri River Division Laboratory. Aggregates have been used on other projects in the Rockford Area.

Type I Portland cement, Class F fly ash, 1-1/2 inch maximum size crushed limestone coarse aggregate, and natural sand fine aggregate are locally available. The cement and pozzolan will be accepted on the basis of manufacturer's certification of compliance accompanied by mill test reports. The concrete mixtures will be proportioned by the Contractor and submitted for approval. The maximum water/cement ratio will be 0.48 by weight. Local ready mix plants are available to supply the concrete.

MATERIAL UTILIZATION

All soils remaining at the completion of the project will require placement at designated disposal areas. These materials may be disposed of at the site shown on plate B-24. This disposal site is located just south of Harlem road and west of Forest Hills Road.

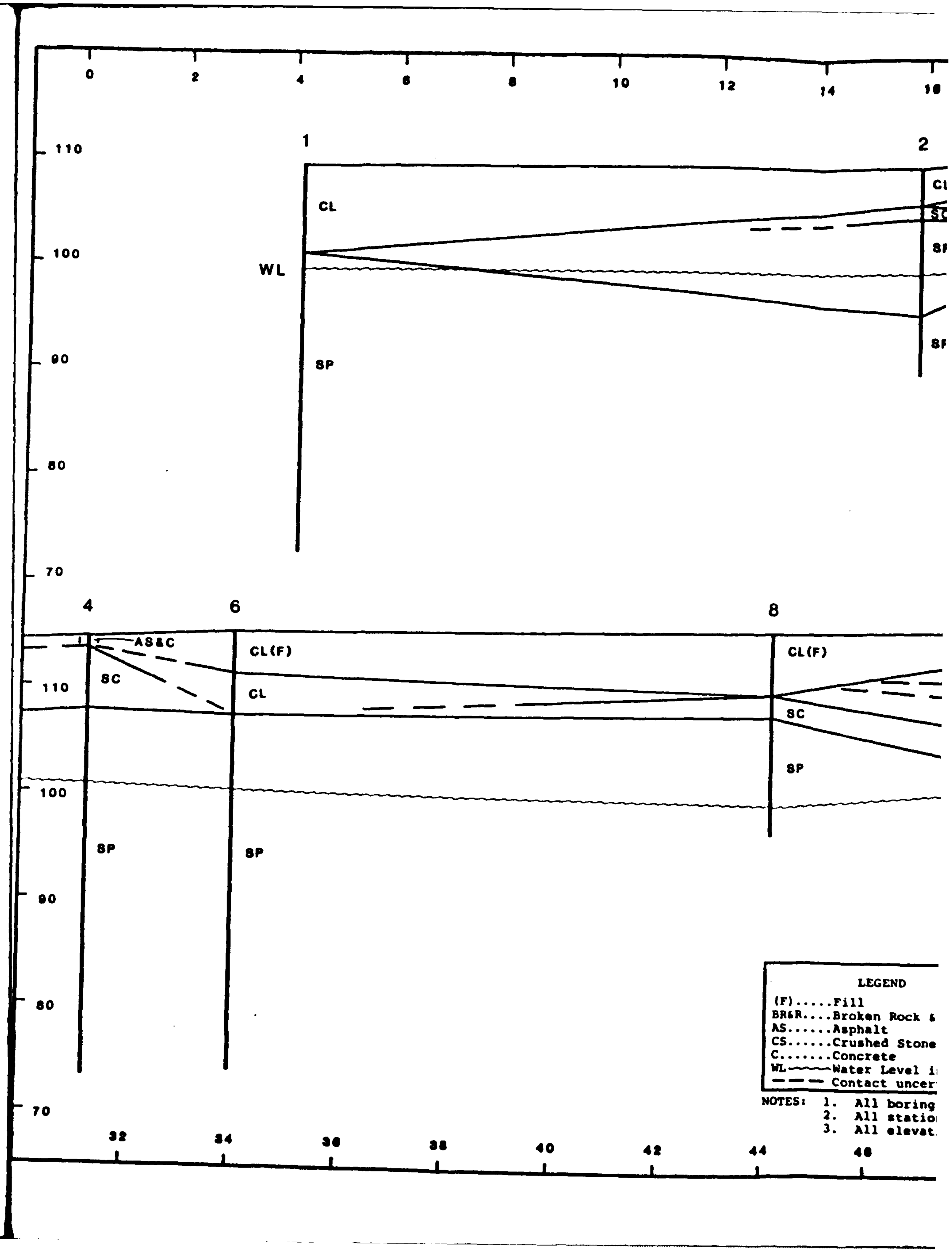
FUTURE WORK

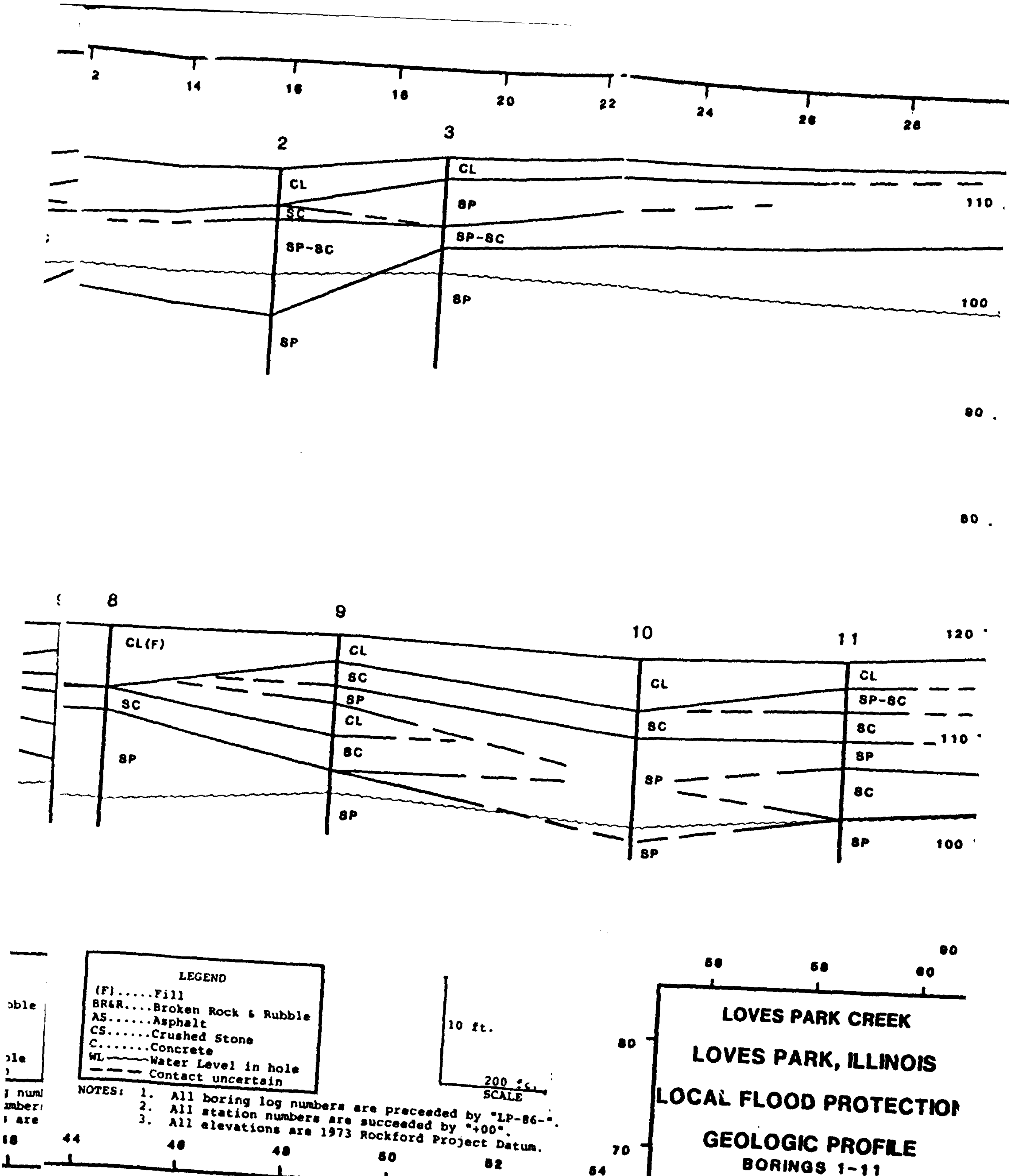
Future work at Loves Park will include geotechnical evaluation and obtaining borings at the following locations to support design assumptions made in this design memorandum.

1. Borings should be taken in the area of the interconnecting channel between Windsor Lake and the North Gravel Pit. The current assumption is that the

area has a thin impervious (CL) top stratum 3-8 feet deep followed by a pervious sand (SP) substratum in which the reinforced concrete pipes will lie.

2. Additional borings should be taken along the diversion channel from the creek into the South Gravel Pit. Borings are needed to determine a more complete soil profile for construction purposes as well as for knowing the type of foundation on which the reinforced concrete pipes will rest.


0
2
4
6
8
10
12
14
110
100
90
80
70
1
2
CL
WL
SP
4
6
8
AS&C
CL(F)
SC
CL
SP
32
34
36
38
40
42
44
LEGEND
(F).....Fill
BR&R....Broken Rock &
AS......Asphalt
CS......Crushed Stone
C.......Concrete
WL——Water Level i
— — — Contact uncer
NOTES: 1. All boring
2. All statio
3. All elevat



LEGEND

(F).....Fill
BR&R....Broken Rock & Rubble
AS......Asphalt
CS......Crushed Stone
C.......Concrete
WL ～～～ Water Level in hole
— — — Contact uncertain

10 ft.
200 ft.
SCALE

NOTES:
1. All boring log numbers are preceeded by "LP-86-".
2. All station numbers are succeeded by "+00".
3. All elevations are 1973 Rockford Project Datum.

LOVES PARK CREEK

LOVES PARK, ILLINOIS

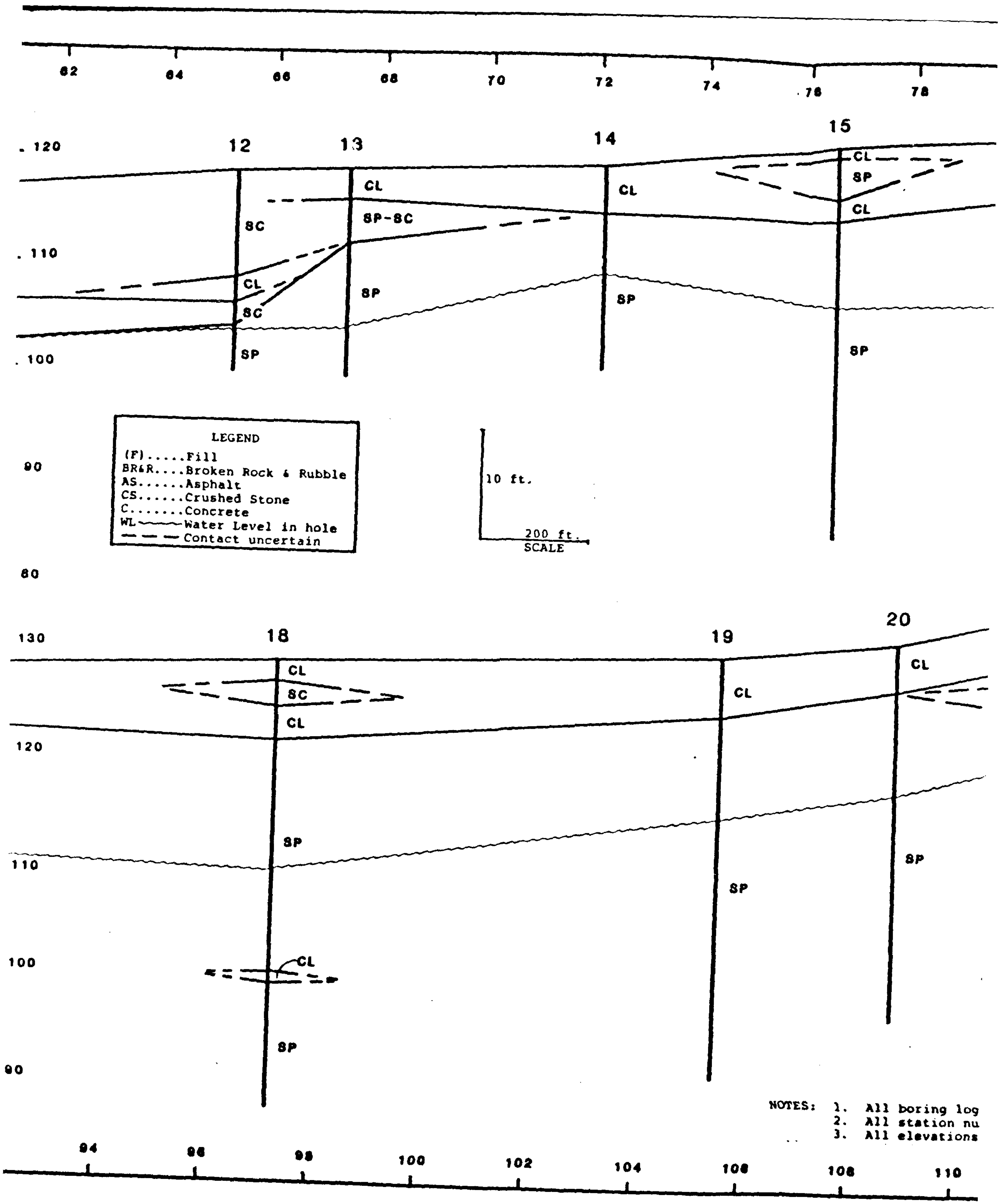
LOCAL FLOOD PROTECTION

GEOLOGIC PROFILE

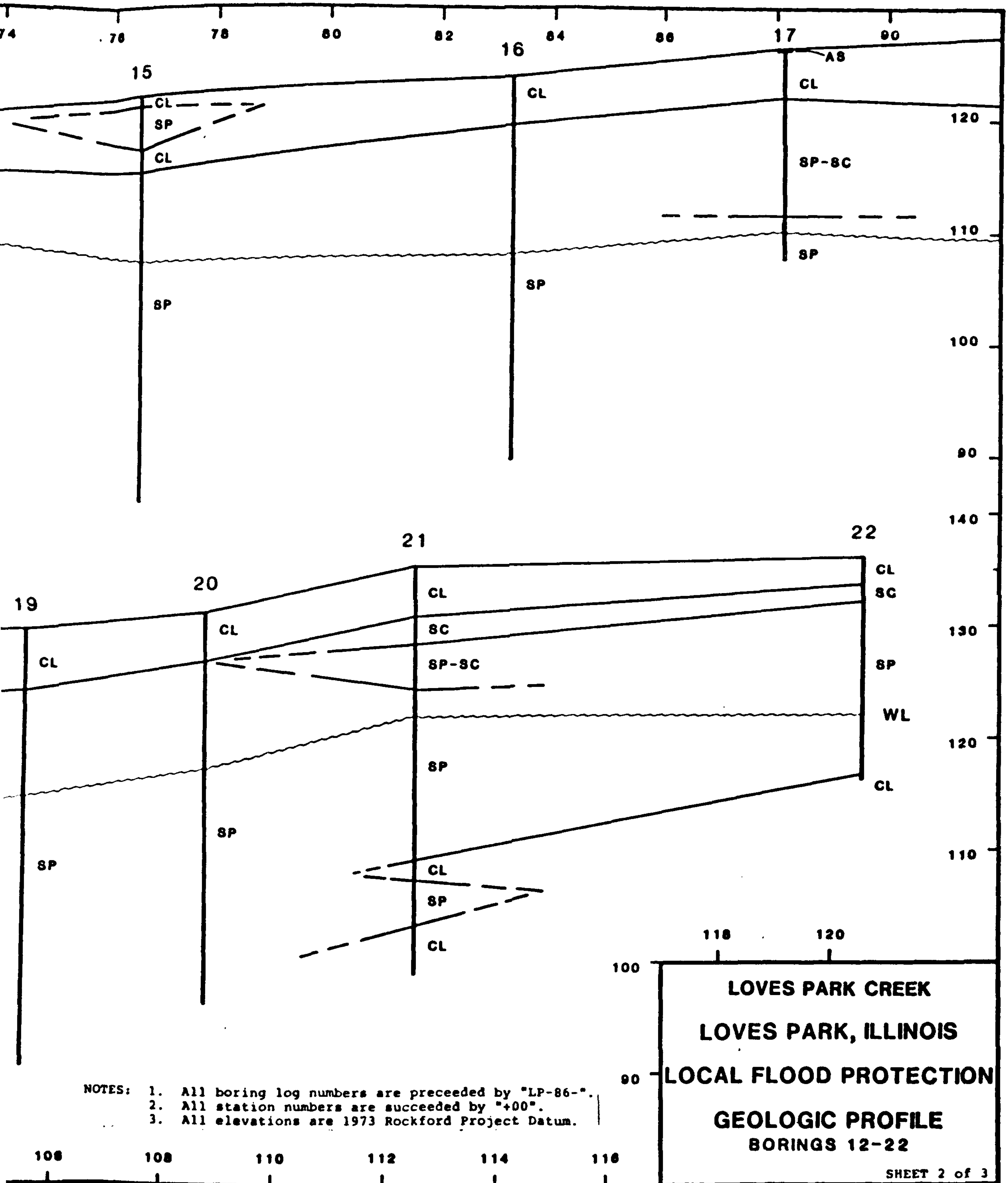
BORINGS 1-11

SHEET 1 of 1

PLATE B-1



62 64 66 68 70 72 74 76 78
12 13 14 15
120
110
100
90
80
CL
SP-SC
SC
SP
LEGEND
(F).....Fill
BR&R....Broken Rock & Rubble
AS......Asphalt
CS......Crushed Stone
C.......Concrete
WL Water Level in hole
Contact uncertain
10 ft.
200 ft.
SCALE
18 19 20
130
120
110
100
90
CL
SC
SP
NOTES: 1. All boring log
2. All station nu
3. All elevations
94 96 98 100 102 104 106 108 110



NOTES:
1. All boring log numbers are preceeded by "LP-86-".
2. All station numbers are succeeded by "+00".
3. All elevations are 1973 Rockford Project Datum.

LOVES PARK CREEK

LOVES PARK, ILLINOIS

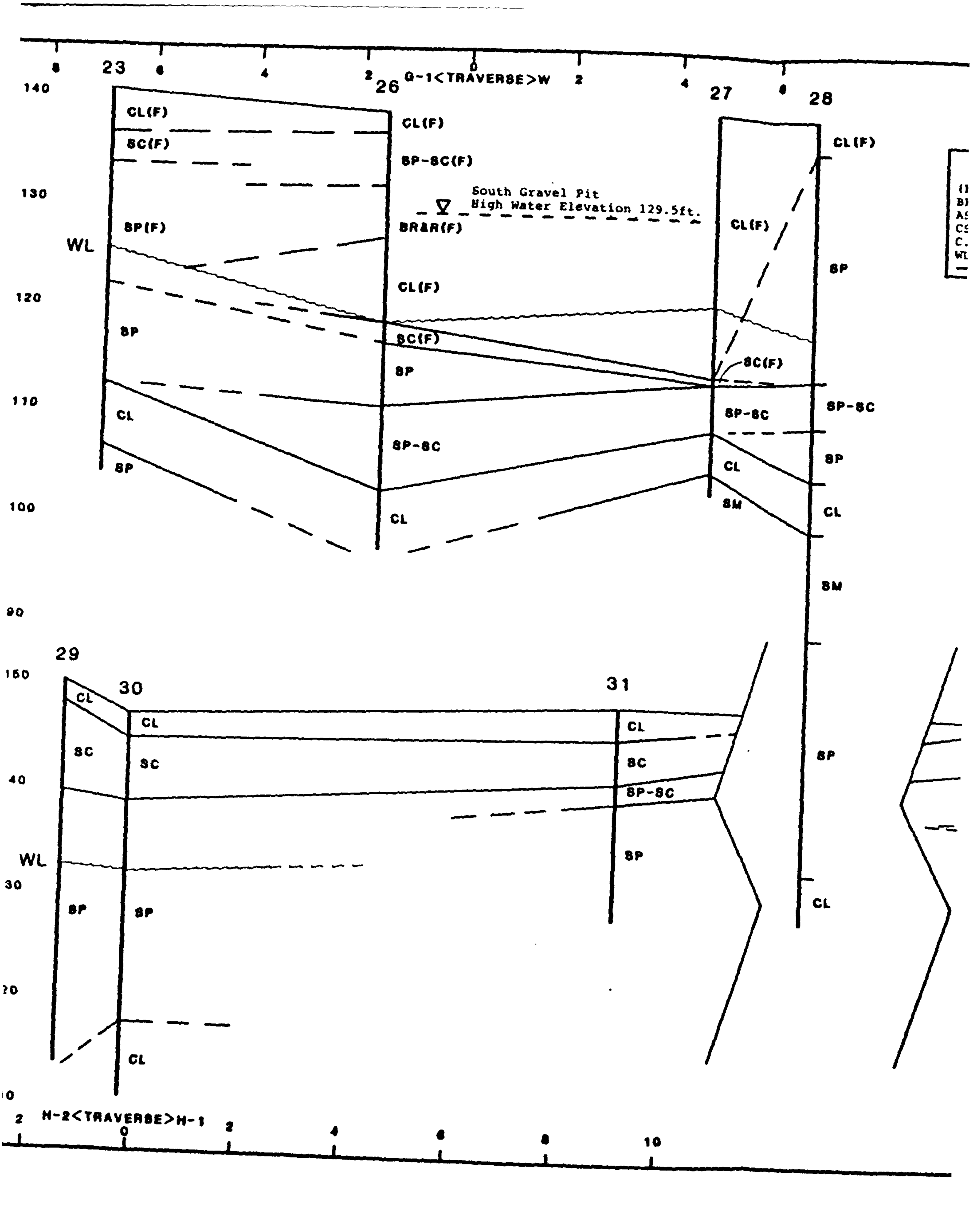
LOCAL FLOOD PROTECTION

GEOLOGIC PROFILE

BORINGS 12-22

SHEET 2 of 3

PLATE B-2



G-1<TRAVERSE>W
23
26
27
28
140
130
120
110
100
90
8
6
4
2
0
2
4
6
CL(F)
SC(F)
SP-SC(F)
South Gravel Pit
High Water Elevation 129.5ft.
SP(F)
BR&R(F)
WL
CL(F)
SP
SC(F)
SP
CL
SP-SC
SP
CL
SP-SC
CL
SM
SC(F)
SP-SC
SP
CL
SM
29
30
31
150
40
30
20
10
CL
SC
SP-SC
SP
WL
H-2<TRAVERSE>H-1
2
0
2
4
6
8
10

LOVES PARK CREEK

LOVES PARK, ILLINOIS

LOCAL FLOOD PROTECTION

GEOLOGIC PROFILE

BORINGS 23,26-33

SHEET 3 of 3

LEGEND

(F).....Fill
BR&R....Broken Rock & Rubble
AS......Asphalt
CS......Crushed Stone
C.......Concrete
WL ~~~~~ Water Level in hole
— — — Contact uncertain

NOTES:
1. All boring log numbers are preceeded by "LP-86-".
2. All station numbers are succeeded by "+00".
3. All elevations are 1973 Rockford Project Datum.

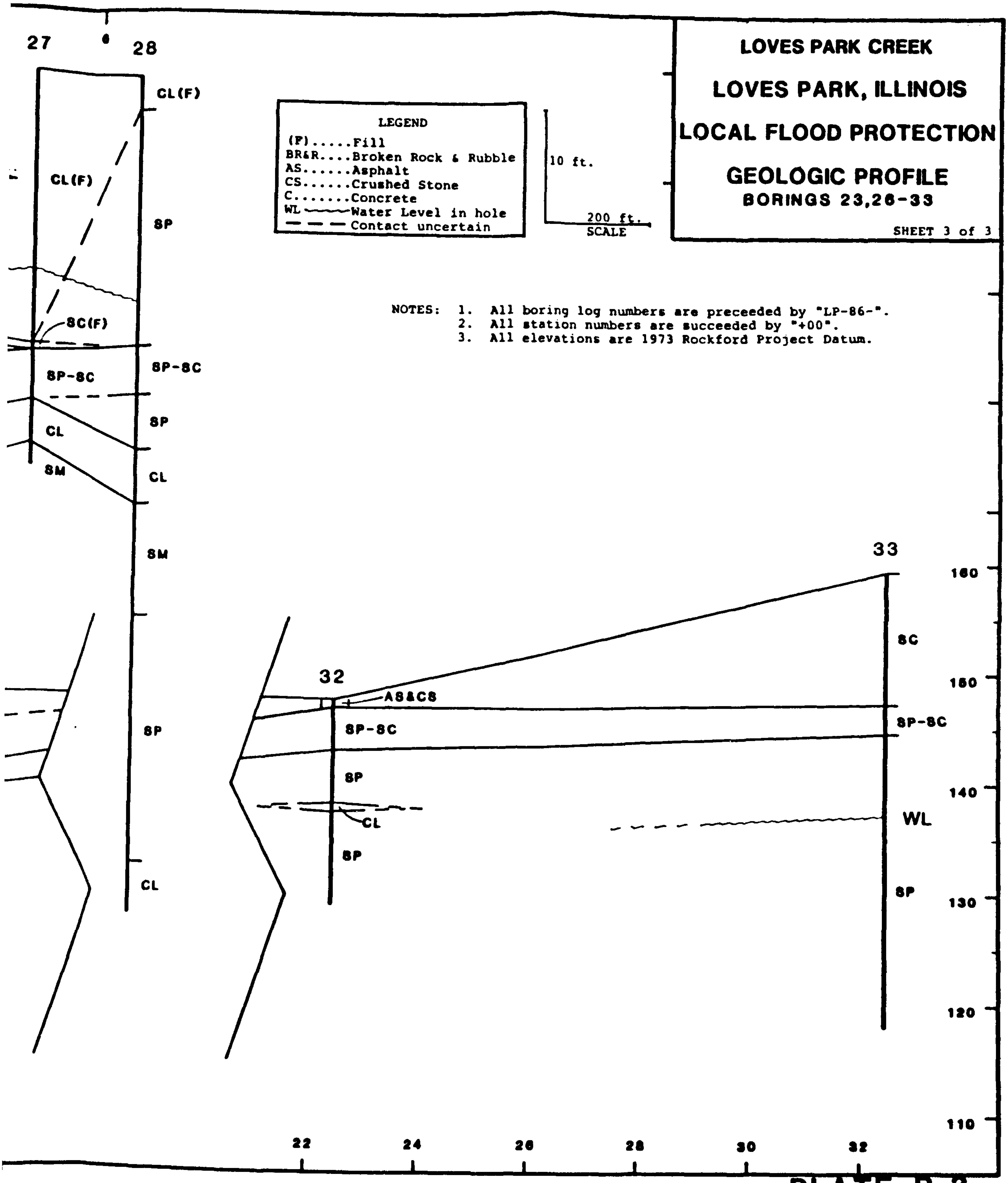
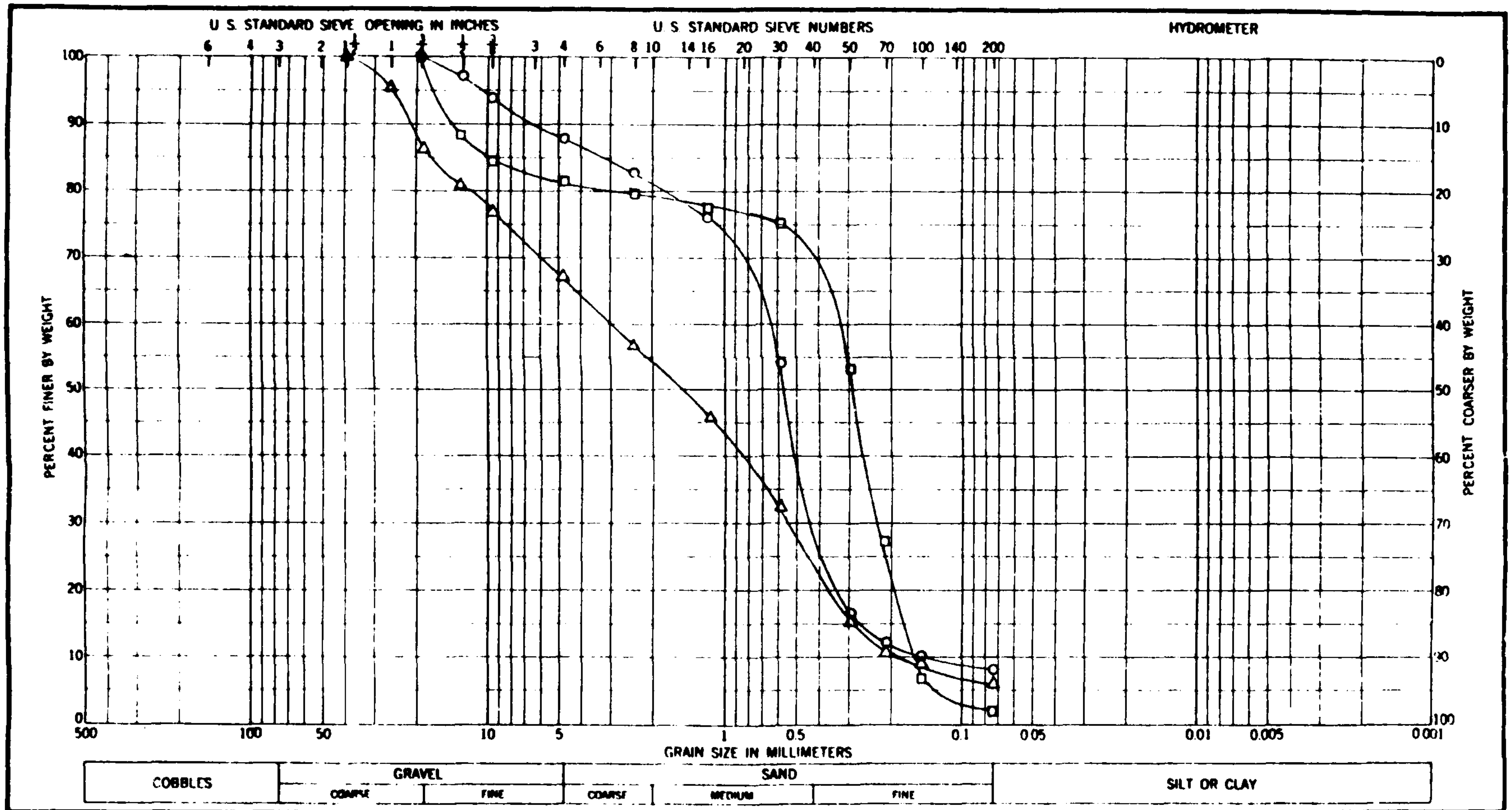


PLATE B-3



Sample No	Elev or Depth	Classification	Nat w %	LL	D_{10}	#-200
○LP2-5	10.5-11.5	SP-SC BR Clayey Gravelly Med to Fine Sand			0.16	7.8%
△LP17-3	8.0-9.0	SP-SC BR Clayey Gravelly Coarse to Fine Sand			0.20	6.0%
□LP23-4	10.5-11.5	SP BR Gravelly Fine Sand with Broken Rock			0.17	1.9%

Project: LOVES PARK LFP

Area: Loves Park Creek

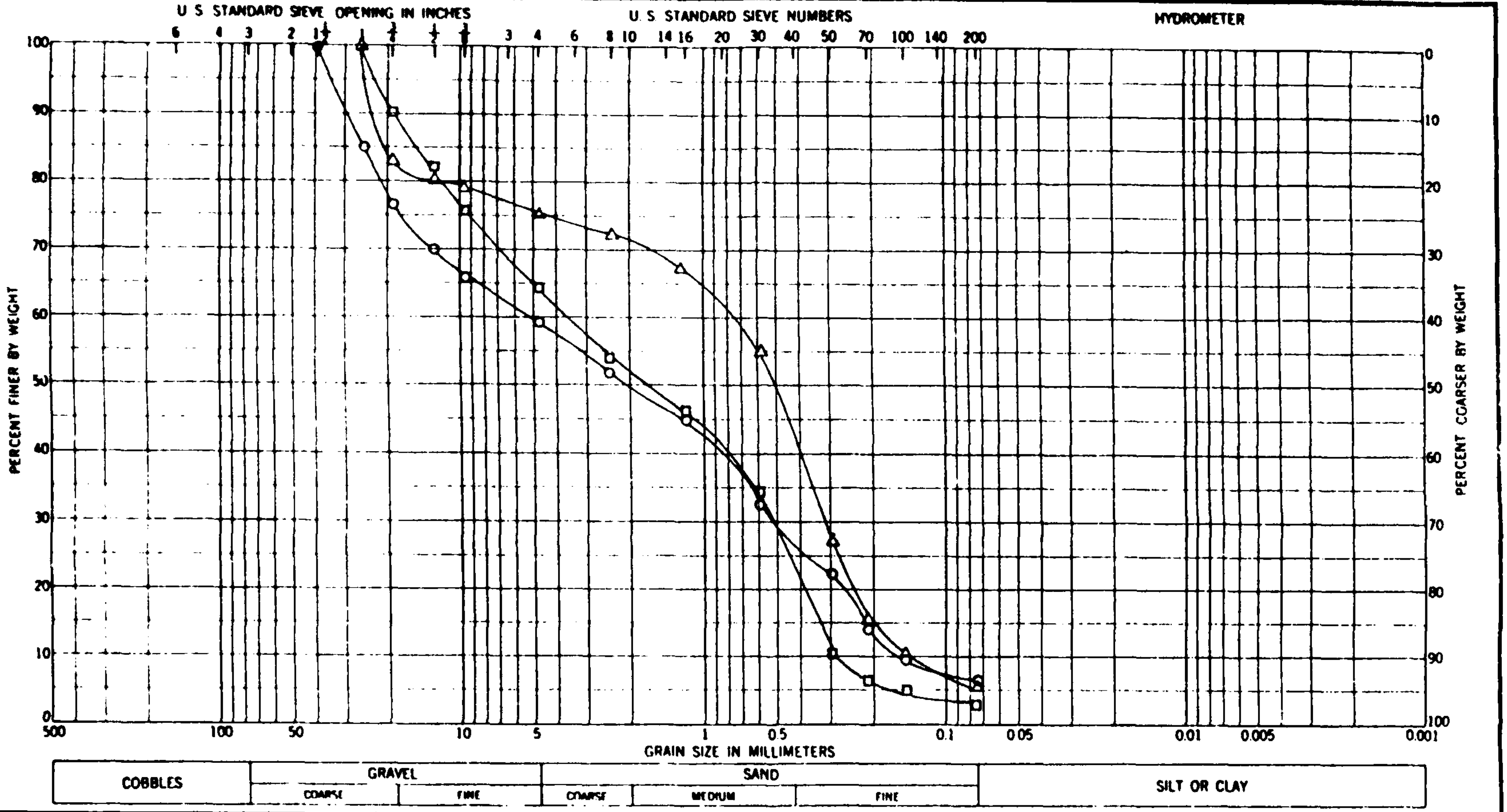
Boring No: LP-86-2, LP-86-17, LP-86-23

Date: 6 January 1988

GRADATION CURVES

ENG FORM 1 MAY 63 2087

PLATE B-4



Sample No	Elev or Depth	Classification	Nat w %	LL	D_{10}	#-200
○ LP26-9	30.5-31.5	SP-SC BR Clayey Gravelly Coarse to Fine Sand with Broken Rock			0.16	6.3%
△ LP27-12	27.5-28.5	SP-SC GR Clayey Gravelly Med to Fine Sand with Broken Rock			0.15	6.0%
□ LP28-3	8.0-9.0	SP BR Gravelly Coarse to Fine Sand			0.29	3.1%

GRADATION CURVES

Project LOVES PARK LFP

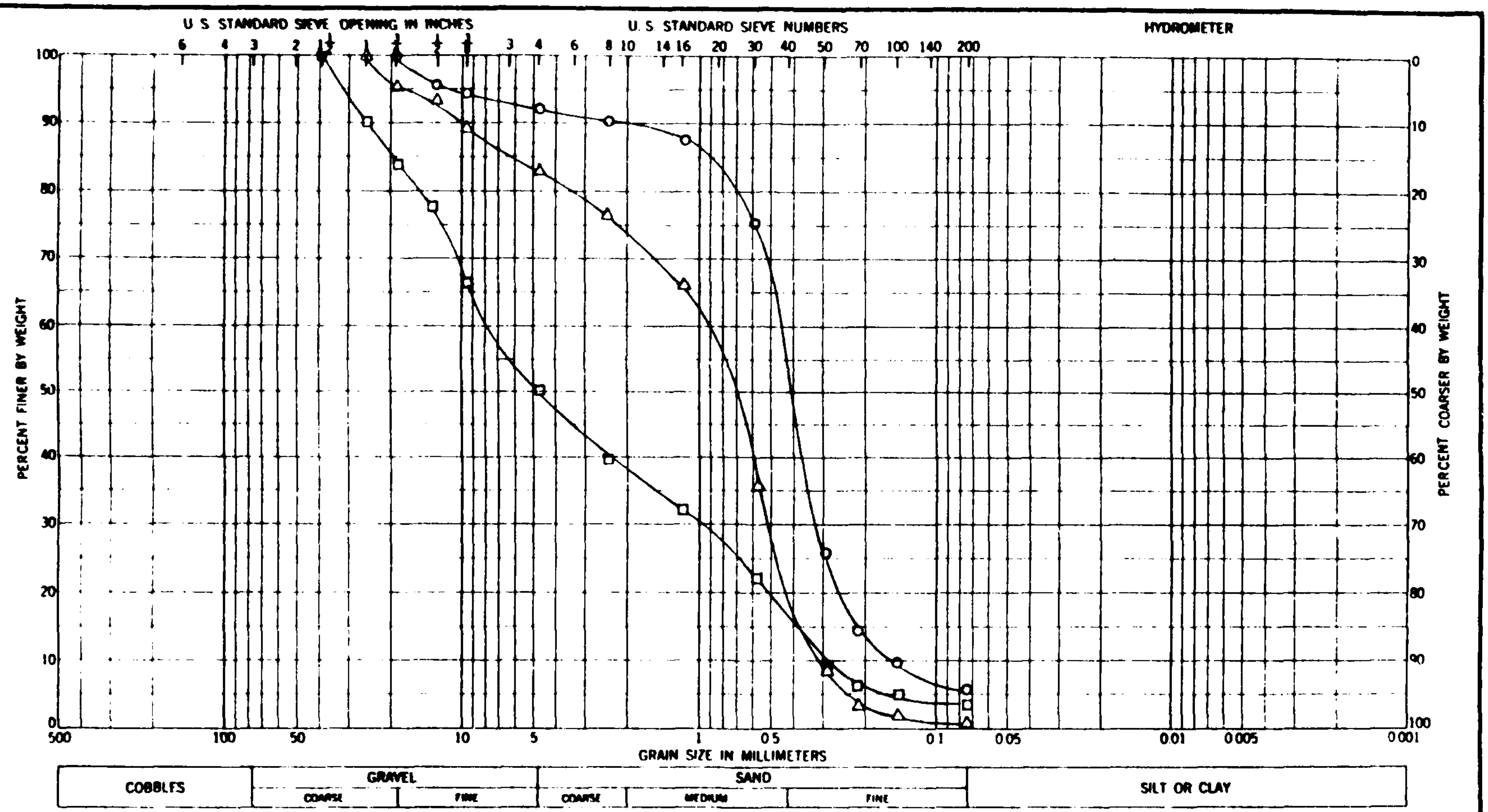
Area Loves Park Creek

Boring No. LP-86-26, LP-86-27, LP-86-28

Date 6 January 1988

ENG FORM 1 MAY 63 2087

PLATE B-5



Sample No	Elev or Depth	Classification	Nat w %	LL	D10	#-200
○ LP28-8	25.0-26.0	SP-SC BR Clayey Med to Fine Sand with Gravel			0.16	6.0%
△ LP29-9	30.5-31.5	SP BR Gravelly Coarse to Fine Sand			0.32	1.0%
□ LP30-7	20.5-21.5	SP BR Gravelly Coarse to Fine Sand			0.30	3.3%

Project: LOVES PARK LFP

Area: Loves Park Creek

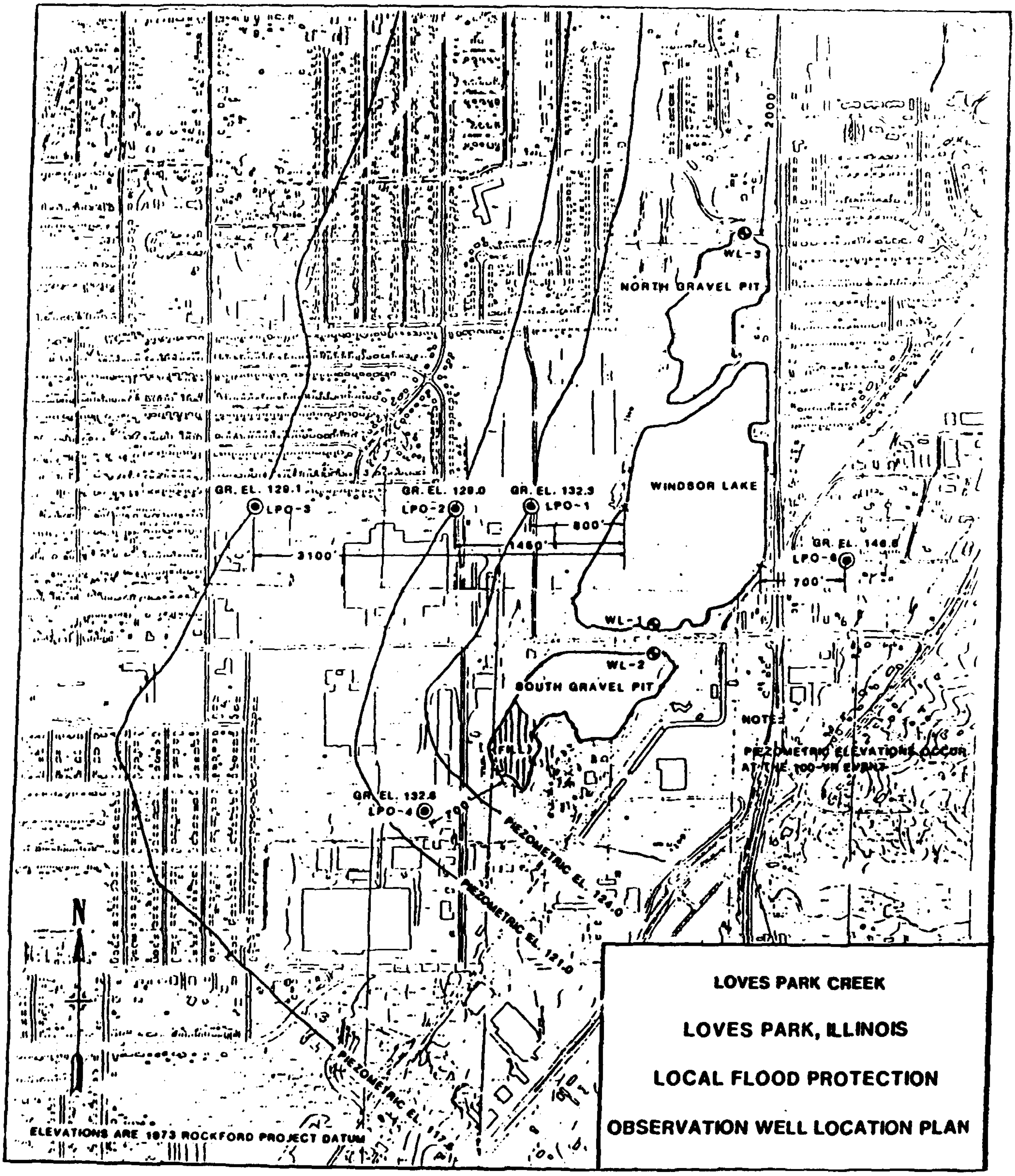
Boring No: LP-86-28, LP-86-29, LP-86-30

Date: 6 January 1988

GRADATION CURVES

ENG FORM 1 MAY 63 2087

PLATE B-6



LOVES PARK CREEK

LOVES PARK, ILLINOIS

LOCAL FLOOD PROTECTION

OBSERVATION WELL LOCATION PLAN

PLATE B-7

STS Consultants Ltd.
6918 Forest Hills Road
Rockford, Illinois 61111
(815) 654-2354

September 30, 1982

Mr. Frank Smith
U.S. Army Engineer District
Clock Tower Building
Rock Island, Illinois 61201

STS Job No. 19906-A

Reference: Water Level Readings, Loves Park, Illinois

Dear Mr. Smith:

The purpose of this letter is to present a summary of the water level readings at the six observation wells, three streams and three lakes at the above referenced project. In addition, the history of the water level gage measurements of the three Windsor Lakes (WL-1, WL-2, and WL-3) are briefly summarized from the initial readings to present.

The attached Summary of Water Level Readings sheets 1 through 7 presents the results of water level elevation measurements made for this project through the period September 19, 1978 to September 2, 1982. With the exception of most recent measurements, periodic reports presenting this data have been provided.

As outlined below, damage to the gages in the three Windsor Lakes by ice or vandals has necessitated repair or replacement of the original gages. Repairs and gage replacements have been provided by both the U.S. Army Corps of Engineers and STS Consultants, Ltd. Details relative to these repairs and new gage installations are outlined below for each of the three Windsor Lake gages (WL-1, WL-2, WL-3).

Windsor Lake Gage WL-1

The original gage in Windsor Lake WL-1 was installed by the U.S. Army Corps of Engineers in June, 1978. The elevation reference provided to STS for this gage was a reading of 6.0 corresponding to elevation +721.7. On August 21, 1979 the original scale on this gage had been removed and a new scale was then installed by STS. The initial reading on this new gage was 3.6 corresponding to elevation +727.6. This gage was utilized for monitoring the water level until September 23, 1980 when the entire gage and scale could not be located or recovered. At this time a new gage and scale (denoted WL-1a) was installed by STS. The initial reading of 3.8 on this scale was determined by STS to correspond to elevation +725.0.

On March 29, 1982 representatives of the U.S. Army Corps of Engineers visited the project site to install new gages and scales in the Windsor Lakes monitored by gages WL-1a and WL-2. The elevation of the water in lake WL-1 determined using the new Corps of Engineers gage and reference elevation indicated a water surface elevation of +723.0. Using the chiselled square benchmark at the south tip of the center rumble strip of Windsor Road, approximately 900 feet west of the centerline of Alpine Road, elevation +746.2, representatives of STS remeasured the reference elevation on the new gage installed by the Corps of Engineers. The water level in Windsor Lake WL-1 based on this reference elevation by STS was +724.6. This later water surface elevation is consistent with the elevation measured using gage WL-1a. For this reason, the water level elevations presented in this report are referenced to zero on the scale equal to elevation +711.3, the reference elevation by STS.

Water level readings were not made at WL-1 in August 1982 because the portion of the gage in the water was submerged completely and the tree supporting the shore portion of the gage was uprooted and floating in the lake.

Windsor Lake Gage WL-2

The original gage in Windsor Lake WL-2 was installed in June, 1978 by U.S. Army Corps of Engineers. The reference elevation provided for this gage was 6.5 on the scale corresponding to elevation +723.8. On August 21, 1979 a new gage and scale was installed by STS since the original gage had been dislocated. The initial reading on this new scale was 3.92 corresponding to elevation +728.2 by STS. On January 8, 1980 the scale on this gage had been removed, likely by ice movement on the lake, and the elevation on the top of the remaining gage (pipe) was used as a reference for water level measurements. The elevation of the top of this gage was determined to be +730.8 by STS. As outlined in our report dated Janaury 4, 1981 this gage in Windsor Lake WL-2 was removed, likely dislocated by ice movement. Therefore, water level elevation measurements were not made for December, 1981 or January, February, or March, 1982.

A new gage and scale was installed on March 29, 1982 by Corps of Engineers in this lake. The elevation measurements provided by Mr. William Wymer indicated that 0.0 on gage scale WL-2 corresonded to elevation +725.0. Elevation measurements by STS indicated that 0.0 on the gage scale corresonded to elevation +720.9. These elevation measurements by the Corps of Engineers and STS were referenced to the benchmark outlined previously in this report. On April 30, 1982 the water level in lake WL-2 was at 4.28 on the new Corps of Engineers scale. This reading corresponds to a water surface elevation of +725.2 based on the STS reference elevation and elevation +729.3 based on the Corps of Engineers reference elevation. Since the water level elevation of +725.2 is consistent with previous water level elevation measurements in this lake, the STS reference elevation of 0.0 corresonding to +720.9 is utilized for water level elevation measurements taken since April 30, 1982.

Windsor Lake Gage WL-3

The original gage in Windsor Lake WL-3 was installed by the Corps of Engineers in June, 1978. The reference elevation provided for this gage was 6.0 on the scale corresponding to elevation +720.2. A new gage was installed in this lake by the Corps of Engineers on March 21, 1979. The reference elevation provided for this gage was 9.24 corresponding to elevation of +724.6. On September 30, 1980 this gage could not be located and a new gage designated WL-3a was installed by STS. The reference elevation for this gage was 11.3 corresponding to elevation +723.6. This gage was utilized for water level elevation measurements until August, 1982 when the gage was completely submerged.

If you have any questions with regard to the water level elevation readings presented with this report or the above history of the water level gages in the three Windsor Lakes, please do not hesitate to contact us. We appreciate this opportunity to be of service to you.

Very truly yours,

STS Consultants, Ltd.

Lynn R. Jester
Area Manager

/lsp
enc

PLATE B-10

| Testing Services, Inc.
1029 Harlem Road
Rockford, Illinois 61111

STS Job No. 1990€
U.S. Army Corps oı ˌngineers
P.O. No. DACW25-78-M-0791

SUMMARY OF WATER LEVEL READINGS
LOVES PARK, ILLINOIS

Observation No.	Elevations 3-24-78	Elevations 4-11-78	Elevations 4-27-78	Elevations 5-10-78	Elevations 5-15-78	Elevations 5-30-78	Elevations 6-12-78
LPO-1	+717.5	+717.7	+718.0	+718.1	+718.55	+718.8	+718.7
LPO-2	+711.3	+714.2	+714.7	+714.8	+715.25	+715.7	+715.7
LPO-3	+714.4	+710.4	+710.9	+711.1	+711.5	+712.1	+712.15
LPO-4	+717.9	+719.1	+719.6	+719.6	+720.3	+720.5	+719.9
LPO-5	+718.8	+720.1	+720.1	+720.3	+720.5	+720.8	+721.0
LPO-6	+728.7	+729.0	+729.5	+729.7	+730.05	+730.7	+730.5
SBLU-1	3-31-78 +745.43	+745.63	+745.43	+745.33	+745.63	+745.33	+745.33
NBLU-1	+743.56	+743.56	+743.36	+743.36	+743.46	+743.36	+743.36
LU	+731.85	+731.95	+731.70	+731.65	+731.80	+731.65	+731.40
WL-1	+721.04	+721.16	+721.40	+721.14	+721.42	+721.52	+721.46
WL-2	+722.46	+722.72	+722.70	+723.04	+723.36	+723.56	+723.52
ʷˌ-3	+719.43	+719.69	+719.67	+719.69	+719.99	+720.21	+720.25

Soil .esting Services, Inc.
1029 Harlem Road
Rockford, Illinois 61111

STS Job No. 19906
U.S. Army Corps of Engineers
P.O. No. DACW25-78-M-0791

SUMMARY OF WATER LEVEL READINGS
LOVES PARK, ILLINOIS

Observation No.	Elevation 6-26-78	Elevation 7-3-78	Elevation 7-11-78	Elevation 7-24-78	Elevation 8-7-78	Elevation 8-22-78	Elevation 9-5-78
LPO-1	+719.1	+720.55	+721.1	+721.7	+721.8	+721.9	+721.9
LPO-2	+716.4	+717.75	+719.2	+719.6	+719.5	+719.4	+719.1
LPO-3	+712.6	+714.65	+716.0	+716.4	+716.1	+715.8	+715.4
LPO-4	+721.1	+725.9	+725.5	+724.9	+724.1	+723.1	+722.4
LPO-5	+721.4	+722.52	+723.7	+724.8	+725.4	+725.7	+725.8
LPO-6	+730.9	+732.22	+733.0	+733.55	+733.7	+733.7	+733.6
SBLU-1	+745.98	+745.78	+745.53	+745.53	+745.68	+745.28	+745.23
NBLU-1	+743.46	+743.36	+743.36	+743.41	+743.46	+743.46	+743.36
LU	+732.05	+732.7	+732.65	+731.95	+731.8	+731.00	+730.80
WL-1	+721.94	+722.63	+722.94	+723.57	+724.11	+724.53	+724.69
WL-2	+723.92	+725.16	+725.04	+725.62	+725.96	+726.12	+726.17
WL-3	+720.89	+722.51	+722.49	+7[illegible].7	+723.91	+724.41	+724.37

Sc   iesting Services, Inc.
1029 Harlem Road
Rockford, Illinois 61111

STS Job No. 19906-A
U.S. Army Corps of Engineers
P.O. No. DACW25-78-M-0218
SHEET NUMBER 1

SUMMARY OF WATER LEVEL READINGS
LOVES PARK, ILLINOIS

Rockford Project Datum = M.S.L. - 602.9 feet

Observation No.	Elevation 9-19-78	Elevation 3-14-79	Elevation 3-21-79	Elevation 4-10-79	Elevation 5-14-79	Elevation 6-7-79	Elevation 8-21-79
LPO-1	+722.0	+720.5	+721.1	+721.5	+722.5	+722.3	+722.7
LPO-2	+719.2	+717.0	+717.7	+718.4	+719.5	+719.5	+719.6
LPO-3	+715.3	+712.6	+713.1	+714.2	+715.8	+715.8	+715.4
LPO-4	+722.8	+720.8	+721.9	+722.1	+722.9	+722.4	+722.4
LPO-5	------	+724.5	+724.7	+725.5	+726.5	+726.6	+726.9
LPO-6	+733.5	+732.1	+732.6	+733.9	+734.7	+734.4	+734.4
SBLU-1	+745.23	+745.73	+745.73	+745.53	+745.53	+745.13	+745.30
NBLU-1	+743.56	+744.36	+743.56	+743.41	+743.56	+743.41	+743.46
LU	+731.65	+732.05	+732.15	+731.95	+731.8	Dry	+731.80
WL-1	+725.11	+726.11 Ice	+726.08 Ice	+725.09	+727.74	+727.68	+727.58
WL-2	+726.29	+726.56 Ice	+727.13	+727.72	+726.34	+728.23	+728.20
WL-3	+724.74	+724.83 Ice	+724.59	+725.17	+726.09	+726.15	+726.63

Soil T-sting Services, Inc.
6918 ...st Hills Road
Rockt..d, Illinois 61111

STS Job No. 19906-A
U.S. Army Corps of Engineers
P.O. No. DACW25-78-M-0218
SHEET NUMBER 2

SUMMARY OF WATER LEVEL READINGS
LOVES PARK, ILLINOIS

Rockford Project Datum = M.S.L. - 602.9 feet

Observation No.	Elevation 10-2-79	Elevation 10-31-79	Elevation 11-30-79	Elevation 12-31-79	Elevation 1-28-80	Elevation 3-1-80	Elevation 3-28-80
LPO-1	+722.1	+721.6	+721.1	+720.8	+720.6	+719.8	+719.7
LPO-2	+719.0	+718.4	+717.9	+717.6	+717.4	+716.9	Obstruction in Pipe
LPO-3	+714.8	+714.1	+713.7	+713.5	+713.7	+713.2	+712.7
LPO-4	+721.6	+721.8	+720.6	+720.6	+720.7	+719.7	+719.5
LPO-5	+726.4	+726.0	+725.2	+725.0	+725.3	+724.3	+723.6
LPO-6	+733.8	+733.3	+732.8	+732.5	+732.4	+731.8	+731.2
SBLU-1	+745.23	+745.33	+745.23	+745.13	+745.3 w/ice	+745.1	+745.0
NBLU-1	+743.46	+743.46	+743.41	+743.66 ice	+743.7 w/ice	+744.7 w/ice	+744.1
LU	+731.45	+731.70	+731.75	+731.85 ice	+732.1 w/ice	+734.5 w/ice	+731.4
WL-1	+727.24	+727.03	+726.82	+726.38 ice	+726.4 w/ice	+726.2 w/ice	+725.7
WL-2	+727.88	+727.61	+727.44	+727.33 ice (read on 1-8)	+727.3 w/ice	+726.9 w/ice	+726.5
WL-3	+726.17	+725.83	+725.54	+725.15 ice	+725.0 w/ice	+724.7 w/ice	+724.3

PLATE B-12

Soil Testing Services, Inc.
6918 st Hills Road
Rock. , Illinois 61111

STS Job No. 19906-A
U.S. Army Corps of Engineers
P.O. No. DACW25-78-M-0218
SHEET NUMBER 3

SUMMARY OF WATER LEVEL READINGS
LOVES PARK, ILLINOIS

Rockford Project Datum = M.S.L. - 602.9 feet

Observation No.	Elevation 4-29-80	Elevation 5-30-80	Elevation 6-30-30	Elevation 7-29-80	Elevation 8-29-80	Elevation 9-30-80	Elevation 10-28-80
LPO-1	+720.0	+720.0	+720.0	+719.8	+719.8	+720.0	+719.6
LPO-2	+716.9	+717.0	+717.1	+716.9	+717.0	+717.2	+716.8
LPO-3	+713.0	+713.1	+713.2	+713.0	+713.1	+713.5	+713.1
LPO-4	+720.6	+720.2	+720.4	+720.0	+720.1	+720.4	+719.7
LPO-5 and LPO-5a	Well Removed During Ditch Excavation	——	——	LPO-5a +721.9	LPO-5a +721.4	LPO-5a +721.7	LPO-5a +721.5
LPO-6	+731.7	+731.4	+731.6	+731.3	+731.4	+731.6	+731.1
SBLU-1	+745.3	+745.3	+745.3	+745.2	+745.1	+745.2	+745.2
NBLU-1	+743.4	+743.5	+743.5	+743.4	+743.2	+743.4	+743.4
LU	+731.8	+731.8	+731.8	+731.8	+731.8	+731.8	+731.8
WL-1 and WL-1a	WL-1 +725.4	WL-1 +725.0	WL-1 +726.2	WL-1 +725.8	WL-1 +725.6	WL-1a +725.0	WL-1a +724.8
WL-2	+727.5	+726.3	+726.0	+725.6	+726.1	+726.0	+725.7
WL-3 and WL-3a	WL-3 +723.9	WL-3 +724.0	WL-3 +723.8	WL-3 +724.0	WL-3 +723.9	WL-3a +723.6	WL-3a +723.5

PLATE B-13

Soil Testing Services, Inc.
6918 'st Hills Road
Rock, Illinois 61111

STS Job No. 19906-A
U.S. Army Corps of Engineers
P.O. No. DACW25-78-M-0218
Sheet No. 4

SUMMARY OF WATER LEVEL READINGS
LOVES PARK, ILLINOIS

Rockford Project Datum = M.S.L. - 602.9 feet

Observation No.	Elevation 11-28-80	Elevation 12-31-80	Elevation 1-28-81	Elevation 2-27-81	Elevation 3-30-81	Elevation 4-29-81	Elevation 5-29-81
LPO-1	+719.2	corrected +719.1	+718.9	+718.5	+716.5	+719.2	+719.1
LPO-2	+716.3	+716.1	+715.8	+715.3	+713.4	+716.3	+716.3
LPO-3	+712.8	+712.6	+712.2	+711.7	+709.8	+712.6	+712.6
LPO-4	+719.1	+718.4	+718.6	+718.4	+717.1	+720.0	+719.8
LPO-5a	+721.0	+720.7	+720.3	+719.3	+717.6	+720.3	+720.5
LPO-6	+730.9	+730.6	+730.3	+729.5	+727.9	+730.6	+730.6
SBLU-1	+745.1	+744.7	+745.1	+745.0	+743.2	+745.3	+745.2
NBLU-1	+743.4	+744.0	+744.1 frozen	+743.2	+741.5	+743.5	dry +743.4
LU	+731.8	+732.3	+732.8 frozen	+731.6	+729.8	+731.8	+731.6
WL-1a	+724.6	+724.7	+724.5 frozen	+724.4	+724.1	+724.2	+723.9
WL-2	+725.5	+725.0	+725.3 frozen	+725.0	+723.0	+725.2	+725.1
WL-3a	+723.6	+723.0	+722.8 frozen	+722.5	+722.1	+722.3	+722.2

PLATE B-14

Soil ˉ ting Services, Inc.
6918 :st Hills Road
Rockfo.d, Illinois 61111

STS Job No. 19906-A
U.S. Army Corps of Engineers
P.O. No. DACW25-78-M-0218
Sheet No. 5

SUMMARY OF WATER LEVEL READINGS
LOVES PARK, ILLINOIS

Rockford Project Datum = M.S.L. - 602.9 feet

Observation No.	Elevation 6-30-81	Elevation 8-3-81	Elevation 8-28-81	Elevation 9-30-81	Elevation 10-30-81	Elevation 11-30-81	Elevation 12-31-81
LPO-1	+719.7	+719.2	+719.0	+719.2	+719.2	718.9	718.9
LPO-2	+717.2	+716.6	+716.3	+716.2	+716.2	716.0	715.7
LPO-3	+713.5	+712.9	+712.6	+712.6	+712.6	712.2	712.1
LPO-4	+721.0	+719.8	+719.5	+719.6	+719.7	719.5	719.1
LPO-5a	+720.7	+720.7	+720.6	+720.8	+720.8	720.6	720.4
LPO-6	+731.0	+730.6	+730.6	+731.0	+731.1	730.9	730.9
SBLU-1	+745.1	+745.0	+745.3	+745.2	+745.1	745.1	745.1
NBLU-1	+743.4	+743.4	+743.6	+743.6	+743.4	743.4 Dry	744.0 Frozen
LU	+731.3	+731.1	+731.8	+731.7 DRY	+731.4	732.1	732.3 Frozen
WL-1a	+724.2	+724.1	+724.1	+724.3	+724.4	724.4 Frozen	724.4 Frozen
WL-2	+725.6	+725.4	+725.3	+725.6	+725.8	725.9 Frozen	No Gage Frozen
WL-3a	+722.5	+722.5	+722.5	+722.7	+722.8	722.6 Frozen	722.6 Frozen

Soil T~sting Services, Inc.
6918 'st Hills Road
Rock. ., Illinois 61111

STS Job No. 19906-A
U.S. Army Corps of Engineers
P.O. No. DACW25-78-M-0218
Sheet No. 6

SUMMARY OF WATER LEVEL READINGS
LOVES PARK, ILLINOIS

Rockford Project Datum = M.S.L. - 602.9 feet

Observation No.	Elevation 1-28-82	Elevation 2-26-82	Elevation 3-29-82	Elevation 4-30-82	Elevation 5-28-82	Elevation 7-6-82	Elevation 8-5-82
LPO-1	+718.6	+718.7	+719.1	+720.1	+720.5	+720.8	+721.0
LPO-2	+715.5	+715.5	+716.2	+717.3	+717.9	+718.3	+718.3
LPO-3	+712.0	+711.9	+712.6	+714.1	+714.4	+714.6	+714.6
LPO-4	+718.7	+718.9	+720.4	+721.7	+721.9	+721.4	+722.0
LPO-5	+720.1	+719.9	+720.5	+721.7	+722.1	+722.8	+723.2
LPO-6	+730.6	+730.3	+731.1	+732.2	+732.3	+732.3	+732.6
SBLU-1	+745.4 Frozen	+745.1	+745.2	+745.2	+745.2	+745.1	+745.1
NBLU-1	+744.2 Frozen	+743.9 Frozen	+743.4	+743.5 Dry	+743.5	+743.4	+743.5
LU	+732.7 Frozen	+732.3 Frozen	+731.6	+731.6	+731.9	+731.4	+731.7
WL-1a	+725.8	724.5	+724.6	+724.8	+725.3	+725.5	+725.8
WL-2	Gauge has not been replaced	Gauge has not been replaced	Gauge has not been replaced	+725.2	+725.7	+725.6	+725.8
WL-3a	+723.4	722.6	+722.7	+723.4	+724.0	+724.3	+724.2

Soil ' 'ing Services, Inc.
6918 st Hills Road
Rockfora, Illinois 61111

STS Job No. 19906-A
U.S. Army Corps of Engineers
P.O. No. DACW25-78-M-0218
Sheet No. 7

SUMMARY OF WATER LEVEL READINGS
LOVES PARK, ILLINOIS

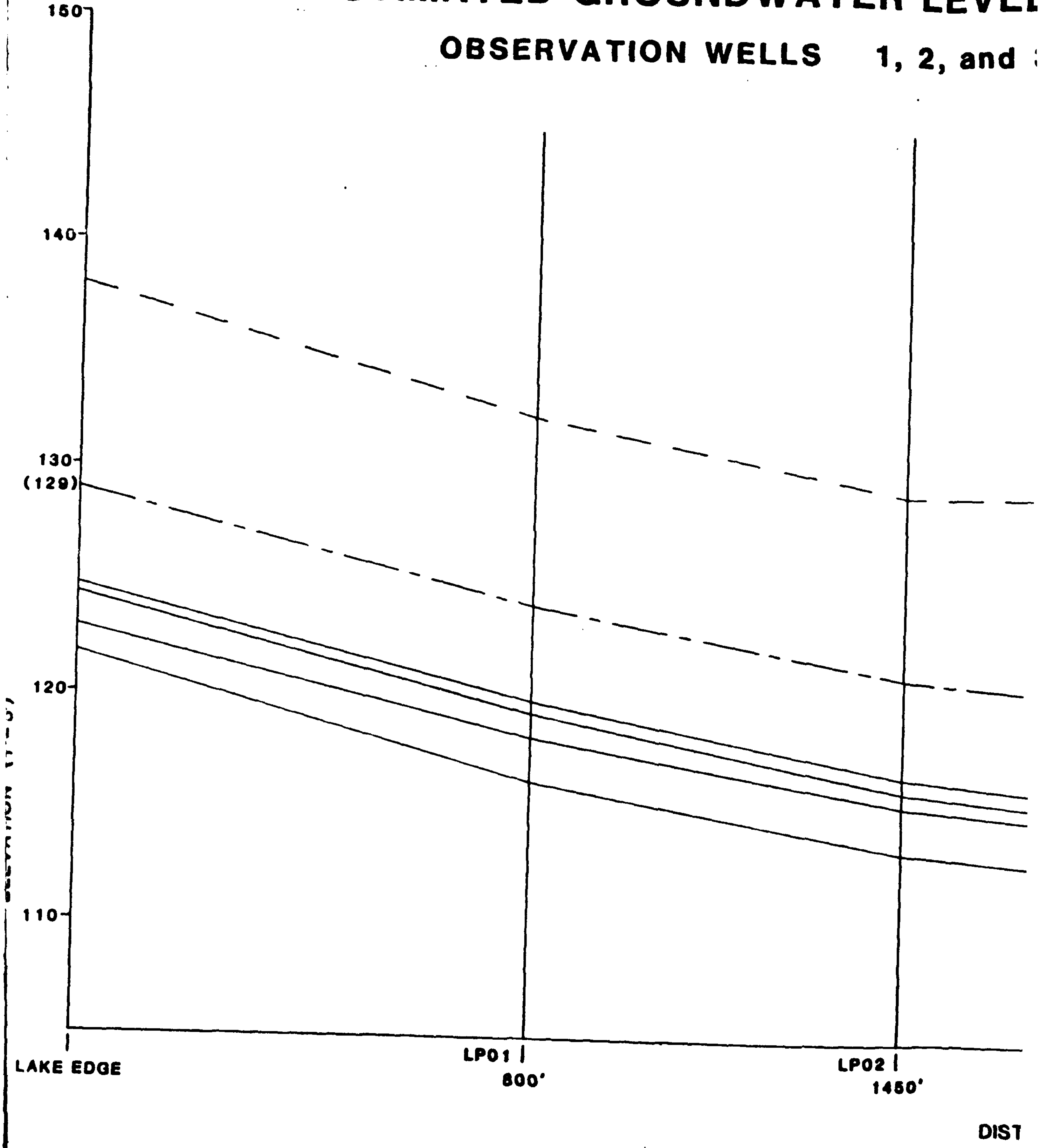
Rockford Project Datum = M.S.L. - 602.9 feet

Observation No.	Elevation 9-2-82						
LPO-1	720.6						
LPO-2	717.9						
LPO-3	714.2						
LPO-4	721.0						
LPO-5	722.9						
LPO-6	732.2						
SBLU-1	745.1						
NBLU-1	743.4						
LU	731.4						
WL-1	Gage Submerged						
WL-2	725.6						
WL-3	Gage Submerged						

PLATE B-17

ESTIMATED GROUNDWATER LEVEL

OBSERVATION WELLS 1, 2, and



R LEVEL AT 100-YEAR EVENT

1, 2, and 3

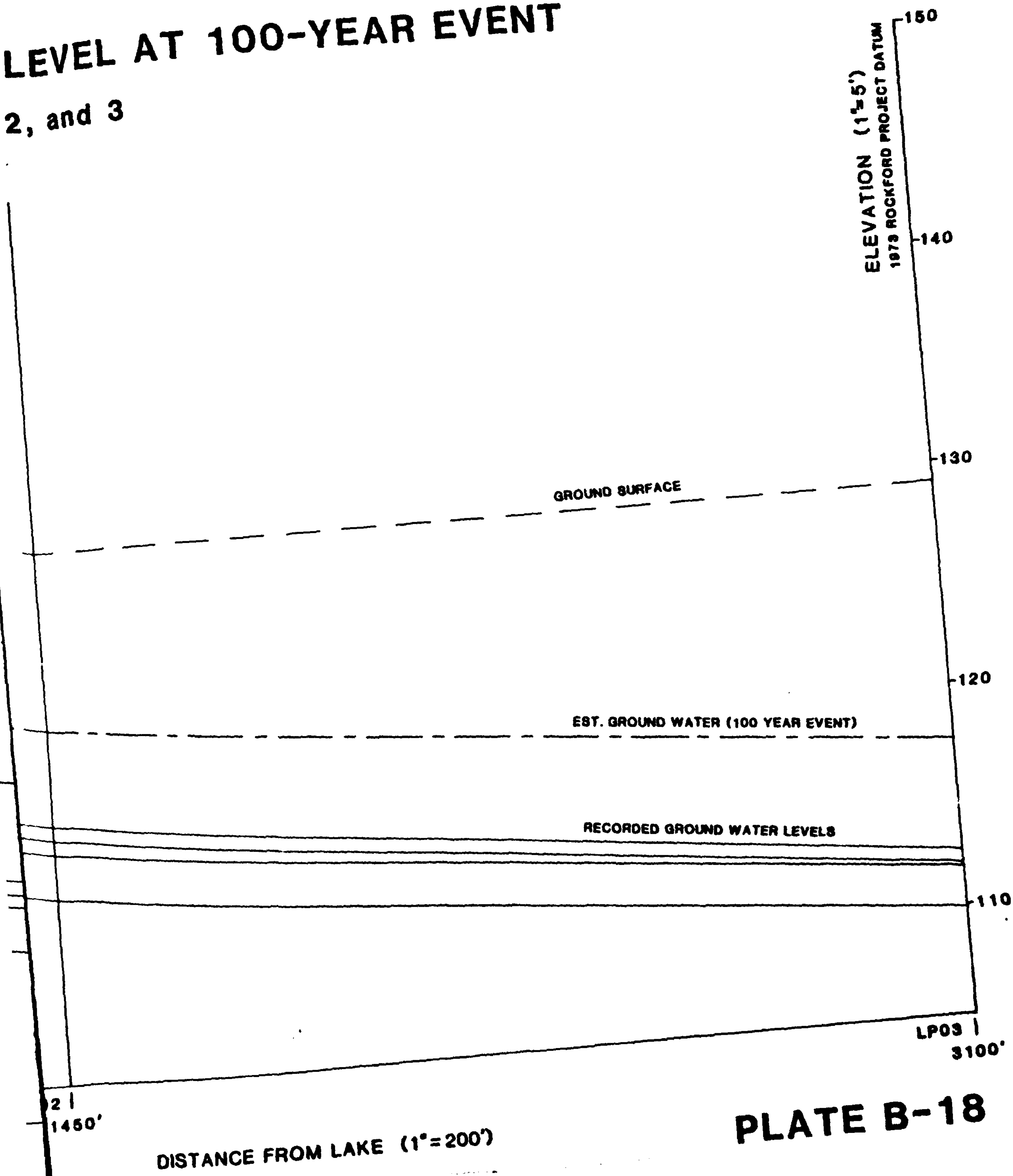


PLATE B-18

C

ESTIMATED GROUNDWATER LEVELS AT 100-YEAR EVENT

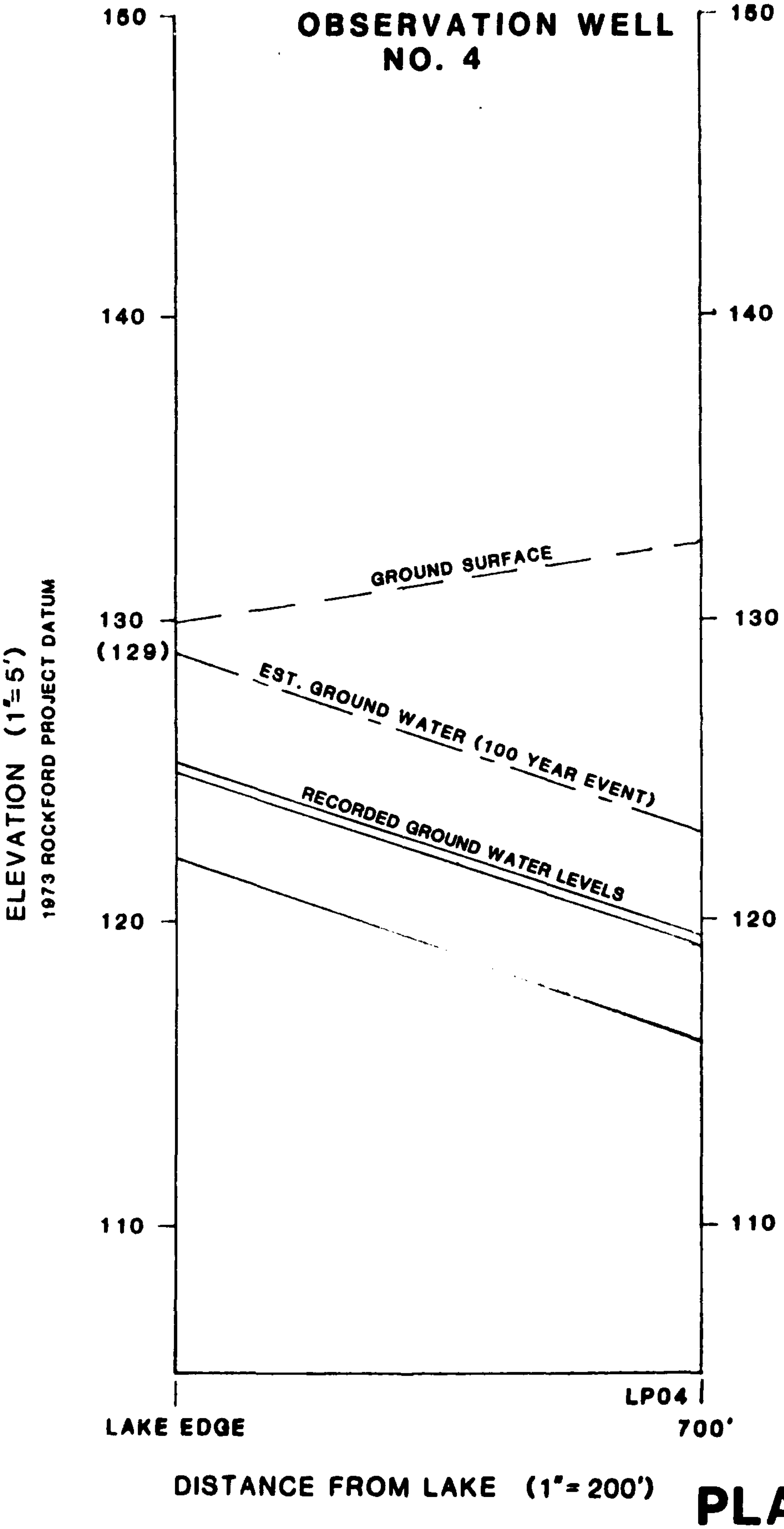
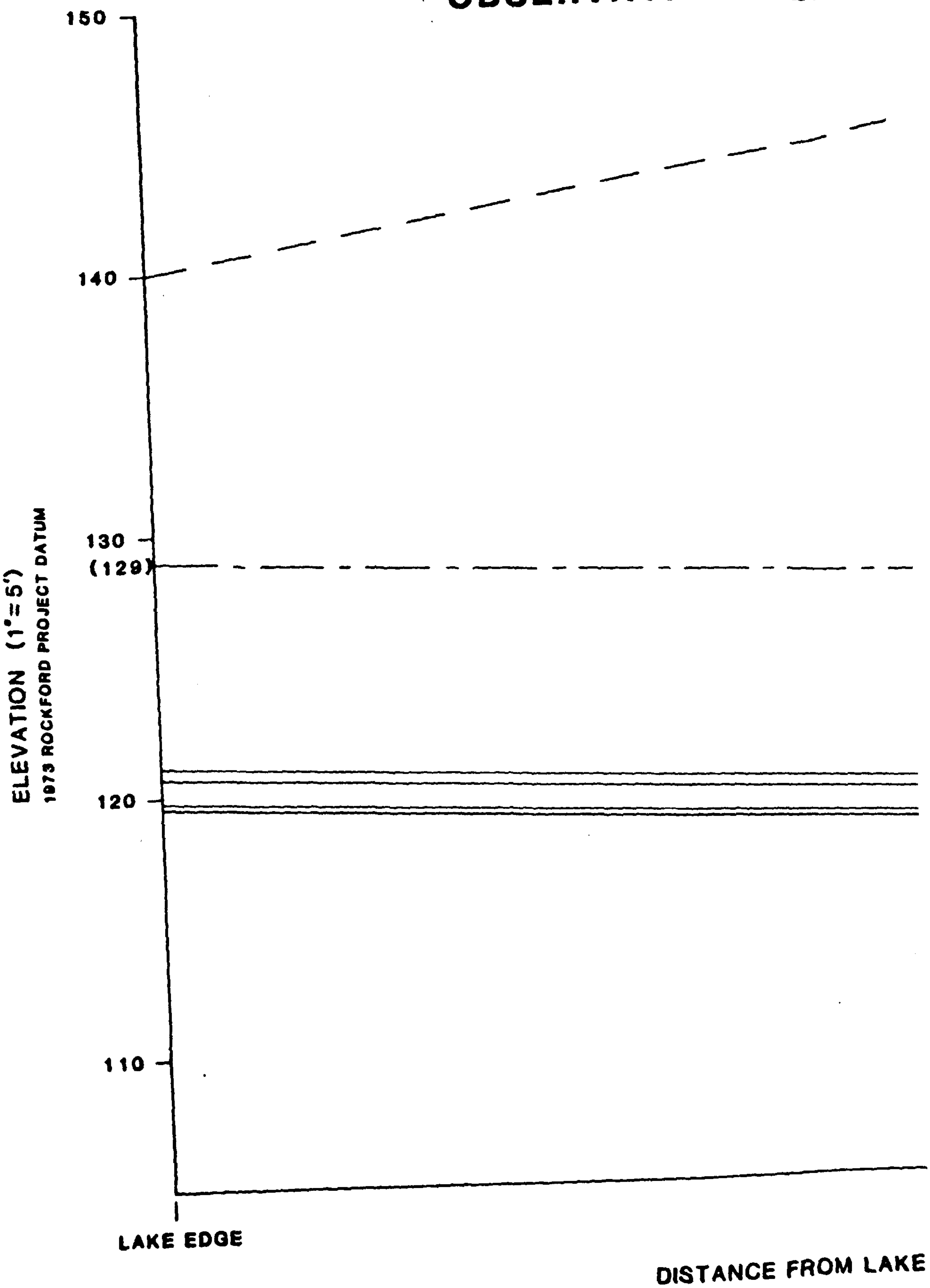


PLATE B-19

ESTIMATED GROUNDWATER I

OBSERVATION WELL



E ATER LEVELS AT 100-YEAR EVENT

O WELL NO. 5

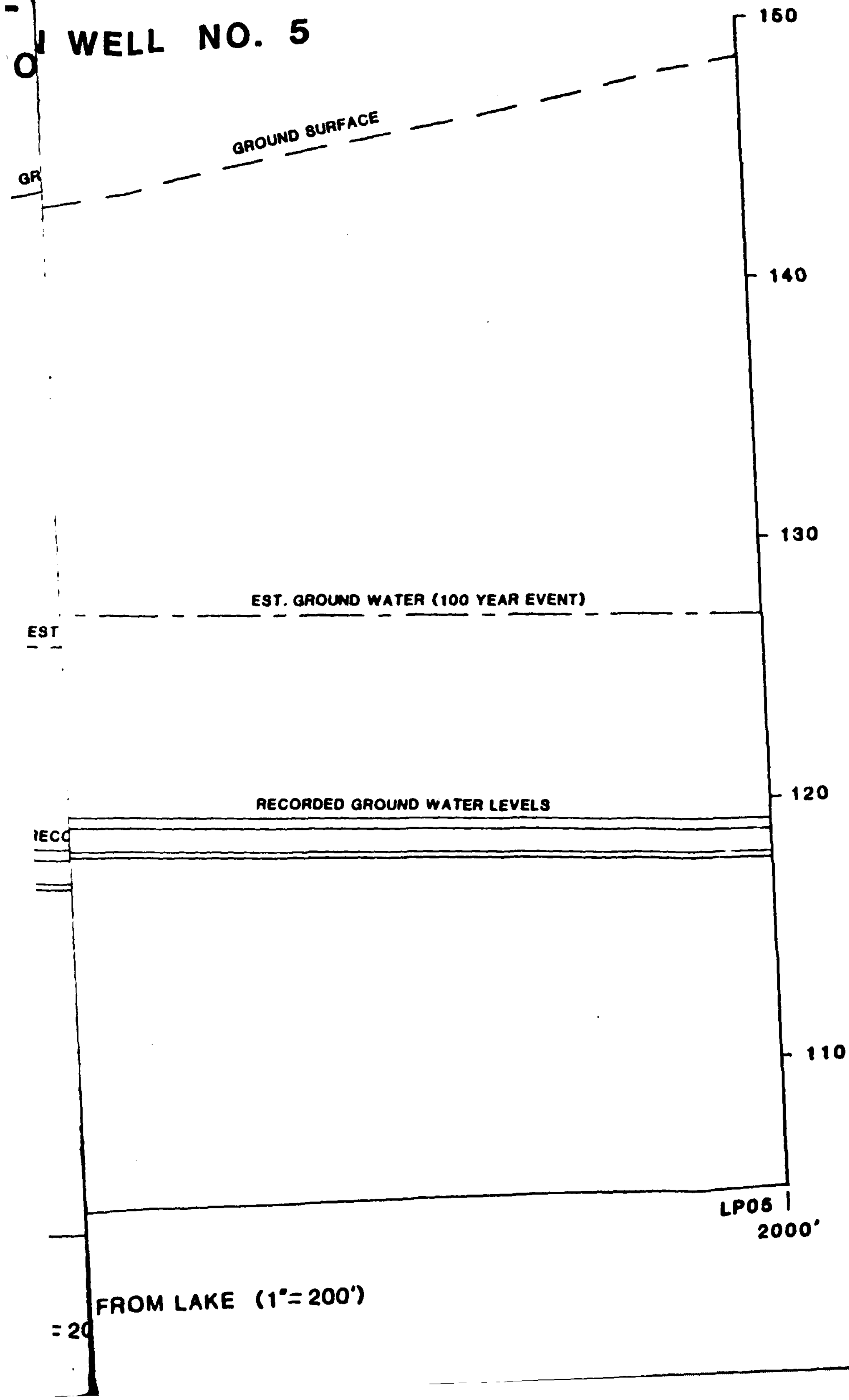
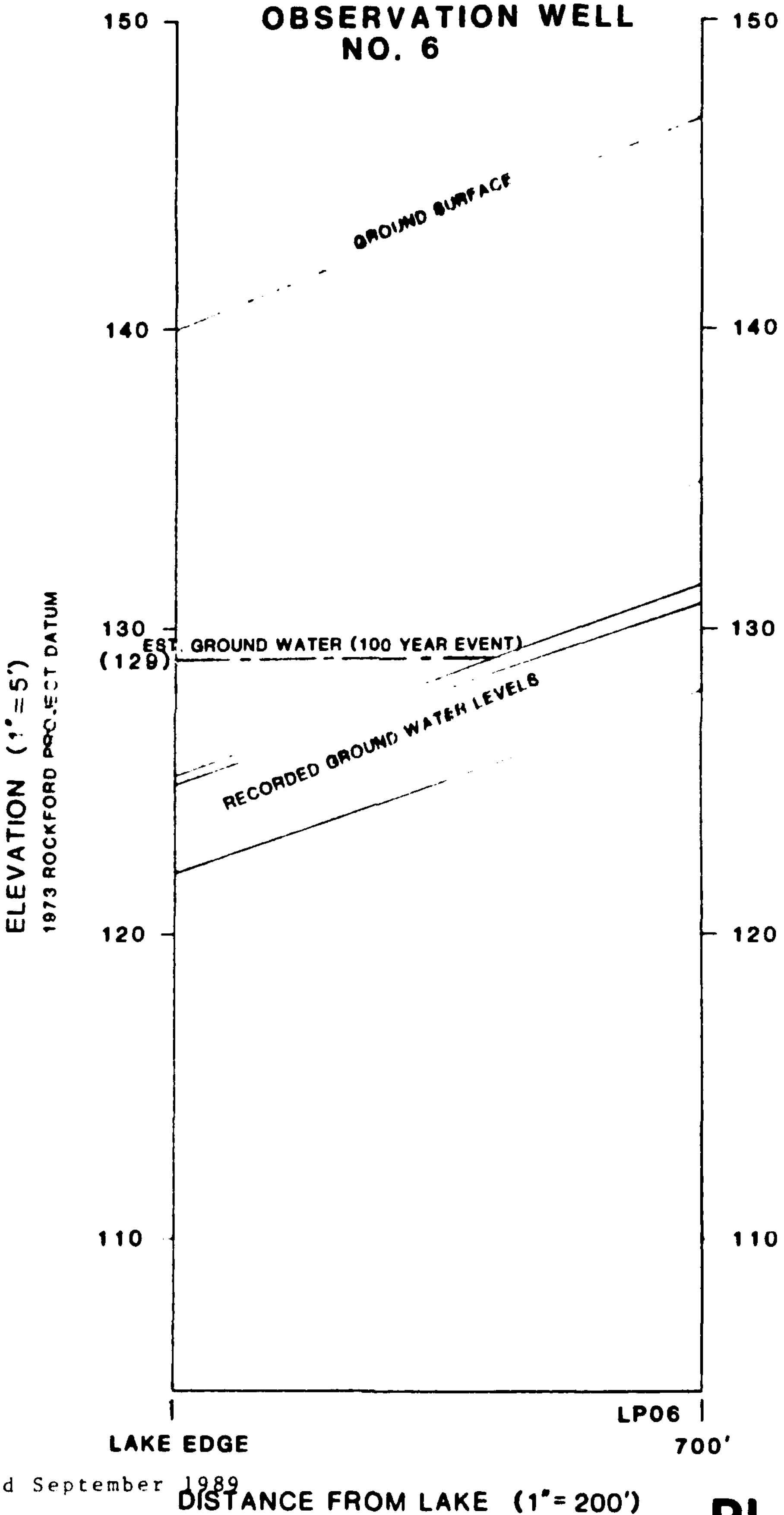


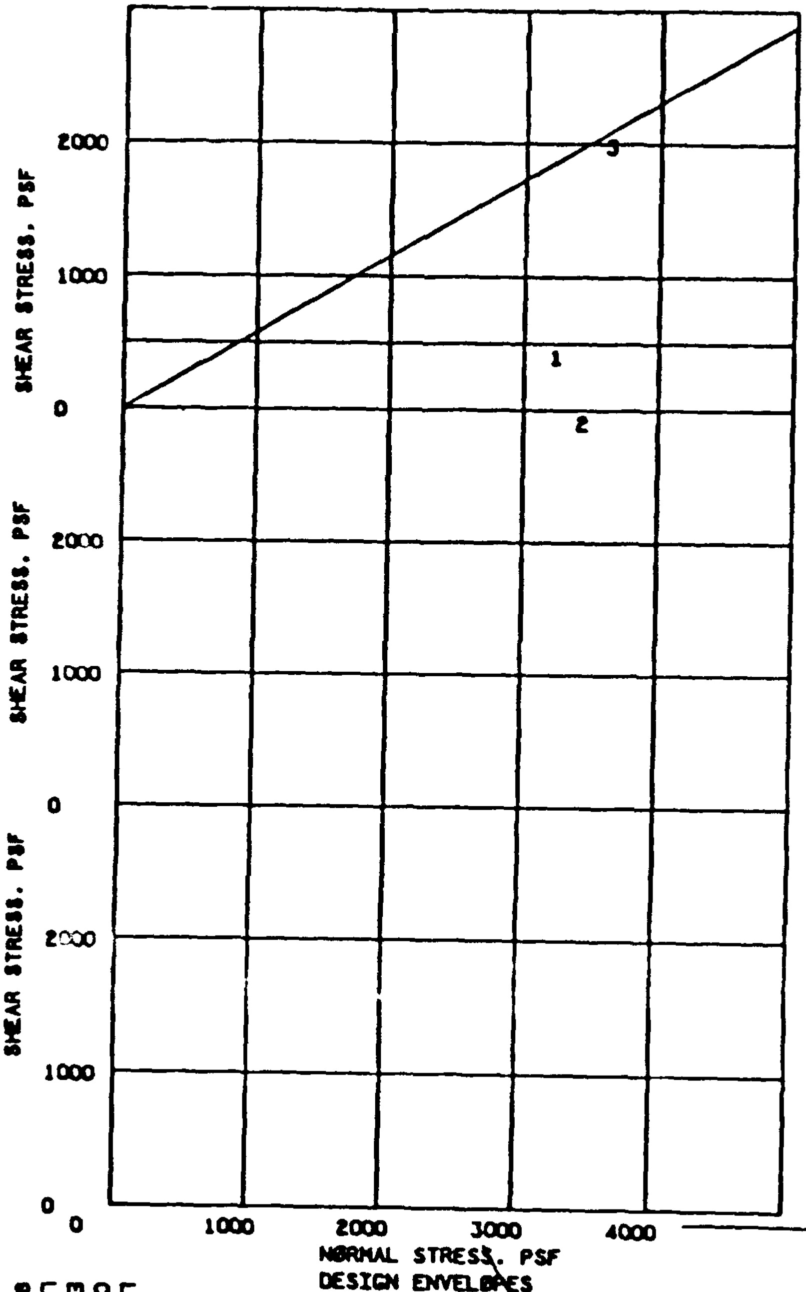
PLATE B-20

ESTIMATED GROUNDWATER LEVELS AT 100-YEAR EVENT



*Revised September 1989

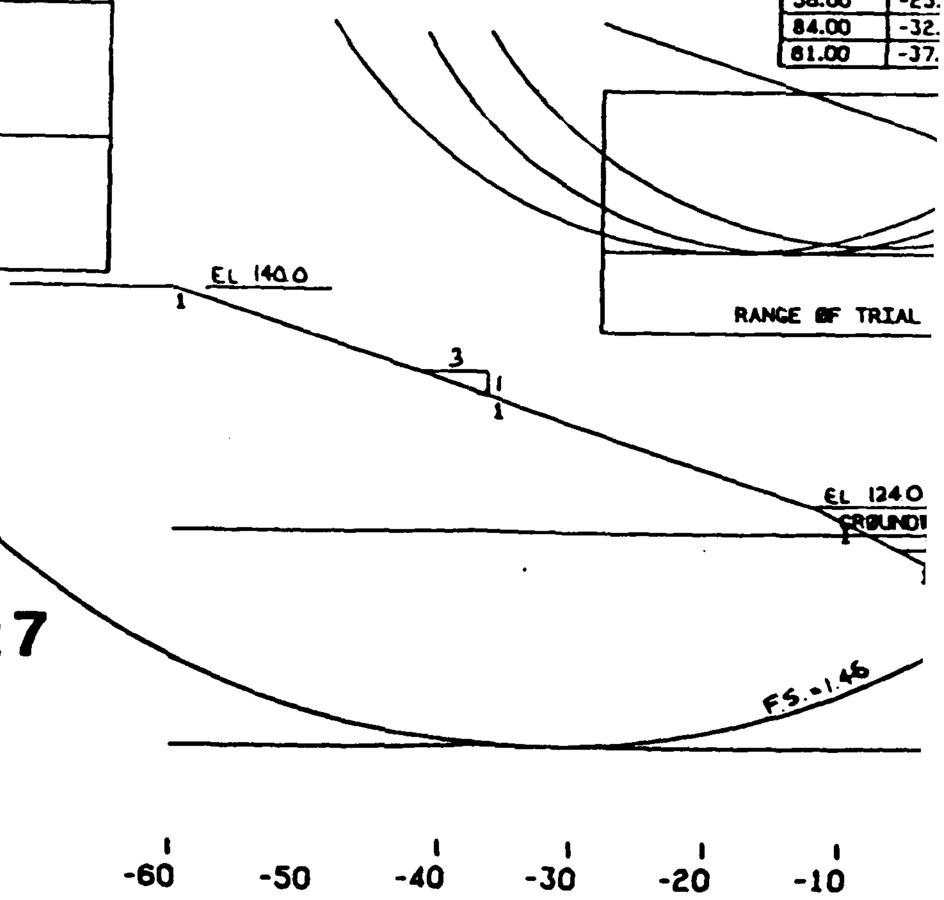
PLATE B-21



MATERIAL		SOIL WT. LBS./CUFT		PHI DEGRE
		MOIST	SAT.	
IMPERVIOUS EMBANKMEN EL. 140 TO EL 108	1	115.00	120.00	0.00
WATER EL 122 TO EL 118	2	62.40	62.40	0.00
PERVIOUS FOUNDATION BELOW EL 108	3	115.00	120.00	30.00

CIR
RESU
COMPUT
TANG

RADIUS OF CIRCLE	CENT DIST. FRO
63.00	-32.
70.00	-41.
69.00	-19.
58.00	-23.
84.00	-32.
61.00	-37.



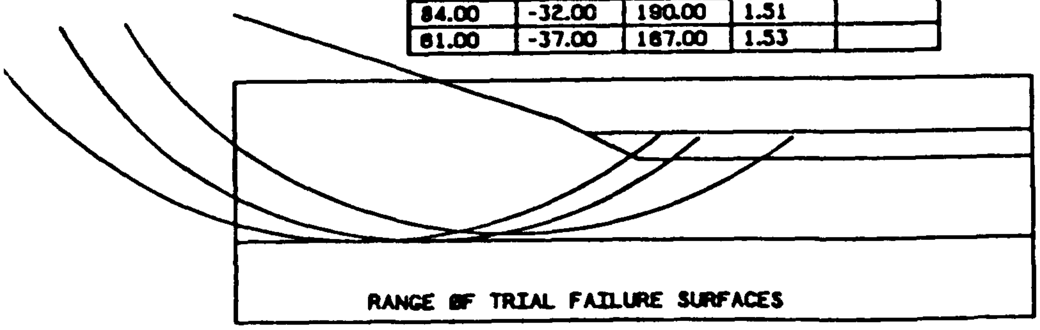
LOVES PARK 120" RCP TRENCH
CIRCLE SLOPE STABILITY ANALYSIS
END OF CONSTRUCTION
LP-86-27
9 MARCH 1988

BORING NO. LP-86-27

MATERIAL	SOIL WT. LBS./CUFT		SHEAR STRENGTH							
			Q		R		S		(R+S)/2	
	MOIST	SAT.	PHI DEGREES	COHESION PSF	PHI DEGREES	COHESION PSF	PHI DEGREES	COHESION PSF	PHI DEGREES	COHESION PSF
US EMBANKMEN @ EL 108 1	115.00	120.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
@ EL 118 2	62.40	62.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FOUNDATION 108 3	115.00	120.00	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CIRCLE FAILURE SURFACE
RESULTS BY HARRIS-500
COMPUTER PROGRAM 741-H5-F424A
TANGENT TO ELEV 108.00
TRIAL ARCS

RADIUS OF CIRCLE	CENTER OF CIRCLE DISTANCE FROM ℄	CENTER OF CIRCLE ELEV	F.S. Q ψ= 0.00	
63.00	-32.00	169.00	1.46	
70.00	-41.00	176.00	1.55	
69.00	-19.00	176.00	1.58	
56.00	-23.00	162.00	1.53	
84.00	-32.00	190.00	1.51	
81.00	-37.00	187.00	1.53	



NOTES
1- ANALYSES WERE RUN ACCORDING TO EM 1110-2-1902 DATED APRIL 1970
2- THE SIDE EARTH FORCE DIRECTION WAS TAKEN AS THE AVERAGE OF THE EMBANKMENT SLOPES IMMEDIATELY ADJACENT TO THE SLICE INTERFACE
3- PSI-SIESMIC COEFFICIENT USED IN ANALYSES

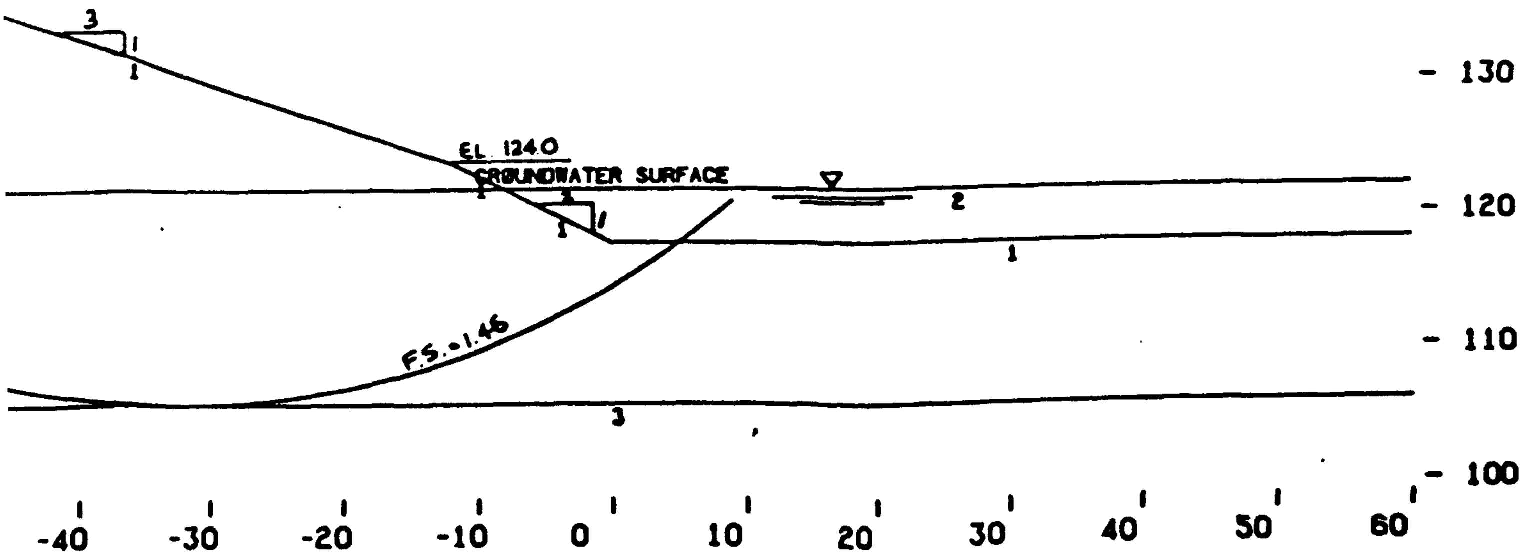
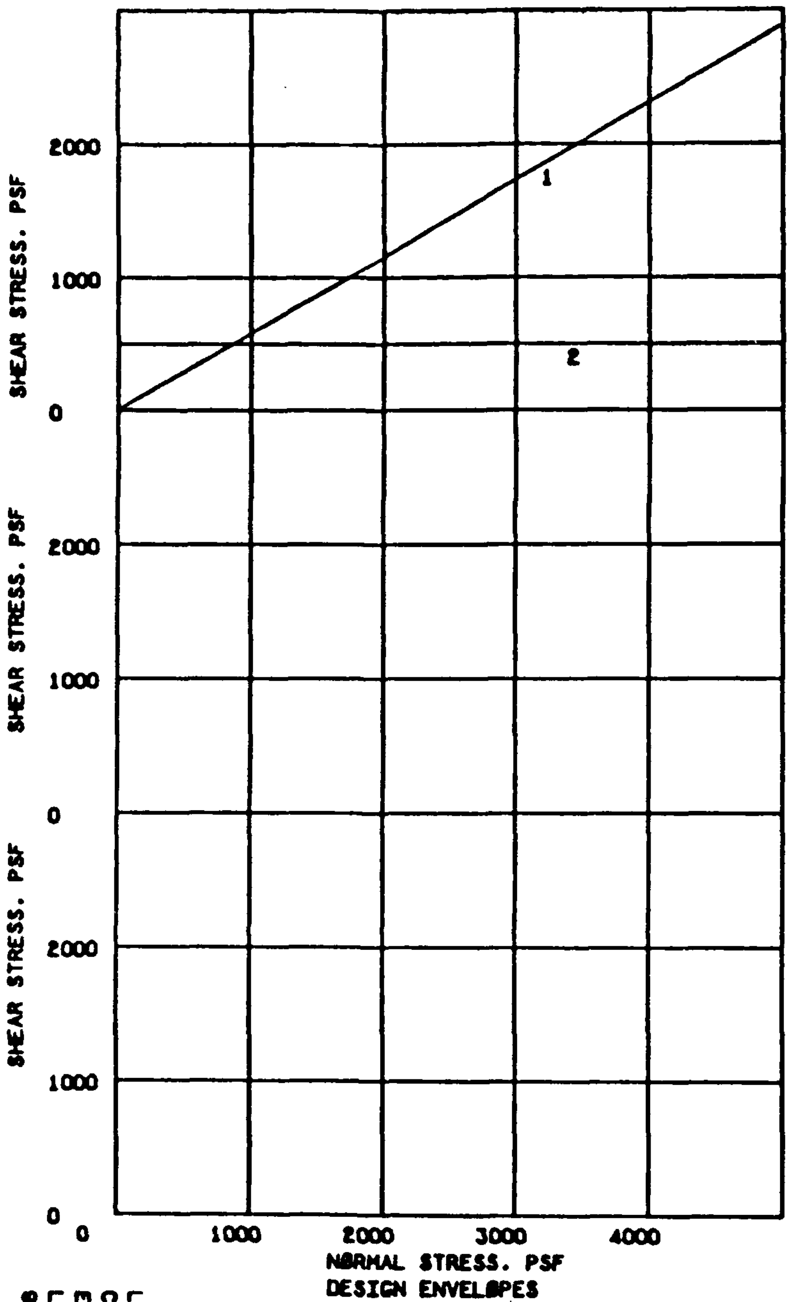


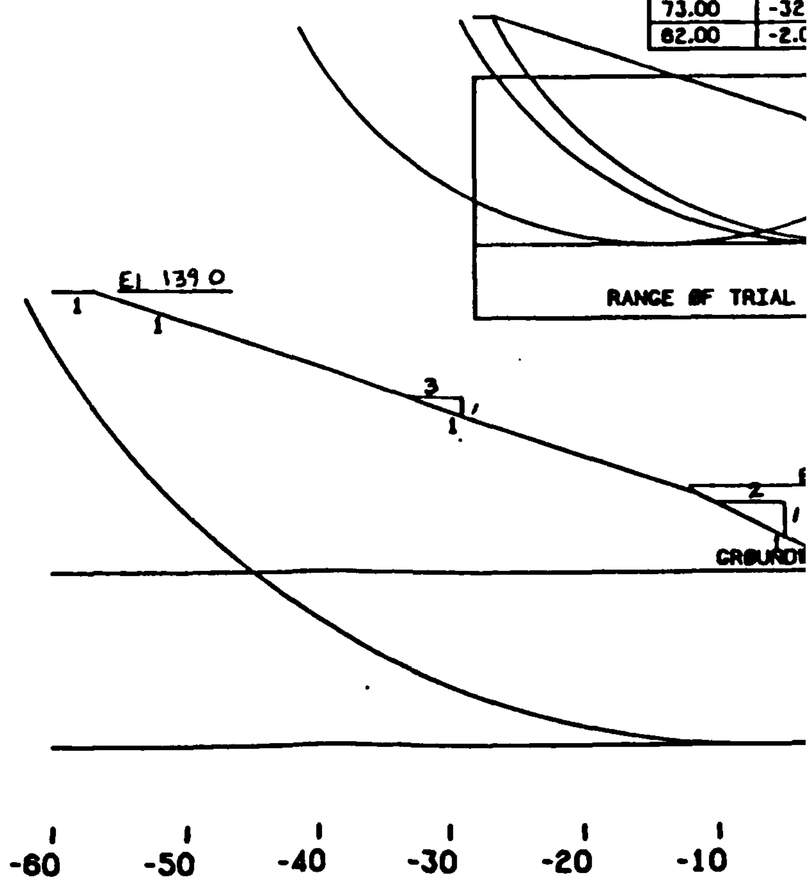
PLATE B-22



MATERIAL		SOIL WT. LBS./CUFT		PHI
		MOIST	SAT.	DEGREE
PERVIOUS EMBANKMENT EL 139 TO EL 105	1	110.00	118.00	30.00
IMPERVIOUS FOUNDATIO BELOW EL 105	2	115.00	120.00	0.00

CIR
RESU
COMPUT
TANG

RADIUS OF CIRCLE	CENT DIST FRO
62.00	-7.0
63.00	-32
62.00	-2.0
52.00	-12
73.00	-32
62.00	-2.0



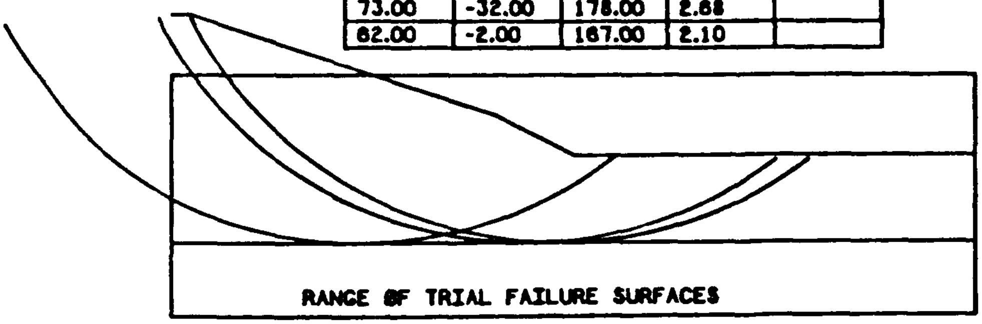
LOVES PARK 120 RCP TRENCH
CIRCLE SLOPE STABILITY ANALYSIS
END OF CONSTRUCTION
LP-86-28
9 MARCH 1988

BORING NO. LP-86-28

MATERIAL	SOIL WT. LBS./CUFT		SHEAR STRENGTH							
			Q		R		S		(R+S)/2	
	MOIST	SAT.	PHI DEGREES	COHESION PSF	PHI DEGREES	COHESION PSF	PHI DEGREES	COHESION PSF	PHI DEGREES	COHESION PSF
US EMBANKMENT TO EL 105 1	110.00	118.00	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IOUS FOUNDATIO EL 105 2	115.00	120.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00

CIRCLE FAILURE SURFACE
RESULTS BY HARRIS-500
COMPUTER PROGRAM 741-H5-F424A
TANGENT TO ELEV 105.00
TRIAL ARCS

RADIUS OF CIRCLE	CENTER OF CIRCLE		F.S.	
	DISTANCE FROM ℄	ELEV	Q	
			Ψ= 0.00	
62.00	-7.00	167.00	2.05	
63.00	-32.00	168.00	2.67	
62.00	-2.00	167.00	2.10	
52.00	-12.00	157.00	2.08	
73.00	-32.00	178.00	2.68	
62.00	-2.00	167.00	2.10	



NOTES
1- ANALYSES WERE RUN ACCORDING TO EM 1110-2-1902 DATED APRIL 1970
2- THE SIDE EARTH FORCE DIRECTION WAS TAKEN AS THE AVERAGE OF THE EMBANKMENT SLOPES IMMEDIATELY ADJACENT TO THE SLICE INTERFACE
3- PSI-SIESMIC COEFFICIENT USED IN ANALYSES

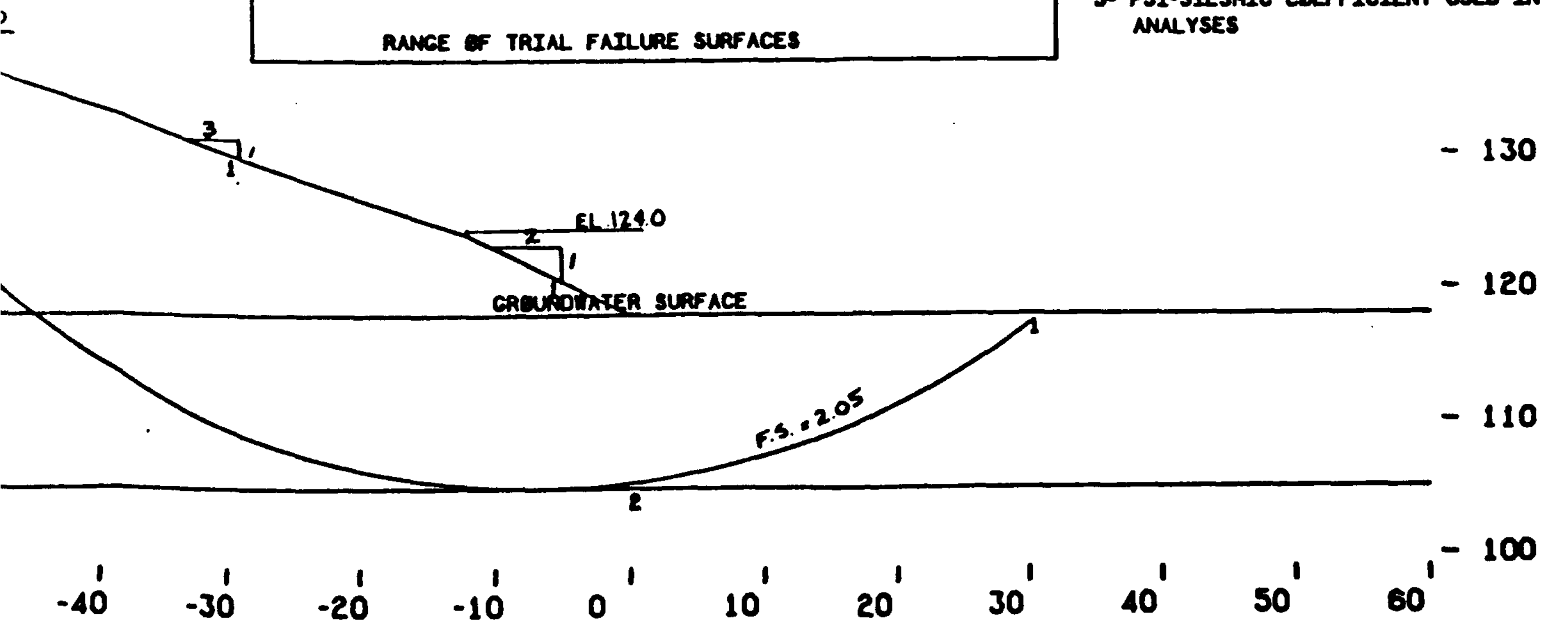
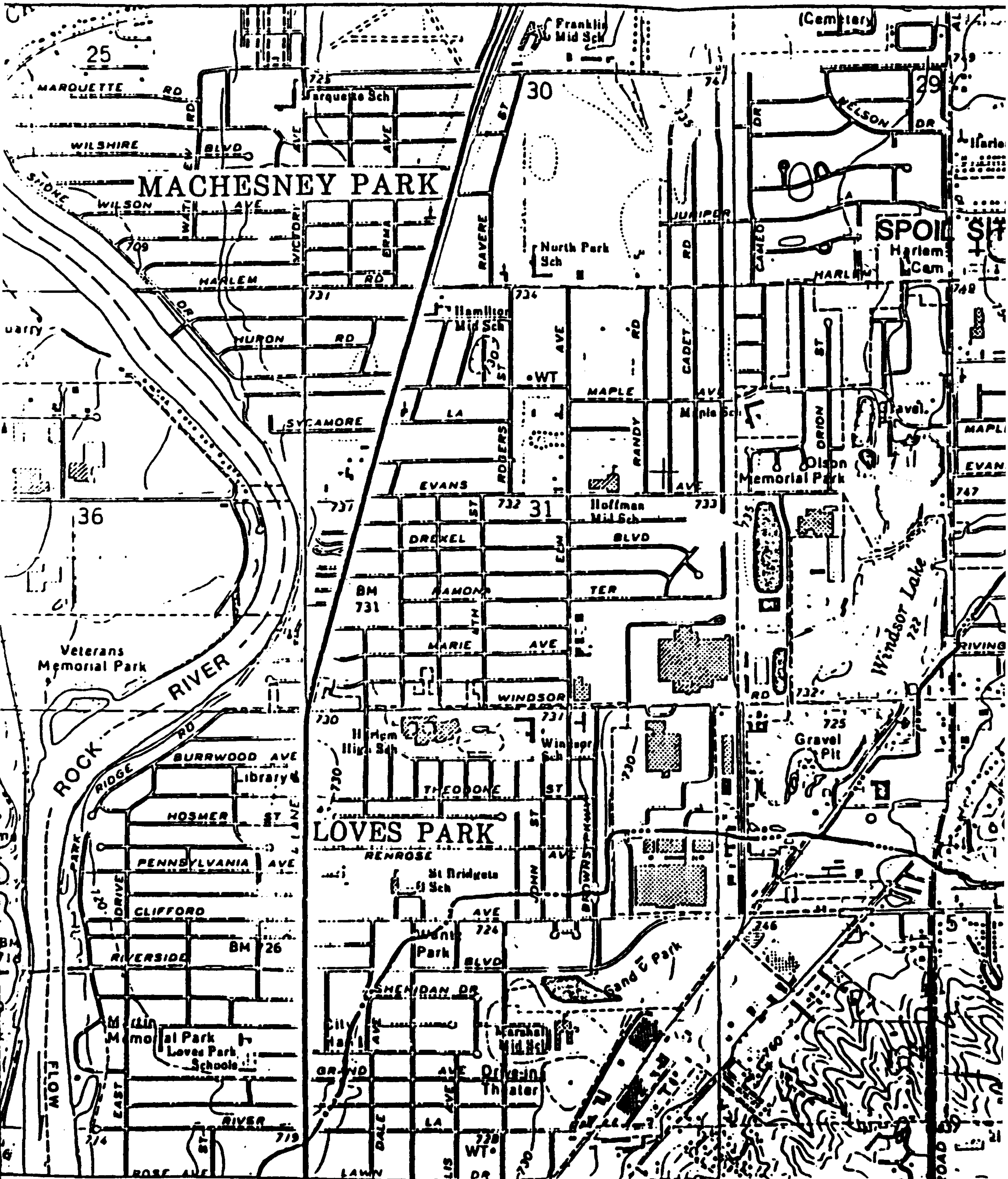


PLATE B-23


MACHESNEY PARK
LOVES PARK
ROCK RIVER
FLOW
SPOIL
Windsor Lake
MARQUETTE RD
WILSHIRE BLVD
WILSON AVE
HARLEM RD
HURON RD
SYCAMORE
EVANS
DREXEL BLVD
RAMONA TER
MARIE AVE
WINDSOR
THEODORE ST
RENROSE AVE
BURRWOOD AVE
HOSMER ST
PENNSYLVANIA AVE
CLIFFORD
RIVERSIDE
SHERIDAN DR
GRAND AVE
RIVER LA
ROSE AVE
LAWN
RIDGE RD
PARK DRIVE
EAST
JUNIPER
CADET
RANDY
ROGERS
RAVERE ST
VICTORY AVE
ORMA AVE
MAPLE AVE
NELSON DR
ORION
ELM
JOHN ST
Marquette Sch
Franklin Mid Sch
North Park Sch
Hamilton Mid Sch
Maple Sch
Olson Memorial Park
Hoffman Mid Sch
Harlem High Sch
Windsor Sch
Library
St Bridgets Sch
Veterans Memorial Park
Martin Memorial Park
Loves Park Schools
City Hall
Marshall Mid Sch
Drive-in Theater
G and E Park
Gravel Pit
Harlem Cem
(Cemetery)
Gravel
WT
BM 731
BM 726
25
29
30
31
36
725
731
734
737
732
733
730
724
738
719
714
725
748
747
722
746

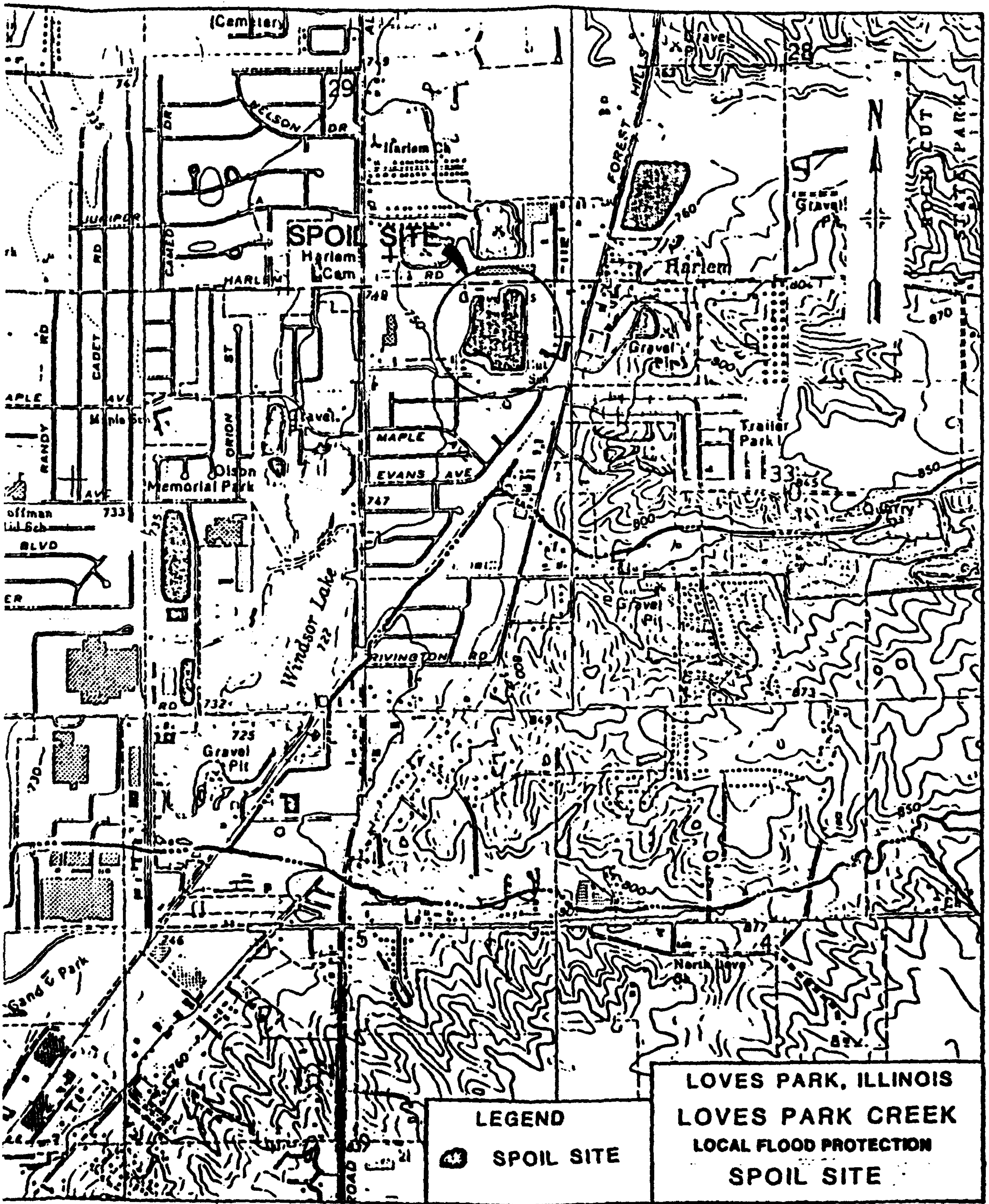

SPOIL SITE
Harlem Cem
Harlem Ch
Harlem
Gravel Pit
Trailer Park
Quarry
Windsor Lake
Memorial Park
Gravel Pit
North Love Ch
FOREST HILLS RD
MAPLE
EVANS AVE
RIVINGTON RD
HARLEM RD
CADET
RANDY
ORION
N
LEGEND
SPOIL SITE
LOVES PARK, ILLINOIS
LOVES PARK CREEK
LOCAL FLOOD PROTECTION
SPOIL SITE

PLATE B-24

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX C

DETAILED COST ESTIMATE

ROCK ISLAND DISTRICT
CORPS OF ENGINEERS
CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS 61201

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX C
DETAILED COST ESTIMATE

1. General. This appendix contains detailed cost estimates for the Loves
** Park Creek Local Flood Protection project including both Project Construction
** and Lands, Easements, Rights-of-Way, Relocation and Disposal (LERRD) first costs.

2. Unit Costs. The unit costs are based on January 1988 prices. The unit costs are considered to be fair and reasonable costs to a well-equipped and capable contractor, including contractor's overhead and profit. They have been derived from bid abstracts for comparable work, taking into account special factors that might influence the unit costs. Where the design has progressed sufficiently to permit reasonably accurate takeoffs of quantities, the items are broken down to the estimated quantities involved. For some items, at this time, it is necessary to estimate the costs on the job or lump sum basis.

3. Construction Stages. Except for Lands and Damages, the cost estimate has been divided into the following construction stages:

STAGE I - all work upstream from the confluence of the North and South branches of the Creek. This includes the gravel pit detention areas.

STAGE II - all work on the Main Stem of the Creek.

4. Cost Estimate Summaries. The detailed estimate of cost is summarized on two tables. Table 1 shows the total costs of project features. Table 2 shows
** the total Project Construction and LERRD cost and division of cost between
** Federal and non-Federal.

** 5. Updated and Projected Cost Estimates. In accordance with EC 1110-2-538, a
** code of accounts estimate using M-CACES computer program was prepared in June
** 1989. The updated estimate used the same work items listed in Table 1. A
** summary of the estimate and division of cost, at October 1989 price levels, is
** presented in Table 3. The estimate is included to provide current cost
** information, but is not used elsewhere in this memorandum. Table 4 presents a
** projected cost estimate and division of cost summary at the midpoint of
** construction. The estimate assumes that construction will begin in May of
** 1991 and be completed in July of 1994 as shown in paragraph 27 of the Main
** Report.

* Revised September 1989
** Revised June 1990

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

TABLE 1

COST ESTIMATE

	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT PROJ CONST	AMOUNT LERRD
	Stage I & II					
	Lands, Improvements & Damages					
	Right-of-Way for Channels, Pipelines, Pump Station, Detention Ponds, Spoil Areas, Contingencies, Cost of Acquisition, and Relocation Assistance	1	Job	Sum		$4,300,000
	Stage I					
	Relocations					
	Power Lines, Telephone & CATV Sta.21+85H-1 to Sta.24+90H-1	1	Job	Sum		13,800
	Relocate Hydrant Sta.8+50H-1	1	Job	Sum		2,000
	Relocate Street & Extend CMP North Branch Sta.8+00H-1	1	Job	Sum		9,150
	Relocate LPG Tank Sta.8+00G-1	1	Job	Sum		500
*	Storm Sewers w/Manholes	1	Job	Sum		4,250
*	Relocate 8" Sanit. Sewer w/Manholes Sta. 8+45	1	Job	Sum		12,500
**	Storm Sewer Modifications	1	Job	Sum		1,000
**	Lower Sanitary Manhole	1	Job	Sum		2,000
**	Total					$45,200
**	Contingencies					6,800
**	Total Stage I Relocations					$52,000
	Channels					
	South Branch To Pump Station					
	Clearing & Grubbing	1	Job	Sum	2,000	
	Excavation	4,000	CY	2.30	9,200	
	Backfill	3,900	CY	3.10	12,090	
	Storm Sewers w/Manholes	1	Job	Sum	4,250	
	Concrete Lining	1,380	CY	250.00	345,000	
	Trash Rack (Steel)	13,000	LB	2.00	26,000	
	Seeding	1	A	900.00	900	
	Total				$399,440	

* Revised September 1989
** Revised June 1990

STAGE I cont.

ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT PROJ CONST	LERRD
Pipeline To South Pit					
Pipe (7' Dia. RCP-Jacked) w/Dewatering	700	LF	775.00	542,500	
Spoil	800	CY	5.10	4,080	
Pipe (7' Dia. RCP-Cut & Cover) w/Dewatering	720	LF	530.00	381,600	
Excavation	22,000	CY	2.30	50,600	
Backfill	20,500	CY	3.10	63,550	
Seeding	2.5	A	900.00	2,250	
Temp. Sheet Pile	4,000	SF	8.00	32,000	
Bracing	22,000	LB	1.60	35,200	
Crushed Rock	620	T	11.00	6,820	
Filter Fabric	1,000	SY	1.80	1,800	
Total				$1,120,400	
South Branch Diversion Outlet					
Reinforced Concrete	200	CY	300.00	60,000	
Stop Log Grooves, Cast Iron	98	LF	70.00	6,860	
Sheet Piling	500	SF	11.00	5,500	
Pipe Handrail	74	LF	45.00	3,330	
Excavation	1,100	CY	1.40	1,540	
Backfill	900	CY	2.00	1,800	
Spoil	66	CY	5.00	330	
Temporary Levee	360	CY	8.00	2,880	
Dewatering	1	Job	Sum	139,200	
Seeding	0.5	A	900.00	450	
Total				$221,890	

Cost Estimate
Page 3

STAGE I cont.

ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT PROJ CONST	AMOUNT LERRD
South Pit To Windsor Lake Connection					
Open Channel Excavation	20,000	CY	7.40	149,480	
Excavation For Pipes & Structures	13,300	CY	3.00	39,900	
Backfill	7,800	CY	2.00	15,600	
Pavement, Remove & Replace	600	SY	55.00	33,000	
Sheet Pile	900	SF	11.00	9,900	
Reinforced Concrete	280	CY	300.00	84,000	
Pipe (10' Dia. RCP Class II)	344	LF	475.00	163,400	
Pipe Handrail	130	LF	45.00	5,850	
Dewatering	1	Job	Sum	157,360	
Seeding	3.1	A	900.00	2,790	
Storm Sewer & Water Protection	1	Job	Sum	5,000	
Crushed Rock	370	T	11.00	4,070	
Filter Fabric	700	SY	1 80	1,260	
Total				$671,610	
Windsor Lake To North Pit Connection					
Excavation For Pipes & Structures	4,500	CY	1.90	8,550	
Temporary Levee	700	CY	8.00	5,600	
Backfill	3,500	CY	2.00	7,000	
Sheetpiling	860	SF	11.00	9,460	
Reinforced Concrete	210	CY	300.00	63,000	
Pipe (5' Dia. RCP Class III)	324	LF	120.00	38,880	
Handrail	150	LF	45.00	6,750	
Dewatering	1	Job	Sum	28,000	
Seeding	0.8	A	900.00	720	
Total				$167,960	
North Branch Diversion To Lake					
Excavation For Pipes & Structures	6,700	CY	1.35	9,045	
Temporary Levee	360	CY	8.00	2,880	
Backfill	5,500	CY	2.00	11,000	
Fill Under Outlet	140	CY	3.10	434	
Pavement, Remove & Replace	430	CY	55.00	23,650	
Sheet Piling	350	SF	11.00	3,850	
Reinforced Concrete	205	CY	300.00	61,500	
Pipe (7' Dia. RCP Class III)	250	LF	300.00	75,000	
Riprap	65	T	19.00	1,235	
Dewatering	1	Job	Sum	56,000	
Handrail	45	LF	45.00	2,025	
Fence	310	LF	11.00	3,410	
Seeding	1.0	A	900.00	900	

Cost Estimate
Page 4

STAGE I, cont.

ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT PROJ CONST	AMOUNT LERRD
North Branch Diversion To Lake, cont.					
Underground Telephone, Gas, & Water Line Protection	1	Job	Sum	500	
Clearing & Grubbing	1.0	A	3,000.00	3,000	
Total				$254,429	
North Branch					
Concrete Removal	1	Job	Sum	5,500	
Excavation	14,700	CY	2.30	33,810	
Backfill	4,540	CY	3.15	14,301	
Spoil	9,500	CY	5.10	48,450	
Clearing & Grubbing	2	A	3,000.00	6,000	
Reinforced Concrete					
a) Trapazoidal Channel	1,050	CY	250.00	262,500	
b) Rectangular Channel	1,440	CY	300.00	432,000	
c) Transitions & Drop Structures	260	CY	300.00	78,000	
Dewatering	1	Job	Sum	2,000	
Seeding	3.0	A	900.00	2,700	
Total				$885,261	

SUMMATION STAGE I CHANNELS

	South Branch To Pump Station	399,440
	Pipeline To South Pit	1,120,400
	South Branch Diversion Outlet	221,890
	South Pit To Windsor Lake Connection	671,610
	Windsor Lake To North Pit Connection	167,960
	North Branch Diversion To Lake	254,429
**	North Branch	885,261
**	Total	3,720,990
**	Contingencies	558,010
**	Total Stage I Channels	$4,279,000

* Revised September 1989
**Revised June 1990

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION PLAN

GENERAL DESIGN MEMORANDUM
DROP STRUCTURE & PUMP STATION

COST ESTIMATE
JANUARY 1988 PRICE LEVELS

ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT PROJ CONST	AMOUNT LERRD
Pump Station					
Excavation	4,400	CY	1.35	5,940	
Temporary Sheet Pile	5,100	SF	8.00	40,800	
Sheet Pile Bracing	23,000	LB	1.60	36,800	
Backfill	1,500	CY	1.50	2,250	
Spoil	2,300	CY	5.10	11,730	
Dewatering w/Wellpoints	1	Job	Sum	168,000	
Crushed Rock	85	Ton	11.00	935	
Filter Fabric	220	SY	1.80	396	
Reinforced Concrete	400	CY	375.00	150,000	
Sump Pump	1	Ea.	2,000.00	2,000	
Emergency Bulkheads	2	Ea.	4,500.00	9,000	
Trash Rack	7,500	LB.	2.00	15,000	
Security Gates @ Pump Outlets	3	Ea.	1,500.00	4,500	
Pumps, 40" Dia. Submersible w/Elect. Panel & Controls	3	Ea.	100,000.00	300,000	
Fence, Chain Link - 6' High	500	LF	11.00	5,500	
Access Ladders	1	Job	Sum	3,500	
Hatch Cover	1	Ea.	640.00	640	
Parking Lot Paving	60	SY	14.00	840	
Seeding	0	A	900.00	0	
Precast Concrete Lift-Off Panels	3	Ea.	380.00	1,140	
Elevated Transformer Pad	1	Job	Sum	1,300	
Total				$760,271	
Contingencies				113,729	
Total Stage I Pump Station				$874,000	

* NOTE: The pump station construction cost tabulated above includes the drop
* structure and 3-40 inch diameter submersible pumps with a total capacity of
* 75,000 GPM. A Feature Design Memorandum on the Pump Station, July 1989,
* modifies the design and proposes 2 submersible pumps with a total capacity of
* 16,300 GPM and separates the cost as follows:

*	Drop Structure (Channel Work)	$275,000
*	Pump Station	315,000
*	TOTAL Combined Structure	$590,000

* These values were included in the estimates shown in Tables 3 and 4.

	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT PROJ CONST	AMOUNT LERRD
	Stage II					
	Relocations					
	Move 8 Residences					
	Walker Ave. To Browns Pkwy.	1	Job	Sum		16,600
	Utilities, Protect During Const.	1	Job	Sum		125,000
	Underground Electrical Etc.					
	Sta. 97+40 to 105+70	1	Job	Sum		51,200
	New Manholes to Abandon					
*	& Plug Existing Sanitary	1	Job	Sum		82,300
*	New 8" Dia. Sanitary	1,100	LF	19.50		21,450
*	New 15" Dia. Sanitary	160	LF	16.00		2,600
**	Storm Sewer to Channel					
	Modifications	1	Job	Sum		31,200
**	Shorten & Seal Sanitary					
	Manholes in Channel	1	Job	Sum		9,000
*	Total					339,350
*	Contingencies					50,650
*	Total Stage II Relocations					$390,000
	Channels - Main Stem					
*	Clearing & Grubbing (Includes					
*	Removal of Buildings at 2nd St.)	1	Job	Sum	30,000	
	Excavation	118,100	CY	2.30	271,630	
	Depression Fill	4,700	CY	3.15	14,805	
	Backfill Sta. 28+00 to 45+00	5,700	CY	3.15	17,955	
	Spoil	106,150	CY	5.10	541,365	
	Concrete (Rectangular)	3,620	CY	300.00	1,086,000	
	Concrete (Trapezoidal)	14,000	CY	250.00	3,500,000	
**	Concrete Drops & Transitions	183	CY	300.00	55,000	
	Concrete Pavers - 6"	129,500	SF	5.70	738,150	
	Riprap	470	T	19.00	8,930	
	Bedding	135	CY	20.00	2,700	
	Crushed Rock	2,480	CY	22.00	54,560	
	Filter Fabric	124,620	SF	0.20	24,924	
	Dewatering Sumps	1	Job	Sum	91,000	
	Dewatering	1	Job	Sum	30,000	
	Other Water Control	1	Job	Sum	140,000	
	Sheet Pile (Permanent)	3,000	SF	11.00	33,000	
	Fencing (Chain Link - 6 ft.)	3,200	LF	11.00	35,200	
	Seeding	10.6	A	900.00	9,540	
	Underpinning of Existing Struct.	1	Job	Sum	47,200	
	Concrete Flumes	1	Job	Sum	1,600	
	Pavement Repairs	1	Job	Sum	25,600	
*	Total				$6,759,159	
*	Contingencies				983,841	
*	Total Stage II Channels				$7,743,000	

* Revised September 1989
** Revised June 1990

Cost Estimate
Page 7

STAGE II, cont.

	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT PROJ CONST	AMOUNT LERRD
	Bridges (Replacement or Removal)					
*	2nd Street (Box Culvert)					
**	Demolition	1	Job	Sum		22,300
*	Channel Improvement	1	Job	Sum	70,000	
*	Superstructure	1	Job	Sum		232,700
*	Approach Pavement	1	Job	Sum		15,000
*	River Lane (Box Culvert)					
**	Demolition	1	Job	Sum		29,600
*	Channel Improvement	1	Job	Sum	[illegible],620	
*	Superstructure	1	Job	Sum		79,480
	Approach Pavement	1	Job	Sum		6,400
*	Walker Ave. (Box Culvert)					
**	Demolition	1	Job	Sum		10,400
**	Channel Improvement	1	Job	Sum		31,200
*	Superstructure	1	Job	Sum		73,100
	Approach Pavement	1	Job	Sum		5,500
	Sidewalk	1	Job	Sum		900
	John St.					
**	Demolition	1	Job	Sum		13,500
	New Pavement (Culdesacs)	1	Job	Sum		33,510
	Sidewalks	1	Job	Sum		1,950
	Drives	1	Job	Sum		4,300
*	Elm St. (Box Culvert)					
**	Demolition	1	Job	Sum		10,400
**	Channel Improvement	1	Job	Sum		31,200
*	Superstructure	1	Job	Sum		73,100
	Approach Pavement	1	Job	Sum		5,500
	Sidewalk	1	Job	Sum		1,900

* Revised September 1989
** Revised June 1990

Cost Estimate
Page 8

STAGE II, cont.

	ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT PROJ CONST	AMOUNT LERRD
	Brown's Parkway (Pedestrian)					
**	Demolition	1	Job	Sum		3,900
*	Abutments	1	Job	Sum		3,930
	Superstructure	1	Job	Sum		23,980
	Culdesac Pavement	1	Job	Sum		16,770
	4" Sidewalk	1	Job	Sum		250
*	Private Drive Station 97+69 (Box Culvert)					
**	Demolition	1	Job	Sum		9,120
**	Channel Improvement	1	Job	Sum		32,440
*	Superstructure	1	Job	Sum		49,540
	Approach Pavement	1	Job	Sum		2,400
	Private R. R. at Sta. 105+17					
**	Demolition	1	Job	Sum	11,960	
	Foundation & Walls	75	CY	325.00	24,375	
	Deck, Railings, Etc.	25	CY	325.00	8,125	
	R. R. Tracks	1	Job	Sum	6,800	
	Pavement	1	Job	Sum	1,070	
	Backfill	1	Job	Sum	2,000	
	Pedestrian at Sta. 101+26					
**	Demolition	1	Job	Sum		740
*	Abutments	1	Job	Sum		2,150
	Superstructure	1	Job	Sum		18,850
**	Material Avenue					
**	Concrete Transition	117	CY	300.00		35,000
**	Total				$178,950	$881,010
**	Contingencies				28,050	132,990
**	Total Stage II Bridges				$207,000	1,014,000(1)

(1) This Value is a Relocation Expense

* Revised September 1989
**Revised June 1990

	Item	PROJ CONSTR	LERRD
	Summation Stage I & II Relocations		
**	Stage I		$ 52,000
**	Stage II		390,000
**	Bridge Relocations		1,014,000
**	Total Project Relocations		$1,456,000
	Summation Stage I & II Channels		
**	Stage I	$ 4,229,000	
**	Stage II	7,743,000	
**	Total Project Channels	$12,022,000	
	Stage I Summation w/o Lands & Damages		
**	Relocations		$ 52,000
**	Channels	$4,279,000	
*	Pump Station	874,000	
**	Total Stage I	$5,153,000	$ 52,000
	Stage II Summation w/o Lands & Damages		
**	Relocations		$ 390,000
**	Bridges	$ 207,000	1,014,000
**	Channels	7,743,000	
**	Revegetation		80,000
**	Total Stage II	$7,950,000	$1,484,000

* Revised September 1989
** Revised June 1990

LOVES PARK CREEK
LOCAL FLOOD PROTECTION
LOVES PARK, ILLINOIS
GENERAL DESIGN MEMORANDUM

TABLE 2

COST ESTIMATE SUMMARY
DIVISION OF COST

*January 1988 Price Levels

**	Item	PROJ CONST	LERRD
	Lands and Damages		$4,300,000
**	Relocations (utilities and buildings)		504,000 (1)
**	Bridges	$ 207,000	1,154,000 (2)
**	Channels	12,022,000	
	Pump Station	874,000	
**	Revegetation		80,000
**	Planning, Engineering and Design	1,864,500	
**	Construction Management	893,500	
**	Subtotal	$15,861,000	$6,038,000
	Non-Federal Cash Contribution (5% Minimum Total Project Cost)	-1,095,000	1,095,000
**	Total Federal	$14,766,000	
**	Total Non-Federal		$7,133,000
**	Combined Total Project Cost	$21,899,000	

** (1) Value includes $35,500 for Engineering and Design, and $26,500 for Construction Management.

** (2) Value inclues $80,000 for Planning, Engineering and Design, and $60,000 for Construction Management.

* NOTES:
* 1. This estimate does not include the credit for the Pebble Creek Dam
* construction. See page H-12 in Appendix H for the credit tabulation.

* 2. Drop Structure is included in Pump Station cost and 75,000 GPM pump
* capacity. See Table 3 for Pump Station with 16,300 GPM capacity that is
* now proposed in the FDM.

* Revised September 1989
**Revised June 1990

LOVES PARK CREEK
LOCAL FLOOD PROTECTION
LOVES PARK, ILLINOIS
GENERAL DESIGN MEMORANDUM

TABLE 3

COST ESTIMATE SUMMARY
DIVISION OF COST

June 1990 Price Levels

	Item	Proj Cost	LERRD
**	Lands and Damages		$4,900,000
**	Relocations (utilities and buildings	$ 439,000	120,000
**	Dams		439,000
**	Bridges	198,000	984,000
**	Channels	13,730,000	
	Pump Station	315,000	
**	Revegetation		85,000
**	Planning, Engineering and Design	2,275,000	90,000
**	Construction Management	809,000	70,000
**	Subtotal	$17,766,000	$6,688,000
**	Non-Federal Cash Contribution (5% Minimum Total Project Cost)	- 1,210,000	1,210,000
**	Total Federal	$16,556,000	
**	Total Non-Federal		$7,898,000
**	Combined Total Project Cost	$24,454,000	

**Revised June 1990

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TABLE 4

COST ESTIMATE SUMMARY
DIVISION OF COST

Estimate at Midpoint of Construction
(July 94 Completion)

	Item	Proj Const	LERRD
**	Lands and Damages		$4,900,000
**	Relocations (utilities and buildings)	$ 439,000	170,000
	Dams		439,000
**	Bridges	214,000	1,063,000
**	Channels	15,169,000	
**	Pump Station	355,000	
**	Revegetation		97,000
**	Planning, Engineering and Design	2,318,000	94,000
**	Construction Management	871,000	75,000
**	Subtotal	$19,366,000	$6,838,000
	Non-Federal Cash Contribution		
**	(5% Minimum Total Project Cost)	- 1,310,000	1,310,000
**	Total Federal	$18,056,000	
**	Total Non-Federal		$8,148,000
**	Combined Total Project Cost	$26,204,000	

* Revised September 1989
**Revised June 1990

LOVES PARK CREEK
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APPENDIX D

ECONOMIC AND SOCIAL ANALYSIS

ROCK ISLAND DISTRICT
CORPS OF ENGINEERS
CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS 61201

Revised September 1989

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APPENDIX D
ECONOMIC AND SOCIAL ANALYSIS

SECTION 1 - INTRODUCTION

PURPOSE

This appendix documents the economic and social analysis undertaken to determine the feasibility of providing flood damage reduction measures for the city of Loves Park, Illinois. Current damages are caused primarily by high flows of Loves Park Creek, a tributary of the Rock River. The six major sections of this appendix summarize the economic studies conducted by the Rock Island District, U.S. Army Corps of Engineers.

Following the introductory section, the second section describes the general characteristics of the study area and summarizes historical flood damages. The third section presents the procedures used to determine flood damages and the potential benefits which would accrue to a flood damage reduction project. The fourth section presents the benefit and cost analysis for the recommended plan. The fifth section summarizes the non-Federal financial analysis. Section six discusses the social impacts of the proposed project. Throughout this analysis, price levels are stated as of January 1988, with the Federal discount rate of 8-5/8 percent for water resource projects being used to amortize costs and to discount benefits to a common period of time.

SECTION 2 - CHARACTERISTICS OF THE STUDY AREA

EXISTING CONDITIONS

This section describes the study area and its existing conditions in terms of physical characteristics and flooding problems, with a brief discussion of likely future conditions. The study site (Loves Park Creek floodplain) is an approximate 900-acre area dominated by residential neighborhoods, with some concentrations of industrial and commercial development. The area also contains four parks and six schools. Table D-1 details the types of properties in the study area. The study area was divided into six major reaches, with a total of 44 economic subareas.1

TABLE D-1

Floodplain Characteristics
Number of Properties

Reach Number	Residential	Commercial	Industrial	Public
I	33	--	--	--
II	1,290	71	1	8
III	322	9	6	--
IV	--	5	1	1
V	--	2	--	--
VI	884	30	5	5
Totals	2,529	117	13	14

SOCIO-ECONOMIC CONDITION

The 1980 population of the city of Loves Park was 13,192, which is a 6.5 percent increase from the 1970 figure of 12,390. The city has experienced population growth rates exceeding those in Winnebago County during each of the last three decades. Other comparative data are shown in table D-2.

TABLE D-2

1980 Comparative Socio-Economic Data

	Loves Park	Rockford SMSA	State of Illinois	United States
Median Household Income ($)	20,799	20,213	22,746	19,917
Median Housing Unit Value ($)	39,600	44,600	53,900	47,300
Households Below Poverty Level (%)	4.3	6.5	8.4	9.6
High School Graduates (%)	66.7	67.5	66.5	66.5
Age 65 Years or Older (%)	7.9	10.2	11.0	11.3

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1 For details, see plates D-1 and D-2.

FLOOD HISTORY

The city of Loves Park lies in a very flat topographical area. When flows in Loves Park Creek rise above channel height, the overbank flooding tends to spread out over the flat, wide terrain. Also, inadequate or nonexistent storm sewers compound flooding problems due to the ponding of storm runoff, especially in the northernmost subreaches. The most recent flooding occurred in April 1973, 1975, and 1978 and in June 1974. The April 20, 1973, flood event caused an estimated $2,780,000 in total damage ($6,890,000 in 1988 price levels). The April 1978 flood caused an estimated $1,085,000 in damages ($1,850,000 in current prices), and was estimated to be a 2- to 5-year flood. The range of damages projected for a 3- to 5-year flood during the GDM studies is $1.7 to $4.3 million. Thus, the damage-frequency values determined for this report appear reasonable.

MOST PROBABLE FUTURE CONDITION

The most likely future condition in Loves Park (without project) will be the increased flood problems. The higher elevation areas southeast of Forest Hills Road are continuing to be developed for residential purposes. This will lead to greater runoff into the Loves Park Creek main stem, and the accompanying higher flood event water levels.

SECTION 3 - METHODS TO DETERMINE POTENTIAL FLOOD DAMAGE REDUCTION BENEFITS

INTRODUCTION

The city of Loves Park has a complicated, if not unique, flooding problem. The area through which Loves Park Creek passes is often at an inverse gradient to the streambank. Therefore, when rising flood waters overtop the channel bank, water inundates the lower elevation areas. In addition, land surface elevations are very inconsistent, so that water might go out-of-bank in one subreach and cause overland flooding in adjacent subreaches. Because of the complexity involved with the hydrologic and economic analysis, the study area was divided into six major reaches, with a total of 44 economic subreaches (plates D-1 and D-2). For details of hydrologic and hydraulic assumptions, refer to Appendix A - Hydrology and Hydraulics.

In 1984, the city of Loves Park completed construction of the Pebble Creek Dam, a retention reservoir on the South Branch of Loves Park Creek. With reference to Section 104 of Public Law 99-662, the benefits and costs of compatible (non-Federal) work will be considered in the economic evaluation of
** a Federal project. The existing (without-project) condition excludes the
** effects of constructing Pebble Creek Dam, and therefore, the benefits (and
** costs) of compatible work completed by construction (non-Federal) of the Pebble Creek Dam are included in the economic evaluation of the Loves Park Local Flood Protection Project.* Within this appendix, damage curves are presented showing with-Pebble Creek Dam frequencies and without-Pebble Creek Dam frequencies. Also, incremental justification for the Pebble Creek Dam construction is presented in tabular form (table D-13).

This study assumes that damages start with overbank flooding. The zero damage point in the damage analysis is the 2-year flood event (.5 probability of occurrence).

ANALYSIS OF POTENTIAL FLOOD DAMAGE

RESIDENTIAL STRUCTURES

Each home in the floodplain was surveyed to establish a ground elevation, first floor elevation, and a fair market value. This information was then analyzed using the standard residential damage computer program developed by the Rock Island District from post-flood surveys and flood insurance data. Content value is estimated to be 34 percent of a residential structure's value. Residential damage-frequency curves were constructed for each reach and subreach in the study area. Input data from the 1978 feasibility study (as discussed in the main report) were used as the basis for the General Design Memorandum analysis. This information was revised to reflect current conditions and values. Table D-3 depicts residential damages by reach for various flood event frequencies. In the city of Loves Park, 53 percent of all homes (2,529 out of 4,788) are located within the floodplain study area. These structures have an average value of approximately $42,000. Residential damage is the main concern of this analysis, as greater than 90 percent of annual damages is in the residential category.

* The credit analysis of the Pebble Creek Dam is provided in Appendix H.

TABLE D-3

Residential Damage by Reach [a]
Existing Conditions ($1,000's)

Frequency[b] W/O	W	Reach I	Reach II	Reach III	Reach VI	Total
.5	.5	0	0	0	0	0
.3	.2	0	2,345	0	1,852	4,197
.19	.1	58	3,228	1,478	2,099	6,863
.12	.05	75	4,006	1,732	2,219	8,032
.06	.02	109	5,727	1,975	2,347	10,158
.03	.01	113	6,297	2,134	2,674	11,218
.015	.005	120	9,403	2,587	6,350	18,460
.006	.002	133	11,811	3,232	8,382	23,558
.0025	.001	139	13,546	3,947	10,267	27,899

a Reaches IV and V have no residential damage.
b W/O = frequency without Pebble Creek Dam; W = frequency with Pebble Creek Dam. Reach VI unaffected by dam.

COMMERCIAL/INDUSTRIAL DAMAGE

Although damages to commercial/industrial establishments account for less than 10 percent of total average annual damage in the study area, a wide variety of enterprises exists in the Loves Park Creek floodplain. Included among the commercial businesses are: food stores; restaurants; hardware; lumber and building supplies; interior decorating; laundering; television and appliance; printing; office equipment; shoe repair; drugs; banking; clothing; motels; auto service and supply; auto sales; and liquor stores. Industrial concerns include: electronic controls; clutch and gear production; small engines; packaged food; metal bearings; water pollution controls; and miscellaneous metal products.

To establish depth-damage relationships, commercial/industrial information from the feasibility study was field-checked, revised, and updated to reflect current values and hydraulic conditions. New business construction was integrated into the analysis, based on field survey of elevations and damageable values. Damages by major reach and flood frequency are shown in table D-4.

TABLE D-4

Commercial/Industrial Damages
Existing Conditions ($1,000's)

Frequency[a] W/O	W	Reach I	Reach II	Reach III	Reach VI	Total
.5	.5	0	0	0	0	0
.32	.2	70	0	70	145	285
.2	.1	106	0	80	422	608
.11	.05	195	23	100	473	791
.06	.02	257	61	108	527	953
.03	.01	320	77	121	557	1,075
.016	.005	373	186	127	658	1,344
.005	.002	466	2,637	151	746	4,000
.003	.001	734	3,993	163	834	5,724

a With and without Pebble Creek Dam; Reach VI unaffected by dam.

PUBLIC DAMAGE

Public properties in the project study area include four parks, six public schools, city hall, a public library, and a fire station. Public structural damage is relatively minor (less than 1 percent) in relation to total project damages. In addition to structural damage from recurrent flooding, the city of Loves Park incurs flood-related costs for street and channel cleanup and repair, silt and debris cleanup, and equipment and contractor assistance during flood events. Because of the "flash-flood" nature of problems along Loves Park Creek, predicted crests and preventative emergency measures are generally not possible.

FUTURE CONDITIONS

Hydrology Changes

New construction is expected to continue in the Loves Park Creek main stem watershed, resulting in greater runoff, higher water levels, and increased damages. As mentioned previously, the area southeast of Forest Hills Road is being developed for residential purposes. This development will continue over a projected 30-year period. Based on analysis of future hydrology, damages will increase only moderately (0.27 percent annually) during this development period. Reaches I, II and III will be affected by higher water levels in the Creek's main stem (Reaches IV-VI unaffected). Residential damages will increase under a future hydrology scenario. Future commercial/industrial damage increases in the main stem area are considered insignificant. Table D-5 details average annual damages under existing and future land-use conditions.

Residential Content and Commercial/Industrial Expansion

The residential affluence concept refers to an increase in accumulated housing content value over time. Based on current OBERS projections for per capita income growth, residential content value is projected to increase 1.35 percent annually to 75 percent of structural value from the present 34 percent. The content value is projected to reach its maximum (75 percent) after 59 years. Thus, damages to residential contents will increase over time in the without-project condition.

The feasibility study indicated a moderate industrial growth projection (4 percent annual), with an insignificant growth scenario for commercial enterprise. However, based on field checks and current projections,[2] both commercial and industrial facilities are likely to expand under a low growth scenario into the next century. A 2-percent[3] annual expansion rate has been assumed for commercial/industrial properties. This rate is projected for a 30-year period, a reasonable limit on growth projections. The 2-percent growth rate has been assumed, even though it is significantly less than the 4-percent projection used in the feasibility study. The Rockford metropolitan area, of which Loves Park is a part, is undergoing fundamental economic changes, as activity shifts away from the industrial manufacturing sector. (It should be noted that the city of Loves Park has had recent significant commercial growth activity in selected areas.) Therefore, the low growth scenario, based on current OBERS projections, provides a reasonable and conservative assumption for estimating the future growth of commercial/industrial activity in the Loves Park study area. (Refer to table D-5 for detail of annual damages with affluence and future growth projections.)

SECTION 4 - BENEFIT-COST ANALYSIS

Throughout this analysis, benefits and costs are stated in January 1988 price levels. A 100-year project life and a discount rate of 8-5/8 percent are used to amortize costs and discount benefits to a common time period. Interest during construction was calculated based on a 5-year construction period. Annual operation and maintenance charges were added to amortized first costs to determine total annual charges to be compared with annual benefits.

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2 1985 OBERS Regional Projections, weighted average projected growth rate for manufacturing, wholesale and retail trade, and services.

3 Ibid.

TABLE D-5

Damage Reduction Benefits
by Category and Time Period
(100-Year Project, 8-5/8%)

Year**	Residential Structure	Residential Content	Commercial/ Industrial	Public +	Total
1990	1,702.0	1,084.0	236.0	56.0	3,078.0
1994	1,702.0	1,143.0	255.0	56.0	3,156.0
2004	1,702.0	1,307.0	310.0	56.0	3,375.0
2014	1,702.0	1,495.0	378.0	56.0	3,631.0
2024	1,702.0	1,710.0	426.0	56.0	3,894.0
2034	1,702.0	1,956.0	426.0	56.0	4,140.0
2044	1,702.0	2,236.0	426.0	56.0	4,420.0
2094	1,702.0	2,391.0	426.0	56.0	4,575.0
Discounted at 8-5/8% (Existing Land-Use Conditions					
1990	1,702.0	1,084.0	236.0	56.0	3,078.0
1994	1,702.0	1,143.0	255.0	56.0	3,156.0
1994-2094	1,702.0	1,371.0	321.0	56.0	3,450.0
Discounted at 8-5/8% (Future Land-Use Conditions)					
1990	1,702.0	1,084.0	236.0	56.0	3,078.0
1994	1,720.0	1,155.0	255.0	56.0	3,186.0
1994-2094	1,768.0	1,407.0	321.0	56.0	3,552.0

+ Includes structural damage, and cleanup/repair of public facilities.

BENEFIT ANALYSIS

FLOOD DAMAGE REDUCTION

Benefits accruing to the reduction of flood damages are computed as the difference between with- and without-project average annual damages. Table D-6 presents a summary of the benefits and the residual (with-project) damages for the 100-year channel improvement project. Table D-7 details existing and future flood damage reduction benefits by category and time period.

TABLE D-6

Average Annual Benefits ($1,000's)
Flood Damage Reduction
100-Year Project Design

Category	Benefits Existing	Benefits Future	Benefits Total	Residual Damage	Average Annual Damage
Residential	2,415.0	278.0a	2,693.0	482.0	3,175.0
Commercial/Industrial	199.0	50.0	249.0	72.0	321.0
Public	45.5	--	45.5	10.5	56.0
Totals	2,659.5	328.0	2,987.5	564.5	3,552.0

a Affluence and Future Hydrology Condition

RESIDUAL DAMAGES

As indicated in table D-6, there will be residual damages in the with-project condition. Several northern and northwestern subareas experience damage from storm runoff due to inadequate or nonexistent storm sewer systems. In these reaches, overbank flooding is not a problem, and a channel project will not alleviate these interior drainage damages. Also, low probability storms (i.e., 200-year event) may result in some overbank flood damages.

TABLE D-7

Damage Reduction Benefits
by Category and Time Period
(100-Year Project, 8-5/8%)

Year	Residential Structure	Residential Content	Commercial/ Industrial	Public	Total
1990	1,462.0	903.0	184.0	45.5	2,594.5
1994	1,462.0	953.0	199.0	45.5	2,659.5
2004	1,462.0	1,089.0	242.0	45.5	2,838.5
2014	1,462.0	1,245.0	294.0	45.5	3,046.5
2024	1,462.0	1,423.0	331.0	45.5	3,261.5
2034	1,462.0	1,627.0	331.0	45.5	3,465.5
2044	1,462.0	1,861.0	331.0	45.5	3,699.5
2094	1,462.0	1,992.0	331.0	45.5	3,830.5
Discounted at 8-5/8% (Existing Land-Use Conditions					
1990	1,462.0	903.0	184.0	45.5	2,594.5
1994	1,462.0	953.0	199.0	45.5	2,659.5
1994-2094	1,462.0	1,143.0	249.0	45.5	2,899.5
Discounted at 8-5/8% (Future Land-Use Conditions) +					
1990	1,462.0	903.0	184.0	45.5	2,594.5
1994	1,478.0	962.0	199.0	45.5	2,684.5
1994-2094	1,518.0	1,175.0	249.0	45.5	2,987.5

+ Affluence and Future Hydrology Condition

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**Revised June 1990

FLOOD INSURANCE SAVINGS

The administration of the Flood Insurance Program is a national cost. Savings of this administrative cost can be credited to a project as a National Economic Development benefit if the project protects an area located in the 100-year (1 percent exceedence frequency) floodplain. It is assumed that all properties in the 100-year floodplain participate in the Flood Insurance Program and that coverage will be eliminated if flood protection is provided. Current annual administrative costs are estimated to be $85 per policy. With a total of 778 properties in the indicated floodplain, $66,100 in insurance cost savings would accrue to the proposed project annually.

ADVANCED REPLACEMENT OF BRIDGES

Benefits will accrue to the proposed project for the advanced replacement of bridges crossing Loves Park Creek. These structures will be replaced by hydraulically more efficient bridges as an integral part of the flood damage reduction project. Benefits were calculated for each bridge to be replaced based on extending the remaining useful life of the structure. It is assumed that the bridge currently yields annual benefits that are at least equal to amortized construction costs. These annual benefits (beyond existing bridge remaining life) were discounted to the base year and amortized over the project life (100 years, 8-5/8 percent).

Table D-8 lists the bridges to be replaced and the benefits derived for this advanced replacement. The total annual benefit for the 100-year design project is $37,900.

TABLE D-8

Advanced Replacement Benefits
Loves Park Bridges

Bridge Location	Construction[a] Cost ($)	Years of Remaining Life	Annual Replacement Benefit ($)
North Second Street	442,000	13	13,000
River Lane	221,000	8	9,840
Walker Avenue	157,100	8	6,990
Elm Street	159,100	8	7,080
Private Drive	121,500	33	680
Railroad Spur	70,300	36	310
Total			$37,900

a Includes E&D, S&A, and Contingencies

SUMMARY OF THE BENEFIT-COST ANALYSIS

Table D-9 presents the benefit-cost analysis for the 100-year levels of protection. The 100-year design project provides net benefits of $912,1000 and is the National Economic Development (NED) plan. This plan has a benefit-to-cost ratio of 1.4. Tables D-10 and D-11 present the calculations for annualizing project costs for the recommended 100-year design project.

TABLE D-9

Benefits and Costs Summary
(8-5/8%, 100-Year Life, January 1988 Prices, $1,000's)

	Item	100-Year
**	Annual Benefits-Total	$3,091.5
	Existing	(2,763.5)
	Residential Damage Reduction	2,415.0
	Commercial/Industrial	199.0
	Public	45.5
	Flood Insurance Savings	66.1
	Advanced Replacement	37.9
	Future	(328.0)
	Residential Affluence	190.0
	Commercial/Industrial Growth	50.0
	Future Hydrology Condition-Residential	88.0
	Cost Estimate:	
**	Federal	15,180.0
**	Non-Federal	7,218.0
**	Interest During Construction	2,861.0
**	Annual Charges-Total	2,179.4
**	Interest and Amortization	(2,154.9)
**	Operation and Maintenance	(24.5)
**	Net Annual Benefits	912.1
**	Benefit-to-Cost Ratio	1.4

PEBBLE CREEK DAM BENEFIT-COST ANALYSIS

** The compatible work associated with the non-Federal construction of the Pebble Creek Dam has been integrated into the benefit-cost analysis for the Loves Park Local Flood Protection Project. Table D-12 summarizes the incremental benefit-cost analysis for the Pebble Creek Dam compatible work. The Pebble Creek Dam benefits are calculated as the decrease in average annual damages due to construction of the detention dam.

** TABLE D-10

Interest During Construction

100-Year Design Project - 8-5/8% Discount Rate

Year	Construction Expenditures (1,000's) Federal	Non-Federal(a)	Time to Base Year (Periods)	Interest Factor of $1 Deposited to Base Year	Accumulated Interest to Base Year (1,000's) Federal	Non-Federal	Total
1990	338.0	200,000	b	b	120.0	71.0	191.0
1991	1,500.0	2,100,000	b	b	364.0	509.0	873.0
1992	3,300.0	2,100,000	b	b	459.0	406.0	865.0
1993	5,700.0	2,039,000	b	b	375.0	416.0	791.0
1994	3,187.0	0	b	b	141.0	0	141.0
					1,459.0	1,402.0	2,861.0

** TABLE D-11

Summary of Annual Charges ($)

100-Year Design Project

(5-8/8%, 100 Year Life)

Description	Federal	Amount Non-Federal	Total
Estimated Economic First Cost	15,180,000	6,938,000[a]	22,118,000[a]
Interest During Construction	1,459,000	1,402,000	2,861,000
Total Economic Costs	16,639,000	8,340,000	24,979,000
Interest and Amortization (.08627)	1,435,400	719,500	2,154,900
Operation and Maintenance	0	24,500	24,500
Total Annual Charges	1,435,400	744,000	2,179,400

a Excludes $280,000 in relocation assistance payments, which are not considered in the economic analysis. First costs are established on page H-12.

b Periods and Interest Factors vary with Stage and Feature of Construction. Stages and Features are separable, so IDC has been calculated from start of item construction to date of beneficial completion.

TABLE D-12

Benefit and Cost Summary
Pebble Creek Dam

Compatible Work Cost	$499,000
Interest During Construction	22,000
Total First Cost	$521,000
Annual Cost (8-5/8%, 100 yrs)	$ 44,900
Annual Benefits	$831,000
Benefit-to-Cost Ratio	18.5
Net Benefits	$786,100

SECTION 5 - FINANCIAL ANALYSIS

TABLE D-13

Loves Park Creek Project
Cost Distribution

**	Total Project Cost Estimate		$22,398,000	
**	Federal Cost Estimate	$15,180,000		
	Non-Federal Cost Estimate			
**	Lands and Damages	$6,038,000		
	Pebble Creek Dam - LERRD Credit	(439,000)		(Completed work)
	Dam Construction - Pebble Creek	499,000		(Completed work)
	Minimum Cash Contribution			
**	(5% of $22,398,000)	1,120,000		
**	Total Non-Federal Cost Estimate	$7,218,000		
**	(32% of Total Project Cost)			

ABILITY TO PAY

Based on the provisions of Section 103 of Public Law 99-662, the city of Loves Park is able to provide its normal share of project costs. The analysis,
** illustrated in table D-15, is based upon the project benefit-to-cost ratio and the project-area per capita income. The city does not qualify for reduced cost-sharing.

** TABLE D-14

Ability to Pay Analysis

Project: Loves Park, Illinois

Annual Cost	$2,179,400	Cost & Benefits Are
Annual Benefits	$3,091,500	For Flood Control
Total Cost	$22,398,000	
Local Share	$7,218,000	
B/C Ratio	1.4	
State Factor	106.4	Sum of State & County Must Be Less
County Factor	99.39	Than 163.2. Sum Is 205.43
Not Qualified		
Base Benefits Floor	35%	1/4 Benefit-Cost Ratio
% Local Share	32%	
EF	-3.74	Eligibility Factor

Not Qualified

FINANCIAL CAPABILITY

The city of Loves Park has the willingness and capability to finance its share of the cost of constructing this local flood protection project. As indicated by the city's financing plan (included with the draft Local Cooperation Agreement in Appendix F), Loves Park will meet its obligations through the following sources.

	Source	Amount
	Pebble Creek Construction - Completed	439,000
	Pebble Creek Dam LERRD - Completed	60,000
	City Drainage Fund	$1,128,000
	Illinois Department of Transportation	400,000
**	Illinois Water Resources Division	2,200,000
**	Debt Instruments	2,991,000
**	Total Non-Federal Cost Estimate	$7,218,000

The city of Loves Park has no long-term debt outstanding, has a bonding capability in excess of $7 million, and has substantial cash reserves. Therefore, the financing of additional cash requirements through the use of debt instruments should have no negative impacts on the city.

SECTION 6 - SOCIO-ECONOMIC IMPACTS

Discussion of Impacts

The socio-economic impacts associated with providing flood protection at Loves Park, Illinois, generally would be positive. Affected residents would experience an increase in community cohesion and would be less likely to move to other parts of the city or region. Services to and from the affected area would be better maintained, and public facilities would benefit from reduced damages. The project would increase the economic viability of the area and could result in increased property values and related tax revenues. The community also would benefit from reduced life, health, and safety risks faced by residents during flood events.

The project would necessitate the relocation of eight households. In considering the impact of relocation, knowing the number of persons to be moved is not enough to assess the socio-economic impact: the individual's income, age, and other characteristics influence his or her ability to adjust to relocation. Specific data for the residents who would be relocated with the proposed project were not available for this analysis; therefore, demographic data for the entire Loves Park area were examined for the following variables:[4]

(a) Income - The 1985 median household income for residents in Loves Park was estimated at $28,900. Less than 18 percent of community households were estimated to have incomes less than $15,000; and

(b) Age - Less than 7 percent of the Loves Park population was estimated to be over 64 years of age in 1985; and

(c) Race - Approximately 3.2 percent of the 1985 population in the Loves Park area was comprised of minority members.

Based on these data, it is probable that residents affected by project-related relocation would be less than 65 years of age, middle class, and non-minority members. Research has shown that individuals possessing these characteristics are most able to adjust to the impact of relocation; they are unlikely to experience economic hardships due to disruption of public transportation

---

4 Claritas, REZIDE, The National Encyclopedia of Residential ZIP Code Demography, 1980 & 1985.

services and facilities or to experience stress due to isolation from stress-handling and social control systems (e.g., family, friends, church).5 Given the small number of relocations required, its effect on the population should not be significant.

The project also would require the relocation of five businesses. Opportunities exist for these businesses to relocate to similar structures or to new constructions within the city. The small number of commercial relocations anticipated would not significantly affect commercial activity in the project area.

A more detailed discussion of socio-economic impacts is provided in the Environmental Assessment, Appendix E.

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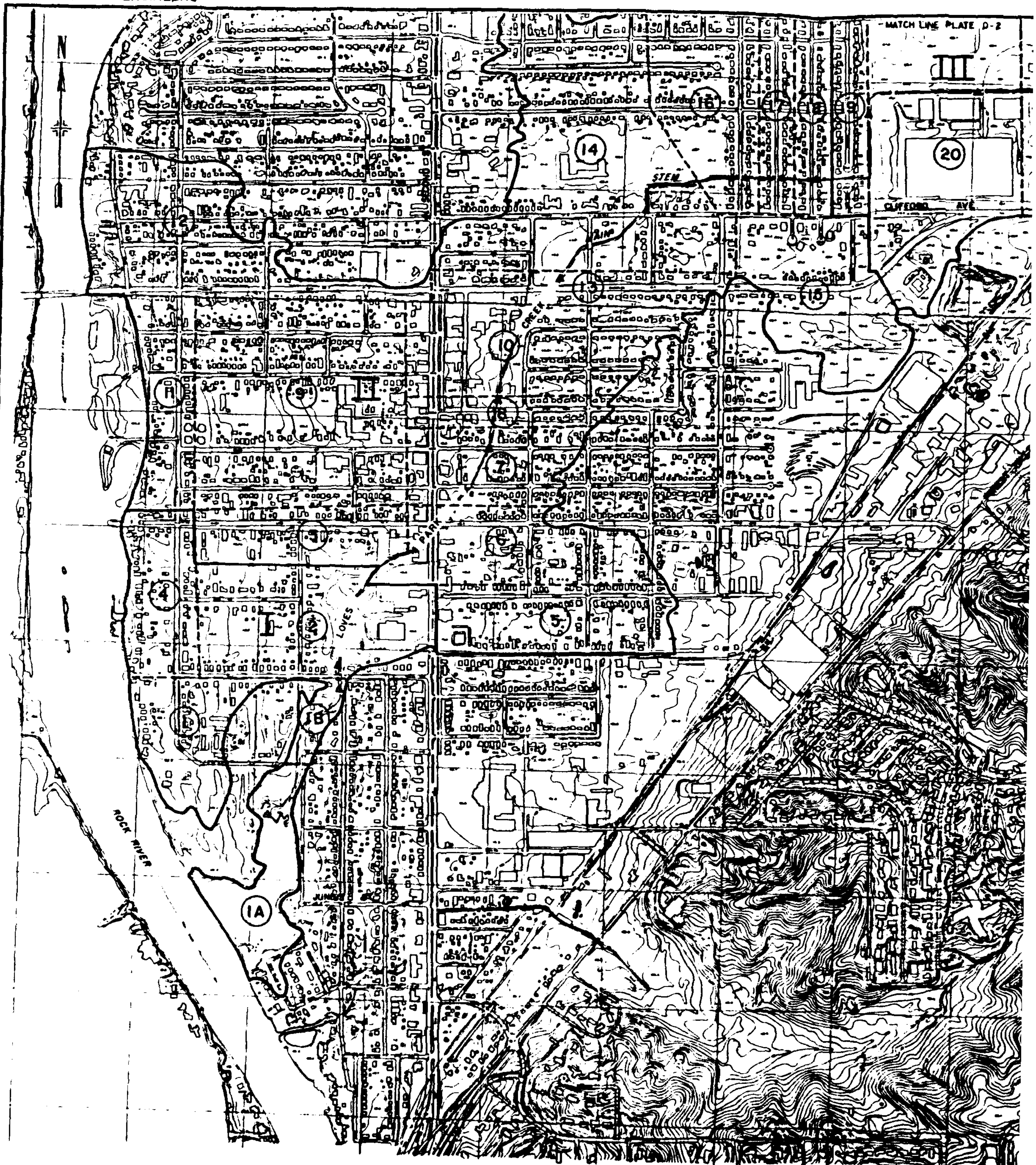
5 Illinois Department of Transportation, Socio-Economic Impact Assessment Manual, 1976.

CORPS OF ENGINEERS



I-VI ECONOMIC REACHES (SUMMATION OF VARIOUS SUBAREAS)

ECONOMIC REACH BOUNDARIES

ECONOMIC SUBAREA BOUNDARIES

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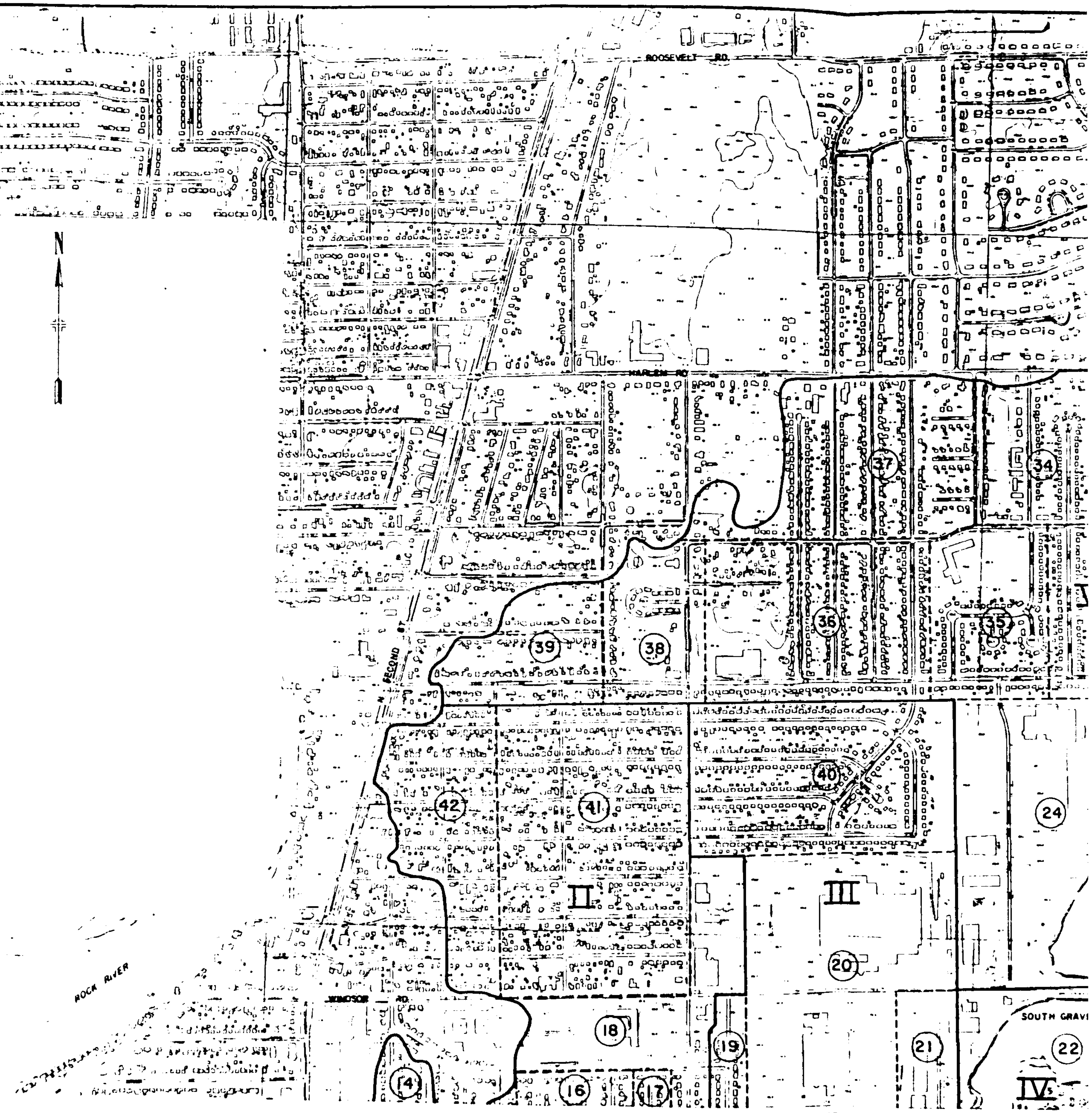
CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
ROCK ISLAND, ILLINOIS

SUBMITTED:
OWEN AYRES & ASSOC.
EAU CLAIRE, WISCONSIN
APPROVED:
DATE: ______

LOVES PARK CREEK
LOVES PARK, ILLINOIS
STREAM FLOOD CONTROL
ECONOMIC SUBAREAS

PLATE D-1



MATCH LINE PLATE D-1

I-VI ECONOMIC REACHES (SUMMATION OF VARIOUS SUBAREAS)

ECONOMIC REACH BOUNDARIES

ECONOMIC SUBAREA BOUNDARIES

LOVES PARK CREEK FLOOD CONTROL ECONOMIC SUBAREAS

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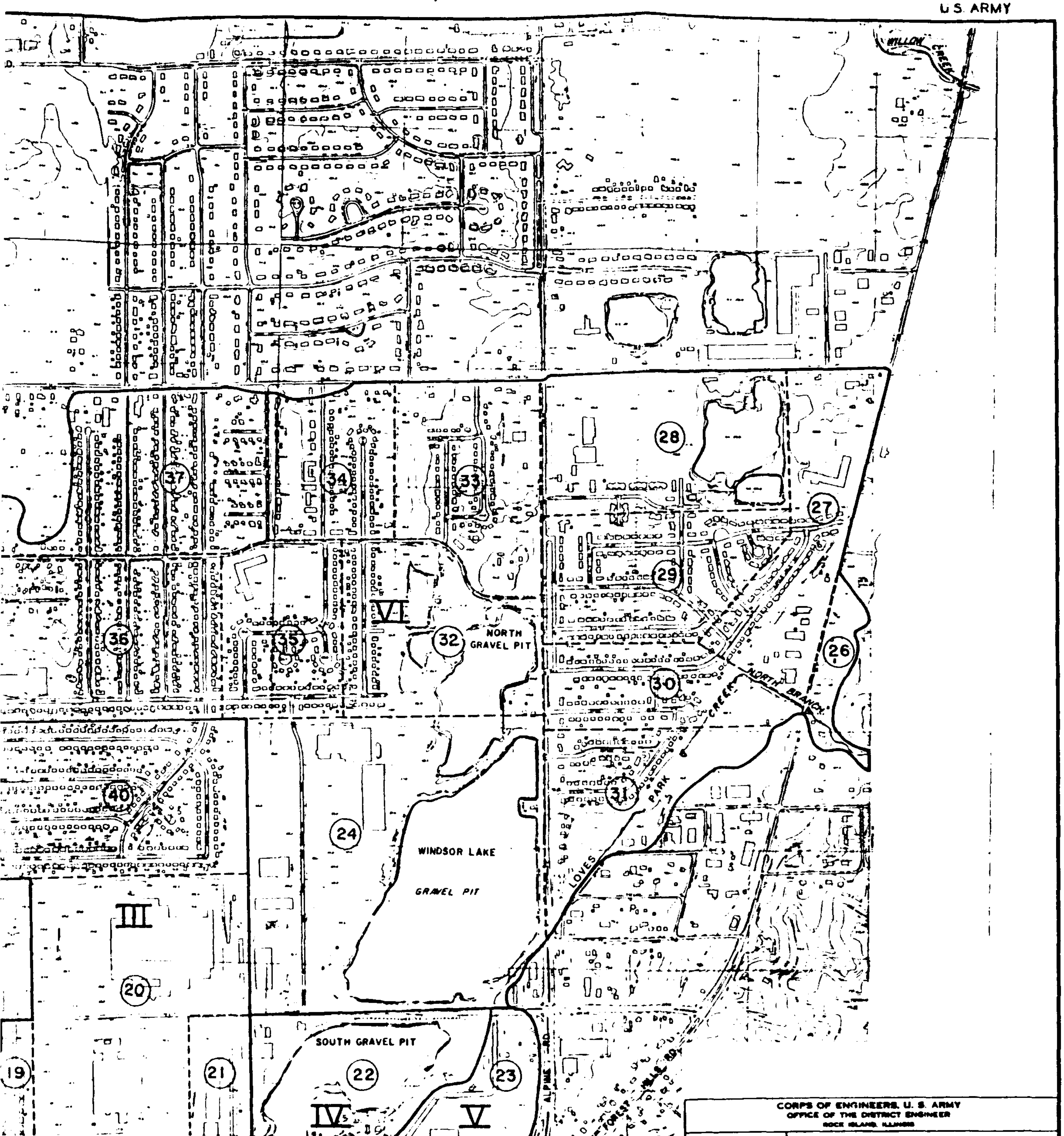

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CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
ROCK ISLAND, ILLINOIS

SUBMITTED: OWEN AYRES & ASSOC. EAU CLAIRE, WISCONSIN

APPROVED:

DATE

LOVES PARK CREEK

LOVES PARK, ILLINOIS

STREAM FLOOD CONTROL ECONOMIC SUBAREAS

PLATE D-2

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX E

ENVIRONMENTAL ASSESSMENT

ROCK ISLAND DISTRICT
CORPS OF ENGINEERS
CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS 61201

LOVES PARK CREEK
LOVES PARK ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX E
ENVIRONMENTAL ASSESSMENT

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GENERAL DESIGN MEMORANDUM

APPENDIX E
ENVIRONMENTAL ASSESSMENT

I. PURPOSE AND NEED FOR ACTION.

The purpose of this project is to provide flood protection to the city of Loves Park. The city is located just north of Rockford in Winnebago County, Illinois. Flood protection is needed to prevent damages caused by flooding from Loves Park Creek including its north and south branches. It is estimated that the 100-year flood event would cause $12.3 million in damages and affect 724 homes, 41 commercial firms, 7 industrial firms, and 7 public facilities including the post office, a fire station, the Loves Park Police Station, and 4 schools. The average annual damages from flooding are $2.4 million.

Past studies have included a Feasibility Report and Environmental Impact Statement (EIS), dated February 1979. In December 1986 the Corps of Engineers, Rock Island District completed a General Reevaluation Report (GRR) and Environmental Assessment. It updated the original plan in the Feasibility Report, making certain modifications but keeping with the principal concept of channel flowage improvements, the partial diversion, and temporary storage of floodwaters. The current Corps study is a General Design Memorandum, which represents the final design phase of the project. This EA addresses those changes proposed in the current study to the plan that was recommended in the 1986 General Reevaluation Report.

II. PROJECT DESCRIPTION.

The 1986 General Reevaluation Report recommended a plan that called for protection up to the 100-year flood for an intensively developed portion of the city of Loves Park. The plan included approximately 17,350 lineal feet of channel improvements (increasing the flowage capacity), partial diversion of floodwaters into Windsor Lake and the South Gravel Pit for temporary storage. The partial diversion includes inlet channels to the ponding areas, an interconnecting channel between the ponding areas, a 75,000 gallon a minute pumping station, and an outlet channel from the South Gravel Pit to Loves Park Creek.

The plan recommended in the current study is essentially the same as that proposed in the General Reevaluation Report but proposes a number of changes. These changes are described as follows:

A. The current study proposes to include using a third (North) Gravel Pit for floodwater storage. Originally only the South Gravel Pit and Windsor Lake were to be used: However, partial filling has resulted in the loss of the needed storage area. The North Gravel Pit would be connected to Windsor Lake by three 5-foot-diameter, 200-foot-long culverts. The invert elevation of 121.5 was chosen to allow for floodwater storage and also to isolate the North Gravel Pit during normal low water table fluctuations on Windsor Lake.

B. A new alignment also would be provided for the South Branch diversion, the pump station, and the outlet channel. This new alignment would combine the inlet and outlets at the South Gravel Pit into one structure, thus eliminating the need to relocate two businesses and to build two new bridges and an inverted syphon. The amount of land required for the project would thus be reduced.

C. It is also proposed to change the various types of channel linings and their locations. Previously the 1986 Reevaluation Report plan called for 17,350 feet of channel improvements. This included 10,680 lineal feet (l.f.) of concrete-lined, 5,370 l.f. of grass-lined, and 1,300 l.f. of riprap-lined channel. Channel improvements would now total 16,800 lineal feet to include 10,600 l.f. of concrete-lined, 3,900 l.f. of grass-lined, and 2,300 l.f. of concrete paver-lined channel. 1,100 l.f. of underground pipeline would also be constructed.

Concrete-paver consists of interlocking blocks. Spaces between the blocks are designed to fill with dirt and allow vegetation to become established. This type of channel liner would provide a flat more aesthetically pleasing ground surface than riprap and will be able to withstand higher water velocities than grass-lined channel.

D. The disposal of approximately 172,000 cubic yards of channel material would be placed at 6 possible locations, with an abandoned gravel pit considered the most likely site. Based on soil sediment analysis of the material in Loves Park Creek, the Illinois Environmental Protection Agency has made certain recommendations. (See Appendix A-1, "Pertinent Correspondence".) These have been incorporated into the current project plans as follows:

The excavation of sediment would be conducted at low or zero stream flow. In order to reduce spillage, appropriately designed equipment would be used to haul the material to the disposal site. In addition, the excavated material would be placed on normally dry ground within the pit. The material would be capped with channel material excavated at and upstream of bulk sediment test sites LPC-NB and LPC-SB (see Enclosure 3 - Bulk Sediment Testing), where concentrations of contaminants were generally lower. The disposal site then would be shaped to promote runoff and revegetated.

* E. The pumping capacity of the storage areas has been downsized from 3
* pumps that pump a total of 75,000 GPM to 2 pumps that pump a total of 16,300
* GPM. This will increase the pumpdown time from 3 to 5 days for the 100 year
* event. The pumpdown could increase to 7.75 days if a high water table allows
* seepage into the gravel pits at the same time as the 100 year event.

* F. The reevaluation report recommended the removal of one, the removal
* and replacement of seven, and the construction of 3 new highway or railroad b

* bridges. The current plan calls for the elimination of the 3 new bridges and
* one removal and replacement bridge. It also calls for the removal of one and
* the removal and replacement of two pedestrian bridges. Locations of the
* various project items can be found in the plates of the main report.

III. ALTERNATIVES.

A. No Action. Under this alternative no federal construction or other actions would take place and no flood protection benefits would occur.

B. Implementation of Project "Without" Design Changes. Under this alternative the project would be implemented without changes as proposed in the 1986 Reevaluation Report. This alternative is not practical because it does not take into account the current need for additional floodwater storage nor does it allow for the more favorable solutions in type of channel linings or in the inlet-outlet relocations to and from the South Gravel Pit.

C. Implementation of Project "With" Design Changes. This is the preferred alternative and is described under project description.

IV. AFFECTED ENVIRONMENT.

A. Natural Resources. The major portion of Loves Park Creek flows through residential, commercial, and industrial areas where it has been altered and channelized. Nearly all the native vegetation has been replaced by mown lawns and scattered, cultivated trees and shrubs. The few remaining patches consist of occasional trees and shrubs along the streamside with an understory of mixed grasses and forbs. Dominant tree species include elm, box elder, willow, mulberry, and cottonwood.

The portion of Loves Park Creek from its mouth to Evelyn Avenue, a distance of approximately 650 feet, provides a diverse habitat. About 4 acres of wetland occurs at the mouth, dominated by arrowhead and cattail. The upstream end of the wetland grades into the streambed surrounded by forest consisting of willow, elm, box elder, hackberry, cottonwood, and mulberry.

The South Gravel Pit area has been heavily disturbed. Much of its shoreline has been filled in. Adjacent land consists of barren ground or sparse vegetation. Small patches of mature cottonwoods occur at a few isolated spots around the gravel pit.

Windsor Lake and the North Gravel Pit are less disturbed than the South Gravel Pit, although the western side of Windsor Lake has been developed into an industrial-commercial park and its south side has been partially filled in. Their banks are generally steep but well vegetated consisting of a mixture of wooded areas with open spaces of grass and forbs. The majority of trees are immature with single or small stands of mature ones scattered along the top of the banks. The dominant tree is Siberian elm. Other species include box elder, willow, and cottonwood.

* Revised September 1989

Six disposal sites for the emplacement of channel cleanout have been identified. Site 1 is an old landfill and Site 2 is a mown lawn in an industrial area. Sites 3, 4, and 5 are agricultural lands planted in row crops within the urban area of Loves Park. Site 6 is an abandoned gravel pit. The majority of this site contains unvegetated fill or low-cut ground cover. Two 3-acre patches of cattail also occur at the bottom of the pit, with one of the patches containing an additional one-half acre of open water. Young to middle-aged trees consisting of cottonwood, box elder, and Chinese elm occur along the southern and eastern slopes of the gravel pit. The placement of spoil at Site 6 will be limited to areas of existing fill. No material would be placed in the open water or cattail marshes.

Terrestrial animal species that would typically be found within the project area include those adapted to urban conditions. These include the cottontail rabbit, squirrel, opossum, groundhog, raccoon, and various songbirds.

The mouth of Loves Park Creek, with its abundant vegetation, provides good habitat for a variety of reptiles and amphibians, as well as fur-bearing mammals. This site probably also serves as spawning habitat and a protective cover area for juvenile fishes. Upstream of the mouth, the creek is seasonal and provides little or no habitat for fish or for spawning. A fishery survey in 1974 of Windsor Lake found it contained predominantly largemouth bass and pumpkinseed sunfish. Bluegill and bullheads also were recorded. The North and South Gravel Pits, based on their similar habitat, are also likely to contain these species.

Waterfowl, such as the mallard and blue-winged teal use the mouth of Loves Park Creek because of its cover and food sources. The gravel pits to a limited extent are also utilized by waterfowl.

B. Cultural Resources. A cultural resources reconnaissance survey was conducted by the Great Lakes Archeological Research Center, Inc. The results of this investigation are described in a report entitled Cultural Resources Reconnaissance, Loves Park, Illinois, Interim 2, Flood Feasibility Study (Van Dyke and Overstreet 1977). This study addressed both the historic and prehistoric cultural resources within the proposed study area. No significant cultural resources were identified within impact areas as a result of the study. In a letter dated 12 September 1978, the Illinois State Historic Preservation Officer determined that the original plan would have no effect on significant cultural resources.

Since the initial cultural resources survey, a number of minor changes and additions have been made to the original plan. Additions to the plan include six alternative disposal areas. Other modifications to the original plan include: (1) moving the diversion structure that connects the North Branch of Loves Park Creek and Windsor Lake; (2) changing the inlet and outlet structure location that connects the southern gravel pit and creek; (3) use of the northern gravel pit.

In an effort to evaluate the effect the proposed changes may have on cultural resources, Rock Island District Archeologists visited the project area on 5 February 1986. As a result of this visit, it was determined that two of the six proposed disposal areas contained no significant cultural resources. In addition, the diversion and outlet structure modifications and use of the north gravel pit will have no effect on significant cultural resources. However, proposed alternative disposal areas 2, 3, 4, and 6 required an archeological reconnaissance survey to determine if significant cultural resources were present. The Illinois State Historic Preservation Officer concurred with these findings on 3 March 1986. On 23 April 1986, the District Archeologist conducted an archeological reconnaissance of the remaining disposal sites. No significant cultural resources were encountered, and it was recommended that the selected plan for flood control at Loves Park would have No Effect on significant cultural resources. The SHPO concurred with these findings on 28 May 1986 (see appendix EA-1). Minor changes to the project being addressed by this E.A. are all within previously disturbed and surveyed areas. There are no significant historic properties present in the project area.

V. ENVIRONMENTAL CONSEQUENCES OF PREFERRED ACTION.

The effects of the proposed changes are summarized on Table EA-1.

A. Social Impacts of Preferred Action.

1. Noise. The project plans as proposed in the 1979 Feasibility Report and the 1986 General Reevaluation Report would temporarily increase noise levels during construction of the project. The proposed changes of this report would not significantly alter the amount or locations of construction and there would be essentially no change in noise levels.

2. Displacement of People. The present plan calls for the removal of
** 8 residences and 5 business sites. The GRR called for the removal of 9
** commercial establishments and 9 residences. Therefore the proposed changes would have a slight positive effect.

3. Aesthetic Values. Temporary adverse impacts would result in grass-lined channels until the vegetative cover can be restored. The riprap- and concrete-lined channels, which were proposed in the 1986 Reevaluation Report, would result in long-term negative impacts. The proposed changes would replace the riprap with concrete paver and also lessen the amount of concrete lined channel, thereby partially reducing the long-term impacts.

4. Community and Regional Growth. No significant short-term or long-term impacts to the growth of the community or region would result from the project. Long-term impacts to the immediate project area would be more pronounced than impacts to the city as a whole. Provision of flood protection could bring an end to any migration of neighborhood residents to other parts of the city or region.

**Revised June 1990

TABLE EA-1

Effects of the Proposed Changes to the Recommended Plan on Natural and Cultural Resources

Types of Resources	Authorities	Evaluation Of Effects 1/
Air Quality	Clean Air Act, as amended (42 U.S.C. 1857h-7 et seq)	No Significant Effect
Areas of Particular Concern Within the Coastal Zone	Coastal Zone Management Act of as amended (16 U.S.C. 1451 et seq)	Not Present in Planning Area
Endangered and Threatened Species Critical Habitat	Endangered Species Act of 1973, amended (16 U.S.C. 1531 et seq)	No Effect
Fish and Wildlife Habitat	Fish and Wildlife Coordination (16 U.S.C. 661 et seq)	No Significant Effect
Floodplains	Executive Order 11968, Flood Management	No Significant Effect
Historic and Cultural Properties	National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq)	No Effect
Prime and Unique Farmland	CEQ Memorandum of 1 August 1980; Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act	No Effect
Water Quality	Clean Water Act of 1977, as amended (33 U.S.C. 1251 et seq)	No Significant Effect
Wetlands	Executive Order 11990, Protection of Wetlands, Clean Water Act of 1977, as amended (42 U.S.C. 1857h-7 seq)	No Significant Effect
Wild and Scenic Rivers	Wild and Scenic Rivers Act, as amended, (16 U.S.C. 1271 et seq)	Not Present in Planning Area

1/ If a type of resource is not present in the planning area, enter "Not present in the planning area." If a type of resource is not affected, enter "No effect."

5. Community Cohesion. Most of the project would consist of widening the existing channel, thereby minimizing the disturbance to existing neighborhoods. Although some residents would be displaced, the project would be expected to solidify and improve community cohesion by reducing the incidence of flooding; floodwaters acting as a barrier separating the eastern and northern portions of the city from the central business district would be reduced, allowing for uninterrupted interaction between the various parts of the city. The proposed changes would not alter the overall effect of the previous 100-year flood protection plan.

6. Life, Health, and Safety. The provision of flood protection would minimize life, health, and safety risks faced by Loves Park residents affected by Loves Park Creek. In particular, the project would reduce the infrequent incidence of seepage entering basements. The project would, therefore, help eliminate the health and other risks associated with standing water in residential or other structures.

B. Economic Impacts of Preferred Action.

1. Property Values and Tax Revenues. Property values could increase following construction of the proposed flood control project. Related tax revenues could be affected by any change in property values. Any resulting increase in tax revenues would help offset the tax losses associated with the removal of real estate from the tax rolls for project use.

2. Public Facilities and Services. Services to and from the affected area would improve as a result of the reduced incidence of flooding with the project. An unquantified benefit resulting from the project would be uninterrupted fire and ambulance services; during times of flooding, ambulances currently must drive at reduced speeds, slowing response times. Additional benefits would accrue from reduced damages to six schools, four parks, a public library, and Loves Park Police Station..

3. Employment/Labor Force. The proposed project would not affect the permanent employment or labor force of the city of Loves Park. However, the project temporarily would increase area employment during the construction phase.

4. Business and Industrial Activity. Changes in business and industrial activity would be universal. The increase in business activity occurring from the temporary infusion of construction workers would be absorbed into the area without long-term effect.

Construction of the project would necessitate the relocation of 5 business locations. The number of relocations is not of a large enough size to have a significant effect on the population or commercial activity of the project area. Opportunities exist for these businesses to relocate to similar structures or new constructions within the city of Loves Park. Therefore, any adverse affects to these businesses would be minimal.

Farm Displacement. Past studies included the use of 30.9 acres of farmland as potential spoil sites for excavated channel material. The proposed changes of the current study would affect no additional farmlands.

C. Environmental Impacts of the Preferred Action.

1. Man-Made Resources. The proposed changes would result in the addition of a third abandoned gravel pit, the North Gravel Pit, to be used for the temporary storage of floodwater.

2. Natural Resources. The realignment of the diversion channel into and the outlet channel from the South Gravel Pit would have little affect on project impacts. Both the new and former alignments fall within an industrial area consisting of mostly mown grasses and forbs and of barren ground. These areas receive heavy human disturbance and have very limited value for wildlife. The new alignment would lessen the overall impacts by combining the diversion and outlet channels thereby reducing the amount of land that would be required for channel construction.

Approximately 2300 feet of concrete paver-lined channel would replace 80 feet of concrete-lined, 1470 feet of grass-lined, and 1300 feet of riprap-lined channel with 550 feet of channel being eliminated through the combining of the inlet and outlet channels to and from the South Gravel Pit and through the use of underground pipeline. Grass-lined channel will be maintained in all places where water velocities are low enough to permit this. Spaces between the interlocking blocks of the concrete paver are designed to allow for dirt fill to accumulate and the establishment of vegetation. This will provide for a somewhat similar habitat quality as that of the grass-lined channel and improve upon that of the riprap- and concrete-lined channel being replaced.

* The change in pumping capacity would increase the inundation time from the
* original 3 days to between 5 and 7.75 days for the 100 year event. Most
* vegetation would remain relatively unaffected or would recover within a short
* period. The general lack of emergent aquatic or other thick ground cover
* along the immediate shoreline prevents its heavy use by wildlife for nesting
* or cover. For these reasons, impacts from ponding should be negligible.

Spoil from channel cleanout would result in the temporary loss of vegetation at the placement site until the areas can be reseeded. All six potential sites have been heavily disturbed and currently support little nesting or cover habitat for wildlife.

Sand and gravel provide an important natural resource within the Loves Park vicinity. At this time commercial quarrying occurs along the less developed edges of the city. The proposed project would require the use of three gravel pits (the North and South Gravel Pits and Windsor Lake) for flood water storage and a fourth for the placement of spoil. All four are abandoned and filling to some extent has occurred in 3 of them. All four are also within intensively developed portions of Lakes Park and the reuse of these areas for commercial quarrying would no longer be compatible with the surrounding land

* Revised September 1989

use. At this time no impacts to sand and gravel resources should occur as a result of the project or the proposed changes.

** The section of Loves Park Creek from Evelyn Street to downstream would be
** subject to increased erosion. This is the downstream point where construction
** of the widened and hardened creek channel ends. Erosion may occur at around
** the 10 year level and would vary in intensity depending on the size of the
** flood level. Erosion is expected to scour within the immediate channel bed
** and cause the loss of small to medium sized elm, box elder, mulberry, and
** cottonwood trees.

** No significant losses to floodplain forest are anticipated. The affected area
** would remain relatively small and the tree species lost are typical to the
** area. No critical or sensitive sites would be affected. Human disturbance
** from the adjacent urban areas further limits its value as wildlife habitat.
** The site of potential scour lies close to the Rock River and has a fairly low
** gradient. The resultant scouring or deepening would likely result in a change
** from bottomland forest to a herbaceous wetland. Such a conversion would
** create greater edge effect and habitat diversity, and would offset losses to
** the trees.

** Public Law 99-662, The Water Resources Development Act of 1986, requires that
** impacts to bottomland hardwoods be mitigated in-kind, to the extent possible.
** The project area is located within the city limits of Loves Park. Because of
** heavy urban development, no sites have been identified for in-kind mitigation.
** The feasibility study and EIS, dated February 1979, proposed channel cleanout
** and riprap placement for the wooded area from Evelyn Avenue to 570 feet
** downstream. This GDM and EA proposes that no channelization take place in
** this area, so that habitat of either bottomland forest or herbaceous wetland
** may be maintained and impacts are minimized.

3. Air Quality - Minor, temporary impacts would occur from the exhaust and dust of construction equipment. The proposed changes would have no noticeable affect to the overall project impacts.

4. Water Quality. A water quality report was conducted for the 1979 Feasibility Study. It concluded that water from the gravel pits would have no effect on the ground water. The surface water of the creeks were also sampled and did not exceed any limits in Illinois Water Pollution Regulations.

In October 1986 bulk sediment samples were taken at 5 sites along Loves Park Creek. Samples taken along the north and south branches above their diversions into the gravel pits indicated no elevated concentrations of contaminants. Based on the above studies, the diversion of flood waters and their storage into the gravel pits is not anticipated to have a significant affect on groundwater quality.

In bulk sediment sampling sites downstream of the gravel pits, elevated concentrations of arsenic and mercury were found in single samples each. Based on the precautions taken, as described for sediment disposal under "Project Description" of this EA, impacts to water quality from channel cleanout and disposal should be minimal.

**Revised June 1990

5. Water Conservation. The project with its proposed changes would not significantly affect water conservation.

6. Cultural Resources. The proposed project will have no impact on any significant historic properties.

VI. ENVIRONMENTAL IMPACTS OF NONPREFERRED ALTERNATIVES.

A. No Action. Under this alternative, no action would be taken and impacts resulting from project construction would not occur.

B. Implementation of Project "Without" Design Changes. Impacts would be similar to that of the proposed plan with the exception that the North Gravel Pit would not be used.

VII. PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED.

The proposed changes would result in the use of the North Gravel Pit as an additional ponding area. The storage of floodwaters would adversely affect both plants and animals living along its shoreline.

Channel construction would result in the disturbance to and loss of existing vegetation along Loves Park Creek. The use of concrete paver in place of riprap and the changes in the amounts of the types of channel, however, would not significantly change these impacts as proposed in previous plans.

VIII. RELATIONSHIP BETWEEN SHORT-TERM USE OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY.

There would be long-term disturbances to Loves Park Creek through channel construction. Periodic disturbances that would occur to the ponding areas through storage of floodwaters would also be long-term. These areas are heavily affected by the surrounding urban environment and are likely to continue to remain so. Therefore the proposed project should have little affect on the maintenance and enhancement of long-term productivity.

IX. ANY IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IF THE PROPOSED ACTION SHOULD BE IMPLEMENTED.

The commitment of manhours, fuel, and machinery to perform the project are irretrievable.

X. RELATIONSHIP OF THE PROPOSED PROJECT TO LAND-USE PLANS.

The majority of the project area is in urban development. The project is designed to protect residences, businesses, and industries and is compatible with the local land uses.

XI. COMPLIANCE WITH ENVIRONMENTAL QUALITY STATUTES. (A summary of compliance can be found in table EA-2.)

A. Endangered Species. Two federally endangered species are listed for Winnebago County, Illinois. These are the bald eagle (*Haliaeetus leucocephalus*) and the Indiana bat (*Myotis sodalis*) both of which are endangered. The project area has a highly developed nature and intensive human use. No suitable roosting, feeding, or nesting habitat occurs for either species and no impacts to the bald eagle or Indiana bat should occur.

B. National Historic Preservation Act. There are no significant historic properties present in any of the proposed project areas. Therefore the project may proceed in full compliance with this act.

C. Federal Water Project Recreation Act. Potential recreational improvements associated with the flood control features of the selected plan were considered. However, recreational improvements have been particularly discouraged by local interests. In addition, local interests have not expressed a willingness to cost-share in any recreational improvements.

D. Fish and Wildlife Coordination Act. The proposed changes would not have a significant effect on fish and wildlife resources. Coordination has been made with the U.S. Fish and Wildlife Service and the Illinois Department of Conservation.

E. Wild and Scenic Rivers Act. No wild or scenic rivers are in the project area.

F. Executive Order 11988, Flood Plain Management. The project plan will reduce flood damages and risks to existing structures and will not encourage development into undisturbed floodplain areas.

G. Executive Order 11990, Protection of Wetlands. The proposed plan would not significantly affect any wetlands.

** H. Clean Water Act. No significant impacts to water quality would occur. The project is covered under a Nation Wide Permit and no 404(b)(1) evaluation of the Clean Water Act is necessary. However, site specific 401 certification is required from the State of Illinois and will be obtained prior to the start of any construction.

** I. Clean Air Act. No violations of air quality standards should occur and air quality should not be significantly affected by this project.

**Revised June 1990

TABLE EA-2

Relationship of the Plan to Environmental Protection Statutes and Other Environmental Requirements

Federal Policies	Compliance
Archeological and Historic Preservation Act, 16 U.S.C. 469, et seq.	Full Compliance
Clean Air Act, as amended, 42. U.S.C. 1857h-7, et seq.	Full Compliance
Clean Water Act (Federal Water Pollution Control Act), 33 U.S.C. 1251, et seq.	Full Compliance
Coastal Zone Management Act, 16 U.S.C. 1451, et seq.	Not Applicable
Endangered Species Act, U.S.C. 1531, et seq.	Full Compliance
Estuary Protection Act, U.S.C. 1221, et seq.	Not Applicable
Federal Water Project Recreation Act, 16 U.S.C. 460-1(12), et seq.	Full Compliance
Fish and Wildlife Coordination Act, 16 U.S.C. 611, et seq.	Full Compliance
Land and Water Conservation Fund Act, 16 U.S.C., 460/-460/-11, et seq.	Not Applicable
Marine Protection, Research and Sanctuary Act, 33 U.S.C. 1401, et seq.	Not Applicable
National Environmental Policy Act, 42 U.S.C. 4321, et seq.	Full Compliance
National Historic Preservation Act, 16 U.S.C. 470a, et seq.	Full Compliance
Rivers and Harbors Act, 33 U.S.C. 403, et seq.	Full Compliance
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, et seq.	Not Applicable
Wild and Scenic Rivers Act, 16 U.S.C., 1271, et seq.	Full Compliance

NOTES

a. Full Compliance. Having met all requirements of the statute for the current stage of planning (either preauthorization or post-authorization).

b. Partial Compliance. Not having met some of the requirements that normally are met in the current stage of planning. Partial compliance entries should be explained in appropriate places in the report and referenced in the table.

c. Noncompliance. Violation of a requirement of the statute. Noncompliance entires should be explained in appropriate places in the report and referenced in the table.

d. Not Applicable. No requirements for the statute required compliance for the current stage planning.

XII. CONCLUSIONS.

The project would provide a 100-year flood protection level to the city of Loves Park. The General Design Memorandum provides a final design for the various construction items as well as updating the overall project to physical developments that have taken place since the 1986 Reevaluation Report. The proposed changes would cause no significant environmental, economic, or social impacts.

XIII. COORDINATION AND CORRESPONDENCE.

Coordination letters were sent to the following agencies:

- U.S. Fish and Wildlife Service
- U.S. Environmental Protection Agency
- Illinois State Historic Preservation Officer
- Illinois Department of Conservation
- Illinois Environmental Protection Agency

Copies of response letters can be found in Appendix EA-1 - Correspondence.

FINDING OF NO SIGNIFICANT IMPACT

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

Having reviewed the information provided by this environmental assessment, along with data obtained from cooperating federal, state, and local agencies and from the interested public, I find that the project changes proposed in General Design Memorandum for Loves Park Creek, Loves Park, Illinois, will not significantly affect the quality of the environment. Therefore it is my determination that a supplement to an Environmental Impact Statement is not required. This determination will be reevaluated if warranted by later developments.

Factors considered in making the determination that a Supplement to the February 1979 Environmental Impact Statement was not required are as follows:

A. The project will provide flood protection to the city of Loves Park.

B. The majority of habitat in the study area is limited in value because of its urban nature.

C. The changes proposed in the General Design Memorandum would not have a major effect on the projects overall design.

D. No significant recreational, environmental, cultural, economic, or social impacts are anticipated by the proposed project changes.

____
Date

John R. Brown
Colonel, U.S. Army
District Engineer

PERTINENT CORRESPONDENCE

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BULK SEDIMENT TESTING
RESULTS - LOVES PARK CREEK,
LOVES PARK, ILLINOIS

INTRODUCTION

The proposed Loves Park Local Flood Protection Project calls for the dredging of approximately 181,000 cubic yards of material from the North and South Branches of Loves Park Creek. To determine the quality of this material and the possible water quality impacts which may result from dredging and disposal activities, the Illinois EPA, in a September 18, 1986, letter to Mr. Dudley Hanson, Chief, Planning Division, recommended that the Rock Island District, U.S. Army Corps of Engineers, perform bulk sediment analyses on samples collected at five sites previously identified by the Corps.

On October 15, 1986, personnel from the Corps' Water Quality and Sedimentation Section collected six composite sediment samples from five Loves Park Creek sites (see Figure 1), including a duplicate sample at site LPC-2.

METHODS

Sediment samples at each site were collected with a plastic-lined, 18-inch core sampler. At each site, three subsamples were collected approximately 20 yards apart and were composited to form one homogeneous sample. Each sample was placed into an appropriate bottle and stored in an ice chest.

Conductivity, water temperature and pH determinations were performed in the field. Dissolved oxygen samples were fixed in the field and analyzed the following day. Turbidity analyses were also performed the following day in the laboratory. All bulk sediment analyses were performed by Enviro-Test/Perry Laboratories, Inc., Downers Grove, Illinois.

Sediment samples were analyzed according to methods outlined in Procedures for Handling and Chemical Analysis of Sediment and Water Samples, U.S. Army Engineers Waterways Experiment Station, Vicksburg, Mississippi, 1981.

RESULTS AND DISCUSSION

Field Analyses

The results of all field analyses, including dissolved oxygen and turbidity determinations are as follows:

Site	pH	Conductivity (umhos/cm at 25°C)	Temperature (°C)	Dissolved Oxygen (mg/l)	Turbidity (NTU)
LPC-NB	8.36	591	8.5	12.0	18
LPC-SB	8.11	630	8.6	12.2	2
LPC-1	8.10	602	8.8	13.4	27
LPC-2	8.33	578	10.0	13.9	16
LPC-3	8.15	702	10.5	12.2	6

No Illinois General Use Water Quality Standards were violated and no unusual values were observed.

BULK SEDIMENT ANALYSES

The State of Illinois does not have sediment quality standards; therefore, sediment quality was evaluated using the 1977, U.S. EPA publication entitled "Guidelines for the Pollutional Classification of Great Lakes Harbor Sediments." This publication classifies a sediment as being "nonpolluted," "moderately polluted," or "heavily polluted," depending on the concentration of selected parameters in the sediment. Table 1 lists the classification scheme used in the U.S. EPA publication for selected parameters.

The results of all bulk sediment analyses are shown in Table 2. In comparing these results to the U.S. EPA publication's classification scheme, only barium at site LPC-2, had a concentration which placed it in the "heavily polluted" category. The barium concentrations at LPC-SB, LPC-1 and LPC-3 warranted placement in the "moderately polluted" category. Other parameters which had concentrations that placed them in the "moderately polluted" category include arsenic at LPC-2, copper at LPC-2, lead at LPC-2 and LPC-3, manganese at LPC-2, nickel at LPC-2 and zinc at LPC-2. The remaining parameters had concentrations that would place them in the "nonpolluted" category at all sites.

The following parameters had concentrations below the detection limit at all sites: hexavalent chromium, cyanide, selenium, silver, PCBs, and all chlorinated hydrocarbon pesticides.

On a site-by-site basis, LPC-2 had the most parameters occurring in the "moderately" and "heavily polluted" categories. With the exception of barium, lead was the only parameter to be placed in the "moderately polluted" category at a site other than LPC-2.

CONCLUSIONS

Bulk sediment analysis results indicate that barium concentrations were comparatively high at all Loves Park Creek sites. At sites upstream of LPC-2, all other parameters had concentrations that would place them in the "nonpolluted" category.

Site LPC-2, by far, had the most contaminated sediment. Seven parameters at LPC-2 occurred in the "moderately" or "heavily polluted" categories. At LPC-3, two parameters occurred in the "moderately polluted" category, while at the remaining three sites, only one parameter occurred in either of these categories.

The concentrations of arsenic, barium, copper, lead, manganese, nickel and zinc in the sediment at site LPC-2 were similar to concentrations of these parameters observed by Corps personnel in the sediment at several Illinois River sites. Dredging, and the bank disposal of dredged material at these sites did not adversely affect water quality; therefore, it is unlikely that problems will result from the dredging and disposal of dredged material from Loves Park Creek.

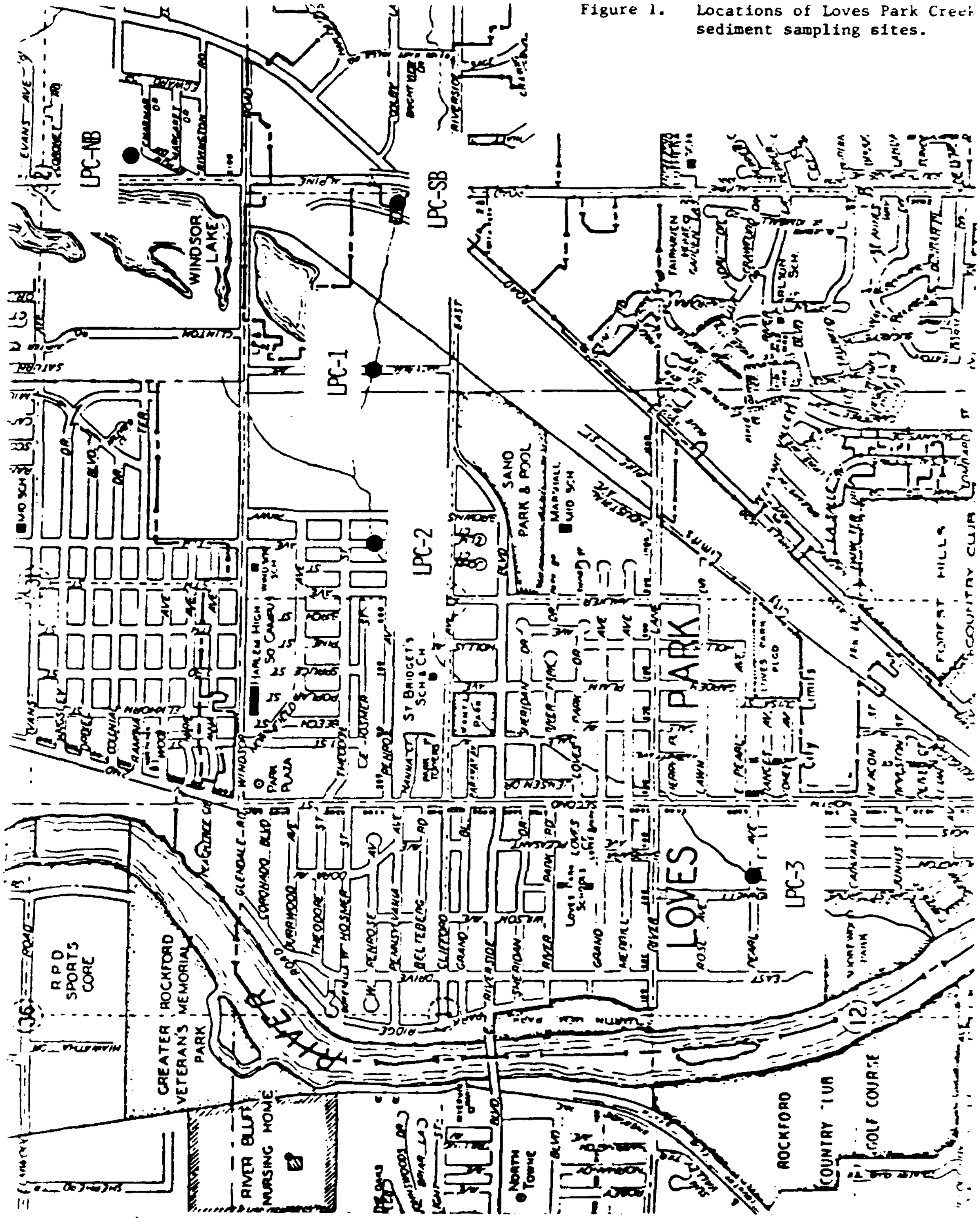

Figure 1. Locations of Loves Park Creek sediment sampling sites.

Table 1. U.S. EPA guidelines for the pollutional classification of Great Lakes harbor sediments in mg/kg dry weight

Parameter	Nonpolluted	Moderately Polluted	Heavily Polluted
Arsenic	<3	3-8	>8
Barium	<20	20-60	>60
Cadmium	*	*	>6
Chromium	<25	25-75	>75
Copper	<25	25-50	>50
Cyanide	<0.10	0.10-0.25	>0.25
Iron	<17,000	17,000-25,000	>25,000
Lead	<40	40-60	>60
Manganese	<300	300-500	>500
Mercury **	-	-	-
Nickel	<20	20-50	>50
PCBs **	-	-	-
Zinc	<90	90-200	>200
Ammonia Nitrogen	<75	75-200	>200
Oil and Grease	<1,000	1,000-2,000	>2,000
Total Volatile *** Residue	<5	5-8	>8

* Lower limits not established for cadmium

** If the concentrations of mercury or total PBCs are greater than or equal to 1 mg/kg or 10 mg/kg, respectively, the sediment is classified as polluted

*** Total volatile residue is expressed as a percent

Table 2. Results of Loves Park Creek bulk sediment analyses, expressed in mg/kg dry weight, or as otherwise stated

Parameter	LPC-NB	LPC-SB	LPC-1	LPC-2	LPC-2(Dup.)	LPC-3
Total Arsenic	1.5	1.6	2.3	4.9*	7.8*	1.4
Total Barium	42*	58*	51*	90**	113**	56*
Total Boron	20	25	28	25	33	22
Total Cadmium	1.4	.64	.80	1.7	1.6	1.4
Total Chromium	6.5	3.3	3.6	8.9	10.1	7.2
Chromium, +6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Copper	7.5	3.9	6.3	20	25*	7.6
Total Cyanide	<.1	<.1	<.1	<.1	<.1	<.1
Total Iron	7,100	4,300	6,200	8,200	11,000	3,800
Total Lead	21	36	19	45*	56*	58*
Total Manganese	232	210	184	315*	403*	165
Total Mercury	.13	.18	.36	.14	.23	.18
Total Nickel	15	8.6	8.6	13	20*	8.0
Total Selenium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Silver	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Zinc	31	21	22	110*	136*	79
Ammonia Nitrogen	7.6	2.2	2.5	12	12	6.8
Phenols	1.4	<1.0	3.4	2.8	2.3	2.7
PCBs	<.2	<.2	<.2	<.2	<.2	<.2
Aldrin	<.005	<.005	<.005	<.005	<.005	<.005
Chlordane	<.025	<.025	<.025	<.025	<.025	<.025
DDD	<.01	<.01	<.01	<.01	<.01	<.01
DDE	<.005	<.005	<.005	<.005	<.005	<.005
DDT	<.01	<.01	<.01	<.01	<0.1	<.01
Dieldrin	<.005	<.005	<.005	<.005	<.005	<.005
Endrin	<.01	<.01	<.01	<.01	<.01	<.01
Heptachlor	<.005	<.005	<.005	<.005	<.005	<.005
Heptachlor Epoxide	<.005	<.005	<.005	<.005	<.005	<.005
Lindane	<.005	<.005	<.005	<.005	<.005	<.005
Methoxychlor	<.01	<.01	<.01	<.01	<0.1	<.01
Toxaphene	<.05	<.05	<.05	<.05	<.05	<.05

* Classified as "moderately polluted"
** Classified as "heavily polluted"

REFERENCES

U.S. Army Corps of Engineers. 1981. Procedures for Handling and Chemical Analysis of Sediment and Water Samples. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.

U.S. Environmental Protection Agency. 1977. Appendix B: Guidelines for the Pollutional Classification of Great Lakes Harbor Sediments. U.S. EPA, Region V, Chicago, Illinois.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
ROCK ISLAND FIELD OFFICE (ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

IN REPLY REFER TO:

COM: 309/793-5800
FTS: 386-5800

April 6, 1988

Mr. Dudley M. Hanson
U.S. Army Corps of Engineers
Rock Island District
Clock Tower Builing, P.O. Box 2004
Rock Island, Illinois 61204-2004

Dear Mr. Hanson:

This is in response to your letter dated February 4, 1988 describing changes in your flood protection plans for Loves Park, Rockford, Illinois.

We understand that these modifications include:

* Using the north gravel pit for floodwater storage.
* Connecting the north gravel pit to Windsor Lake.
* Possible drawdown of the gravel pits prior to flood events
* Utilization of a new alignment for the South Branch Diversion pump station and outlet channel.
* Conversion of 760 linear feet of grass lined channel to concrete.

Due to the urban nature of the project area, these modifications will have an insignificant effect on the fish and wildlife resources of the area. Therefore, we have no objection to their implementation.

This letter provides comment under the authority of and in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. et seq.); the National

Environmental Policy Act of 1969, as amended; the Endangered Species Act of 1973, as amended; and in accordance with the Fish and Wildlife Service's Mitigation Policy.

Sincerely,

Richard C. Nelson
Field Supervisor

cc: IL DOC (Lutz)

Illinois Environmental Protection Agency 2200 Churchill Road, Springfield, IL 62706

217/782-1696

Rock Island District Corps of Engineers (Winnebago County)
Loves Park Flood Protection Project
Log #C-497-86

January 19, 1988

Mr. Dudley M. Hanson, P.E.
Chief, Planning Division
Rock Island District Corps of Engineers
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204

Dear Mr. Hanson:

We have reviewed the proposed changes to the Loves Park Flood Protection Project specified in your letter of December 30, 1987. The modifications, which are now under consideration for the General Design Memorandum, include the use of the North Gravel Pit, as a storm water detention basin, a new channel alignment of the South Branch and the use of concrete lined channel instead of grass along a segment of the North Branch.

Plans to cap the excavated material with sediment upstream of sampling points LPC-NB and LPC-SB and to implement the recommendations we previously forwarded are noted. While we generally advise against severe channelization methods like concrete lined channels, we will withhold further comment on this issue pending a review of your assessment of the need for such a structure in the GDM. We have no additional comments on the other proposed modifications.

If you have any questions on this project, please contact Bruce Yurdin of my staff.

Very truly yours,

Thomas G. McSwiggin

by H. Keller

Thomas G. McSwiggin, P.E.
Manager, Permit Section
Division of Water Pollution Control

TGM:BY:dks/31j, 35

cc: IEPA, Records

Illinois Environmental Protection Agency · 2200 Churchill Road, Springfield, IL 62706

217/782-1696

Rock Island District Corps of Engineers (Winnebago County)
Loves Park Flood Protection Project
Log # C-497-86

May 27, 1987

Mr. Dudley M. Hanson, P.E.
Chief, Planning Division
Rock Island District Corps of Engineers
Clock Tower Building, P. O. Box 2004
Rock Island, Illinois 61204

Dear Mr. Hanson:

We have reviewed the sediment data collected for the Loves Park Flood Protection Project, from the north and south branches of Loves Park Creek.

Based on a comparative assessment of these data and the statewide classification developed by the Agency for stream and lake sediments, it appears that the majority of material to be excavated contains average concentrations of the contaminants analyzed. In some instances, however, concentration for arsenic and mercury were elevated. Levels exceeding 7.6 mg/kg and 0.27 mg/kg are considered elevated for arsenic and mercury, respectively.

Bulk sediment analyses, as you know, are not particularly accurate measurement techniques for determining water quality impacts (refer to our letter of September 18, 1986). Given the results described above and the proposal to dispose of approximately 181,000 cubic yards of this material in an abandoned sand and gravel quarry (Site 6), it is evident that precautions must be taken in conducting the disposal phase of this project. We recommend the following items be incorporated into the final plan for disposal: 1) excavation of the sediment should be conducted during low or zero flow in the streams to reduce or eliminate instream loss and resuspension of contaminated sediment, 2) material transport to the disposal site should be conducted using appropriately designed equipment to reduce loss or spillage of excavated material, and 3) the disposal site must be adequately designed and prepared prior to disposal, so that protection of groundwater quality is provided at the site (i.e. siting the disposal area within the quarry to minimize contact or runoff to known or suspected aquifers, containing the material with uncontaminated fill and sloping the final elevation to promote surface runoff from the excavated material). In the event that these or other similarly effective procedures cannot be included in the design of this project, further analysis of the material as detailed in our previous correspondence will be warranted to establish the degree of contamination which may be released to surface and groundwater resources.

If you have any questions on these matters, please contact Bruce Yurdin of my staff.

Very truly yours,

Thomas G. McSwiggin

Thomas G. McSwiggin, P.E.
Manager, Permit Section
Division of Water Pollution Control

TGM:BY:ds:2593g/8-9

cc: IEPA, Records

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING – P O BOX 2004
ROCK ISLAND ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

February 13, 1986

Planning Division

Mr. William G. Farrar
Deputy State Historic Preservation Officer
Illinois Historic Preservation Agency
Old State Capitol Building
Springfield, Illinois 62701

Dear Mr. Farrar:

The Rock Island District, Corps of Engineers, is planning a flood control project for Loves Park, Winnebago County, Illinois. The proposed project will include channelization and deepening of an unnamed tributary of the Rock River, with diversion of the creek into three gravel pit lakes for water storage. The unnamed stream flows southwesterly through a residential portion of Loves Park. Great Lakes Archaeological Research Center, Inc. (GLARC) conducted a cultural resources reconnaissance of the proposed project in 1977. Their report concluded that the proposed project would have no effect on significant cultural resources. In letters dated September 12, 1978, and October 11, 1978, the State Historic Preservation Officer, Dr. David Kenney, concurred with these findings (see enclosed letters).

Due to minor changes and additions to the project plan since the GLARC survey, District Archeologists Kenneth Barr and Charles Smith visited the project area on February 5, 1986. Additions to the plan include seven alternative disposal areas. Other modifications to the original plan may include: (1) using a third northern gravel pit for water storage; (2) moving the inlet structure that connects the unnamed creek and Windsor Lake; (3) changing the outlet structure location that connects the southern gravel pit and creek; and (4) constructing slurry pits around industrial structures near Windsor Lake, as necessary, to prevent uplift (see enclosed map). The District archeologists visited all areas to be affected by the additions and modifications to the proposed project.

The area for the proposed inlet structure has been disturbed previously by road and gravel pit construction. The proposed outlet structure will flow between existing industrial buildings in an area that also has been disturbed previously. Land modification associated with using the third northern gravel pit for water storage will consist of a small channel between Windsor Lake and the gravel pit. GLARC's survey of the Windsor Lake area indicated that there were no cultural resources present at any location around the lake. Any necessary slurry pit construction will be limited to areas immediately adjacent to the industrial buildings located around the gravel pits. This area has been modified previously by commercial development. The proposed modifications to the original project will have no effect on significant cultural resources.

Seven alternative disposal areas are being considered for disposal of dredge material excavated from the creek. Two areas (5 and 6 on the enclosed map) are gravel pits, and filling these areas will have no effect on cultural resources. The Sand Park area (Area 1) has been used for landfill in the past and is extensively disturbed. Area 2 is a lawn and will require an archeological survey before it can be used for dredge disposal. Areas 3 and 7 are bean fields and also would require an archeological survey. A portion of area 4 is a small pond created by graveling operations. However, the area surrounding the pond is relatively undisturbed and would require an archeological survey prior to dredge disposal.

Based on the field survey, alternative disposal areas 1, 5, and 6 have been previously disturbed, and use of the areas will have NO EFFECT on significant cultural resources. Alternative disposal areas 2, 3, 4, and 7 will require an archeological survey to determine the presence or absence of significant cultural resources prior to any dredge disposal. The inlet and outlet structure modifications, construction of any necessary slurry pits, and use of the northern gravel pit will have NO EFFECT on significant cultural resources.

We request your comments on this project at your earliest convenience. If you have any questions, please call Mr. Kenneth Barr at 309/788-6361, Ext. 349, or write to the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Sincerely,

James Schuessler
for Dudley M. Hanson, P.E.
Acting Chief, Planning Division

Enclosures

CONCUR

By: William G. Farrar III
Deputy State Historic Preservation Officer
Date: March 3, 1986

Illinois Department of Conservation
life and land together

605 STATE OFFICE BUILDING • 400 SOUTH SPRING STREET • SPRINGFIELD 62
CHICAGO OFFICE – ROOM 100 160 NO LASALLE 60601
David Kenney, Director • James C. Helfrich Assistant Director

September 12, 1978

Mr. Doyle W. McCully, P. E.
Chief, Engineering Division
Department of the Army
Rock Island District
Corps of Engineers
Clock Tower Building
Rock Island, IL 61201

RE: NCRED-PB
"Archaeological Report for Large & Small Unnamed Creeks in Loves Park, Illinois."
Winnebago County

Dear Mr. McCully:

My staff archaeologist has reviewed the report submitted on the survey conducted for the above referenced project.

The survey and assessment of the archaeological resources appear to be adequate and, based on this report, it has been determined that the project will have no adverse impact on archaeological resources.

Sincerely,

David Kenney
State Historic Preservation
Officer

DK/MKB/ar
cc: T. E. Kornbacher
National Trust

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING – P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

May 1, 1986

Planning Division

Mr. William G. Farrar
Deputy State Historic
Preservation Officer
Illinois Historic
Preservation Agency
Old State Capitol Building
Springfield, Illinois 62701

Dear Mr. Farrar:

The Rock Island District, Corps of Engineers, is planning a flood control project for Loves Park, Illinois. Details of the proposed project and information on previous cultural resource evaluations of the project with recommendations for any additional cultural resource surveys needed were provided to your office in a letter dated February 13, 1986. The Deputy State Historic Preservation Officer concurred on March 3, 1986, that, with the exception of four proposed disposal areas that had not been evaluated, the proposed project would have No Effect on significant cultural resources.

Since the above referenced correspondence, two additional disposal locations have been proposed (sites 7 and 8 on enclosed map). Rock Island District archeologist Kenneth Barr and biologist Ron Klump conducted a Phase I reconnaissance of the six proposed disposal areas on April 23, 1986. Proposed disposal area No. 2 is located in a sod-covered lawn adjacent to a commercial structure. A series of 10 shovel probes placed at 15-meter intervals across the disposal area failed to identify any cultural artifacts or features. Proposed disposal area No. 3 occupies an alfalfa field with 20 - 30 percent surface visibility. A walkover survey of the field at 15-meter transect intervals failed to recover any cultural artifacts. Proposed disposal area No. 4 is a small, 3-meter deep quarry pit. A walkover survey of the alfalfa field surrounding the pit failed to identify any cultural resources. Proposed disposal areas No. 7 and No. 8 have both been totally disturbed by previous quarrying activities. Proposed disposal area No. 9 (designated No. 7 in the letter to your office dated February 13, 1986) occupies a soybean field with 20 - 40 percent surface visibility. A walkover survey of the field at 15-meter transect intervals failed to recover any cultural artifacts. Based on these investigations it is our opinion that the proposed Loves Park, Illinois, Flood Control Project will have No Effect on significant cultural resources.

We request your comments on this project at your earliest convenience. If you have any questions, please call Mr. Kenneth Barr at 309/788-6361, Ext. 349, or write to the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building - P.O. Box 2004
Rock Island, Illinois 61204-2004

Sincerely,

James Achnerra
fDudley M. Hanson, P.E.
Chief, Planning Division

Enclosure

CONCUR
By: William G Farrar
Deputy State Historic Preservation Officer
Date: 5/26/86

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX F

DRAFT OF LOCAL COOPERATION AGREEMENT AND FINANCIAL CAPABILITY

ROCK ISLAND DISTRICT
CORPS OF ENGINEERS
CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS 61201

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX F
DRAFT OF LOCAL COOPERATION AGREEMENT
AND FINANCIAL CAPABILITY

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5 July 90

LOCAL COOPERATION AGREEMENT
BETWEEN
THE DEPARTMENT OF THE ARMY
AND
THE CITY OF LOVES PARK, ILLINOIS
FOR CONSTRUCTION OF THE
FLOOD CONTROL PROJECT
AT LOVES PARK, ILLINOIS

THIS AGREEMENT, entered into this ________ day of ______________, 19______, by and between the DEPARTMENT OF THE ARMY (hereinafter referred to as the "Government"), acting by and through the Assistant Secretary of the Army (Civil Works), and the CITY OF LOVES PARK, ILLINOIS, (hereinafter referred to as the "City"), acting by and through its Mayor,

WITNESSETH, THAT:

WHEREAS, construction of the flood control project at Loves Park, Illinois, (hereinafter referred to as the "Project", as defined in Article I.a. of this Agreement) was authorized by the Water Resources Development Act of 1986 (P.L. 99-662); and

WHEREAS, Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, specifies the cost-sharing requirements applicable to the Project; and

WHEREAS, Section 221 of the Flood Control Act of 1970, Public Law 91-611, as amended, provides that the construction of any water resources project by the Secretary of the Army shall not be commenced until each non-Federal interest has entered into a written agreement to furnish its required cooperation for the project; and

WHEREAS, the City does not qualify for a reduction of the maximum non-Federal cost share pursuant to the guidelines which implement Section 103(m) of the Water Resources Development Act of 1986, Public Law 99-662, published in 33 C.F.R., Sections 241.1 - 6, entitled "Flood Control Cost-Sharing Requirements Under the Ability to Pay Provision"; and

WHEREAS, the City has the authority and capability to furnish the cooperation hereinafter set forth and is willing to participate in cost-sharing and financing in accordance with the terms of this Agreement;

NOW THEREFORE, the parties agree as follows:

ARTICLE I - DEFINITIONS AND GENERAL PROVISIONS

For purposes of this Agreement:

a. The term "Project" shall mean construction of approximately 17,900 linear feet of channel improvements (including 10,600 linear feet of concrete-lined channel); a pumping station; temporary diversion storage in three detention lakes; and replacement of eight bridges, including highway, pedestrian, and a combination highway-railroad bridge, as generally described in the General Design Memorandum dated March 1988, revised September 1989, and approved by the Commander, North Central Division November 1989.

b. The term "total project costs" shall mean all costs incurred by the City and the Government directly related to construction of the Project. Such costs shall include, but not necessarily be limited to, continuing planning and engineering costs incurred after October 1, 1985; costs of applicable engineering and design; actual construction costs; supervision and administration costs; costs of contract dispute settlements or awards; the credits afforded for Pebble Creek Dam under Article II.k. herein; and the value of lands, easements, rights-of-way, utility and facility alterations or relocations, and dredged material disposal areas provided for the Project by the City, but shall not include any costs for betterments, operation, repair, maintenance, replacement, or rehabilitation.

c. The term "period of construction" shall mean the time from the advertisement of the first construction contract to the time of acceptance of the Project by the Contracting Officer.

d. The term "Contracting Officer" shall mean the U.S. Army District Engineer for the Rock Island District, or his designee.

e. The term "highway" shall mean any highway, thoroughfare, roadway, street, or other public or private road or way.

f. The term "relocations" shall mean alterations, modifications, lowering or raising in place, and/or new construction related to, but not limited to, existing: railroads, highways, bridges, railroad bridges and approaches thereto, buildings, pipelines, public utilities (such as municipal water and sanitary sewer lines, telephone lines, and storm drains), aerial utilities, cemeteries, and other facilities, structures, and improvements determined by the Government to be necessary for the construction, operation and maintenance of the Project.

g. The term "fiscal year" shall mean one fiscal year of the United States Government, unless otherwise specifically indicated. The Government fiscal year begins on October 1 and ends on September 30.

h. The term "involuntary acquisition" shall mean the acquisition of lands, easements, and rights-of-way by eminent domain.

i. The term "functional portion of the Project" shall mean a completed portion of the Project as determined by the Contracting Officer to be suitable for tender to the City to operate and maintain in advance of completion of construction of the entire Project.

ARTICLE II - OBLIGATIONS OF THE PARTIES

a. The Government, subject to and using funds provided by the City and appropriated by the Congress of the United States, shall expeditiously construct the project (including relocations of railroad bridges and approaches thereto), applying those procedures usually followed or applied in Federal projects, pursuant to Federal laws, regulations, and policies. The City shall be afforded the opportunity to review and comment on all contracts, including relevant plans and specifications, prior to the issuance of invitations for bid. The City will be afforded the opportunity to review and comment on all modifications and change orders prior to the issuance to the contractor of a Notice to Proceed. The Government will consider the comments of the City, but award of contracts, modifications or change orders, and performance of all work on the Project (whether the work is performed under contract or by Government personnel), shall be exclusively within the control of the Government.

b. When the Government determines that the Project or a functional portion of the Project is complete, the Government shall turn the completed Project or functional portion over to the City which shall accept the Project or functional portion and be solely responsible for operating, repairing, maintaining, replacing, and rehabilitating the Project or functional portion in accordance with Article VIII hereof.

c. As further specified in Article VI hereof, the City shall provide, during the period of construction, a cash contribution of 5 percent of total project costs.

d. As further specified in Article III hereof, the City shall provide all lands, easements, rights-of-way, and dredged material disposal areas, and perform all relocations (excluding railroad bridges and approaches thereto) determined by the Government to be necessary for construction of the Project. At its sole discretion, the Government may perform relocations in cases where it appears that the City's contributions will exceed the maximum non-Federal cost share set out in Article VI.f.

e. If the value of the contributions provided under paragraphs c. and d. of this Article represents less than 25 percent of total project costs, the City shall provide, during the period of construction, an additional cash contribution in the amount necessary to make its total contribution equal to 25 percent of total project costs.

f. No Federal funds may be used to meet the City share of total project costs under this Agreement unless the expenditure of such funds is expressly authorized by statute as verified in writing by the granting agency.

g. The City agrees to participate in and comply with applicable Federal flood plain management and flood insurance programs.

h. The City shall prevent encroachment on any of the flood protection structures, including ponding areas, and if ponding areas are impaired, provide substitute storage capacity or equivalent pumping capacity promptly without cost to the United States.

i. No less than once each year the City shall inform affected interests of the limitations of the protection afforded by the Project.

j. The City shall publicize flood plain information in the area concerned and shall provide this information to zoning and other regulatory agencies for their guidance and leadership in preventing unwise future development in the flood plain and in adopting such regulations as may be necessary to prevent unwise future development and to ensure compatibility with protection levels provided by the Project.

k. Pursuant to Section 104 of Public Law 99-662 and in accordance with the Memorandum for the Director of Civil Works from the Assistant Secretary of the Army (Civil Works), dated May 17, 1988, Subject: General Credit for Flood Control for the Pebble Creek Dam (Loves Park Creek, Illinois Project), the Government shall apply a maximum credit of $60,000 for work performed by the City for Pebble Creek Dam, toward the City's contributions required under paragraph d. of this Article and shall apply a maximum credit of $439,000 for work performed by the City for Pebble Creek Dam, toward the City's contributions required under paragraph e. of this Article. The credit afforded for Pebble Creek Dam shall not exceed the actual audited, allowable costs of Pebble Creek Dam that are allocable to the Project, nor shall the credits exceed the value of the City's contributions under Article III for lands, easements, right-of-way, relocations, and dredged material disposal area, or 20% of total project costs, whichever is greater. Should it appear that the sum of the City's contributions under Article III for lands, easements, rights-of-way, relocations, and dredged material disposal areas and the amount of the credit afforded for Pebble Creek Dam will exceed 20 percent of total project costs, the Government shall perform relocations, or acquire any real estate interest necessary for the Project, in an amount equal to the credit to be applied by the Government toward the City's contributions required under paragraph e. of this Article, or the amount that such sum exceeds 20 percent of total project costs, whichever is least.

ARTICLE III - LANDS, FACILITIES, AND PUBLIC LAW 91-646 RELOCATION ASSISTANCE

a. The City shall furnish to the Government all lands, easements, and rights-of-way, including suitable borrow and dredged material disposal areas, as may be determined by the Government to be necessary for the construction, operation, and maintenance of the Project, and shall furnish to the Government evidence supporting the City's legal authority to grant rights-of-entry to such lands. The necessary lands, easements, and rights-of-way may be provided incrementally, but all lands, easements, and rights-of-way determined by the Government to be necessary for work to be performed under a construction contract must be furnished prior to the advertisement of the construction contract.

b. The City shall provide or pay to the Government the cost of providing all retaining dikes, wasteweirs, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged material disposal areas necessary for construction of the Project.

c. Upon notification from the Government, the City shall accomplish or arrange for accomplishment at no cost to the Government all relocations (excluding railroad bridges and approaches thereto) determined by the Government to be necessary for construction of the Project.

d. The City shall comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 C.F.R. Part 24, in acquiring lands, easements, and rights-of-way for construction and subsequent operation and maintenance of the Project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

ARTICLE IV - VALUE OF LANDS AND FACILITIES

a. The value of the lands, easements, and rights-of-way to be included in total project costs and credited towards the City's share of total project costs will be determined in accordance with the following procedures:

1. If the lands, easements or rights-of-way are owned by the City as of the date the first construction contract for the Project is awarded, the credit shall be the fair market value of the interest provided to the Government by the City at the time of such award. The fair market value shall be determined by an appraisal, to be obtained by the City, which has been prepared by a qualified appraiser who is acceptable to both the City and the Government. The appraisal shall be reviewed and approved by the Government.

2. If the lands, easements, or rights-of-way are to be acquired by the City after the date of award of the first construction contract for the Project, the credit shall be the fair market value of the interest at the time such interest is acquired. The fair market value shall be determined as specified in Article IV.a.1. of this Agreement. If the City pays an amount in excess of the appraised fair market value, it may be entitled to a credit for the excess if the City has secured prior written approval from the Government of its offer to purchase such interest.

3. If the City acquires more lands, easements, or rights-of-way than are necessary for project purposes, as determined by the Government, then only the value of such portions of those acquisitions as are necessary for project purposes shall be included in total project costs and credited towards the City's share.

4. Credit for lands, easements, and rights-of-way in the case of involuntary acquisitions which occur within a one-year period preceding the date this Agreement is signed or which occur after the date this Agreement is signed will be based on court awards, or on stipulated settlements that have received prior Government approval.

5. Credit for lands, easements, or rights-of-way acquired by the City within a five-year period preceding the date this Agreement is signed, or at any time after this Agreement is signed, will also include the actual incidental costs of acquiring the interest, e.g., closing and title costs, appraisal costs, survey costs, attorney's fees, plat maps, and mapping costs, as well as the actual amounts expended for payment of any Public Law 91-646 relocation assistance benefits provided in accordance with the obligations under this Agreement.

b. The costs of relocations which will be included in total project costs and credited towards the City's share of total project costs shall be that portion of the actual costs as set forth below, and approved by the Government:

1. Highways and Highway Bridges: Only that portion of the cost as would be necessary to construct substitute bridges and highways to the design standard that the State of Illinois would use in constructing a new bridge or highway under

similar conditions of geography and traffic loads.

2. Utilities and Facilities (including railroads): Actual relocation costs, less depreciation, less salvage value, plus the cost of removal, less the cost of betterments. With respect to betterments, new materials shall not be used in any alteration or relocation if materials of value and usability equal to those in the existing facility are available or can be obtained as salvage from the existing facility or otherwise, unless the provision of new material is more economical. If, despite the availability of used material, new material is used, where the use of such new material represents an additional cost, such cost will not be included in total project costs.

ARTICLE V - CONSTRUCTION PHASING AND MANAGEMENT

a. To provide for consistent and effective communication between the City and the Government during the period of construction, the City and the Government shall appoint representatives to coordinate on scheduling, plans, specifications, modifications, contract costs, and other matters relating to construction of the Project. The City will be informed of any changes in cost estimates.

b. The representatives appointed above shall meet as necessary during the period of construction and shall make such recommendations as they deem warranted to the Contracting Officer.

c. The Contracting Officer shall consider the recommendations of the representatives in all matters relating to construction of the Project, but the Contracting Officer, having ultimate responsibility for construction of the Project, has complete discretion to accept, reject, or modify the recommendations.

ARTICLE VI - METHOD OF PAYMENT

a. The City shall provide, during the period of construction, the cash payments required under Article II of this Agreement. Total project costs are presently estimated to be $26,204,000. In order to meet its share, the City must provide a cash contribution presently estimated to be $1,310,000. The dollar amounts set forth in this Article are based upon the Government's best estimates which will reflect projection of costs, price level changes, and anticipated inflation. Such cost estimates are subject to adjustments based upon costs actually incurred and are not to be construed as the total financial responsibilities of the Government and the City.

b. The City shall provide its required cash contribution in proportion to the rate of Federal expenditures during the period of construction in accordance with the following provisions:

1. For purposes of budget planning, the Government shall notify the City by ______________ of each year of the estimated funds that will be required from the City to meet its share of total project costs for the upcoming fiscal year.

2. No later than 60 calendar days prior to the award of the first construction contract, the Government shall notify the City of the City's share of total project costs, including its share of costs attributable to the Project incurred prior to the initiation of construction, for the first fiscal year of construction. No later than 30 calendar days thereafter, the City shall verify to the satisfaction of the Government that it has deposited the requisite amount in an escrow account acceptable to the Government, with interest accruing to the City.

3. For the second and subsequent fiscal years of project construction, the Government shall, no later than 60 calendar days prior to the beginning of the fiscal year, notify the City of the City's share of total project costs for that fiscal year. No later than 30 calendar days prior to the beginning of the fiscal year, the City shall make the necessary funds available to the Government through the funding mechanism specified in Article VI.b.2. of this Agreement. As construction of the Project proceeds, the Government shall adjust the amounts required to be provided under this paragraph to reflect actual costs.

4. If at any time during the period of construction the Government determines that additional funds will be needed from the City, the Government shall so notify the City, and the City, no later than 45 calendar days from receipt of such notice, shall make the necessary funds available through the funding mechanism specified in Article VI.b.2. of this Agreement.

c. The Government will draw on the escrow account provided by the City such sums as the Government deems necessary to cover contractual and in-house fiscal obligations attributable to the Project as they are incurred, as well as costs incurred by the Government prior to the initiation of construction.

d. Upon completion of the Project and resolution of all relevant contract claims and appeals, the Government shall compute the total project costs and tender to the City a final accounting of the City's share of total project costs. In the event the total contribution by the City is less than its minimum required share of total project costs, the City shall, no later than 90 calendar days after receipt of written notice, make a cash payment to the Government of whatever sum is required to meet its minimum required share of total project costs.

e. In the event the City has made cash contributions in excess of 5 percent of total project costs which result in the

City's having provided more than its required share of total project costs, the Government shall, no later than 90 calendar days after the final accounting is complete, subject to the availability of funds, return said excess to the City; however, the City shall not be entitled to any refund of the 5 percent cash contribution required pursuant to Article II.c. of this Agreement.

f. If the City's total contribution under this Agreement (including lands, easements, rights-of-way, and relocations, and dredged material disposal areas provided by the City) exceeds 50 percent of total project costs, the Government shall, subject to the availability of funds for that purpose, refund the excess to the City no later than 90 calendar days after the final accounting is complete.

ARTICLE VII - DISPUTES

Before any party to this Agreement may bring suit in any court concerning an issue relating to this Agreement, such party must first seek in good faith to resolve the issue through negotiation or other forms of nonbinding alternative dispute resolution mutually acceptable to the parties.

ARTICLE VIII - OPERATION, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION

a. After the Government has turned the completed Project, or functional portion of the Project, over to the City, the City shall operate, maintain, repair, replace, and rehabilitate the completed Project, or functional portion of the Project, in accordance with regulations or directions prescribed by the Government.

b. The City hereby gives the Government a right to enter, at reasonable times and in a reasonable manner, upon land which it owns or controls for access to the Project for the purpose of inspection, and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the Project. If an inspection shows that the City for any reason is failing to fulfill its obligations under this Agreement without receiving prior written approval from the Government, the Government will send a written notice to the City. If the City persists in such failure for 30 calendar days after receipt of the notice, then the Government shall have a right to enter, at reasonable times and in a reasonable manner, upon lands the City owns or controls for access to the Project for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the Project. No completion, operation, maintenance, repair, replacement, or rehabilitation by the Government shall operate to relieve the City of responsibility to meet its obligations as set forth in this Agreement, or to preclude the Government from pursuing any other remedy at law or equity to assure faithful performance pursuant to this Agreement.

ARTICLE IX - RELEASE OF CLAIMS

The City shall hold and save the Government free from all damages arising from the construction, operation, and maintenance of the Project, except for damages due to the fault or negligence of the Government or its contractors.

ARTICLE X - HAZARDOUS SUBSTANCES

a. After execution of this Agreement and upon direction by the Contracting Officer, the City shall perform, or cause to be performed, such environmental investigations as are determined necessary by the Government or the City to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, on lands necessary for Project construction, operation, and maintenance. All actual costs incurred by the City which are properly allowable and allocable to performance of any such environmental investigations shall be included in total project costs and cost-shared as a construction cost in accordance with Public Law 99-662.

b. In the event it is discovered through an environmental investigation or other means that any lands, easements, rights-of-way, or disposal areas to be acquired or provided for the Project contain any hazardous substances regulated under CERCLA, the City and the Government shall provide prompt notice to each other, and the City shall not proceed with the acquisition of lands, easements, rights-of-way, or disposal areas until mutually agreed.

c. The Government and the City, shall determine whether to initiate construction of the Project, or if already in construction, to continue with construction of the Project, or to terminate construction of the Project for the convenience of the Government in any case where hazardous substances regulated under CERCLA are found to exist on any lands necessary for the Project. Should the Government and the City determine to proceed or continue with construction after considering any liability that may arise under CERCLA, as between the Government and the City, the City shall be responsible for any and all necessary clean up and response costs, to include the costs of any studies and investigations necessary to determine an appropriate response to the contamination. Such costs shall not be considered a part of total project costs as defined in this Agreement. In the event the City fails to provide any funds necessary to pay for clean up and response costs or to otherwise discharge its responsibilities under this paragraph upon direction by the Government, the Government may either terminate or suspend work on the Project or proceed with further work as provided in Article XVII.

d. The City and the Government shall consult with each other under the Construction Phasing and Management Article of this Agreement to assure that responsible parties bear any necessary clean up and response costs as defined in CERCLA. Any decision made pursuant to paragraph c. of this Article shall not relieve any party from any liability that may arise under CERCLA.

e. The City shall operate, maintain, repair, replace, and rehabilitate the Project in a manner so that liability will not arise under CERCLA.

ARTICLE XI - MAINTENANCE OF RECORDS

The Government and the City shall keep books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to this Agreement to the extent and in such detail as will properly reflect total project costs. The Government and the City shall maintain such books, records, documents, and other evidence for a minimum of three years after completion of construction of the Project and resolution of all relevant claims arising therefrom, and shall make available at their offices at reasonable times, such books, records, documents, and other evidence for inspection and audit by authorized representatives of the parties to this Agreement.

ARTICLE XII - GOVERNMENT AUDIT

The Government shall conduct an audit when appropriate of the City's records for the Project to ascertain the allowability, reasonableness, and allocability of its costs for inclusion as credit against the non-Federal share of total project costs.

ARTICLE XIII - FEDERAL AND STATE LAWS

In acting under its rights and obligations hereunder, the City agrees to comply with all applicable Federal and State laws and regulations, including Section 601 of Title VI of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto and published in Part 300 of Title 32, Code of Federal Regulations, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army."

ARTICLE XIV - RELATIONSHIP OF PARTIES

The parties to this Agreement act in an independent capacity in the performance of their respective functions under this Agreement, and neither party is to be considered the officer, agent, or employee of the other.

ARTICLE XV - OFFICIALS NOT TO BENEFIT

No member of or delegate to the Congress, or resident commissioner, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom.

ARTICLE XVI - COVENANT AGAINST CONTINGENT FEES

The City warrants that no person or selling agency has been employed or retained to solicit or secure this Agreement upon agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the City for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to annul this Agreement without liability, or, in its discretion, to add to the Agreement or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE XVII - TERMINATION OR SUSPENSION

a. If at any time the City fails to make the payments required under this Agreement, the Secretary of the Army shall terminate or suspend work on the Project until the City is no longer in arrears, unless the Secretary of the Army determines that continuation of work on the Project is in the interest of the United States or is necessary in order to satisfy agreements with any other non-Federal interests in connection with the Project. Any delinquent payment shall be charged interest at a rate, to be determined by the Secretary of the Treasury, equal to 150 per centum of the average bond equivalent rate of the 13-week Treasury bills auctioned immediately prior to the date on which such payment became delinquent, or auctioned immediately prior to the beginning of each additional 3-month period if the period of delinquency exceeds 3 months.

b. If the Government fails to receive annual appropriations for the Project in amounts sufficient to meet project expenditures for the then-current or upcoming fiscal year, the Government shall so notify the City. After 60 calendar days either party may elect without penalty to terminate this Agreement pursuant to that Article or to defer future performance hereunder; however, deferral of future performance under this Agreement shall not affect existing obligations or relieve the parties of liability for any obligation previously incurred. In the event that either party elects to terminate this Agreement pursuant to this Article, both parties shall conclude their activities relating to the Project and proceed to a final accounting in accordance with Article VI of this Agreement. In the event that either party elects to defer future performance under this Agreement pursuant to this Article, such deferral shall remain in effect until such time as the Government receives sufficient appropriations or until either party elects to terminate this Agreement.

ARTICLE XVIII - NOTICE

a. All notices, requests, demands, and other communications required or permitted to be given under this Agreement shall be deemed to have been duly given if in writing and delivered personally, given by prepaid telegram, or mailed by first-class (postage pre-paid), registered, or certified mail, as follows:

<u>If to the City</u>:

Mayor of Loves Park
City Hall
1000 River Park Drive
Loves Park, Illinois 61111

<u>If to the Government</u>:

District Engineer
U.S. Army Engineer District, Rock Island
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61204-2004

b. A party may change the address to which such communications are to be directed by giving written notice to the other party in the manner provided in this Article.

c. Any notice, request, demand, or other communication made pursuant to this Article shall be deemed to have been received by the addressee at such time as it is personally delivered or seven calendar days after it is mailed, as the case may be.

ARTICLE XIX - CONFIDENTIALITY

To the extent permitted by the laws governing each party, the parties agree to maintain the confidentiality of exchanged information when requested to do so by the providing party.

ARTICLE XX - SECTION 902 PROJECT COST LIMITS

The City has reviewed the provisions set forth in Section 902 of P.L. 99-662, as amended, and understands that Section 902 establishes a maximum construction cost for the Project. For purposes of this Agreement, the Section 902 cost limit is $43,260,000 as calculated on October 1, 1989. This amount shall be adjusted to allow for appropriate increases for inflation and changes in the project cost as provided in Section 902. Should this cost maximum be reached, no additional funds may be expended on the Project until additional authority is obtained from Congress.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, which shall become effective upon the date it is signed by the Assistant Secretary of the Army (Civil Works).

THE DEPARTMENT OF THE ARMY	THE CITY OF LOVES PARK, ILLINOIS
By ________________________	By ________________________
ROBERT W. PAGE Assistant Secretary of the Army (Civil Works)	JOSEPH F. SINKIAWIC Mayor The City of Loves Park, Illinois
DATE: ____________________	DATE: ____________________

CERTIFICATE OF AUTHORITY

I, ________________________________, do hereby certify that I am the principal legal officer of the City of Loves Park, Illinois, that the City of Loves Park is a legally constituted public body with full authority and legal capability to perform the terms of the Agreement between the Department of the Army and the City of Loves Park in connection with the construction of a flood control project at Loves Park, and to pay damages, if necessary, in the event of the failure to perform, in accordance with Section 221 of Public Law 91-611, as amended, and that the person who has executed this Agreement on behalf of the City of Loves Park has acted within his statutory authority.

IN WITNESS WHEREOF, I have made and executed this certification this _________ day of ________________, 19______.

____
Attorney for the City
of Loves Park, Illinois

Loves Park Financing Plan

CITY OF LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION PROJECT

FINANCING PLAN OUTLINE

The City of Loves Park, Illinois, non-Federal sponsor of the Loves Park Local Flood Protection Project, is capable of meeting it cost sharing and other obligations as required under the terms of the draft Local Cooperation Agreement.

USES OF FUNDS	AMOUNT 1/	COMMENT
Land Acquisition and Relocations	$6,098,000	Required Real Estate acquisition, necessary relocations, engineering cost
Cash Contributions	$1,120,000	Non-Federal cash contribution requirement during construction
Annual Operation and Maintenance	$ 24,500	Normal Operation Maintenance of completed project
SOURCES OF FUNDS		
Pebble Creek Dam Construction Credit	$ 439,000	
Pebble Creek Dam LERRD-Credit	$ 60,000	
Cash Available for Project	$1,128,000	From current balance of City's drainage Fund
Financing to be Obtained:		
State of Illinois Grant	$ 400,000	Illinois Department of Transportation
State of Illinois Grant	$2,200,000	Illinois Water Resources Division
Debt Instruments 2/	$2,991,000	Short and Long term, borrowing as conditions during construction indicate
Annual Budget Appropriations	$ 24,500	Normal budget procedures for public works maintenance

2/ The City of Loves Park has no long-term debt outstanding, a bonding capability in excess of $7 million, and substantial cash reserves. Therefore, financing of additional cash requirements through the use of debt instruments is a reasonable and accessible funding source.

1/ January 1988 Cost Estimates (per GDM), including costs and credits for Pebble Creek Dam construction.
Revised September 1989
Revised June 1990

DISTRICT COMMANDER'S ASSESSMENT OF
NON-FEDERAL SPONSOR'S FINANCING CAPABILITY

The Financing Plan presented by the City of Loves Park, Illinois has been reviewed and is deemed adequate to participate in the construction of the Loves Park Local Flood Protection Project. Based upon information received from the non-Federal sponsor, it is reasonable to expect that ample funds will be available to satisfy the non-Federal sponsor's financial obligation for the project.

John R. Brown
Colonel, Corps of Engineers
District Engineer

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANUDM

APPENDIX G

RELOCATIONS

RAILROADS, HIGHWAYS, AND UTILITIES

ROCK ISLAND DISTRICT
CORPS OF ENGINEERS
CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS 61201

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX G
RELOCATIONS
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RELOCATIONS
RAILROADS, HIGHWAYS, AND UTILITIES

RAILROAD RELOCATIONS

1. General. The proposed flood protection plan for Loves Park will affect the facilities of the Chicago and Northwestern Transportation Company at three locations. Also affected is a combination private road and railroad bridge serving an industrial area.

The criteria used to differentiate and categorize alterations or relocation of those facilities as Federal or non-Federal responsibility is set out in Paragraph 1-84 of EM 1120-20-101.

2. Existing Railroad Facilities.

a. Private Road and Railroad Bridge at Station 105+17

b. C & N.W. Railway Bridge Alterations at Station 112+35

c. C & N.W. Railway Bridge Alterations at Station 121+35

d. Install two seven foot diameter concrete pipes under C & N.W. Railway at Station 5+40 G-1.

3. Proposed Railroad Alterations.

a. Private Road and Railroad Bridge at Station 105+17 is to be altered as follows: The existing twin RCB Culvert is to be enlarged for waterway opening requirements as shown on Plate 23. The installation of two new reinforced concrete culvert barrels should not affect railroad operations. The spur line and affected structure serves an industrial area.

b. Chicago and Northwestern Transportation Company Railroad Bridge at Station 112+35 is to be altered as follows: The waterway opening under the bridge will be increased as shown in detail on Plate 26. The lowering of the channel complete with new concrete channel improvement will not affect the operation of the Railway. The channel improvement under the Railroad bridge will improve waterway opening characteristics, including future debris and maintenance problems.

c. Chicago and Northwestern Transportation Company Railway Bridge at Station 121+35 is to be altered as follows: The waterway opening under the bridge will be improved as shown on Plate 26. The concrete channel improvement will improve waterway opening requirements and future debris and maintenance problems at this location.

d. Install two seven foot diameter concrete pipes under Chicago and Northwestern Transportation tracks at Station 5+40 G-1. The purpose of this work is to drain South Branch channel during flooding to an existing lake to reduce flooding downstream in Loves Park.

4. Views of Owners. The owner of the railroad company affected by the project has been informed of the proposed plans for their facilities, and a general concurrence of these plans has been requested.

5. Cost Estimate. The cost estimate for the proposed railroad relocations is contained in appendix D.

6. Design and Construction Responsibilties. The major portions of the bridge alterations for the channel improvements are expected to be accomplished by the Government. Should track work be required on operating tracks; this work will be accomplished with railroad forces.

HIGHWAY RELOCATIONS

7. General. The proposed flood protection plan for Loves Park will affect the facilities of the Illinois Department of Transportation, the city of Loves Park, county roads, and private access roads and parking lots.

8. Existing Streets. Locations of roads to be relocated and/or modified are shown on plan and profile plates (4-17) and in detail on plate 23.

9. Proposed Highway and Street Alterations.

a. City of Loves Park. The city plans to replace four existing street bridges and two private bridges at the following locations for project waterway opening requirements.

(1) North Second Street Bridge. The city proposes to replace an existing culvert at Station 31+65 with a new 48.5-foot precast bridge across Loves Park Creek as shown on plates 6 and 23. The North Second Street Bridge is part of the State Highway 251 system and will be designed and constructed by the Illinois Department of Transportation.

(2) River Lane Bridge. At this location the city will remove an existing 3-span bridge at Station 32+92 and replace with a new 46.9-foot precast bridge as shown on plates 6 and 23.

(3) Walker Ave. Bridge. The city proposed to replace an existing double barrel R.C.B. culvert at Station 76+70 with new 66-foot bridge as shown on plates 9 and 23.

(4) Elm Street Bridge. The existing bridge at Sta. 83+08 is proposed to be replaced with a new 66-foot bridge as shown on plates 9 and 23.

(5) Browns Parkway Bridge. The existing foot bridge at Station 86+33 is proposed to be replaced with a new 66-foot bridge as shown on plate 9.

(6) Private Road Bridge. The existing private road bridge at Station 97+69 will be replaced with a new 47-foot bridge as shown on plates 10 and 23.

(7) Existing Private Foot Bridge at Station 101+28 will be replaced with a new 47-foot structure as shown on plates 11 and 23.

(8) Private Road and Railroad Bridge (Station 105+17). See paragraph 3a under Railroad alterations for details.

b. Private Access Roads. All private access road relocations will be accomplished by the city as a non-federal responsibility.

10. Views of Owner. The proposed plans for road relocations have been furnished to the owners for their review and comments. Preliminary conferences have been held with the city regarding the street alterations and modifications.

11. Cost Estimates. The cost estimates for the proposed highway relocations are contained in Appendix D.

12. Design and Construction Responsibility. Design of highways and streets will be accomplished by the city and Illinois D.O.T. and shall comply with all applicable State, county, and local government design standards. Design and construction of highway bridge alterations will be accomplished by Illinois Department of Transportation with waterway opening requirements for all bridges furnished by Government as part of design criteria for the project. Other construction shall be carried out under the requirements of local interest obligations as non-Federal costs.

UTILITY RELOCATIONS

13. General. The proposed flood protection plan affects the facilities of the City's Water Company, Illinois Bell Telephone Company, Commonwealth Edison Electric Company, Northern Illinois Gas Company and the Rockford Park Cablevision Company.

14. Existing Utilities Affected.

a. Loves Park Water Department. The facilities of the city water department affected by the project include twenty waterlines ranging in size from 6-inches to 12-inches.

b. Illinois Bell Telephone Company. The facilities of the Illinois Bell Telephone Company affected by the project include buried cable and overhead lines.

c. Commonwealth Edison Electric Company. The facilities of Commonwealth Edison Electric Company affected by the project include powerlines. The electric powerlines include both distribution and transmission facilties.

d. Northern Illinois Gas Company. The facilities of Northern Illinois Gas Company affected by the project include twenty one gas mains ranging in size from 1-1/4-inches to 12-inches.

e. CATV. The facilities of Rockford Park Cablevision are located on Commonwealth Edison Electric Overhead pole lines. They have no underground lines.

15. Proposed Utility Alterations. The location of the proposed utility alterations are shown on plan and profile plates 4 through 17. All utility work required is listed on the utility schedule at the end of this appendix.

a. Loves Park Water Department. There are twenty waterlines affected by the project ranging in size from six to twelve inches. It is proposed to relocate all waterlines affected by the project to new or existing bridges that cross the channel. All other waterlines not located near bridges are proposed to be lowered beneath the new channel or remain in place. In summary there are ten waterlines proposed to be attached to new or existing bridges; four waterlines that require no work; five waterlines are proposed to be lowered under the new channel and one waterline can remain in place with minor protection during excavation of the channel. All waterlines attached to the bridges will be accomplished as non-federal items of responsibility by the city. The waterlines proposed to be lowered under the new channel are considered an integral part of the project and a federal responsibility. Refer to the utility schedule at the end of Appendix G for details.

b. Northern Illinois Gas Company. There are twenty one gaslines affected by the project ranging in size from 1-1/4-inches to 12-inches. It is proposed to relocate all gaslines on new or existing bridges that cross the channel. All other gas lines not located near bridges are proposed to be lowered beneath the new channel or remain in place. In summary there are four gas lines that require no work; five gaslines proposed to be lowered under the new channel; and twelve gaslines proposed to be attached to new or existing structures. The gaslines proposed to be lowered under the new channel are considered an integral part of the project and are a federal responsibility. Refer to utility schedule at end of Appendix G for details.

c. Commonwealth Edison Electric Company. The alterations to the powerline facilities of Commonwealth Edison Company will be the responsibility of the city of Loves Park. Items of powerline work include six locations where overhead powerlines and poles require relocation because of channel improvements. There are another sixteen locations where no work is required, including a 138 KV Power Line. The location and disposition of all powerlines is shown on the utility schedule at the end of Appendix G.

d. Illinois Bell Telephone Company. The alterations to the telephone line facilities of Illinois Bell will be the responsibility of the city of Loves Park. Items of telephone work include relocation of six overhead telephone lines and the removal of six buried conduits from the channel with attachment to new or existing bridges. There are eleven other locations where no work is required to telephone lines. These lines are either overhead, attached to bridges, or buried in the channel. The location and disposition of all telephone lines is shown in the utility schedule at the end of this appendix.

e. CATV. Alteration of the facilities of Rockford Park Cablevision located on Commonwealth Edison Electric pole lines are the responsibility of the city of Loves Park. The locations and disposition of these lines are contained in the utility schedule at the end of Appendix G.

16. Views of Owner. Representatives of the city, and the three utility companies affected by the project have been informed of the proposed plans for utility relocation, and concurrence in these plans will be secured from each company.

17. Cost Estimate. The cost estimate for the proposed utility relocations is contained in Appendix D.

18. Design and Construction Responsibility. The alterations to the electric
** powerlines, telephone lines, waterlines, gas mains and valves will be the
** responsibility of the local Government of Loves Park. All other utility alterations will be designed and constructed by the respective utility companies. Federal responsibility work to be performed by the utility companies will be covered by negotiated relocation agreements.

**Revised June 1990

UTILITIES SCHEDULE

GAS - WATER - POWER - TELEPHONE - CABLE TV

Station	Existing Facility	Disposition	Remarks
Sta. 8+00	Power Line	No work required	
Sta. 8+32	2" Gas Line (Steel)	Passes under channel; requires protection during construction	See Plate 4
Sta. 13+51	Overhead Power Line	No work required	See Plate 4
Sta. 13+64	6" Water Main	Crosses beneath the channel requires protection during construction	See Plate 5
Sta. 13+87	2" Gas Line (Steel)	No work required	See Plate 5
Sta. 13+92	Tele. Conduit		See Plate 5
	(Attached to Bridge)	No work required	
Sta. 27+85	Overhead Telephone	No work required	See Plate 6
Sta. 27+95	1-1/4 Gas Line	No work required	See Plate 6
Sta. 29+30	10" Water Main	Remove from channel and attach water line to new N. 2nd St. Bridge	See Plate 6
Sta. 29+64	Buried Telephone		See Plate 6
	(6 Duct)	Remove from channel and attach telephone cables to new N. 2nd St. Bridge	
Sta. 29+65	8" Gas Line (Steel)	Remove from channel and attach gas lines to new N. 2nd St. Bridge	See Plate 6
Sta. 32+92	2" Gas Line (Steel)	Remove from channel and attach to new River Lane Bridge	See Plate 6
Sta. 33+12	10" C.I. Water Main	Remove from channel and attach to new River Lane Bridge	See Plate 6
Sta. 33+27	2" Tele. Conduits	Remove from channel and attach to new River Lane Bridge	See Plate 6
Sta. 34+83	Overhead Telephone Line	Relocate pole out of channel, removing and reinstalling phone line	See Plate 6
Sta. 35+00	Overhead Telephone Line	Remove and reinstall phone line to relocated pole (above - Sta. 34+83)	See Plate 6
Sta. 35+21	Overhead Telephone Line	Remove and reinstall phone line to relocated pole (above - Sta. 34+83)	See Plate 6
Sta. 35+74	Overhead Telephone Line	Remove and reinstall phone line to relocated pole (above - Sta. 34+83)	See Plate 6
Sta. 36+42	2" Gas Line (Steel)	Remove from channel and attach to existing Merrill Ave. Bridge	See Pla e 6
Sta. 36+73	6" Water Main	Remove from channel and attach to existing Merrill Ave. Bridge	See Plate 6
Sta. 38+43	Overhead Telephone Line	Relocate pole out of channel R.O.W.	See Plate 6
Sta. 40+02	2" Gas (Steel)	Remove from channel and attach to existing Grand Ave. Bridge	See Plate 6
Sta. 40+58	Overhead Telephone Line	No work required	See Plate 6
Sta. 40+59	6" Water Main	Remove from channel and attach to existing Grand Ave. Bridge	See Plate 6
Sta. 40+65	Overhead Power Line	No work required	See Plate 6
Sta. 42+20	Overhead Telephone Line	No work required	See Plate 6
Sta. 43+44	Buried Telephone Cable	Remove from channel & attach telephone cable to exist. Loves Park Dr. Bridge	See Plate 7
Sta. 43+58	2" Gas Line (Steel)	Remove from channel & attach gas line to exist. Loves Park Dr. Bridge	See Plate 7
Sta. 43+85	6" Water Main	Remove from channel & attach water line to exist. Loves Park Dr. Bridge	See Plate 7
Sta. 45+53	Overhead Power	Relocate power pole and power line	See Plate 7
Sta. 51+60	6" Water Main	Remove 70' of water line, replace 7' lower	See Plate 7
Sta. 51+95	2" Gas Line (Steel)	No work required	See Plate 7
Sta. 52+83	Overhead Power Line	No work required	See Plate 7
Sta. 53+34	Overhead Power Line	No work required	See Plate 7
Sta. 54+92	4" Gas Line (Steel)	Remove from channel & attach gas line to exist. Riverside Blvd. Dr.	See Plate 7
Sta. 55+63	6" Water Main	Remove from channel & attach water main to exist. Riverside Blvd. Dr.	See Plate 7
Sta. 57+40	Buried Telephone Cable	Remove from channel & attach telephone cable to exist. River side Blvd. Dr.	See Plate 7
Sta. 60+29	Buried Telephone Cable		See Plate 8
	(9 Duct)	Remove from channel & attach telephone cable to exist. Garden Plain Ave. Dr.	
Sta. 61+56	Overhead Telephone Line	No Work Required	See Plate 8
Sta. 61+76	Overhead Telephone Line	No Work Required	See Plate 8
Sta. 61+99	Overhead Telephone Line	No Work Required	See Plate 8
			See Plate 8

UTILITIES SCHEDULE

GAS - WATER - POWER - TELEPHONE - CABLE TV

Station	Existing Facility	Disposition	Remarks
Sta. 65+79	2" Gas Line (Steel)	Remove from channel and attach gas line to exist. Clifford Ave. Bridge	See Plate 8
Sta. 65+86	Buried Telephone Cable (15 Duct)	Remove from channel & attach telephone cable to exist. Clifford Ave. Bridge	See Plate 8
Sta. 65+86	Overhead Power Line	No work required	See Plate 8
Sta. 66+07	6" Water Main	Remove 60' of water line, replace 7' lower	See Plate 8
Sta. 68+14	Overhead Telephone Line	No work required	See Plate 8
Sta. 69+17	Overhead Telephone Line	Relocate pole and lines out of channel R.O.W. (Sta. 69+00 - 73+50)	See Plate 8
Sta. 75+10	Overhead Power Line	No work required	See Plate 9
Sta. 76+86	6" Water Main	Remove from channel and attach water line to new Walker Ave. Bridge	See Plate 9
Sta. 76+92	2" Gas Line (Steel)	Remove from channel and attach gas line to new Walker Ave. Bridge	See Plate 9
Sta. 78+30	Overhead Power Line	No work required	See Plate 9
Sta. 80+05	6" Water Main	Remove 60' of water line, replace 6' lower (John St. Bridge Sta. 79+90 to be removed and not replaced)	See Plate 9
Sta. 80+07	2" Gas Line (Steel)	Remove 60' of gas line, replace 6' lower (John St. Bridge Sta. 79+90 to be removed and not replaced)	See Plate 9
Sta. 81+47	Overhead Power Line	No work required	See Plate 9
Sta. 81+47	Overhead Telephone Line	No work required	See Plate 9
Sta. 82+75	Buried Telephone (9 Duct)	Remove from channel and attach phone line to new Elm Street Bridge	See Plate 9
Sta. 83+08	2" Gas Line (Steel)	Remove from channel and attach gas line to new Elm Street Bridge	See Plate 9
Sta. 83+25	12" Water Main	Remove from channel and attach water line to new Elm Street Bridge	See Plate 9
Sta. 84+65	Overhead Power Line	No work required	See Plate 9
Sta. 84+65	Overhead Telephone Line	No work required	See Plate 9
Sta. 86+30	6" Water Main	Remove from channel and attach water line to new Browns Prwy. Bridge	See Plate 9
Sta. 86+30	2" Gas Line	Remove from channel and attach gas line to new Browns Prwy Bridge	See Plate 9
Sta. 88+09	Overhead Power and Telephone Line	No work required	See Plate 10
Sta. 88+14 to 95+00	Ovehead Power Line	Remove 4 poles and 870' of power line out of channel R.O.W.	See Plate 10
Sta. 98+67	Buried Telephone Cable	No work required (protect during construction)	See Plate 10
Sta. 111+96	8" Water Main	Remove from channel and attach line to existing Material Ave. Bridge	See Plate 11
Sta. 111+96	Telephone Conduit	No work required (attached to bridge)	See Plate 11
Sta. 111+96	6" Gas Line (Steel)	Remove from channel and attach gas line to existing Material Ave. Bridge	See Plate 11
Sta. 111+96	12" Gas Line (Stewl)	Remove from channel and attach gas line to existing Material Ave. Bridge	See Plate 11
Sta. 121+34	Overhead 138 KV Power Line	No work required	See Plate 12
Sta. 0+18	10" Water Main	No work required	See Plate 13
Sta. 0+60	Overhead Power Line	Relocate pole	See Plate 13
Sta. 7+57 G-1	6" Water Line	No work required	See Plate 13
Sta. 7+40 G-1	2" Gas Line (Steel) (North Branch)	No work required	See Plate 13
Sta. 7+09 G-1	Overhead Power line	No work required	See Plate 13
Sta. 6+18 G-1	Overhead Power Line	Relocate pole	See Plate 13
Sta. 5+82(W)	12" Water Main	No work required (protecting during construction)	See Plate 14
Sta. 0+70 H-2	2" Gas Line	Relocate 2" gas line below diversion channel at Alpine Road	See Plate 15
Sta. 1+48 H-2	10" Water Main	Relocate 10" water main below diversion channel at Alpine Road	See Plate 15
Sta. 1+30 H-1	2" Gas Line	Relocate 2" gas line	See Plate 15
Sta. 7+50 H-1	2" Gas & 8" Water Line	Relocate 2" gas line and 8" water main	See Plate 15
Sta. 13+25 H-1	6" Water Line	No work required	See Plate 16
Sta. 11+54 H-1	Overhead Power Line	Relocate power pole	See Plate 16
Sta. 22+00 to 24+90 H-1	Overhead Power Line	Relocate power lines and poles	See Plate 16
Sta. 26+40 H-1	Overhead Power Line	No work required	See Plate 17
Sta. 24+07 H-1	Overhead Power Line	No work required	See Plate 17
Sta. 32+55 H-1	Buried Telephone Line	No work required	

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX H

PEBBLE CREEK DAM CREDIT

ROCK ISLAND DISTRICT
CORPS OF ENGINEERS
CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS 61201

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX H
CREDIT ANALYSIS

TABLE OF CONTENTS

PEBBLE CREEK DAM
LOVES PARK, ILLINOIS

APPENDIX H
CREDIT ANALYSIS

1. General. A copy of the evaluation and recommendation for general credit for the construction of the Pebble Creek Dam is included at the end of this appendix. The evaluation was submitted to higher authority (NCD) for review and approval on 22 February 1988. The evaluation was conducted to determine the reduction in cost of the proposed GDM project due to the construction of the Dam so that a credit amount could be established. The design basis is described in the following paragraphs.

2. Hydrologic Design. The South Branch discharge at Forest Hills Road is 1145 cfs for the proposed GDM project. Without the Pebble Creek Dam that discharge would increase to 1345 cfs. Both values were used to size downstream channels for the with and without dam conditions.

Design discharges were computed at various points along Loves Park Creek using the Corps of Engineers HEC-1 computer program. The Pebble Creek Dam reduces the design discharge on the South Branch Tributary by about 200 CFS. The reduction at Forest Hills Road is nearly equal to the difference between the peak inflow and outflow hydrographs at the dam. This information is found in the Dam computations plotted on Plate A-3 in the Hydrologic and Hydraulic Appendix A. These computations were based on a Modified Puls routing.

The same hydrograph (Plate A-3) was used to determine the difference in the lake storage requirements. The quantity (38 acre-feet) is the difference in the volumes under the Dam inflow and outflow hydrographs minus the flow down the Main Stem. The flow down the Main Stem varies between 150 and 200 cfs and has been plotted on the hydrograph.

3. Channel - Forest Hills to Pump Station. The drop structure at the pump station and the channel width have been decreased by 3 feet due to the construction of the dam. Right-of-way requirements have also been reduced by three feet.

4. Pipeline - Pump Station to South Gravel Pit. The two underground pipes have been decreased from a 7.5 foot diameter to 7.0 foot diameter. The right-of-way required and the outlet structure at the lake is one foot narrower.

5. Interconnecting Channels between the Lakes. The underground pipes and open channels have an adequate capacity for both design conditions.

6. Lake Storage Area. 38.0 acre-feet of additional storage would have been required for the without the dam design condition. 6.3 acres of water surface would be required to accommodate the extra storage with a water depth of six feet. Six feet is the depth of water used for the proposed GDM project. For

estimation purposes, the proposed fill areas of Windsor Lake that have not been presently filled, plus the strip of land between Windsor Lake and the North Pit were used to obtain the additional 6.3 acres. The strip of land between the two lakes would have to be excavated down to elevation 123.0 feet, which is the pumpdown level of the lakes.

/. Cost Estimate. A detailed cost estimate of construction costs and right-of-way requirements for the difference between the with and without the dam conditions is provided on the following page.

PEBBLE CREEK DAM
LOVES PARK, ILLINOIS

COST ESTIMATE

ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT FED	AMOUNT NON-FED
Lands, Improvements & Damages					
Right-of-Way for Channels, Pipelines, Pump Station, Detention Ponds, Spoil Areas & Contingencies	1	Job	Sum		$60,000
Channels					
South Branch To Pump Station					
Concrete Lining	75	CY	250.00	18,750	
Excavation	270	CY	2.30	621	
Backfill	-185	CY	3.10	-573	
Spoil	485	CY	5.10	2,473	
Trash Rack (Steel)	780	LB	2.00	1,560	
TOTAL				$22,831	
Pipeline to South Pit					
Pipe (7.5' Dia. RCP - Jacked) w/Dewatering (Diff. = 855 - 775)	700	LF	80.00	56,000	
Spoil	180	CY	5.10	918	
Pipe (7.5' Dia. RCP - Cut & Cover) w/Dewatering (Diff. = 585 - 530)	720	LF	55.00	39,600	
Excavation	330	CY	2.30	759	
Backfill	240	CY	3.10	744	
Bracing	550	LB	1.60	880	
Seeding	0.1	A	900.00	90	
Crushed Rock	30	T	11.00	330	
Filter Fabric	40	SY	1.80	72	
TOTAL				$99,393	
South Branch Diversion Outlet					
Reinforced Concrete	4.0	CY	300.00	1,200	
Sheet Piling	10.0	SF	11.00	110	
Pipe Handrail	1.0	LF	50.00	50	
Excavation	40.0	CY	1.50	60	
Backfill	15.0	CY	2.00	30	
Spoil	20.0	CY	5.00	100	
Temporary Levee	10.0	CY	8.00	80	
TOTAL				$1,630	

Cost Estimate, Cont'd

ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT FED	AMOUNT NON-FED
Additional Lake Storage					
Clearing & Grubbing	4	A	3,000.00	12,000	
Excavation	48,800	CY	2.30	112,240	
Spoil	48,800	CY	5.10	248,880	
Pipe to North Pit Not Required (From Basic Project Cost Estimate)				-167,960	
TOTAL				$205,160	
Summation Channels					
South Branch to Pump Station				22,831	
Pipeline to South Pit				99,393	
South Branch Diversion Outlet				1,630	
Additional Lake Storage				205,160	
TOTAL				329,014	
Contingencies				49,386	
TOTAL Channels				$378,400	
Drop Structure at Pump Station					
Excavation	96.0	CY	2.50	240	
Temporary Sheet Pile	150.0	SF	8.00	1,200	
Backfill	40.0	CY	3.10	124	
Spoil	50.0	CY	5.10	255	
Crushed Rock	7.0	T	11.00	77	
Filter Fabric	10.0	SY	1.80	18	
Reinforced Concrete	10.0	CY	375.00	3,750	
TOTAL				$5,664	
Contingencies				936	
TOTAL Drop Structure at Pump Station				$6,600	

CENCR-ED-DM 22 February 1988

MEMORANDUM FOR: Commander, North Central Division, ATTN: CENCD-PD-PL

SUBJECT: Section 104, P.L. 99-662 Guidelines, General Credits for Flood Control - ER 1165-2-29

1. The evaluation and recommendation for the allowance for general credit for the Loves Park, Illinois, Local Flood Protection project is attached as enclosure 1. A copy of the City of Loves Park, Illinois' request for credit and the DCA acknowledgement receipt are attached as enclosures 2 and 3, respectively. This is submitted per discussions between Ms. Susan M. Smoley, NCD, and Mr. John J. Copeland, NCR on 10 February 1988 and NCD-PD-PL (1105) letter dated 8 January 1988 concerning subject credits.

2. The Loves Park project is scheduled to have a signed LCA in September 1988.

3. The Loves Park, Illinois project is incorrectly noted as a Section 205 continuing authority project on page 2 of the list of applications received for pre 17 November 1986 Section 104 credits. Loves Park is a specifically authorized project.

FOR THE COMMANDER:

ORIGINAL SIGNED BY

GARY LOSS

3 Encls
ac

DOYLE W. McCULLY, P.E.
Chief, Engineering Division

CF: (w/encls)
CENCR-ED-D (Dist File)
CENCD-ED-T
CENCR-ED
CENCR-ED-DM (Viktora)
CENCR-RE

CENCR-ED-DM
22 Feb 88

Loves Park Creek, Local Flood Protection, Loves Park, Illinois

Information Concerning Allowance for General Credit Per ER-1165-2-29, dated 30 Nov 87

1. Project Authorization

- Authorized for Construction by the Water Resource Development Act of 1986 PL 99-662

- Act date: 17 November 1986

- Act Language:

ROCK RIVER, ILLINOIS

The project for flood control, Rock River, Rockford and Vicinity, Illinois (Loves Park Interim): Report of the Chief of Engineers, dated September 15, 1980, at a total cost of $31,300,000, with an estimated first Federal cost of $23,500,000 and an estimated first non-Federal cost of $7,800,000. The project shall include flood protection measures along Small Unnamed Creek, as described in the Interim Report of the District Engineer, Rock Island, dated February 1979. Before the acquisition of land for, or the actual construction of, the project the Secretary shall study the probable effects of the project on existing recreational resources in the project area and, as part of the project, shall undertake such measures as he determines necessary and appropriate to mitigate any adverse effects on such recreation resources.

- The project is not subject to the following sections of PL 99-662: 903(a), 903(b), 401(b), 601(b).

2. Creditable work began 17 Nov 1981

3. Creditable work was completed by 17 Nov 1986

4. Federal funds were not used in the construction of the project.

5. The Pebble Creek Dam was constructed approximately 1.3 miles upstream of Forest Hills Road on the South Branch of Loves Park Creek. Forest Hills Road is the upstream end of the authorized project. The structure consists of a 700

Enclosure #1

foot long, 21 foot high, earth filled dam with 30 foot wide and 120 foot long grass lined emergency spillway. Approximately 40 acres of land was purchased for the project. A concrete drop structure and an 8 foot diameter concrete pipe make up the outlet works. During a 100-year flood event, the design discharge rate is 910 cfs and 100 acre-feet of water is stored. The stored water will have a surface area of 17.0 acres. The summation of actual cost for Pebble Creek Dam is included as Attachment 1.

The authorized project consists of channel improvements and the partial diversion, storage, and pumping of stored water after a flood event. A GDM is being prepared and is scheduled for completion in March 1988. A preliminary cost estimate for the project along with a tabulation of proposed Federal and non-Federal costs are included as Attachment 2 and 3 respectively.

The Pebble Creek Dam project has been determined to be substitute work accomplished external to the project. For a 100-year event, the project has resulted in a 200 cfs flow reduction in the South Branch of Loves Park Creek. The project has therefore reduced the following basic project items:

a. The size of the South Branch channel (3 foot width reduction).

b. The size of the South Branch diversion pipeline (6 inch diameter reduction).

c. The amount of surface area required for the temporary storage of flood water (less land to purchase).

d. The amount of water pumping required after a flood event has passed. This item was not included in our analysis, as it is a local responsibility and not a first construction cost.

Credit is proposed for the amount of cost reduction for the authorized project rather than for the higher costs associated with the actual construction of the Pebble Creek Dam. A summation of estimated cost for compatible work is included as Attachment 4. The value of LERRD for reduction of land needed for the Loves Park Creek Local Flood Protection project is estimated to be $60,000 based on February 1988 prices. The entire estimate is for lands and damages.

6. The source of the credit value is a District estimate for the reduction of total project cost as will apply for the upcoming GDM for the project. The GDM is scheduled for submittal in March 1988.

7. NCR recommends that a credit for compatible work of $499,000 be approved in accordance with Section 104 of PL 99-662. A Computation of the Credit is shown as Attachment 5. Some minor adjustments may be required when the GDM is completed.

PEBBLE CREEK DAM
LOVES PARK, ILLINOIS

FEBRUARY 22, 1988

SUMMATION OF ACTUAL DAM CONSTRUCTION COSTS
(AS CONSTRUCTED)

	Federal	Non-Federal
Lands & Damages	-	$149,900
Construction Contract	$455,945	-
Subtotal	$455,945	$149,900
Engineering & Design	126,963	-
Supervision & Administration	34,757	-
Totals	$617,665	$149,900
*Combined Total Cost	$767,565	

*The City of Loves Park Credit Request was reduced by $350.00 for money spent prior to 17 November 1981

LOVES PARK CREEK
LOCAL FLOOD PROTECTION
LOVES PARK, ILLINOIS

PRELIMINARY COST ESTIMATE SUMMARY
GENERAL DESIGN MEMORANDUM

FEBRUARY 16, 1988

	Fed	Non-Fed
Lands and Damages	-	$4,300,000
Relocations (utilities, buildings and bridges)	-	$998,000
Channels	$12,687,000	-
Pump Station	$874,000	-
Beautification	$250,000	-
Engineering and Design	$1,991,000	$80,000
Supervision and Administration	$829,000	$60,000
Total	$16,631,000	$5,438,000
Combined Total	$22,069,000	

NOTE: This estimate is for the basic authorized project and does not include the Pebble Creek Dam.

Attachment 2

LOVES PARK CREEK
LOCAL FLOOD PROTECTION
LOVES PARK, ILLINOIS

FEBRUARY 16, 1988

COMPUTATIONS USED IN DETERMINING NON-FEDERAL CASH CONTRIBUTIONS

PRELIMINARY FOR GENERAL DESIGN MEMORANDUM

The following determination of Cash Contribution is based on 25% of total costs of construction of the flood control project.

Item	Total Federal and Non-Federal Costs
Lands & Damages	$4,300,000
Relocations	$249,000
Channels	$13,436,000
Pump Station	$874,000
Beautification	$250,000
Engineering & Design	$2,071,000
Supervision & Administration	$889,000
Total Project Cost	$22,069,000

Non-Federal Cost

Lands and Damages	$4,300,000
Relocations Utilities	$284,000
Relocations Bridges	$854,000
Minimum Cash Contribution(5% of $22,069.0)=	$1,103,000
Total Non-Federal Cost	$6,541,000

PEBBLE CREEK DAM
LOVES PARK, ILLINOIS

FEBRUARY 22, 1988

SUMMATION OF ESTIMATED COST FOR CREDITABLE COMPATIBLE WORK

REDUCTION IN GDM PROJECT DUE TO DAM CONSTRUCTION
(Flows in the South Branch were Reduced 200 cfs)

	Federal	Non-Federal
Lands & Damages	-	$ 60,000
Channels	$378,400	-
Drop Structure at Pump Station	$6,600	-
Subtotal	$385,000	$ 60,000
Engineering & Design	$30,800	-
Supervision & Administration	$23,200	-
Totals	$439,000	$ 60,000
Combined Total	$499,000	

NOTE: This cost condition controls over actual construction cost for creditable compatible work.

PEBBLE CREEK DAM
LOVES PARK, ILLINOIS

FEBRUARY 22, 1988

COMPUTATION OF CREDIT

	Condition: LERRD less than 25% TPC	Basic Project	Compatible Work=$499,000 (1)
	Non-Federal:		
**	5% Cash	$ 1,095,000	$ 1,120,000
**	LERRD	$ 6,038,000	$ 5,659,000 (2)
	Extra Cash (Toward Cost)	-	-
	Construction (Estimated)		439,000
**	Subtotal	$ 7,133,000	$ 7,218,000
	Federal:		
**	Construction	$14,766,000	$14,741,000
	LERRD	-	$ 439,000 (3)
**	Subtotal	$14,766,000	$15,180,000
**	TPC	$21,899,000	
**	Adjusted TPC ($21,899,000 + $499,000)	-	$22,398,000
	Excess Compatible Work	-	0
	Increase in Federal Costs	-	$ 414,000

(1) Compatible Work = $439,000 + $60,000 = $499,000
(Dam Construction Cost + Dam LERRD)

** (2) LERRD Calculation = 6,038,000 - $439,000 + $60,000 = $5,659,000
(Basic Project LERRD - Dam Construction Cost + Dam LERRD)

(3) LERRD Responsibility to be Assumed by Federal Government

Attachment 5

*Revised September 1989
**Revised June 1990

OFFICE OF THE MAYOR
CITY OF LOVES PARK
1000 RIVER PARK DRIVE
LOVES PARK, ILLINOIS 61111
815/654-5030

Joseph F. Sinkiawic, Mayor

March 20, 1987

USACE
DAEN-CWR-R
Washington, D.C. 20314-1000

RE: FLOOD DAMAGE REDUCTION - LOVES PARK CREEK

Gentlemen:

Pursuant to the provisions of Section 104 of Public Law 99-662, we are requesting cost credit for flood control work completed by the City of Loves Park, as work compatible with the referenced project.

Specifically, the work for which we are requesting credit is the project known as the Pebble Creek Dam, completed in November of 1984, for a total cost of $767,915.00. The total cost includes engineering, real estate appraisal and acquisition, legal fees, construction etc.

Thank you for your prompt consideration of this request.

Sincerely,

Joseph F. Sinkiawic

Joseph F. Sinkiawic
MAYOR

JFS/jg

Encl. 1

''THE CITY WITH A HEART''

Enclosure #2

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314

REPLY TO
ATTENTION OF:

27 MAR 1987

Honorable Joseph F. Sinkiawic
Mayor, City of Loves Park
540 Loves Park Drive
Loves Park, Illinois 61111

Dear Mayor Sinkiawic:

This acknowledges receipt of your application dated March 20 1987, for credit for flood control work carried out in connection with the Loves Park Creek project. The procedural requirement that such application be made not later than March 31, 1987, for consideration for credit under Section 104 of the Water Resources Development Act of 1986, Public Law 99-662, has been met.

We are currently developing guidelines and procedures for implementing the credit provisions of Public Law 99-662. A determination of the extent to which the work identified in your application may be eligible for a credit cannot be made until those guidelines are established. A draft of the guidelines will soon be published in the Federal Register to afford opportunity for public comment. The final guidelines must be published in the register by November 17, 1987.

The North Central Division and the Rock Island District, the Corps of Engineers offices that would be responsible for implemention of the Federal project, will be asked for their recommendations. If additional information on the completed work is needed to support a credit recommendation, it will be requested by the Rock Island District.

Sincerely,

Joseph T. Larremore

Joseph T. Larremore
Colonel, Corps of Engineers
Executive Direcor of Civil Works

Enclosure #3

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX I

STRUCTURAL DESIGN ANALYSIS

ROCK ISLAND DISTRICT
CORPS OF ENGINEERS
CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS 61201

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX I
STRUCTURAL DESIGN ANALYSIS

TABLE OF CONTENTS

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX I
STRUCTURAL DESIGN ANALYSIS

1. General. This appendix presents the design of a portion of a structure in the subject project to illustrate typical calculations which will be undertaken to complete the structural design for final plans and specifications. Computations are shown for a typical inlet structure and for selection of concrete drainage pipe. All the structures in the project are quite similar to these items from a structural analysis view.

2. Criteria. The reinforced concrete hydraulic structures in the project
* will be designed following the current ACI Building Code and ETL1110-2-312 Strength Design Criteria for Reinforced Concrete Hydraulic Structures. Concrete Pipe strength requirements will be determined following procedures recommended in Concrete Pipe Design Manual by the American Concrete Pipe Association. The few miscellaneous structural steel items in the project will be designed in accordance with EM 1110-1-2101 Working Stresses for Structural Design.

3. Material Selection. Concrete structures will be designed for 28-day compressive strength of 3500 psi. Concrete reinforcement will be deformed billet-steel bars conforming to ACI 615, grade 60 requirements. Structural steel will meet ASTM-A36, and steel sheet piling, used primarily to prevent undermining of structures, will meet ASTM-A328.

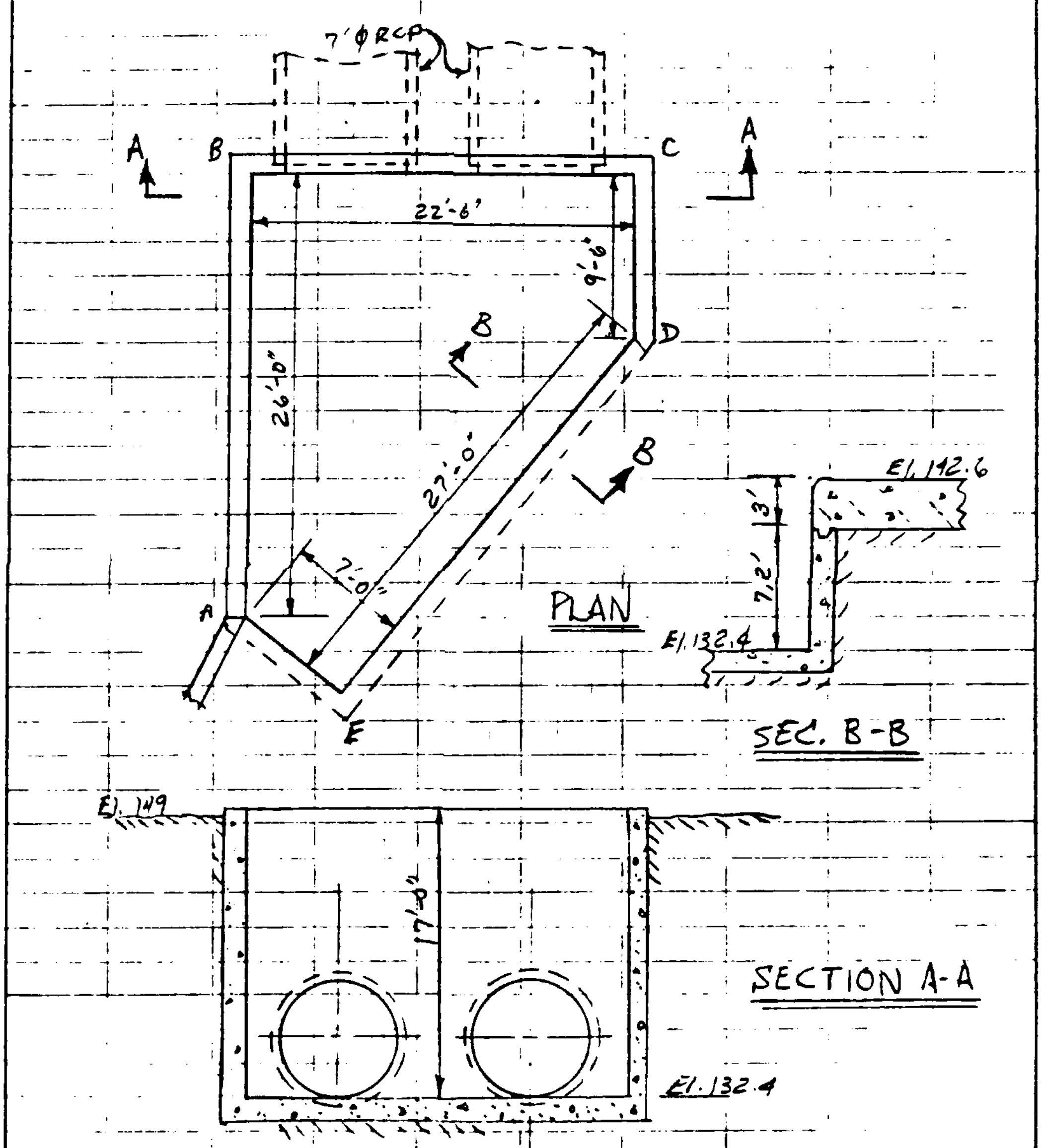
4. Bridges. The Bridge on Second Street is on State Highway 251. The design of the bridge will be by the Illinois Department of Transportation according to their standards.

The preliminary design of other bridges has been carried out using existing bridges as the example for the type of proposed structures. Illinois Department of Transportation standards have been used to determine member sizes and span capabilities.

*Revised September 1989

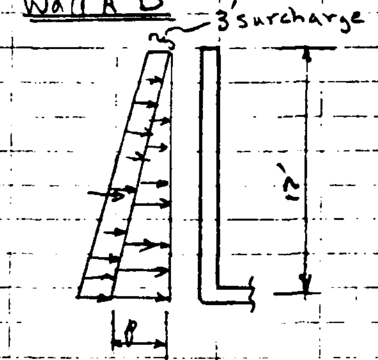
Subject Loves Park - Alpine Road Diversion Chute		Date 12/87
Computed by DAB	Checked by MCW	Sheet 1 of

Alpine Rd. Inlet:



Subject: Loves Park - Alpine Rd. Diversion Chute		Date: 12/87
Computed by: DAP	Checked by: MCW	Sheet 2 of

<u>Wall A-B</u>



Backfill is expected to be essentially sandy. Estimate coeff. lateral pressure K = 0.6

$P = K\gamma d = 0.6\,(120)(17) = 1225\ psf$

surcharge load pressure

$p = 0.6\,(120)(3') = 215\ psf$

Reference "Moments & Reactions for Retangular Plates" by W.T. Moody, Bureau of Reclamation Monograph No 27

$\frac{a}{b} = \frac{26/2}{17} = 0.76$

For the varying load max. mom. on a 1' wide vertical section occurs at bottom: $M_y = (\text{coeff.})\,pb^2 = 0.0584\,(1225)(17)^2 = 21'^K$

For the surcharge induced pressure

$M_y = (0.1212)(215)(17)^2 =$ $\underline{8'^K}$

$M_y = 29'^K$

Max Reaction @ center of wall @ bottom

for the varying load $= (0.4055)(1225)17 =$ 8500#/ft

for surcharge load $= (0.6725)(215)17 =$ <u>1500</u>

11,000#/ft of width

Subject: Loves Park - Alpine Rd. Diversion Chute		Date 12/87
Computed by DAP	Checked by MCW	Sheet 3 of

$V_u = 1.7(11000) = 18700^{\#}$

$V_c = \phi 2\sqrt{f'_c}\, bd = (0.85)2\sqrt{3500}(12)(17) = 20,500 > 18700$ OK

using 20" thickness of wall @ bottom

$$\frac{M_u}{\phi f_c b d^2} = \frac{1.7(29000)(12)}{0.9(3500)(12)(17)^2} = 0.0592$$

$$\rho = 0.0560\left(\frac{3.5}{60}\right) = 0.0033$$

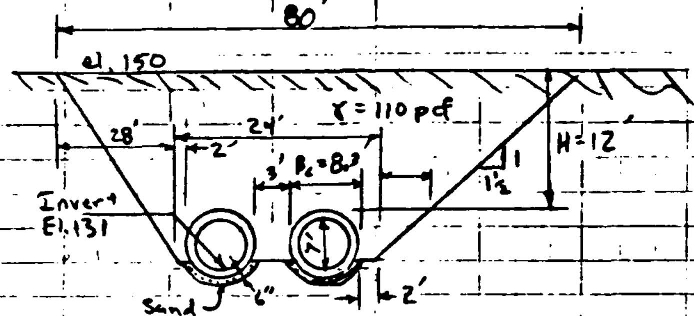
$$A_s = 0.0033(12)(17) = 0.67\ \text{in}^2/\text{ft}$$

Use 20" thickness @ bottom of wall AB, vary to 12" top
Finish wall design at Plans & Specs.

NCR Form 1 Aug 80 381b

Subject: Loves Park - Alpine Road Diversion Chute	Date: 12/87
Computed by: DAP / Checked by: MCW	Sheet 4 of

Pipe Selection:



Wide trench installation (Example 4-6 p 49)

W_E = 13250 × 1.1 = 14600 (Table 31)

Live load does not add to load significantly because of H = 12' relatively large (Table 44)

Select Class 'B' bedding (shaped granular bed, well compacted backfill to 12" above top of pipe) L_f = 1.9

$$\text{Req'd D-load} = \frac{W_L + W_E}{L_f \times D} \times F.S. \quad (p\ 40,\ eq.\ 31)$$

$$* = \frac{0 + 14600}{1.9 \times 7} \times 2.0 = 2200 \text{ for } 0.01'' \text{ crack}$$

* Class V pipe D-load = 3000 OK

Reference:
Concrete Pipe Design Manual, 1970 edition

NCR Form 381b 1 Aug 80

*Revised September 1989

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX J

CORRESPONDENCE

ROCK ISLAND DISTRICT
CORPS OF ENGINEERS
CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS 61201

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

APPENDIX J
CORRESPONDENCE

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OFFICE OF THE MAYOR
CITY OF LOVES PARK
1000 RIVER PARK DRIVE
LOVES PARK, ILLINOIS 61111
815/654-5030

Joseph F. Sinklawic, Mayor

March 25, 1988

Colonel Neil A. Smart, District Engineer
U.S. Army Engineer District
Rock Island Clock Tower Building
P. O. Box 2004
Rock Island, Illinois 61204-2004

RE: STATEMENT OF FINANCIAL CAPABILITY

Dear Colonel Smart:

The City of Loves Park has been working very closely with the Army Corp of Engineers for more than a decade on the proposed flood control project on the Loves Park Creek. Flooding along this creek has potentially severe impact on a large flood plain running through the center of our community. Solving this flood problem has been a number one priority in our community for more than two decades.

Recently we have had several meetings with the Corp of Engineers Staff regarding the final general re-evaluation report and the proposed general design memorandum. The Staff of the Corp of Engineers have been extremely helpful in insuring that we understand all of the details of the project including the details of project design, lands which will be acquired, potential time tables for the project and of course, the City's obligations and responsibilities as part of the project.

The City of Loves Park is a municipal corporation chartered by the State of Illinois and has the legal authority to enter into the local cooperation agreement with the Corp of Engineers and to fulfill its obligations, both financial and otherwise, for all phases of the project. We understand that the current cost figure using 1988 price levels for the entire project is $22,069,000. Of this, the non-federal share is $6,541,000. This non-federal share consists of $1,103,000 cash and $5,438,000 for land easement and right-of-ways.

The City of Loves Park is committed to meet the non-federal financial liabilities and it is our committment to do so. At this point in time, we intend to meet this non-federal obligation as follows: $400,000 from the Department of Transportation; $1,600,000 from the Water Resources Division; $1,103,000 from the City's drainage fund and $3,438,000 from short and long term borrowing. These funds will be made available to provide project funding for FY90 new start construction.

"THE CITY WITH A HEART"

Colonel Neil A. Smart, District Engineer
U.S. Army Engineer District
Rock Island Clock Tower Building
P. O. Box 2004
Rock Island, Illinois 61204-2004

Sources of funds represent our best intentions at this point. Proportions between funding sources may vary according to future circumstances including financial markets and fund balances at the time of funding.

I want to express my appreciation for all the work that you have done and pledge the continued support of the city of Loves Park to see this project a reality at the earliest possible date.

Sincerely,

Joseph F. Sinkiawic

Joseph F. Sinkiawic
MAYOR

Illinois Department of Transportation
Division of Highways / District 2
819 Depot Avenue / Dixon, Illinois 61021
815 / 284-2271

PLANNING
Project and Environment
FAP Route 738 (IL 251)
Section 2B
Loves Park Creek
Winnebago County

March 21, 1988

Colonel Neal A. Smart, District Engineer
U.S. Army Corps of Engineers
Clock Tower Building
P.O. Box 2004
Rock Island, IL 61201-2004

Dear Colonel Smart:

This letter is in response to your agency's proposal to construct the proposed Loves Park Flood Control Project. The Illinois Department of Transportation (IDOT), Division of Highways has reviewed this proposal and concurs with the concept shown. The IDOT Division of Highways will cooperate with your agency in the implementation of this project, particularly as it affects the existing structure carrying Illinois 251 (North Second Street) over Loves Park Creek. As shown in the project report and preliminary plans, the existing structure will be removed and replaced with another drainage structure, at this time proposed to be a bridge. Final determination as to structure type (bridge versus box culvert) and preparation of contract plans of this structure will be done by the IDOT Division of Highways. These plans will then be incorporated into your agency's overall flood control plans.

Letting of the bridge contract will therefore be by your agency. Supervision of bridge construction will then be carried out by the Corps of Engineers subject to the review and direction of the District Engineer, District 2, of the IDOT Division of Highways. It is also understood that the City of Loves Park will acquire all necessary project right-of-way and the Corps of Engineers will undertake all building demolition.

The division of costs will be those as shown in the Preliminary Cost Estimate dated February 16, 1986, as furnished to the Department of Transportation. The Corps of Engineers will be responsible for cost of demolition of the existing structure and cost of construction of the proposed abutments, piling and pier caps, while the IDOT Division of Highways will be responsible for the cost of the superstructure, paving other highway appurtenances and special traffic control necessary during structure construction.

It is understood that the Corps of Engineers will notify the IDOT Division of Highways District 2 office as soon as the Corps construction funding is allocated and at least one year prior to initiating construction of the structure in question. Advance notification is required to provide the IDOT necessary lead time in programming the construction funding and preparing the contract plans for the bridge to meet your agency's timetable. It is also understood that the IDOT Division of Highways will be solely responsible for the determination of the staging of bridge construction and any traffic control to maintain the flow of traffic on this important highway. The Corps of Engineers therefore agrees to direct construction of this replacement structure in conformance with the traffic staging plan.

It is understood that a separate Letter of Understanding will be required with the Illinois Department of Transportation Division of Water Resources to address the concerns of that agency.

Please indicate your concurrence with these concepts by signature below and return of a copy to this office. If you have any questions, please contact Mr. L. E. Reed in our District 2 office (815/284-5443).

Sincerely,

William D. Ost

William D. Ost
District Engineer

0542p25

Donald H. Zerniw

Colonel Neal A. Smart
District Engineer
U.S. Army Corps of Engineers

30 MAR 88
Date

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT. CORPS OF ENGINEERS
CLOCK TOWER BUILDING—P.O. BOX 2004
ROCK ISLAND. ILLINOIS 61204-2004

REPLY TO ATTENTION OF

March 31, 1988

Design Branch
Project Management Section

Mr. Brock Nelson
Building and Bridges
Chicago and Northwestern Transportation Company
325 Spenser Street
West Chicago, Illinois 60185

Dear Mr. Nelson:

We are presently completing the General Design Memorandum for Loves Park, Illinois, Flood Control Project. The report is scheduled to be submitted to our higher authority for approval yet this month. The channel improvements proposed in the design memorandum will affect your facilities at these locations. Two of your existing bridge structures within the project limits will be cleaned out and lined with concrete. The other location involves the construction of two new seven-foot diameter R.C. pipe culverts under your tracks.

We are furnishing you a general plan and pertinent plan and profile drawings showing the general location of your structures, together with detail sheets of the three locations. A copy of the General Design Memorandum Report will be furnished to you in the near future.

The major portions of the railroad relocations are expected to be accomplished by the Government. Plate 26 shows the new concrete channel improvements required under two of your structures at Station 112+35 and Station 121+35. The other location involves the construction of two new seven-foot diameter R.C. pipe culverts under your tracks at Station 5+65 G-1 as shown on Plate 13.

All work required at the three locations outlined above will be accomplished by the Federal Government as a Federal responsibility. Should the railroad need to perform track work on active lines, this work would be covered by a negotiated relocation agreement with the railroad.

We should appreciate your review and comments on the plan and if you have questions on the railroad work, please call Mr. Dan Viktora at 309/788-6361, extension 642.

Sincerely,

Doyle W. McCully, P.E.
Chief, Engineering Division

Enclosure
(Plates 1, 2, 3, 11, 12, 13 & 26)

Copy Furnished:
Mr. James Girard
City Engineer
832 Lawn Drive
Loves Park, Illinois 61111

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING—P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO ATTENTION OF

March 31, 1988

Design Branch
Project Management Section

Honorable Joseph F. Sinkiawic
Mayor of Loves Park
Acting Water Works Superintendent
1000 River Park Drive
Loves Park, Illinois 61111

Dear Mayor Sinkiawic:

We are presently completing the General Design Memorandum for Loves Park, Illinois, Flood control Project. The report is scheduled to be submitted to our higher authority for approval this month. The channel improvements proposed in the design memorandum will affect several waterlines within the project limits.

We are furnishing you a general plan and the plan and profile drawings (Plates 1-17) showing the general location of waterlines, together with a Utilities Schedule which shows the disposition of twenty waterlines, together with all other utilities affected by the project. Also enclosed for your information are Plates 23-26 which show details of existing and proposed bridge structures. A copy of the General Design Memorandum Report complete with project schedules will be furnished to you in the near future.

The general considerations for the proposed disposition of waterlines affected by the project are: 1) Whenever possible the waterline should be relocated outside of the project limits. This would include attaching them to bridges that cross the channel. 2) If the waterline cannot be relocated outside of the project limits, then it can be buried under the channel.

The recommended plan outlined in the attached Utilities Schedule indicates that twenty waterlines are within the limits of the proposed channel improvements for the flood control project. Ten waterlines are proposed to be relocated from the channel to the new or existing bridges; five waterlines are proposed to be lowered under the new channel; and five other waterlines require no alterations.

As part of the provisions of the Local Cooperation Agreement, the city is responsible for the coordination and relocation of all utilities affected by the project. All waterlines proposed to be buried under the channel would be considered a Federal responsibility. The waterline modifications required by the project will be subject to cost sharing provisions of the project.

We should appreciate your review and comments on the waterlines plan and if you have questions, please call Mr. Daniel Viktora at (309) 788-6361, ext. 642.

Sincerely,

Doyle W. McCully, P.E.
Chief, Engineering Division

Copies Furnished: w/ Enclosures

Ms. Pauline Smith
Chairman of Water Works Committee
5009 Forest Grove Street
Loves Park, Illinois 61111

Mr. Gerald Groth
Strand Associates, Inc.
Consulting Engineers
910 West Wingra Drive
Madison, Wisconsin 53715

Mr. Edward Reynolds
Loves Park Water Department
5440 Walker Avenue
Loves Park, Illinois 61111

Mr. James Girard (w/o Plates 1-17)
City Engineer
832 Lawn Drive
Loves Park, Illinois 61111

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING—P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO ATTENTION OF

March 31, 1988

Design Branch
Project Management Section

Mr. Jim O'Reilly
System Protection Supervisor
Northern Illinois Gas Company
4651 Linden Road
Rockford, Illinois 61109

Dear Mr. O'Reilly:

We are presently completing the General Design Memorandum for Loves Park, Illinois, Flood Control Project. The report is scheduled to be submitted to our higher authority for approval yet this month. The channel improvements proposed in the design memorandum will affect several of your gas lines within the project limits. A copy of the General Design Memorandum Report will be furnished to you in the near future.

We are furnishing you a general plan and the plan and profile drawings (Sheets 1-17) showing the general location of gas lines, together with a Utilities Schedule which shows the disposition of all gas lines known to be affected by the project. Also enclosed for your information are Plates 23-26 which show details of existing and proposed bridge structures.

The general considerations for the proposed disposition of gas limes affected by the project are: 1) Whenever possible the gas line should be relocated outside of the project limits. This would include attaching it to bridges that cross the channel. 2) If the gas line cannot be relocated ourside of the project limits, then it can be buried under the channel.

As part of the provisions of the Local Cooperation Agreement, the city is responsible for the relocation of gas lines affected by the project. All gas lines proposed to be buried under the channel would be considered a Federal responsibility. The gas line modification required by the project will be subject to cost sharing provisions of the project.

We should appreciate your review and comments on the plan and if you have further questions on the utilities, please call Mr. Daniel Viktora at 309/788-6361, extension 642.

Sincerely,

Doyle W. McCully, P.E.
Chief, Engineering Division

Enclosures

Copy Furnished:
Mr. James Girard (w/o Plates 1-17)
City Engineer
832 Lawn Drive
Loves Park, Illinois 61111

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING—P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

March 31, 1988

Design Branch
Project Management Section

Mr. Joseph Contarino
Engineering Manager
Sanitary District of Rockford
3333 Kishwausee Street
Rockford, Illinois 61105

Dear Mr. Contarino:

We are presently completing the General Design Memorandum for Loves Park, Illinois, Flood Control Project. The report is scheduled to be submitted to our higher authority for approval yet this month. The channel improvements proposed in the design memorandum will affect several of your sanitary sewer lines within the proposed project limits. A copy of the General Design Memorandum Report will be furnished to you when available.

We are furnishing you a general plan and the plan and profile drawings (Plates 1-17) plus four drawings (Plates 21, 24 and 35) showing proposed channel sections and modification details. The drawings show the location of known sanitary sewers and describes proposed modifications. Telephone conversations were held with personnel in your office concerning modification solutions.

The modification of the sanitary sewers will be a Federal responsibility and will be coordinated into a general construction contract. Please review and comment on the proposed work. If you have questions concerning the sanitary work, please call Mr. Dan Viktora at 309/788-6361, extension 642.

Sincerely,

Doyle W. McCully, P.E.
Chief, Engineering Division

Enclosure

Copy Furnished:
Mr. James Girard (w/o Plates)
City Engineer
832 Lawn Drive
Loves Park, Illinois 61111

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT. CORPS OF ENGINEERS
CLOCK TOWER BUILDING—P.O. BOX 2004
ROCK ISLAND. ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

March 31, 1988

Design Branch
Project Management Section

Mr. W. J. Harmon, Engineer
Illinois Bell Telephone Company
416 S. Madison Street
Rockford, Illinois 61108

Dear Mr. Harmon:

We are presently completing the General Design Memorandum for Loves Park, Illinois, Flood Control Project. The report is scheduled to be submitted to our higher authority for approval yet this month. The channel improvements proposed in the design memorandum will affect several of your overhead and buried telephone lines and conduits within the proposed project limits.

We are furnishing you a general plan and the plan and profile drawings (Plates 1-17) showing the general location of telephone lines, together with a Utilities Schedule which shows the disposition of all telephone lines known to be affected by the project. A copy of the General Design Memorandum Report will be furnished to you when available.

As part of the provisions of the Local Cooperation Agreement, the city is responsible for the coordination and relocation of all overhead telephone lines and buried cables affected by the project prior to construction. These non-Federal items are part of the total project cost and are subject to cost sharing provisions of the project with the city.

We should appreciate your review and comments on the plan and if you have questions on your telephone lines, please call Mr. John Merritt at 309/788-6361, extension 294.

Sincerely,

Doyle W. McCully, P.E.
Chief, Engineering Division

Enclosure

Copy Furnished: (w/o Plates 1-17)
Mr. James Girard
City Engineer
832 Lawn Drive
Loves Park, Illinois 61111

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING—P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

March 31, 1988

Design Branch
Project Management Section

Mr. Dale LaGesse
District Engineer
Commonwealth Edison Company
123 Energy Avenue
Rockford, Illinois 61109

Dear Mr. LaGesse:

We are presently completing the General Design Memorandum for Loves Park, Illinois, Flood Control Project. The report is scheduled to be submitted to our higher authority for approval yet this month. The channel improvements proposed in the design memorandum will affect several of your power lines within the project limits.

We are furnishing you plan and profile drawings (Plates 1-17) showing the general location of power lines, together with a Utilities Schedule which shows the disposition of all power lines known to be affected by the project. A copy of the General Design Memorandum Report will be furnished to you when available.

As part of the provisions of the Local Cooperation Agreement, the city is responsible for the coordination and relocation of all power lines affected by the project prior to construction. These non-Federal items are part of the total project cost and are subject to cost sharing provisions of the project with the city.

We should appreciate your review and comments on the plan and if you have further questions on the utilities, please call Mr. John Merritt at 309/788-6361, extension 294.

Sincerely,

Doyle W. McCully, P.E.
Chief, Engineering Division

Enclosures

Copy Furnished: (w/o Plates 1-17)
Mr. James Girard
City Engineer
832 Lawn Drive
Loves Park, Illinois 61111

SUBJECT: Carlson Letter

A letter from Edwin W. Carlson, owner of the proposed detention lakes has been included on page J-15. The letter arrived too late for comment in this report. Matters discussed in the letter will be addressed with the Mayor prior to preparation of plans and specifications.

Windsor Lakes

7125 Windsor Lake Parkway Loves Park, Illinois 61111 815/633-7245

March 30, 1988

Mayor Joe Sinkiawic
City of Loves Park
1000 River Park Drive
Loves Park, Illinois 61111

RE: Corps of Engineer Flood Plan, Loves Park, Il

Dear Mayor Sinkiawic:

After attending the Corps meeting on March 16, 1988, we have studied the new plan and have these comments and recommendations.

As you know, in the past fifteen years, we have changed the Lake properties into a Business and Fitness Park. We are making extended use of the lakes for wind surfing, boating, fishing, plus constructing walking paths at the lakes' edge, plus enjoying the scenic beauty of the lake.

We now have ten major buildings along the lakes with prospects for many more in the future. I mention this because the lakes are still referred to as gravel pits in the Corps plan and literature.

Recommendations

1. Pipes under Windsor Road should extend 300 feet or more to the water line on both sides of Windsor so the property above the pipes can be fully developed. We have plans for buildings and parking lots directly over the pipe area on both sides of Windsor Road.

2. We have talked with Federal, State, and private consultants and experts regarding running dirty water directly into Windsor Lake. The advice we have received is to direct all drainage water from the North and South Creeks into South Lake. Using the South Lake as a separate sediment pond. Then raise the pipes between the South and Windsor Lake so much of the silt will be contained in the South Lake. There will still be damaging effects from dirty water entering Windsor Lake and the North Lake, but this procedure should reduce the damage.

Mayor Joe Sinkiawic
March 30, 1988
Page Two

3. We would request that all spoil sites for the entire project, including materials from all channel widening, be dumped and leveled on six different areas on our property. We would expect this to be written in the bid documents so only our sites are used.

   This is beneficial to the Corps plan because our sites are close to the construction area and it is beneficial to Loves Park and the community because the new land area will be developed into future office and commercial property.

4. We would expect a sum of money be set aside in this plan for future cleaning and dredging of the South Lake as silt builds up and for regular maintenance and cleaning of all lakes and shore line for debris that will enter the lakes.

   This reserve fund may require the purchase of oxygen water pumps to preserve the fish and breeding process and help preserve the water quality of the lakes.

5. We would like to cooperate with the basic Flood Plan and be compensated fairly, and at the same time protect our investment and allow the development to grow and benefit the entire community.

Sincerely,

Edwin W. Carlson

LOVES PARK CREEK
LOVES PARK, ILLINOIS
LOCAL FLOOD PROTECTION
GENERAL DESIGN MEMORANDUM

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