ROSSMILLEX

MISSISSIPPI RIVER
DAVENPORT, IOWA

PHASE II

GENERAL DESIGN MEMORANDUM
LOCAL FLOOD PROTECTION

VOLUME 1 OF 2
(REVISED)

FEBRUARY 1982

US Army Corps of Engineers
Rock Island District

93

NCDED-T (15 Mar 82) 5th Ind S: 26 Nov 82
SUBJECT: Mississippi River, Davenport, Iowa, Local Flood Protection - Phase II, General Design Memorandum (Revised)

DA, North Central Division, Corps of Engineers, 536 South Clark Street, Chicago, Illinois 60605 10 SEP 1982

TO: Commander, Rock Island District

1. The OCE comments are referred for appropriate action.

2. In light of comment 3b directing that the final rights-of-way not be consummated until the interior flood control features are approved, the District must assure that the Interior Drainage FDM will be completed in February 1983, as scheduled. Also, the District must request an exception to this requirement in order to meet the schedule for Stage I. This request should note that Stage I, which protects the treatment plant, will not be affected by the ongoing interior drainage analysis.

3. In response to comment 6 concerning the need for riprap along the Credit Island Levee, the District must include river velocities, wave heights and levee materials in the discussion if riprap is not recommended.

4. Due to the nature of the comments, an "Issues Resolution Conference" should be scheduled with OCE and NCD prior to 10 December 1982. This conference should be designed to resolve comments 3a and 4 through 11 in the 4th Indorsement and address how the remaining interior drainage comments will be resolved. Tentative responses to the OCE comments and previous NCD comments must be forwarded to this office at least 15 days prior to the conference.

FOR THE COMMANDER:

ZANE M. GOODWIN, P.E.
Chief, Engineering Division

to the date of any scheduled conference. Responses to the above comments and NCD comments in the 3rd indorsement should be available for conference participants 10 days prior to conference.

FOR THE COMMANDER:

Jack R. Thompson

wd all incl

for LLOYD A. DUSCHA, P.E.
Chief, Engineering Division
Directorate of Civil Works

c. Overtopping impacts appear to be minimized in the Credit Island Slough portion of the levee. Consideration should be given to adjusting the freeboard to force initial overtopping in the Credit Island area.

5. Paragraphs 2, 11a(2), and 11a(12). The project plan uses I-280 and the Government bridge embankments as tieback levees, I-280 also contains a closure structure. These existing structures are to be a functional part of the project. With this in mind, it appears that the City of Davenport should have a contract with the owners of the I-280 and Government bridge embankments.

6. Paragraph 11a(4). Riprap is deleted on the Credit Island levee segment because a tree screen protects the levee from wave wash. Prior experience with tree screens have shown a high velocity flow path can sometimes form in space between trees and levee face. The possibility of levee erosion from this source should be investigated and appropriate protection provided.

7. Plates 4, 5, and 6. Use smooth curves, rather than abrupt angles to connect levee tangents.

8. Plate 37. The planter box design should be checked to ascertain that there is adequate drainage to prevent freeze damage.

9. Plate 56.

a. An explanation should be furnished for plugging the 2- and 4-inch weep holes on the existing interceptor sewer.

b. The structural adequacy of the existing interceptor sewer would be discussed in conjunction with the proposed T-wall to be built on top of it.

10. Plate 61. The ½-inch exterior plywood wearing surface should be deleted from the bicycle bridge. The 2- by 6-inch members should be adequate and would be less slippery than the plywood. Also, if a small gap is left between the members, drainage would be faster than would occur with plywood in place.

11. A major concern remains for the large number of closures in the plan as presently proposed.

12. A conference would be helpful to resolve the above issues and therefore should be scheduled at the earliest possible date. Detailed comments on the interior flood control analysis and plan would be provided by DAEN-CWE prior

DAEN-CWE-BB (15 March 1982) 4th Ind
SUBJECT: Mississippi River, Davenport, Iowa, Local Flood Protection - Phase II, General Design Memorandum (Revised)

HQ, U.S. Army Corps of Engineers, Washington, D.C. 20314 13 August 1982

TO: Commander, North Central Division, ATTN: NCDED-T

1. Reference 5th indorsement NCDED-T, 4 June 1982, and 4th indorsement NCDRE-D, 15 March 1982, on letter NCRED-D, 31 October 1979, entitled: "Mississippi River, Davenport, Iowa, Local Flood Protection - Phase II, General Design Memorandum."

2. Approved, subject to the following comments.

3. Paragraph 2 of the 3rd indorsement. The studies to be contained in the interior drainage design memorandum could lead to substantial changes in the interior drainage plan set forth in the subject General Design Memorandum. Replies contained in the indorsements referenced in paragraph 1 above are satisfactory subject to the following comments.

a. 4th indorsement. Paragraphs 5 and 8. Although the information cited does suggest that the I-280 and railroad embankments will serve as adequate levees, additional engineering studies, possibly based on information available from the owners, should be made to verify that measures to control underseepage and/or through seepage will not be needed. Also, the possibility that utilities are buried under these embankments should be investigated.

b. Paragraph 3 of the referenced 5th indorsement and paragraph 2 of the 2nd indorsement of this chain. Since additional information is needed to adequately review the interior drainage plan, final rights-of-way should not be consummated until interior flood control features are approved by DAEN-CWE.

4. 2nd indorsement of referenced chain, paragraph 37; Appendix A, paragraph 3.5; and Plate 3.7. A levee/floodway with a level of protection for a 0.5 percent chance flood has an overtopping probability of about 40 percent during any 100-year period.

a. With this potential, the overtopping impacts should be provided as requested in paragraph 37. In addition, the overtopping location should be designed to minimize the adverse impacts.

b. A specific example of overtopping problem is the standard project flood profile. This profile has been computed and plotted, and the freeboard is increased to four feet in the upstream portion of the project. However, only 4,000 feet of floodwall has 4 feet of freeboard and 20,000 feet of levee downstream has 3 feet. The profile of the SPF is closest to the top of the levee at a point near the upstream end of the 3-foot freeboard portion which is near Centennial Bridge. This seems to be an undesirable place for initial levee overtopping to occur and may cause adverse impacts. This problem should be carefully addressed.

NCDED-T (15 March 1982) 3rd Ind
SUBJECT: Mississippi River, Davenport, Iowa, Local Flood Protection - Phase II, General Design Memorandum (Revised)

DA, North Central Division, Corps of Engineers, 536 South Clark Street, Chicago, Illinois 60605

4 JUN 1982

TO: HQDA (DAEN-CEW-BB)
WASH DC 20314

1. The subject report is forwarded recommending approval. An Issue Paper clarifying the major economic issues is also attached.

2. Two Feature Design Memorandums will be prepared by the District. A concrete materials design memorandum will be prepared for Division approval. An interior drainage design memorandum addressing interior drainage, pump station design and pump optimization will be prepared for OCE approval. In addition to the Feature Design Memorandums appropriate model tests of the floodwall will be undertaken prior to completion of plans and specifications to assure their practicability and implementability.

FOR THE COMMANDER:

for ZANE M. GOODWIN
Chief, Engineering Division

2 Incl
1. Phase II GDM (10 cpy)
2. Issue Paper

NCRED-D (15 Mar 82) 2d Ind
SUBJECT: Mississippi River, Davenport, Iowa, Local Flood Protection - Phase II, General Design Memorandum (Revised)

DA, Rock Island District, Corps of Engineers, Clock Tower Building, Rock Island, Illinois 61201 12 MAY 1982

TO: Commander, North Central Division

Replies to 1st Indorsement comments are as follows and are numbered to correspond to the 1st Indorsement. Specific comments provided as Inclosure 2 will be addressed during preparation of plans and specifications.

1. Noted.

2. A Feature Design Memorandum concerning interior drainage will be submitted at a later date to be established by separate correspondence.

3. The Local Cooperation Agreement has been revised and copies are furnished as Inclosure 5. The revised sheet should be inserted in Volume 1 in place of the similar Agreement sheet.

4. An issue paper concerning key economic issues is attached as Inclosure 6. Differences may be noted in paragraphs 3.A.iv. and 3.C.i. from the sample furnished by NCD.

5. The District will undertake appropriate model tests of the proposed folding floodwall system prior to submitting plans and specifications for that stage of the project.

6. Table 1 has been corrected and is attached as Inclosure 7. The revised sheet should be inserted in the report in Volume 1 in place of the similar Table 1.

FOR THE COMMANDER:

DOYLE W. McCULLY, P.E.
Chief, Engineering Division

7 Incl
wd incl 1-4
Added 3 incl
5. Local Coop. Agreement (revised) (22 cys)
6. Issue Paper
7. Table 1 (revised) (22 cys)

NCDED-T (15 Mar 82) 1st Ind
SUBJECT: Mississippi River, Davenport, Iowa, Local Flood Protection - Phase II, General Design Memorandum (Revised)

6. The Phase II GDM costs in Table 1 of the main report do not agree with Appendix E. Additionally, the explanation of change from the PB-3 to the Phase II GDM is in error. For example, price level differences should be minimal because the PB-3 represents Oct 81 price levels while the Phase II GDM represents Jul 81 price levels, a three month difference.

FOR THE COMMANDER:

ZANE M. GOODWIN, P.E., Chief
Engineering Division

3 Incl
wd incl 1
Added 3 incl
2. Specific Comments
3. Interior Drainage Comments
4. Issue Paper

NCRED-D

ISSUE PAPER
SUBJECT: MISSISSIPPI RIVER,
DAVENPORT, IOWA
PHASE II GDM

12 May 82

1. During the study of flood control at Davenport, Iowa, three components of the economic analysis were not evaluated with "standard" methods embodied in WRC regulations. These components have, therefore, been the subject of numerous inquiries and concerns (expressed by agency reviewers).

2. The object of this paper is to highlight key issues concerning these three components of the economic analysis contained in the subject memorandum. The components are Redevelopment Benefits, Location Benefits, and Future Industrial Growth Benefits.

3. Area Redevelopment Benefits (ARB).

A. ARB Inclusion. ARB's have been consistently included in project benefits throughout the study. The first indorsement of the GDM highlighted, in paragraph 6, ARB inclusion as a major policy issue. The inclusion of ARB's is deemed appropriate for the following reasons:

i. Scott County has historically been an area of high unemployment (above 6 percent annually since 1977), and had unemployment rates of 9.0 percent in October 1981 and 12.0 percent in February 1982.

ii. It is not unreasonable to assume that the unemployment rate for the construction industry is twice that of the overall unemployment rate. This assumption cannot be supported by Job Services statistics, since workers are generally hired through local unions. In October 1981, the number of claims filed for unemployment by construction workers in the County was more than 500. Construction of the project is expected to employ, on the average, 100 workers annually.

iii. The employment situation will undoubtedly vary over time in Scott County. But, if the recent unemployment trends cited above continue, ARB's for the project will, in fact, be realized.

iv. Scott County is not currently a qualified EDA area of substantial and persistent unemployment. This qualification is required by Principles and Standards in order to claim ARB's. However, this project is exempted from P&S. (Reference DAEN-CWP-F 23 Dec 80 letter, subject: P&S Exemption Policy and DAEN-CWB-C 9 Nov 81 Memorandum, subject: ARB's.) Non-qualification by EDA standards does not necessarily infer that ARB's will not be realized by project implementation.

v. The Project B/C ratio without ARB's is .82; including ARB's it is 1.17.

Incl 6

B. Percentage of Onsite Construction Costs.

i. The 50 percent factor used in determining the labor component of onsite construction costs was arrived at by comparing major work items at Davenport to similar flood control features at the Clinton project and similar recreation features at the Saylorville project; then applying actual labor costs incurred at the existing projects to the Davenport features and prorating the costs according to the percentage of total onsite costs represented by the particular type of work. The weighted average arrived at for the flood control features was 51.7 percent; for recreation features 56.8 percent.

ii. The labor component of onsite construction costs is considered a reasonable estimate because it is based on actual employment experiences at nearly completed projects.

iii. This factor is "normally" 25 to 30 percent. The key evaluation criterion for this factor is whether experiences at the Clinton and Saylorville projects are representative of the cost breakdown expected at Davenport.

C. Benefit Wages to Unemployed Labor. A figure of 90 percent was used in computing the benefit to unemployed workers of the total onsite labor costs. This figure was chosen for the following reasons:

i. The District's experience is that most often primary contractors are located outside the project area. They bring in supervisory personnel but most of the project's hiring must be fulfilled locally from union halls. The local unions use their referral lists to provide laborers.

ii. Examination of payroll records and interviews with the contractor's project engineer at the Clinton project supported the 90 percent local hire figure. Of five samplings, four showed local employment greater than 90 percent. The fifth showed 83 percent.

iii. Current guidelines (WRC NED manual) allow for the use of a percentage such as the one used in the Davenport GDM. Although the study is exempted from manual guidelines, the manual's justification requirement for using such a figure is valid: to support the figure used by conducting an empirical study that shows different actual percentages on a similar project (not the "standard case" percentages). The GDM provides this justification.

iv. The key evaluation criterion for the local hire percentage is whether experiences at the Clinton* project are representative of the local hire expected at Davenport. There are no known reasons for not assuming that experiences in the closely proximate Clinton project will be obtained at Davenport.

v. The project B/C ratio using a 75 percent local hire factor and allocating wages as outlined in Case II, subpart N of the NED manual is .99; using a 90 percent factor it is 1.17.

* The Clinton project is still under construction.

4. Location Benefits.

Value of Flood-free Land.

i. Sales information provided by the city of Davenport estimate a flood protected value of $45,100 per acre ($10,800 per acre currently) for vacant flood plain land.

ii. The key evaluation criteria for the value of flood protected land is whether all of the increase is due to the project or whether other factors (land improvements, surrounding development, transportation access) contribute to the increased land value; and if the utilization of vacant land is due exclusively to the provision of flood control.

iii. The project B/C ratio without location benefits is 1.09; with location benefits it is 1.17.

5. Future Industrial Growth.

Industrial Wage and Profits.

i. Interviews with flood plain occupants indicate that economic activity will increase in the future. Since output per employee is an indicator of real productivity, it was used to forecast benefits to wages and profits from flood protection.

ii. Business growth for industrial occupants of the flood plain is another, more conventional indicator of future economic growth. But because, for the industries in this flood plain, modernization and growth estimates were not considered the most graphic indicator, they were not used. "Down-time" and its corresponding income and wage losses were considered the most significant factor of flood losses to industrial income and wages. Therefore, output per employee was used.

iii. The key criterion for evaluating this future growth estimator is if it represents an adequate measure of expected growth for flood plain occupants' income and wages. Specifically, if another indicator were substituted, how much would it differ from the 2.75 percent annual rate used?

iv. The project B/C ratio without future industrial growth benefits is 1.15; with them it is 1.17.

Rossmiller

NCDED-T (15 Mar 82) 1st Ind
SUBJECT: Mississippi River, Davenport, Iowa, Local Flood Protection - Phase II, General Design Memorandum (Revised)

DA, North Central Division, Corps of Engineers, 536 South Clark Street, Chicago, Illinois 60605 30 April 1982

TO: Commander, Rock Island District

1. Processing the subject report is deferred pending resolution of our comments. Major issues are summarized below; specific questions are attached.

2. There are numerous questions concerning the interior drainage analysis, including the pump plant designs. Rather than delay processing of the report, a Feature Design Memorandum (FDM) is recommended in lieu of incorporating the comments in the subject report. Detailed comments to be addressed in the FDM are attached.

3. The Local Cooperation Agreement must be revised to contain the following additional item: 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 maintenance and operation of the project.

4. A summary of key economic issues should be prepared. Issues to be addressed include:

Area Redevelopment Benefits

Percent of On-Site Construction Costs

Benefit Wages to Unemployed Labor

Location Benefits

Future Industrial Growth.

A sample issue paper is attached for your guidance.

5. The folding flood wall appears to be awkward, time-consuming, subject to failure and difficult to raise in an emergency. The District should undertake a model test of the floodwall to assure constructability and reliability. Alternate designs such as a metal lower panel in lieu of concrete should be reconsidered.

NCDED-T

DAVENPORT, IOWA

SPECIFIC COMMENTS

1. Page 36, paragraph 33. The District should reconsider the February award dates for Stages I and II and the January award date for Stage IV due to their close proximity to budget testimony. A March award date is suggested.

2. Plates 3 to 21. Clarify if the design grade has been adjusted for settlement.

3. Plate 22, Section 245+20 to 220+00. Show excavation to rock.

4. Plate 40. Where is the access for bringing in the closure panels to the RR closure structure? Where are the panels, beams, etc. stored?

5. Plates 44, 45 & 46. The 36" slide gate has a non-raising stem and is opened and closed from a floor box. What provisions are made to accomplish the opening and closing, i.e., is a portable operator provided and if so, how is it connected to the slide gate shaft?

6. Plate 50. Present design allows access to rooftop from walkway. Consider revising design to prevent this in order to minimize vandalism. Consider eliminating jib crane and use mobile crane with access to bulkheads via an access ramp. Consider bringing power from transformer underground to pump station.

7. Plate 51. Why does the bridge have lifting lugs? Cable stays interfer with lifting.

8. Plate 52. Provide means for dewatering sump, i.e., sump pump.

9. Plate 53. Suggest using full size permanent flood wall near Station25+00 and using flood wall as a wall of pump station. There is an existing building north of proposed location. (See Plate 20). If submersibles are still desired, then it must be demonstrated that they are cost effective. (Sewage type only). How is the pump raised and lowered? Even with a submirsible pump, a building is required to house the controls and the hoisting mechanism.

10. Page B-4, paragraphs 14 through 18.

a. Change plate 30 to plate 22.

b. Justify the 4H to 1V backslope. Explain why this slope was chosen over a 3H to 1V or 5H to 1V slope.

11. Page C-5. Crane is unable to lift bridge since stays are in way of boom travel. Crane used must be capable of lifting 20^{k} minimum + 25%, say 25^{k}.

12. Plate C-5r.

a. Revaluate the need for piles when new borings are made for the final design.

b. Show geotechnical design of piles, including lateral loads.

13. Page D-2, paragraph 3. The plates show a 30" propeller pump for Main Street and not an 18" as described here.

14. Plate D-5. The system head curve and computations do not track with the sketch on Plate 53.

DAVENPORT, IOWA
INTERIOR DRAINAGE/PUMP PLANT
DETAILED COMMENTS

1. Submersible propeller pumps are not acceptable for the Main Street pump station.

2. The report does not provide adequate data to support the evaluation of the pressure sewer in areas 3A, 3B, 3C and 3D. The report presents hydraulic gradients for areas 3A and 3B and indicates that no runoff from areas 3C and 3D will reach the line of protection in areas #1 or #2. This contention of no overflow into areas 1 or 2 from 3C and 3D must be verified. A hydrologic analysis of area 3C and 3D must be presented which evaluates the complete range of discharges up to the SPF. The point of pressurization must be determined by presentation of the hydraulic gradient for the discharge capacity of the sewer. The pressure sewer capacity cannot be assumed by assuming a velocity but must be calculated through an analysis which includes the capacity of the inlets as well as the friction and transition losses themselves.

3. The hydraulic gradients presented on plates A 6.2.1 and A 8.4.2 appear to be in error. Computations conducted in areas 3A and 3B using the design discharges presented in the report indicate that the true hydraulic gradients are significantly steeper than those presented in the report. This would have the effect of moving the point of pressurization further up in the basin. This additional area will be flowing to the line of protection and the proposed interior drainage system. The evaluation of runoff reaching the interior drainage system must include (1) evaluation of the capacity of the pressure sewer, (2) computation of the point of pressurization, (3) computation of the hydrographs of the runoff reaching the line of protection for representative conditions.

4. Paragraph 5.1.2 indicates that the excess flow from Area 3C will be handled by the Gaines St. pumping station while section 6 (Gaines St. Pump station) only evaluates runoff from area 3.B. This disparity must be resolved in the hydrologic re-analysis of the pressure sewer areas.

5. Evaluation of the pond-stage frequency curves for the Gaines St. and Main St. pumping stations indicates that significant land will be innundated in the vicinity of the pumping stations during a 1% event. The report fails to mention if the city has acquired the right to innundate the area adjacent to the pumping stations. Further, the report needs to discuss the alternative of designated ponding areas adjacent to the pumping facilities.

6. The report should provide justification for use of the 25 year event for analysis of the pressure sewers. Use of a higher river stage during blocked gravity conditions would result in a more critical condition.

7. The report should reproduce the map presented on plate A 4.1 showing the location of gravity sewers, point of major inflow into the interceptors

serving the pumping stations, and delineations of the sub-drainage area contributing to the sewers flowing into the interceptors. The map should also show ponding areas, pumping stations, creek and diversion ditches.

8. The report does not present an adequate hydrologic analysis to verify the determination of inflow to the pumping stations. The hydrographs for the 1% event should be developed for each of the tributary areas. These hydrographs should be shown at the major points of inflow to the interceptor. These hydrographs should show the effect of overland flow and flow in sewers. The conveyance of each of the major points of inflow to the interceptor should be demonstrated through routing.

9. The report should discuss the design of the interceptors serving the pumping station. The philosophy of sizing the interceptor to equal the capacity of the pumping station appears to be very risky. This method of analysis assumes perfect knowledge of the relative contribution from each of the sewers and manholes inflowing to the interceptors. The interceptors should be sized to convey all flow which will occur during blocked gravity conditions.

10. The report should present the peak flow and volume for each storm event at each interior drainage area, i.e., Main St., Gaines St. and Credit Island Slough for the period of record analysis.

11. The effect of the SPF must be evaluated during gravity condition at each outlet. This evaluation must include the peak elevation and the resultant area flooded and damage incurred for each outlet.

12. The report should present the area flooded at the 1% event for each ponding area for blocked gravity conditions.

13. The discussion regarding the method of extension of the 28 years of rainfall data for use in the 101 years of river stage data is unclear. Also what is meant by the statement infiltration equals 30%. 30% of what?

14. The residual damage in each interior drainage basin with the proposed facility must be quantified.

15. Paragraph 7.2 indicates that above elevation 560.4 the drainage divide between areas 1 and 2 disappear. It appears that this was not properly accounted for in the pumping station analysis. To accurately model the interior drainage system, areas 1 and 2 must be evaluated as a system, including the interflow between areas 1 and 2.

16. Plates A 6.3 and 6.4 show Area 2B on the operation graph. It appears that this should be area 3B.

17. The report does not provide adequate data on the determination of the unit hydrograph for computations of inflows into Credit Island Slough. Phrases that Tc and R are based on local experience and that Tc and R were

modified for the time of travel influenced by sewers are not specific enough.

18. The determination of the composite unit hydrograph for Credit Island Slough is unclear. The composite hydrograph must be determined by routing and combining unit hydrograph for the individual sub-areas. The simplification discussed on paragraph 8.1.2.6 is not acceptable. Why was this procedure used? How do the I-280 lakes affect the inflow reaching Credit Island Slough.

19. The report should present the hydraulic gradient for all interceptors.

20. The statement in Para 8.3.1 that the 72" RCP is oversized is confusing. Is this 72" the pipe which is proposed to go from the outfall of the 72" pressure sewer to the McManus Creek Diversion? Why are we oversizing it? To adequately evalute the interceptor, the historic runoff from area 4 and excess from Area 3A must be routed through various size conduits to determine their adequacy.

21. What is the design discharge at the McManus Creek Diversion? The statement in para. 8.3.4 that the McManus Creek Diversion is limited to the capacity of the existing 6x10 RCB is unclear. If it is too small, then a larger RCB needs to be installed. If the diversion capacity is limited to the capacity of a 6x10 RCB, Why are 3-96" RCP's being installed under the Credit Island Causeway? Where is the Howell Street Interceptor? What area does it drain? What is the design discharge under gravity and blocked gravity conditions?

22. The report should present the hydrologic analysis behind the 495 cfs design discharge for the 3 RCP's under the Credit Island Causeway.

23. What is the basis for sizing the 40-foot wide opening with a sill elevation at 536.0 for the outlet of the Credit Island Slough? What is the Can the closure be initiated during periods of storm runoff (flowing water)? The reference to plate A-11.1 should be A 8.11.1. Does this routing assume outflow fr a the inlet structure? There does not appear to be any reason why the inlet structure cannot be used to evacuate runoff during gravity events.

24. Since there are 1000 acre-ft of storage between elevation 552.0 and 545, the storage does not decrease significantly in this range. There are no significant break points in the storage elevation curve. The reason for avoiding drawdown below elevation 552.0 should be based on environmental considerations. The adverse environmental impacts should be presented in more detail than in para. 8.4.2 to justify the proposal to avoid drawdown below elevation 552.0. The feasibility of adopting a normal drawdown elevation of 552.0 and drawing down the pond to 547.0 based on forecasts of excess precipitation should be evaluated. The impact of this revised drawdown should be presented on the pump capacity.

25. The report should indicate if the gate closure elevation for Credit Island Slough impacts on the pump capacity. That is, if the gate closure elevation were set at 553.5 would the selected pump capacity change?

26. Calculations based on the drainage area tributary to the Credit Island Slough indicate that there are 1.2" not 1.8" inches of runoff between elevations 552 and 555.

27. The reference to plate C.13 in para. 8.4.5 should be 8.13.

28. Plate 8.13 should be redrawn to make the information more readable. The curve should show elevation vs time for various pump capacities. After drawdown, the impact of 1, 2, 5 and 10 year storms should be shown. The inflow to the slough should be based on the routed and combined runoff. The impact of drawdown to elevation 547 (assuming the ability to forecast) should also be displayed.

29. Another aspect of the desirable evacuation time is the chance of getting severe runoff during periods of blocked gravity drainage. Because the ability to forecast rainfall is limited to 2 day with the current state of the art, it seems reasonable that a 2 day time be selected as the maximum time for evacuation of runoff.

30. The data behind the plotting of the pond stage frequency curve, i.e., rainfall, max inflow, and max pond stage should be summarized for each storm used in the period of record analysis.

31. The range of pump sizes evaluated should extend to at least 150,000 gpm. The frequency curves presented on plate 8.15 do not appear to realistically follow the graphical plotting points. How would these frequency curves change if the pond were evacuated to elevation 547.0?

32. The report should discuss the basis for sizing the conduits at the inlet to the Credit Island Slough. The analysis should discuss in quantitive terms how the water quality in the slough may be improved from use of the inlet structure. The size of 2-8'x8' boxes may be reduced based on the need to pass inflow into the slough and its effect on water quality.

33. Since improvements to Blackhawk Creek have been elimated from the report, the report should not make recommendations in this area. The report should only indicate that interior drainage for the Garden Addition is the responsibility of the City of Davenport and that the results of the Corp's Interior Drainage analysis have been made known to them.

34. Plate 56, How is the sanitary flow handled on the upstream side when the gates are closed (78" & 42" sanitary sewers @ Gatewell W1?

NCDPD-EC

ISSUE PAPER
SUBJECT: MISSISSIPPI RIVER,
DAVENPORT, IOWA
PHASE II GDM

12 Apr 82

1. During the study of flood control at Davenport, Iowa, three components of the economic analysis were not evaluated with "standard" methods embodied in WRC regulations. These components have, therefore, been the subject of numerous inquiries and concerns (expressed by agency reviewers).

2. The object of this paper is to highlight key issues concerning these three components of the economic analysis contained in the subject memorandum. The components are Redevelopment Benefits, Location Benefits and Future Industrial Growth Benefits.

3. Area Redevelopment Benefits (ARB)

A. ARB Inclusion. ARBs have been consistently included in project benefits throughout the study. The first indorsement of this GDM highlighted, in paragraph 6, ARB inclusion as a major policy issue. The inclusion of ARBs is deemed appropriate for the following reasons:

i. Scott County has historically been an area of high unemployment (above 6 percent annually since 1977), and had unemployment rates of 9.0 percent in October, 1981 and 12.0 percent in February, 1982.

ii. It is not unreasonable to assume that the unemployment rate for the construction industry is twice that of the overall unemployment rate. This assumption cannot be supported by Job Services statistics, since workers are generally hired through local unions. In October, 1981, the number of claims filed for unemployment by construction workers in the County was more than 500. Construction of the project is expected to employ, on the average, 100 workers annually.

iii. The employment situation will undoubtably vary over time in Scott County. But, if the recent unemployment trends cited above continue, ARBs for the project will, in fact, be realized.

iv. Scott County is not currently a qualified EDA area of substantial and persistent unemployment. This qualification is required by Principles and Standards in order to claim ARBs. However, this project is exempted from P&S. (reference DAEN-CWP-F 23 Dec 80 letter, subject: P&S Exemption Policy and DAEN-CWB-C 9 Nov 81 Memorandum, subject: ARBs). Non-qualification by EDA standards does not necessarily infer that ARBs will not be realized by project implementation. Of greater import is that ARB deletion in the Davenport project evaluation makes the project economically infeasible and that there is sufficient evidence to justify the inclusion of ARBs.

v. The Project B/C ratio without ARBs is .82; including ARBs it is 1.17.

B. Percentage of on-site Construction Costs.

i. The 50 percent factor used in determining the labor component of on-site construction costs was arrived at by comparing major work items at Davenport to similar flood control features at the Clinton project and similar recreation features at the Saylorville project; then applying actual labor costs incurred at the existing projects to the Davenport features and prorating the costs according to the percentage of total on-site costs represented by the particular type of work. The weighted average arrived at for the flood control features was 51.7 percent; for recreation features 56.8 percent.

ii. The labor component of on-site construction costs is considered a reasonable estimate because it is based on actual employment experiences at nearly completed projects.

iii. This factor is "normally" 25 to 30 percent. The key evaluation criterion for this factor is whether experiences at the Clinton and Saylorville projects are representative of the cost breakdown expected at Davenport.

C. Benefit wages to unemployed labor. A figure of 90 percent was used in computing the benefit to unemployed workers of the total on-site labor costs. This figure was chosen for the following reasons:

i. The district's experience is that most often primary contractors are located outside the project area. They bring in supervisory personnel but, based on the Clinton project, most of the project's hiring is fulfilled locally, from union halls. The local union uses its referral list to provide laborers.

ii. Examination of payroll records and interviews with the contractor's project engineer at the Clinton project supported the 90 percent local hire figure. Of five samplings, four showed local employment greater than 90 percent. The fifth showed 83 percent.

iii. Current guidelines (WRC NED manual) allow for the use of a percentage such as the one used in the Davenport GDM. Although the study is exempted from manual guidelines, the manuals justification requirement for using such a figure is valid: to support the figure used by conducting an empirical study that shows different actual percentages on a similar project (not the "standard case" percentages). The GDM provides this justification.

iv. The key evaluation criterion for the local hire percentage is whether experiences at the Clinton* project are representative of the local hire expected at Davenport. There are no known reasons for not assuming that experineces in the closely proximate Clinton project will be obtained at Davenport.

v. The project B/C ratio using a 75 percent local hire factor and allocating wages as outlined in Case II, Subpart N of the NED manual is .99; using a 90 percent factor it is 1.17.

*-The Clinton project is still under construction.

4. Location Benefits.

A. Value of flood-free land.

i. Sales information provided by the City of Davenport estimate a flood protected value of $45,100 per acre ($10,800 per acre currently) for vacant floodplain land.

ii. The key evaluation criteria for the value of flood protected land is whether all of the increase is due to the project or whether other factors (land improvements, surrounding development, transportation access) contribute to the increased land value; and if the utilization of vacant land is due exclusively to the provision of flood control.

iii. The project B/C ratio without location benefits is 1.09; with location benefits it is 1.17.

5. Future Industrial Growth.

A. Industrial Wage and Profits.

i. Interviews with floodplain occupants indicate that economic activity will increase in the future. Since output per employee is an indicator of real productivity, it was used to forecast benefits to wages and profits from flood protection.

ii. Business growth for industrial occupants of the floodplain is another, more conventional indicator of future economic growth. But because, for the industries in this floodplain, moderization and growth estimates were not considered the most graphic indicator, they were not used. "Down-time" and its corresponding income and wage losses were considered the most significant factor of flood losses to industrial income and wages. Therefore, output per employee was used.

iii. The key criterion for evaluating this future growth estimator is if it represents an adequate measure of expected growth for floodplain occupants income and wages. Specifically, if another indicator were substituted, how much would it differ from the 2.75 percent annual rate used?

iv. The project B/C ratio without future industrial growth benefits is 1.15; with them it is 1.17.

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

REPLY TO
ATTENTION OF:

NCRED-D

15 MAR 1982

SUBJECT: Mississippi River, Davenport, Iowa, Local Flood Protection - Phase II, General Design Memorandum (Revised)

Commander, North Central Division
ATTN: NCDED-T

1. Transmitted herewith in accordance with EC 1110-2-193, dated 20 April 1979, are copies of the revised subject report for review and approval.

2. A separate design memorandum is being prepared, scheduled for completion in May 1982, concerning concrete materials to be used in the subject project and other nearby projects.

3. A special post authorization change report (SPAC) concerning preservation of Nahant Marsh was submitted to OCE on 13 January 1978. Authorization of the SPAC is pending. The subject Phase II GDM assumes preservation of the marsh as recommended in the SPAC.

4. The Final Environmental Impact Statement (FEIS) was filed with the Council on Environmental Quality on 13 March 1978. Supplemental information to the FEIS for the subject project was transmitted to NCD on 4 January 1979.

5. The Section 404 evaluation process is described in appendix H of this report. A copy of the certification report and an evaluation of comments received during the public review period are also included in that appendix.

6. Correspondence concerning Executive Order 11988 received from the State of Iowa and from the city of Davenport has been incorporated into this report in exhibit A of appendix H.

1 Incl
Phase II GDM--2 Vol. (22 cys)

BERNARD P. SLOFER
Colonel, Corps of Engineers
Commanding

MISSISSIPPI RIVER
DAVENPORT, IOWA

PHASE II
GENERAL DESIGN MEMORANDUM
LOCAL FLOOD PROTECTION

VOLUME 1 OF 2
(REVISED)

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

DECEMBER 1981

MISSISSIPPI RIVER
DAVENPORT, IOWA

LOCAL FLOOD PROTECTION
PHASE II

GENERAL DESIGN MEMORANDUM

PERTINENT DATA

Authorization: Public Law 91-611, 91st Congress 31 December 1970. House Document No. 92-161, 92nd Congress, 1st Session.

Location: Mississippi River, north bank between river miles 478 and 483.

Purposes: Flood Control, Recreation, Preservation and Enhancement of wetlands.

Level of Protection: Mississippi River 1/2% (200-year flood)

Project Features:

4-1/2 miles of levees
1,900 lineal feet of permanent floodwall
2,078 lineal feet of folding floodwall
1,017 lineal feet of cap wall
7 Street closures
4 Walk-through closures
4 Railroad closures
2 Small bridges
3 Pumping stations
1 Harbor closure
33 Gatewells
3 Sewers to be pressurized (non-Federal)
5.1 miles of paved bicycle path
1.0 miles of paved road
Development of one new large park
Enhancement of one existing park
Development of one boat launch area
Preservation of 163 acres of marsh

Estimated Costs:

Federal	$29,700,000
Non-Federal	$ 4,161,000
Total	$33,861,000

Benefit/Cost Ratio: 1.17

MISSISSIPPI RIVER
Davenport, Iowa

Local Flood Protection
Phase II
General Design Memorandum

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(Volume 2)

MISSISSIPPI RIVER
Davenport, Iowa

Local Flood Protection
Phase II
General Design Memorandum

1. Project Authorization. The flood protection project for Davenport, Iowa, was authorized on 31 December 1970, in Public Law 91-611, 91st Congress, substantially in accordance with the recommendations of the Chief of Engineers in House Document No. 92-161, Ninety-Second Congress, 1st Session. A post-authorization change report (PAC) based on the Davenport, Iowa, Phase I General Design Memorandum dated August 1976, recommended expansion of recreational development, revisions in the areas provided protection, channel improvement in lieu of a reservoir on Blackhawk Creek, and mitigation and enhancement of fish and wildlife features. The flood control aspects of the PAC were approved on 29 November 1977. The mitigation and enhancement of fish and wildlife, or more specifically the preservation of Nahant Marsh, was made the subject of a special post-authorization change report (SPAC) and was submitted to OCE on 13 January 1978. Disposition of the SPAC is pending. The Phase I General Design Memorandum for Davenport, Iowa with the exception of the Nahant Marsh feature, was approved by OCE on 2 May 1978. The availablility of the Final Environmental Impact Statement was published in the Federal Register on 3 March 1978.

2. Basic Description. The project consists essentially of levees, floodwalls, closure structures, recreation features, preservation of a wetland, and interior flooding control items amounting to certain sewer work, numerous gated gravity outlets, and three permanent pumping stations. The project is a cooperative effort between the Federal Government and the city of Davenport. The Federal role consists mainly of planning, funding, and contracting for construction of the various features. The basic responsibilities of local interests are to provide planning input, provide right-of-way, maintain and operate the completed works, and bear certain initial costs related to utility alterations, recreation development, and sewer modification. The local cooperation requirements are further discussed in paragraph 9, and a copy of the specific agreement between the United States and Davenport is included at the end of this text as Exhibit 2.

3. Related Projects. Davenport is the largest city in a group of Iowa and Illinois communities locally known as the Quad-Cities. Flood control projects for these associated communities are in various stages as noted in the following paragraphs. None of the projects will conflict with the Davenport project.

a. Rock Island, Illinois, Local Flood Protection Project. Rock Island, Illinois, is located directly across the Mississippi River from Davenport. The Flood Protection Project was authorized

by Public Law 87-874, 87th Congress, H.R. 13273, 23 October 1962. The project, as described in House Document 564, 87th Congress, and is now complete.

b. Moline, Illinois, Local Flood Protection Project. Moline is located on the Mississippi River immediately upstream of Rock Island. The Moline project was authorized by Congress in June 1972, under provision of Section 201 of the Flood Control Act of 1965, substantially in accordance with the recommendations of the Secretary of the Army and the Chief of Engineers, in the House of Representatives Document 92-161. The Phase I General Design Memorandum (GDM) for flood protection for Moline, Illinois, was approved in January 1979 and work is proceeding on preparation of the Phase II GDM.

c. East Moline, Illinois, Local Flood Protection Project. East Moline is located on the Mississippi River adjacent to and upstream of Moline. This project was authorized on 13 August 1968 in Public Law 90-483, 90th Congress. A single phase GDM was approved in 1976. The final levee construction contract is scheduled to be awarded in the summer of 1982.

d. Bettendorf, Iowa, Local Flood Protection Project. Bettendorf is located on the Mississippi River adjacent to and upstream of Davenport. The Bettendorf project was authorized on 13 August 1968 in Public Law 90-483, 90th Congress. OCE approved the basic project plan in 1973, and an updated plan was approved 31 December 1981. A feature DM on a large pump station is scheduled for completion in the spring of 1982. A post authorization change report (PAC) concerning project pumping stations and costs is under review by higher authority.

e. Milan, Illinois, Local Flood Protection Project. Milan is located about five miles south of Davenport, immediately adjacent to Rock Island, Illinois. The community is located on the Rock River, a tributary of the Mississippi River. A flood control project was authorized in the same law as the Bettendorf and East Moline projects. The Phase II GDM report for Milan was approved by OCE on 28 June 1978, subject to certain limitations. Funds for construction were first provided in FY 1980, and the project is presently under construction.

f. Section 208 - 1954 Flood Control Act. Under the snagging and clearing authority of this act, work was accomplished in 1966 to clear the floodway of Blackhawk Creek which drains a portion of the western part of the city of Davenport. The plan proposed in this report prevents flooding by the Mississippi River of the land around the mouth of Blackhawk Creek, but there is no work proposed on the creek itself.

g. Quad-Cities Urban Study. This study was authorized by resolutions of the Senate Committee on Public Works on August 5, 1974, and by the House Committee on Public Works on October 10, 1974. The primary study objective is flooding along the lower Rock River in Illinois. Secondary objectives encompass an overall evaluation of land use, navigation, flood protection, water supply, water quality, erosion and sedimentation, and water-based recreation. The report is under review at OCE.

h. Emergency Levees. Prior to high water on the Mississippi River in the spring of 1969, some emergency levee construction was completed near Blackhawk Creek in Davenport under the authority of Public Law 84-99, Operation Foresight. These emergency levees will be superfluous upon completion of the project described in this document.

4. Location and Area Description. The city of Davenport is located in east-central Iowa on the right bank of the Mississippi River from approximately River Mile 477 to Mile 485. There are about 85,000 square miles of Mississippi River drainage upstream of the city. The city population is about 100,000 in an area of about 62 square miles. The proposed project would protect about 1700 acres in the Mississippi River flood plain from floods having a chance of occurrence of 1/2% (200-year flood). More than 75% of the Davenport area in the Mississippi River flood plain is developed for industrial, commercial, residential and recreational activity. U.S. Highways 61 and 67 and three major railroads pass through the protected area. The project areas subject to the 1/2% Mississippi River flood is shown on Plate 1.

5. Description of Project Document Plan and Phase I General Design Memorandum Plans.

a. Project Document Plan. The project described in House Document No. 92-161 for flood protection at Davenport is shown on Plate A. The plan consists primarily of earth levees and flood walls along the Mississippi River shore from McClellan Boulevard at the upstream end to Blackhawk Creek at the downstream end. A dam was proposed on Blackhawk Creek for flood control. The project included several pumping stations for interior drainage and recreational development at the dam and at selected locations along the Mississippi River protection system.

b. Phase I GDM Plan. The approved Phase I plan provides for earth levees and floodwalls to protect an area from LeClaire Street at the upstream end of the project to Interstate I-280 at the downstream end. The plan also provides for protection of the Davenport water treatment plant located about 1 mile upstream from the beginning of the protection system. Flood protection on Blackhawk Creek is provided by modification of the creek channel. Recreation features are provided principally near the middle of the protection system from Marquette Street to Credit Island and at Credit Island Slough which is near the downstream end of the protection system. Congressional approval is pending for the addition to the project of the preservation of Nahant Marsh located at the downstream end of the project. Three pumping stations for interior drainage were included in the Phase I plan. Plate B shows the Phase I Plan.

6. Prior Reports. House document No. 564, 87th Congress, 2d Session considered the advisability of providing flood protection at urban areas along the Upper Mississippi River from Hampton, Illinois, to Mile 300. Under the criteria current at that time, and for the corresponding development, a flood protection project at Davenport could not be economically justified.

a. House Document No. 513, 87th Congress, 2d Session considered the authorization of small-boat harbors on the Mississippi River between the mouth of the Missouri River and Minneapolis, Minnesota. Subsequently, two such harbors were authorized by Congress to be constructed at Davenport. The Lindsay Park small-boat harbor, in Pool No. 15 at Davenport, was constructed by the Corps of Engineers in 1961. The proposed flood protection system would not conflict with this harbor which is immediately upstream of the water treatment plant. The other small-boat harbor at Davenport, in Credit Island Slough in Pool No. 16, has not been constructed due to lack of support by local interests. The proposed flood control levee would severely affect the small boat harbor which was studied for the Credit Island Slough, but local interests have not expressed any desire to renew study of the slough small boat harbor.

b. A project for a small flood protection project on Blackhawk Creek at Davenport was studied under the provisions of Section 205 of the 1948 Flood Control Act, as amended. The study was discontinued in 1964 when the project cost was determined to exceed the Federal limitation for such projects of $1,000,000.

c. In 1965, a report on a small snagging and clearing project in Blackhawk Creek at Davenport was approved under the provisions of Section 208 of the 1954 Flood Control Act, and construction was authorized. The work, completed in 1966, involved the cleanout of debris in the creek from the mouth to a point 6,700 feet upstream.

d. The Davenport, Iowa, Phase I General Design Memorandum-Plan Formulation for Flood Control dated August 1975 was approved, excepting the proposed mitigation and enhancement of fish and wildlife, on 6 July 1977, by OCE. The report and the associated Environmental Impact Statement are further discussed in paragraph 1 of this report.

7. Investigations and Data Assembly. For the reports in the project document and the Phase I study, sufficient field surveys and topographic mapping were done to serve as a basis for quantity estimates and to provide for alternative studies. Data on past flood damages were obtained, and studies were made of existing and anticipated development, 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 structural design, cost estimates and benefit analysis to accomplish the project formulation. A number of meetings were held with local officials to discuss the proposed plans. The local sponsors reviewed the formulated plans and expressed their approval with the understanding that the plan was subject to change. For the phase II design memorandum studies, additional surveys and extensive subsurface investigations were carried out.

a. The topographic maps used for the phase I report were also used for phase II supplemented with additional data as necessary. Proposed borrow areas in the Mississippi River were surveyed by electronic depth measurement equipment to determine bottom contours for quantity evaluation and for environmental studies. Numerous drill borings were taken along

the line of protection. In the proposed river and slough borrow areas, exploratory drill work was accomplished from a barge. Additional soil boring information was obtained from the Iowa Department of Transportation and from two consulting engineering firms engaged in preparation of plans for sewer work near the proposed line of protection.

b. Hydraulic and hydrological studies made for the Phase I report were reviewed and supplemented as necessary. Sewer plans were obtained where pertinent to the hydrologic study or to the proposed line of protection. Special field surveys were made to determine where possible critical sizes, invert elevations, and sewer outlet locations and drainage patterns.

c. Information on gas, electric, telephone and water lines was obtained from local utility companies. Data concerning these utilities is discussed in Appendix G, Relocations. Pump station power requirements have been reviewed with the local power company and are discussed in Appendix D, Pumping Stations. Data on highways, city streets, bridges, and related structures was obtained from the respective agencies, and from railroads in the study area. Appendix G discusses further the effect of the proposed plan on railroad facilities.

d. Using the data gathered, structures and facilities were designed complete enough to determine their location, size, stability and cost. Complete structural analysis will be made prior to final plans and specifications with additional data and coordination as necessary for individual items. No feature design memorandums are proposed for this project. Preliminary design analyses are included in Appendix C of this report.

8. Views of Local Interests. The proposed project as described in the Phase I General Design Memorandum was presented at a series of conferences and public meetings throughout formulation of the plan. Following the public meetings, city officials requested certain modifications and changes in the authorized project. The plan presented in the Phase I General Design Memorandum was then developed by the Corps of Engineers and indorsed by city officials. Shortly before publication of the Phase I report, a private consultant hired by the city developed a comprehensive plan for long range development of the city river front. At the request of the city, the flood protection plan, as presented in the Phase I General Design Memorandum, was integrated with the river front development plan. After assembly of the Phase I report, the city staff and officials requested consideration of an alternative location for a short reach of this protection system in the downtown area and for consideration of the feasibility of a movable or folding wall system in the downtown area. Thus, the Phase II plan was developed closely following the plan formulated in the Phase I report with some modifications in the downtown reach. This proposed plan in the downtown area is more fully discussed in paragraph 11a(10) of this report. Recreation developments in the Phase II report have also been modified to a limited extent from the Phase I plan,

at the request of city staff and officials. The proposed recreation developments are more fully discussed in paragraph 12, and in Appendix I, Recreation and Aesthetics.

9. Local Cooperation Requirements. The general nature of the role of local interests has been outlined in paragraph 2 of this report. More specifically, if the pending proposal to include acquisition and management of the Nahant Marsh (noted in paragraph 1 of this report) is approved by Congress, the city will be required to assure that it will (a) bear 16.5 percent of the Nahant Marsh preservation cost attributable to mitigation features; (b) bear 50 percent of the Nahant Marsh preservation plan cost attributable to nature study features; (c) acquire all lands, easements, and rights-of-way necessary for the Nahant Marsh preservation plan, with the city receiving a credit for the land acquisition costs exceeding the city's share. This credit will be applied to other cost-sharing features of the project; and (d) maintain and manage Nahant Marsh for wildlife and nature study after the project is completed. In addition, the agreement between the United States and the city of Davenport, a copy of which is located at the end of this text as Exhibit 2, includes local cooperation requirements which may be briefly described as follows:

(1) Provide lands, easements, and rights-of-way for construction of the project;

(2) Hold the United States free from damages not due to negligence;

(3) Maintain and operate the works;

(4) Bear the cost of utility and road alterations;

(5) Bear one-half of the cost of recreation developments;

(6) Prevent encroachment on ponding areas;

(7) Pressurize sewers at Iowa, Ripley, Division, and Marquette Streets;

(8) Provide assistance as required by law for any persons displaced by the project;

(9) Cooperate with the Federal Government in inspection of the completed works;

These requirements have been reviewed with city staff and officials, and it is anticipated that the local sponsors will furnish the required assurances. A letter of intent from the city of Davenport is attached to this report as Exhibit 1.

In an effort to expedite funding for the project, the city council passed a resolution in April 1981 expressing the willingness of the city to acquire Nahant Marsh prior to construction of the flood protection project to permit mitigation and preservation of the marsh. The resolution and its accompanying letter are attached as Exhibit 3.

10. Orientation of Plan and Profile Sheets. Plan and profile sheets are arranged in this design memorandum to have the match line on the right of each sheet correspond to the match line on the left of the following sheet. To the extent possible, North is placed toward the top of the sheet. Flow of water on the sheets concerning the Mississippi River is from right to left on the sheets. This results from the desirability of having match lines meet as noted above and of having North generally toward the top of the sheet. In keeping with customary surveying practice, the traverse on the Mississippi River proposed line of protection is oriented from upstream to downstream. The water treatment plant is an isolated unit and the protection plan for it appears on one sheet with North toward the top and the Mississsippi River flow from right to left.

11. Project Plan. The general plan for the proposed flood protection project is shown on Plate 1. There are two separable units to the protection system. The largest unit is along the Mississippi River from Interstate I-280 at the downstream end to LeClaire street (or the Government Bridge) at the upstream end. The other, smaller unit of protection is around the city water treatment plant which is located on the Mississippi River about one mile upstream from the Government Bridge which forms the upstream end of the major unit as noted above. Two principal features of the proposed plans are shown on separate plates from the main protection system plans. One feature is the preservation plan for the mitigation and enhancement of Nahant Marsh which is shown on Plate 31 and is more fully described in paragraph 13. The other major item consists of recreation features on Credit Island and at Crescent Park as shown on Plates 58, 59, and 62, and discussed in paragraphs 12a and 12b. Appendix H, Environment and Cultural Resources, fully discusses the Nahant Marsh preservation plan, and Appendix I, Recreation and Aesthetics, discusses the proposed recreation. Estimated annual benefits for the Mississippi River unit (flood control only) are $3,008,000, and estimated annual costs are $2,665,000 (B/C = 1.13). The water treatment plant unit has estimated annual benefits of $128,000 and estimated annual costs of $89,000 (B/C = 1.44). The recreation features have estimated annual benefits of $696,700 and estimated annual costs of $394,200 (B/C = 1.77). Appendix E provides a complete breakdown of estimated costs and Appendix F provides a complete description of estimated benefits and computation of annual costs.

a. Mississippi River Protection Unit.

(1) General. This unit of the flood protection plan consists of a levee system constructed principally of pervious material dredged from the adjacent river. An impervious blanket is provided on the river-side slope to retard seepage. Impervious material will be obtained from the proposed borrow area shown on Plate 1. The proposed river and slough borrow areas are shown on Plate 30 and discussed in paragraph 21. Riprap is proposed on the riverside slope where needed for wave protection, while a grass slope is proposed on the landside. A slough of the Mississippi River adjacent to Credit Island will be dredged to provide the material for the landside slope. The levee construction extends about 4 miles from Interstate I-280 to the Centennial Bridge (Gaines Street). From the

Centennial Bridge to the Government Bridge (LeClaire Street) the protection system is a combination of various wall systems. The levee is designed to a height of 3 feet above the flood having a chance of occurrence of 1/2% (200 year flood). The wall system, being at the upper end of the unit of protection, is provided with 4 feet of freeboard above the design flood. An inspection trench is to be provided the full length of the levee down to the water table which occurs about elevation 545 to 550. Plates 3 through 21 show the protection systems in plan and profile. Typical levee sections are shown on Plates 22 and 23.

(2) Downstream Tie-off (Sta. 257+36.45 to Sta. 247+00) Plate 3 shows the tie-off of the levee system at the downsteam end of the line of protection. Interstate I-280 crosses the Mississippi River immediately downstream of Credit Island, and the highway embankment leading to the bridge will form the line of protection extending inland from the levee to natural high ground. There are two isolated closures necessary in the I-280 embankment. These are located northwest of the end of the levee proper. A triple track railroad underpass must be provided with a closure structure and a large box conduit further removed from the levee must be provided with a slide gate. The location and details of these structures are shown on Plate 40. The levee itself proceeds from the highway embankment across an open field toward the downstream end of Credit Island. The levee is to be constructed of pervious fill dredged from the Mississippi River and furnished with riprap protection on the riverside slope. Side slopes are 1v on 3h riverside and 1v on 4h landside. Grass cover will be provided on the 10 foot top and on the landside slope. This reach of levee has a maximum height of about 16 feet. Concord Street, which proceeds along the shore of Credit Island Slough, will be ramped over the levee in this reach. To reduce the required height of the ramps, a sandbag closure is proposed for the 3-foot freeboard zone of the levee at the road crossing.

(3) Harbor Closure Reach (Sta. 247+00 to Sta. 220+00) From Concord Street the line of protection extends across the downstream end of Credit Island Slough to the downstream tip of Credit Island. The levee across the slough is to be constructed of pervious dredged fill placed at 1v on 3h riverside slope and 1v on 4h landside. Riprap slope protection is provided on the riverside. The landside slope is seeded. A 12 foot levee top width is provided for a bicycle path to be placed on the top of the levee, and to allow access by motor vehicles to the pump station and harbor closure structure located in this reach. Paragraph 12c and Appendix H, Environment and Cultural Resources, further discusses the proposed bicycle path, and paragraph 18g(1), and Appendix C, Design Analysis, discuss the pump station and harbor closure. Plate 50 shows details of the harbor closure and pump station structure. As shown on Plate 4, the discharge conduit for the new Davenport sewage treatment plant is extended through the levee in this reach. The 8 foot diameter conduit is provided with a slide gate for emergency closure. Since the treatment plant can continue to discharge through this conduit even in flood conditions, the slide gate would normally be open. If a break occurs in the discharge line or some other unforseen emergency, the gate would be closed and emergency pumping of the line can be accomplished from the manhole on the

discharge line near Concord Street and Wapello Avenue. The treatment plant, located about 1/4 mile along Concord Street from the point where the discharge line crosses the levee, will be inside the line of protection. Due to the depth of the river bottom at the harbor closure, the levee top will be about 30 feet above the slough bottom after dredging.

(4) Credit Island Reach (Sta. 220+00 to Sta. 142+00) Plates 6 through 12 show the levee alignment along the landside (or slough side) of Credit Island. The levee is placed along the shoreline of the slough rather than on the riverside to minimize the constricting effect on the Mississippi River between this levee and the flood protection system for the city of Rock Island located across the river. Another factor in selecting the slough shore line for the levee location was the desirability of minimizing the disturbance of the island proper. As discussed in Appendix H, the downstream end of the island is to remain undeveloped as a wildlife refuge, while the upstream portion, which is already utilized as a city park, will be further developed for that purpose as part of this flood protection project. Dredged pervious fill will be used for the levee construction throughout the length on the island. The riverside slope at 1v on 3h is to be provided a 3-foot thick impervious cover, and the landside at 1v on 4h will have an impervious cover of 18 inches. Both slopes will be seeded. The trees on the island riverward of the levee will provide wavewash protection allowing the deletion of riprap in this reach. The 8-foot wide paved bicycle path (as discussed in paragraph 12c and Appendix I) will be placed in the center of the 12-foot levee top for the full length of this reach. To be compatible with the proposed recreation development on the island, the levee is placed over the existing road at the downstream half of the island while on the upstream part the road is to remain in place at the riverside toe of the levee. The paved road surfacing will be removed in that area where the levee is to cover the road. The proposed recreation development for the island is shown on Plates 58 and 59 and discussed in paragraph 12a and Appendix I. A 24" pipe and gatewell are provided near the middle of this reach to allow flow from the slough to enter the lagoon in the middle of Credit Island which is to be part of the recreation development on the island. The lagoon has an outlet to the Mississippi River on the southeast side of the island. The proposed 24" pipe into the lagoon from the slough will allow some flow of water through the lagoon to the river, preventing development of a stagnant water condition. Plate 34 shows a typical section of a gatewell on a pipe through the levee.

(5) Credit Island Causeway Reach (Sta. 142+00 to Sta. 128+00) Access to Credit Island is by paved road across a causeway located at the extreme upper end of the island which separates the slough from the Mississippi River. As shown on Plate 12 the proposed levee will be placed on the causeway and the access road placed on the top of the levee. The paved road will be ramped up to and down from the levee to maintain access to the island in the present location. The levee will be of pervious dredged fill on 1v on 3h riverside slope and 1v on 4h slough side slope. A 3-foot thick impervious blanket and riprap protection are provided on the riverside. An 18" impervious, seeded blanket is provided on the slough side. The proposed 24-foot wide access road is to be centered on

the 30-foot wide levee top. A flow of water from the river into the slough is presently provided through two 8-foot diameter corrugated metal pipes. This flow is needed to prevent deterioration of the slough water because of the discharge of the recently constructed sewage treatment plant at the downstream end of the slough. Twin 8' x 8' concrete conduits are proposed under the new levee-access road to maintain the flow into the slough. Details of the conduit are shown on Plate 36. Slide gates will be provided on the conduits to close when the river is to be excluded from the slough allowing it to act as a ponding area. The existing corrugated metal pipes will be salvaged, if possible, for use in the nearby McManus Creek ditch. If the pipes are contributed by the city to construct the project, credit can be allowed for their value toward the city's obligation to cost share the proposed recreation development. The proposed ditch is shown on Plate 13 and discussed in the following paragraph. The bicycle path which is on top of the levee on Credit Island crosses the access road and continues upstream parallel to the levee.

(6) Scenic Road Reach (Sta. 128+00 to Sta. 96+00) Reference Plates 13 through 15. Construction of the levee in this reach is generally as described for the Credit Island Causeway, namely dredged pervious fill, impervious blanket on both slopes, riprap protection on the riverside and grass on the landside. The levee top will be 30 feet wide to accommodate the proposed 24-foot wide paved scenic road. Users of the scenic road in this area will be furnished visual access to the river in an area previously screened by buildings and topographic features. The road will also act as a connecting access between the proposed Crescent Bridge Park and Credit Island Park. These features are discussed in paragraph 12 and Appendix I. The bicycle path proposed to extend throughout this reach will be on a berm on the riverside of the scenic road and levee. In addition to acting as a base for the bicycle path, the berm will add stability to the levee in this area of soft foundation material. This is more fully discussed in Appendix B, Geology and Soils. McManus Creek will pass through the protection line in this reach at Station 123+00. Twin gated 10 ft. x 10 ft. conduits will be constructed to carry the creek to the river under gravity drainage conditions. Plate 13 shows a ditch which will be excavated landward of the levee to direct the creek flow into Credit Island Slough when the slide gates are closed. As shown on Plate 12 three 8-foot diameter corrugated metal conduits will carry the flow under Credit Island access road to the slough for pumping by the plant at the downstream end of the slough. Also directed into this ditch will be the flow from a proposed 72' interceptor sewer shown on Plates 13 through 16. This sewer, which will carry storm flows from the area of the city inland of Crescent Park to the Credit Island Harbor pump station, is discussed in Appendix A, Hydrology and Hydraulics. As noted in paragraph 18, a study was made to consider constructing a pump station at the foot of Howell Street where this sewer begins instead of constructing the 72" interceptor. The pump station was found to be more than a quarter million dollars more expensive than the interceptor sewer. At the upstream end of this reach, a 72" storm sewer and a 60" overflow sewer are to be carried under the levee and provided with slide gates.

(7) Crescent Park Reach (Sta. 96+00 to Sta. 72+00) Until a few years ago, this area, shown on Plates 15 and 16, was a landfill site for the City of Davenport. The landfill operation has raised the topography above the design grade over most of the reach. This high ground condition extends landward about 500 to 1000 feet from the present shoreline. This area is the site of the proposed Crescent Park recreation development shown on Plate 62 and discussed in paragraph 12b and Appendix I. The existing topography is irregular in elevation but generally at design grade or higher in the landfill area. Proposed construction will fill in minor low areas and cut some areas where necessary to maintain a reasonable grade for the proposed scenic road which passes through the area. The riverside slope of cuts and fills will be at 1v on 5h and all work will be seeded. Since the high ground is very deep measured back from the shore line, and the proposed slopes are gradual, riprap will not be necessary. Impervious dredged fill from Credit Island Slough will be used to provide an impervious cover over most of the proposed park area to help insure complete covering of waste material from the past landfill operation. In addition, material found unsuitable for backfill in the inspection trench of the levee will be placed in low areas of the proposed park. Some impervious fill from the river borrow areas (see Plate 1) will be needed for road subbase construction since the dredged impervious material will generally be too high in moisture content for good compaction. The bicycle path continues through this area on the river side of the line of protection. Generally, the bike path follows the ground contours, although some cut and fill is required to maintain a reasonable grade.

(8) Marquette St. to Gaines St. Reach (Sta. 72+00 to Sta. 45+00) An existing road in this reach will be raised to the design grade and will extend the scenic road previously described to the Centennial Bridge (Gaines Street). Near Gaines Street, the road is ramped down to existing ground in back of the levee to a junction with Gaines Street near the baseball staduium. To accommodate the road, the levee top width will be 30 feet through most of this reach. After the road ramps off the levee, a 10 foot top width is used. Dredged pervious material will be used for levee construction with compacted impervious material on the riverside slope to reduce seepage and on the landside for grass. Side slopes will be 1v on 3h riverside and 1v on 4h landside. Riprap will be provided on the riverside throughout this reach. Soil exploration in this reach indicates a potential seepage condition in the subgrade. To reduce this effect, an impervious blanket is proposed from the levee to an existing seawall. The bicycle path will be on top of the impervious blanket as it progresses through this reach.

(9) Stadium Reach (Sta. 45+00 to Sta. 37+00). Various types of floodwalls and closures form the line of protection beginning at approximately station 45+00 and extending nearly a mile to the upstream terminus of the main Mississippi River protection system. Each type is more fully described in paragraphs 18j through 18j(4) and in Appendix C, Design Analysis. A short length of I-wall will form the transition from the previously described levee to a tee-wall which is proposed to extend around the baseball stadium located immediately upstream of the Centennial Bridge at the foot of Gaines Street. The stadium is used by the class A

Quad Cities Cubs. The stadium field is bounded by a fence on the riverside and adjacent to the fence are several large light standards. Typical I-wall and tee-wall sections are shown on Plate 34. The proposed tee wall will be located just riverward of the light poles. A closure structure is provided at the foot of Gaines Street across Beiderbecke Drive which is an existing road passing from Gaines Street around the riverside of the outfield fence. Four feet of freeboard is used to determine design grade for the protection system upstream of this closure. A pump station is proposed adjacent to the closure structure. Plates 42 and 52 show these proposed structures at the foot of Gaines Street. Plates 18 and 19 show the plan and profile of the floodwall system in this reach. Appendix D, Pumping Stations, discusses the Gaines Street Pump Station.

(10) Downtown Reach (Sta. 37+00 to Sta. 14+00). This reach is a combined riverfront park and auto parking lot extending along the riverfront for about seven blocks. The downstream half is predominantly park and the upstream half predominantly parking lot. Immediately inland from the park and parking area is the downtown commercial/retail center of the city. The auto parking along the riverfront is important to the operation of the downtown area. The park and the adjacent river form an important contrast to the commercial activity of the adjacent downtown area. Maintaining the nature and use of the park and parking area was important in the design of a protection system through this reach. Plates 19, 20 and 21 show the line of protection through the area in plan and profile. A combination low levee, low permanent wall, and upper folding wall is used throughout nearly all of this reach. The low levee will be about 3½ feet high, the permanent wall about 3½ feet high, the lower portion of the folding wall about 3½ feet and the upper portion about 3 feet. A number of closures are incorporated in the system also. A relatively large number of storm sewers outlet to the river in this reach, and each is provided with a slide gate for closure in high river conditions. The bicycle path will be immediately in back of the folding wall on the low levee. This widened, paved levee top will also be used for operation and mainenance vehicles. Details of the combination low levee-permanent wall-folding wall are shown on Plate 37 and discussed in paragraph 18j(4) and in Appendix C, Design Analysis.

(a) Three road closures are provided in this reach. One, at the downstream end of the reach adjacent to the stadium, will be across Beiderbecke Drive as it circles the outfield fence. A small ramp is proposed for the road to reduce the height of the closure and to reduce the frequency of installation. The bicycle trail will also pass through this closure opening. Details of this closure will be similar to the closures described in the following paragraph. The second road closure is on a boat ramp at the foot of Main Street in about the middle of this reach. The city is planning improvements in landscaping and traffic orientation for several blocks of Main Street and the development anticipates access both visually and physically to the Mississippi River through the closure at the foot of Main Street. Road closures are further discussed in paragraph 18k(3). Plates 43 and 44 show the details of the Main Street closure. The third closure will provide access through the flood wall system at Perry Street. This closure, shown on Plate 45, will

allow auto access to the restaurant located at the river shore at the foot of Perry Street and access by maintenance vehicles to the riveredge between Perry and Main Streets.

(b) Four other closures are provided in the wall system in this reach. These are shown in plan and profile on Plates 19, 20 and 21. Plate 49 shows details of the structure proposed for these openings. These closures will provide both physical and visual access through the wall to help maintain continuity of the park and to maintain the aesthetic relationship of the downtown to the river. The closures are located at the foot of Ripley, Harrison, and Brady Streets, and one is located adjacent to the bandshell between the stadium and Ripley Street.

(c) One pump station will be located in this reach between Main and Harrison Streets. The location of the plant is shown on Plate 20 and details on Plate 53. To maintain the aesthetics of the park, the plant will be located totally underground, except for the pump controls. Paragraph 18g and Appendix D, Pumping Stations, provide further discussion of the proposed station.

(11) Perry Street to Iowa Street Reach (Sta. 14+00 to 5+00) Plate 21 shows the plan and profile for the proposed wall system in this reach. From the Perry Street closure a tee-wall will be constructed just riverward of the railroad track which runs parallel to the river in this reach to a location suitable for a railroad closure. A single track railroad closure is provided at Station 9+80 where the line of protection crosses to the landside of the tracks. Details of the railroad closure are shown on Plate 41. A low levee in combination with a 10-foot high I-wall is proposed from the railroad closure to Iowa Street. Tee-wall construction is resumed from Iowa Street to a location appropriate for a closure across River Drive which is discussed in the following paragraph. Several gatewells are necessary in this reach where the tee-wall crosses sewers at the end of Iowa Street. Plate 34 shows a typical detail of a cast-in-place gatewell combined with a tee-wall.

(12) Upstream Tieoff (Sta. 4+00 to Sta. 0+00). At approximately Station 3+50 a closure structure will be placed across River Drive (US Highway 67). This area is shown on Plate 21, and the closure is shown in detail on Plate 46. A railroad spur track crosses diagonally through this closure as it proceeds west to serve an industrial user near Pershing and Second Streets. The closure is further discussed in paragraph 18k(3) and in Appendix C, Design Analysis. A tee-wall will proceed parallel to River Drive from the closure structure for about 100 feet, and an I-wall construction will be used for about another 150 feet until design flood grade is reached at the approach to the Government Bridge. A sandbag closure will be used for closure in the freeboard zone at the end of the I-wall. This will avoid constructing a wall or panel structure within the sidewalk which progresses up the bridge approach at the proposed wall end.

(b) The railroad embankment which extends northwest from Second and LeClaire Streets forms part of the line of protection up to the junction with natural high ground near Fourth and Iowa Streets. Two road closures

are proposed to complete the upstream tieoff. One will be across Second Street as it crosses the approach to the Government Bridge. The closure structure is placed on the upstream side of the Government Bridge approach to allow traffic at all times between Second Street and the Government Bridge. Sandbags are proposed at the Government Bridge approach end of this closure in the freeboard zone to reduce the length of structure to be installed. The other end of the closure secures against the abutment of the railroad bridge which crosses on the upper level of the Government Bridge. The final closure structure of the upstream tieoff is needed on Third Street which passes under the railroad embankment as it proceeds west away from the Government Bridge. These two closure structures are shown in plan and detail on Plates 47 and 48.

(c) Westward of the closure on Third Street an alley passes under the railroad embankment. Sandbags are proposed to close this opening which is in the freeboard zone of the design flood condition. This closure completes the unit of protection along the Mississippi River which began about 4-3/4 miles downstream at Interstate I-280.

b. Water Treatment Plant Protection Unit.

(1) General. This unit of the flood protection plan consists of a levee and wall system around three sides of the water treatment plant as shown on Plate 55. River Drive (U.S. Highway 67) passes close on the landside of the plant and is above design grade. The plant is located about one mile upstream from the Government Bridge where the previously described unit of protection ends. Essentially all of Davenport and adjacent Bettendorf are provided water service from this plant. Most of the protection is accomplished by raising an existing seawall. Short reaches of levees, walls and closures at each end of the proposed system are designed to a height of 3 feet above the flood having a chance of occurrence of 0.5% (200 year flood). Due to the limited extent of this unit, three feet of freeboard is provided uniformly throughout the system. Levee construction will be of compacted impervious fill from borrow area No. 1 shown on Plate 1. An inspection trench is planned under the levees down to the water table which occurs about 10 feet below existing ground. The typical levee section shown on Plate 56 shows the proposed riprap protection on the riverside of the levees and a grassed slope on the protected side. Side slopes will be 1v on 3h with a 10-foot top width.

(2) Also shown on Plate 56 is the proposed wall raise which extends for about 1,000 feet along the seawall on the riverside of the water plant. One closure is provided in this cap wall near the midlength point at the plant intake pipes. This closure will provide maintenance access to the intakes and will furnish a convenient location to unload supplies arriving by barge for the plant. Details of the closure are shown on Plate 57, and discussed in paragraph 181(1). Also shown on the same plate are two railroad closures for the single track which passes through the protection system, as shown in the plan on Plate 55. Short segments of wall, both I-wall and tee type, are needed between the levees and cap wall.

(3) Two large sanitary sewers pass through the protected area and are to be provided with slide gates for emergency closures. Several storm drains and process water drains are also provided with slide gates. Several of these small drains are combined to flow into two 24-inch gatewalls as shown on Plate 55. Typical gatewall details are shown on Plate 56.

(4) An existing gravel road circles the treatment plant on the riverside and is to be ramped over the line of protection on the upstream side of the plant. A sandbag closure on this ramp is proposed for the freeboard zone to reduce height of the ramp. On the downstream side of the protected area, the access road is within the line of protection as it exits to U.S. Highway 67 (River Drive).

(5) Long range plans of the city include construction of a bicycle path along the riverfront passing between the treatment plant and the river. If construction of the bicycle path by the city becomes eminent, the proposed flood protection work can be modified to accommodate the path. At the upstream end of the protected area the necessary modification would probably involve constructing a ramp over the levee. At the downstream end, the proposed railroad closure might be enlarged to include the path, a separate closure could be provided, or the path could be routed near River Drive around the end of the protection system.

12. Recreation Features. Integrated with the flood control features previously described are several recreation developments. These include two park areas, a bicycle trail, a scenic road and a boat launch area. These features are more fully described in Appendix I, Recreation and Aesthetics.

a. Credit Island Park. This island in the Mississippi River is located near the downstream end of the project from Station 220+00 to Station 140+00. The island has been used for many years by the city for recreation of various types. Most recently, the island has been developed principally for picnicking, tennis, baseball and golf. Proposed development in conjunction with the flood control work will enhance and add to the existing recreation features. Approximately the downstream quarter of the island is undeveloped and will remain as a nature preserve. The area immediately upstream of the nature preserve is to be semi-developed for family picnicking and casual tent camping of short duration. Bordering the picnicking and tent camping area is a lagoon which will be dredged and enlarged to provide paddle boat and canoe recreation.

(1) Primary recreation development on the island will be upstream of the lagoon. An existing paved road which circles the upstream end will continue to provide access along both riverside and landside edges of the island, but will be divided into two separate parts for more positive traffic control. At the end of the landside road a parking lot and boat rental building are proposed. This building will be constructed at local expense for rental and storage of paddle boats, canoes and sailboats. The latter two items will be used primarily on the adjacent slough which is to be dredged to obtain material for use on the landside slope of the levees and to cover the proposed Crescent Park area.

(2) A large portion of the upper end of the island has been a municipal golf course. Using material dredged from the lagoon, several low areas in the course will be filled and graded. Electric service will be provided to the proposed boat rental building. Two portable pairs of toilet buildings are proposed on the island. One will be located at the family picnicking and tent camping area, and the other will be adjacent to the boat rental building and parking lot.

(3) A six-foot wide gravel path will be provided the full length of Credit Island near the water edge on the slough side of the levee. This path is shown on Plates 6 through 11 and on Plate 22. The path will mitigate for the loss of convenient access by fishermen and strollers to the water due to the proposed levee contruction.

b. Crescent Park. For many years an area near the Crescent railroad bridge which crosses the Mississippi River near the middle of the proposed flood control project (Station 86+00) was the primary city landfill. Several years ago the city halted dumping in the area and has provided an earthen covering over the previously placed refuse. In conjunction with the flood control project this area wll be developed as a park of approximately 60 acres. Plate 62 shows the proposed development. The downstream half of the park will be for casual use, primarily picnicking and family games. A parking area is proposed with access off the road on top of the proposed levee and off River Drive (US 67). A toilet building, children's play area and several picnic shelters are planned in the area. The upstream half of the park will be developed for organized softball. Four lighted, fenced fields are proposed. A centrally located building will provide restroom facilities as well as storage and a concession area. A parking lot is proposed adjacent to the ballfields with access off the levee road.

c. Bicycle Path. A paved bicycle/walking path is proposed throughout much of the main flood protection unit along the Mississippi River. Near the downstream end of the project at Concord Street and Wapello Avenue (Station 244+00) a ramp will allow access from Concord Street onto the levee. An eight-foot wide asphalt path is proposed on top of the levee the full length of Credit Island. Near the middle of the island, a ramp will provide connection from the path on the levee crown to the road which provides access to the riverside of the island. At the upper end of the island the bicycle path splits to provide two possible routes for the bicyclists.

(1) One proposed path proceeds along the slough side of the levee toward River Drive (US 67), then proceeds parallel to River Drive until it joins with South Concord Street. Thus, a complete circle around Credit Island Slough is possible. This trail is shown on Plate 60. A bridge is proposed, as shown on Plate 61, to carry the trail over Blackhawk Creek. A bridge for maintenance vehicles provided across the harbor closure at the downstream end of Credit Island Slough, as shown on Plate 50, will also be used by bicyclists.

(2) The other branch of the bicycle path proceeds upstream on a riverside berm of the Mississippi River levee. This branch of the trail extends along the river shore as far as the upstream side of the baseball stadium (Station 39+00). The trail then joins the maintenance/operation road which is proposed landward of the flood wall. This road will serve as the bicycle/walking trail up to Perry Street (Station 15+00) when the road is not needed for maintenance or operation of the flood protection system. This branch of the bicycle path, from Credit Island to Perry Street, is shown on Plates 12 through 21.

(3) Near the middle of this branch at the proposed Crescent Park, a loop of the bike path will proceed through the park. This is shown on Plate 62.

d. Scenic Road. From the upstream end of Credit Island to the Centennial Bridge at Gaines Street (Station 130+00 to Station 46+00), the proposed levee will be constructed wide enough to accommodate a two-lane, paved, scenic road. In addition, the causeway between Credit Island and the mainland which now carries a road for access to the island will be raised to form the levee and will be constructed to carry the access road on the levee crown. The levee road will provide access between Credit Island Park and Crescent Park as well as furnishing a vista of the river. A ramp is provided at Marquette Street just upstream of Crescent Park for connection to the city street system. The existing road from Marquette Street to Gaines Street will be raised to the levee crown and will provide an extension of the scenic road as far as the Centennial Bridge where a ramp is provided onto Gaines Street.

e. Boat Launch. Near the midpoint of Credit Island Slough just below the mouth of Blackhawk Creek, a boat launch is proposed as shown on Plate 60. This item will provide for launching of small boats brought in by trailer. Auto parking will be available in the proposed lot, and access is provided to Concord Street.

13. Nahant Marsh. Plate 31 shows the proposed work for mitigation and enhancement of this wetland. The marsh would no longer be subject to periodic flooding by the Mississippi River under the proposed flood protection plan. The marsh would still receive runoff water from the adjacent higher ground. The marsh is connected to the Mississippi River through a culvert under Wapello Avenue and under the embankment of Interstate I-280. A slide gate is proposed on the culvert under the I-280 embankment to prevent flooding of the city during high river conditions. However, during low and moderate river levels, this gate will be open allowing connection between the marsh and the river. Management of the marsh includes control of the water level. This is accomplished by constructing a small levee and culvert at the northeast end of the marsh and by providing stop log weirs on the culvert as well as on the existing one under Wapello Avenue. Stop logs will be stored at the sewage treatment plant located on Concord Avenue. The marsh preservation is further discussed in Appendix H, Environment and Cultural Resources.

14. Departure from the Phase I GDM Plan. The most significant deviation from the Phase I plan is the elimination of flood protection on Blackhawk Creek. The Phase I plan proposed modification of the creek channel extending about one mile upstream from the mouth of the creek to provide protection for flooding on the creek having a chance of occurrance of 1 percent (100-year event). The Phase I GDM combined the costs and benefits of protection on Blackhawk Creek with the proposed protection along the Mississippi River and at the water treatment plant. Since the protection along the creek does not physically affect the other proposed flood protection, a study was made for the Phase II GDM to consider each of these three seperable units independently. The Blackhawk Creek protection system was found to have a benefit-to-cost ratio significantly less than 1.0 (about 0.3) for all levels of protection. For this reason, protection on the creek has been deleted from the Phase II plan. Each of the remaining protection systems (the water treatment plant unit and the main Mississippi River unit) have a benefit-to-cost ratio greater than 1.0. Other deviations from the Phase I GDM plan are essentially only refinements due to more detailed studies or due to accumulation of new data on existing conditions. The extent and basic alignment of the line of protection for the main unit and for the treatment plant unit is the same as the Phase I GDM plan. The changes are discussed in the following paragraphs.

a. Mississippi River Protection Unit.

(1) From the Interstate I-280 embankment at the downstream end of the project (Station 256+00) to the baseball stadium (Station 44+00) the location of the line of protection and the construction of the levee is the same as in the Plase I GDM. The scenic road on top of the levee at the crossing of the railroad tracks at the Crescent Bridge has been moved slightly from the Phase I GDM location. Since the ground elevation in the vicinity of the bridge is at or near the design flood grade, the line of protection is essentially unchanged. In the Phase I GDM plan the road passed under an existing railroad bridge. However, the railroad proposes to abandon this bridge and establish the tracks on an embankment. Thus, the Phase II GDM provides for an at-grade crossing of the tracks by the scenic road and bike path.

(2) The Phase I GDM plan proposed a flood wall to design grade from the baseball stadium to Perry Street (Station 15+00). The Phase II plan proposes a folding wall system throughout this reach rather than a fixed, full height wall as in the Phase I plan. The folding wall is shown on Plate 37 and discussed in paragraph 18j(4) and Appendix C, Design Analysis.

(3) From Perry Street to just upstream of Iowa Street (Sta. 3+80) the Phase I GDM plan proposed a tee-wall along the riverside of the railroad track which runs parallel to the river. A closure was provided across the tracks at about Sta. 3+80 directly adjacent to the River Drive closure. As shown on Plate 21, the Phase II plan locates the railroad closure further downstream to the foot of Pershing Street. This location reduces the height of closure. The grade of the railroad track begins

descending at approximately Pershing Street to pass under the Government Bridge which means a closure about 2 feet higher would be needed if it were located at Iowa Street. Between Pershing and Iowa Streets the Phase II plan proposes an I-wall on top of a low levee rather than a full height tee-wall which would be more costly because of the proximity of the railroad tracks.

b. Water Treatment Plant Unit. The alignment and form of protection around the plant is the same in Phase II as in the Phase I GDM. A closure is now proposed in the wall system at the plant intake system which was not in the Phase I plan. This is shown on Plate 55.

c. Recreation Facilities. The recreational developments in Phase II closely follow those proposed in Phase I. Some changes in usage are proposed for the Crescent and Credit Island Park areas.

(1) At Credit Island Park the Phase I GDM proposed both trailer and tent camping facilities. The proposed camping area for trailers has been eliminated and the tent area has been scaled down to a less formalized area intended for short term use without fee requirements. After further consideration of the Phase I plans and in coordination with the city park department it was deemed more appropriate that activities at Credit Island be oriented toward one day usage by local residents of the surrounding region rather than trailer facilities which would require intensive maintenance and would be relating primarily to non-local people. In addition, upon further study, the first costs of installing adequate utility facilities for extended camping were found to be considerably higher than estimated in the Phase I GDM plan. Instead of highly developed camping, the Phase II plan for Credit Island Park proposes to supplement the existing picnic facilities, develop the lagoon as proposed in the Phase I plan, and place dredged material in selected low areas of the existing golf course to aid the city in enhancing and maintaining it.

(2) At Crescent Park, the Phase II plan basically follows the Phase I plan, but enhances the proposed development. The upstream part of the park is oriented for four fields of organized softball instead of three as in the Phase I GDM. The downstream end of the park is developed essentially the same as in the Phase I report for picnicking and field games. However, open space is provided for casual games rather than formalized areas for organized activities in conjunction with the picnic facilites.

15. Hydrology. Appendix A discusses the hydrologic analysis in detail. The design water surface elevations and frequency estimates used for the proposed project were prepared as a part of the Generalized Regionalized Flow Frequency study of March 1966 on the on the Mississippi River from Guttenberg, Iowa, to Hamburg Bay, Illinois, approved by the Office, Chief of Engineers on 13 May 1966. The Mississippi River protection system is based on a flood having a chance of occurrence of 1/2 percent (200 year flood). Three feet of freeboard is provided in the downstream area, and four feet in the upper reach. The water treatment plant system is provided 3 feet of freeboard uniformly and provides protection for the 1/2 percent occurrence flood event.

16. Water Quality Control. While there are no major problems regarding water quality in connection with the proposed project, several aspects are directly related.

a. The recently completed sewage treatment plant on South Concord Street near Wapello Avenue near Station 237+00 would be inside the proposed line of protection. Although the plant was constructed to operate in a high water condition, access roads, storage yards and railroad service feeder lines will be protected making plant operation much easier and more effective. The plant discharge line which outfalls approximately at the intersection of South Concord Street and Wapello Avenue will be extended through the proposed levee and provided with a slide gate for emergency closure. The discharge will be into the river at all times. This is shown on Plate 4. Two existing large culverts through the Credit Island Causeway (Station 139+00) provide an inlet for Mississippi River water in the slough at the upstream end, insuring that the treatment plant effluent does not tend to pond in the slough due to occasional back currents which might occur if the slough were only open at the downstream end. As shown on Plate 12, the protection plan proposes two 8 ft. x 8 ft. conduits with slide gates through the causeway to continue the river flow into the slough. The slide gates as well as the harbor closure gates at the downstream end would be closed during flood conditions on the Mississippi River.

b. The interceptor sewers which supply the treatment plant are located adjacent to the river shore line and are crossed several times by the proposed flood protection system. At each crossing a slide gate is provided for emergency closure should a break occur in the line during high river conditions.

c. Much of the material for construction of the levees will be dredged from the Mississippi River and from Credit Island Slough. The proposed borrow areas are shown on Plates 1 and 30. Bottom samples were taken to determine the scope of potential water contamination from the dredging activity. The sample analysis and conclusions are discussed in Appendix H, Environment and Cultural Resources. Further analysis is proposed prior to construction to more fully evaluate possible detrimental dredging effects. Excavation of material will be done so as to minimize deleterious effects. Material dredged from Credit Island Slough will be stockpiled on the island in a manner to allow ponding of runoff water sufficiently long to allow pollutants to settle out. Clarified water would be allowed to return to the slough and the excavated material, when sufficiently dried, would be transported to the location needed.

17. Geology and Soils. A detailed discussion of geology and soils in the project area is presented in Appendix B, Geotechnical Design. Numerous borings were taken to evaluate engineering properties of the proposed construction area. Information was also obtained from the city and private engineering firms engaged in sewer construction in the vicinity of the proposed flood protection. No unusual geological condition is present in the areas which would affect construction. However, soil conditions

vary considerably from point to point and the properties affecting construction were evalulated for each proposed feature. Some further exploratory work would be necessary for major features before construction.

18. Description of Proposed Structures.

a. Pervious levee. Typical levee sections for the Mississippi River protection unit are shown on Plates 22 and 23. Top soil will be stripped from the levee base area, and where undesirable foundation material is found, it will be removed. The levee will be constructed of pervious material dredged from the river. Borrow sites are discussed in paragraph 21. Side slopes will be 1 vertical to 3 horizontal on the riverside and 1 vertical to 4 horizontal landside. A 3-foot thick compacted impervious cover will be provided on the riverside to retard seepage. Top soil and impervious material 18 inches thick from stripping and dredged from Credit Island Slough will be placed on the landside of the levee for grass growth to prevent erosion. A 10-foot crown width is used from Interstate I-280 to South Concord Street (Station 256+00 to Station 245+00). From South Concord Street to the start of the Credit Island Causeway (Station 245+00 to Station 134+00) a 12-foot crown is provided to accommodate the 8-foot paved bicycle path and a 2-foot shoulder on each side. From the upstream end of Credit Island to the Centennial Bridge (Station 134+00 to Station 46+00) the levee is constructed with a 30 foot top width to provide for the 24 foot wide scenic road.

b. Impervious Levee. Three reaches of compacted impervious levee are proposed in the protection plan. One is located in the downtown area of the Mississippi River protection unit from Station 39+00 to Station 15+00 where a low levee is used in combination with a wall system. The low levee and wall system are discussed in paragraph 18j(4). A second reach of impervious low levee is used as a base for I-wall construction from about Station 9+50 to Station 5+50 as shown on Plate 21. Riprap 18 inches thick on 6 inches of bedding will be provided on the riverside slope of this low levee. Another reach of impervious levee is proposed at the water treatment plant as shown on Plate 55. This levee will have a ten-foot top, 1 on 3 side slopes and will be protected by 18 inches of riprap on 6 inches of bedding on the riverside. The crown and landside slope will be seeded. A typical section is shown on Plate 56. Impervious material for the levee construction will be obtained from borrow area #1 (see Plate 1).

c. Slope Protection. Riprap 18 inches thick on 6 inches of granular bedding will be placed on the riverside of the pervious levee except on the reach on Credit Island. Gradation of riprap is discussed in Appendix B, Geotechnical Design. Heavy existing tree growth on the riverside of the levee on Credit Island will provide protection against wave action. The levee will be seeded on both sides on Credit Island and on the landside in all other reaches to prevent erosion. Where practical, topsoil obtained from stripping will be used on the landside for seed bed. This will be supplemented by material dredged from Credit Island Slough.

d. Underseepage and Through Seepage Considerations. Cutoff trenches and inspection trenches are proposed thoughout all reaches of levee construction. Trenches are shown on the typical sections on Plates 22, 23 and 56. Appendix B provides a complete discussion of seepage considerations. The compacted impervious blanket to be provided on the riverside of all reaches of impervious levee will provide cutoff of through seepage. The wide construction of the levee which carries the scenic road will also inhibit seepage. Toe drains are proposed at the landside base of all closure structures and walls. All pipes passing through the impervous levees will be provided with a pervious annular fill to intercept seepage and discharge it through a chimney drain.

e. Road Crossing Ramps. Existing roads are ramped over the levee system in four locations. One occurs at South Concord Street near Wapello Avenue, about Station 245+50 and one at the upstream end of the water treatment plant on the service road. The ramps on Concord Street and on the water treatment plant service road are provided with sandbag closures in the freeboard zone to minimize the height of permanent structure. The road ramp at Credit Island Causeway is constructed to full protection height. At Beiderbecke Drive the road is ramped up about 3 feet to pass over the low levee which forms the base of the closure at this location. Metal panels are placed above the levee for this road ramp to obtain the protection grade.

f. Sandbag Closures. In addition to the two road ramps noted in the previous paragraph which are proposed for sandbag closures in the the freeboard zone, sandbags are proposed for two other locations. One site for sandbags is at the approach to the Government Bridge, Station 1+00. Here, a concrete wall terminates at the sidewalk on the dowstream side of the approach. Sandbags are needed on the sidewalk to extend the wall in the freeboard zone to meet the design grade on the approach of the bridge. On the upstream side of the approach sandbags are again needed to close in the freeboard zone between the metal panels of the proposed Second Street closure and the high ground on the bridge approach. These sandbag areas are shown on Plate 21. The other area proposed for a sandbag closure in the freeboard zone is the alley which passes under the railraod embankment between 2nd and 3rd Street. This site is shown on Plate 47.

g. Permanent Pumping Stations. Three permanent pumping stations are proposed for the project. One will evacuate from a ponding area and two will pump storm sewer flow. All pumps are to be driven by electric motors and will be automatically controlled by float devices once the station is activated. Pumps are sized to provide two-thirds of station capacity with one pump inoperative. Charactertistics of the pumps and the electircal power requirements are detailed in Appendix D, Pumping Stations.

(1) Credit Island Slough Pumping Station. This station will be located at the downstream end of Credit Island Slough (Station 235+00 and is to be constructed as part of the harbor closure which is further discussed in paragraph 18o. Design capacity of this station is 73,500 gpm (164 cfs). Three 30-inch centrifugal pumps of 24,500 gpm each are proposed.

The pumps are to be operated when the gates are closed at each end of the slough converting it to a ponding area. Closure of the slough is at elevation 555.0 and the pumps will be used to bring the ponding area down to elevation 552.0 or lower to store interior drainage, primarily Blackhawk Creek. This is fully discussed in Appendix A, Hydrology and Hydraulics. The plan for this station is shown on Plate 50. Trash racks with hand raking are provided to protect the pumps. Access to the station is along the top of the levee on the paved road which also serves as a bicycle path.

(2) Gaines Street Pumping Station. This station, shown on Plate 52, is located at the foot of Gaines Street between the Centennial Bridge and the baseball stadium (Station 45+00). Pumping requirements of 35,000 gpm (78 cfs) are met by three 20-inch propeller pumps of 11,700 gpm each. The station will evacuate sewers in the downstream portion of the downtown area and sewers in the area between the Centennial Bridge and the Crescent Bridge. The proposed interceptors leading to the plant are shown on Plates 18 and 19. Existing streets furnish access to the plant. Since the plant is immediately adjacent to the baseball stadium and is in a prominant location a screening fence is proposed landward of the building.

(3) Main Street Pumping Station. Plate 53 shows the details of this station. It is furnished with two submersible propeller pumps of 6600 gpm capacity to meet the requirements of 10,000 gpm (23 cfs) for the station. Since the plant is centrally located in the downtown riverfront park, submersible pumps were selected to avoid having a building which would visually interrupt the park area. Using a pump station similar to that proposed at Gaines Street would result in the building roof approximately 15 feet above the flat surrounding ground surface. Even an attractive building would look inordinately prominent. The proposed submersible pumps do not require a building, yet are easily lifted to the surface for servicing. Controls are in a small cabinet adjacent to the station and screened by landscaping. Trash racks are provided to protect the pumps and hand racking is accomplished through access covers above the trash rack. Flap gates are provided at the discharge pipe outlets, and gate valves are proposed on the discharge lines to prevent backflow through the pumps in the event of pump failure during flood conditions. This station evacuates sewers in the center and upstream portion of the downtown area. The location of the plant and sewers is shown on Plates 19, 20 and 21.

h. Existing Pumping Facilities. The city has no permanent pumping facilities in the proposed flood protection area.

i. Portable Pumps. No portable pumping facilities are provided as part of the protection plan. The city has a number of small portable pumps which are used in combating interior drainage problems. At the water treatment plant, near the downstream end, about Station 238+00, pipes which discharge process water will be provided with slide gates for emergency closure. Landside of the gates, large manholes are proposed to allow installation of portable pumps if necessary to discharge the process water. Pumps would be provided by the water company and or/the city.

j. Floodwalls. Several types of concrete floodwalls are used throughout the project. Each type is discussed in the following paragraphs as well as in Appendix C, Design Analysis.

(1) I-Wall. Several short reaches of I-wall are proposed in the project. This type of wall is used where the exposed height is 10 feet or less. A typical section is shown on Plate 34. At the I-280 railroad underpass, shown on Plate 40, about 60 feet of I-wall is used between the closure structure and the embankment of the highway. About 40 feet of I-wall will be used between the levee and tee type wall at Station 46+00 near the Centennial Bridge. Between Pershing Street and Iowa Street about 310 feet of I-wall will be constructed on top of a low levee. About 150 feet of I-wall is needed from the end of the tee-wall up to the approach of the Government Bridge. At the water treatment plant short lengths of I-wall are used adjacent to each railroad closure structure. The location is shown on Plate 55 and the typical section on Plate 56.

(2) Cap-Wall. As shown on Plate 55, about 1,000 feet of existing sea wall will be raised to provide protection at the water treatment plant. A typical secion is shown on Plate 56.

(3) Tee Wall. In the downtown area, tee wall construction is proposed for three reaches. One reach is shown on Plate 19 where this type of wall extends for about 600 feet around the baseball stadium from about station 45+50 to station 39+00. A second reach, of approximately 500 ft. extends from about station 14+00 to station 9+00, between Perry Street and Pershing Street near the upstream end of the downtown area. Tee-wall construction is also proposed for about 150 feet each side of the closure across River Drive as shown on Plate 21. A typical section of the proposed tee wall is shown on Plate 34.

(4) Folding Wall. This type of floodwall is a modified I-wall and forms the principal unit of protection through the downtown reach. The location of the wall is shown on Plates 19, 20 and 21. Typical sections and details are shown on Plates 37, 38 and 39. This type of structure was selected to provide the protection needed while minimizing the impact of the system on the aesthetics of the area. Factors considered in selecting the type of protection to be used in this area included maintaining a view of the river, maintaining as much parking area as possible during flood periods as well as during normal river conditions, maintaining the riverfront park in a useable configuration, obtaining an attractive structure, obtaining a reliable system that could be operated and maintained by local interests, and obtaining a system at a viable cost. While none of these factors is fully met by the proposed folding wall system, it does provide a protection system that obtains a significant portion of each factor without ignoring the others. Measured against other possible protection systems, it provides the most satisfactory system overall.

(a) The proposed system consists of a low levee about 4 to 41/2 feet high, a permanent 31/2-foot concrete wall, a 31/2-foot high folding concrete panel and a 3-foot high aluminum panel. The folding concrete

panel is hinged to the permanent wall and the aluminum panel is hinged to the concrete panel. When not in use, these panels hang from the hinges on the landside of the permanent wall. Struts are used to support the folding panels when erected. When not in use, the struts are stored between the folded panels. Small parts, such as bolts, waterstops and filler panels which close the gap between the folding panels, would be stored at the city maintenance garage. The city will be advised to keep parts separate from other material and in a locked area.

(b) The system provides several levels of flood protection. With the placement of road closures at Main Street and Perry Street (described in paragraph 18k(3)) the low levee would provide an initial level of flood protection from Perry Street to the baseball stadium. Erecting four walkway closures (described in paragraph 18k(4)) completes the flood protection up to the top of the permanent wall which is about 1½ feet above the flood of record. Lifting the lower panels into place with the necessary struts and associated items provides a protection level about one foot above design flood. Moving the aluminum panels into position with necessary struts and appurtenances provides full design height from Perry Street to the stadium (Station 15+00 to Station 39+00). One hundred two lower panels and an equal number of upper panels would be needed, in addition to closure structures, to extend over this full reach.

(c) Erection of the folding wall would be accomplished from the wide top of the low levee on the landside of the wall. A ten foot wide asphalt pavement is proposed on the levee to provide a roadway for operation and maintenance vehicles. The pavement will serve as a bicycle and walking path when the panel system is not in use. Users of the path can easily see over the 3½-foot high permanent part of the wall and, in addition, are observing from a slightly raised elevation. To raise the lower panels, alternate manhole covers are opened to allow connection of struts to the foundation, the waterstop between the fixed wall and the lower panel is placed on top of the permanent wall, the panel is raised using a crane, a strut is bolted in place at the end of each panel and bolted to the foundation, and the filler panel is placed by hand between the main panels, and tightened into position. This concludes erecting a 20 foot length of lower panel. The operations and maintenance manual will fully discuss the details of the panel installation.

(d) A center strut is provided for the lower panel but is only used when the upper panel is raised. The strut at the end of the lower panel supports each end of two adjacent panels, thus raising a lower panel requires installing one strut and opening one foundation access cover. One bolt connects the strut to the foundation and one bolt connects the other end of the strut to the ends of two adjacent panels. The combined weight of the upper and lower panel is slightly less than 6,000 pounds. Since one end of the panel is supported by the hinges, a maximum of 3000 pounds lifting effort is needed to raise the lower panel.

(e) Raising the upper 20 foot long panels is similar to the procedure for the lower panels. A waterstop is placed betwen the panels, the foundation access cover at the center of the panels is removed, and

the panel is raised into position. An upper panel, weighing just under 200 pounds, requires a 100 pound maximum lift effort. This lifting could be accomplished by crane or manually. Struts are then installed at the center of the lower panel, the center of the upper panel and at the end of the upper panel and the filler panels are secured in place to close the gap between the upper panels. To lower the panels the procedure is reversed.

(f) Plate 65 shows the type of landscaping proposed in conjunction with the folding wall system. The landside slope will be grass with some trees and shrubs near the toe. On the riverside, a continuous plater box is formed by low retaining walls as shown on Plates 37 and 65. This system will provide structural stability to the riverside toe of the low levee and also accommodate plantings or grass. At selected locations concrete platers are proposed with benches to form conversation areas along the river shore line. The folding wall and concrete planters will provide an attractive finish for a pleasing appearance. The landscaping is further discussed in Appendix I. At the location of the four walk-through closures described in paragraph 18k(4) steps will be provided on the riverside of the folding wall to allow pedestrian traffic from the bicycle/walking path down the low levee to the river edge.

k. Closure Structures. Most closure structures in the project consist of panels which are stored at a site away from the place of use, trucked to the line of protection when needed, and erected using a small crane or other lifting aid such as an end loader. A few of the closures are small enough to allow erection without a crane and are aluminum for easy manual installation. Storage of panels would be at three sites: the new sewage treatment plant on South Concord Street near Wapello Avenue (near Station 237+00), the grounds of the city maintenance garage on Marquette Street near Beiderbecke Drive (Station 68+00) and at the water treatment plant. A storage building will be provided at each location exclusively for the panels. The panels are galvanized steel and aluminum for minimum maintenance and minimum handling effort. Posts and struts are aluminum for manual installation. Steel panels will be installed using a crane.

(1) Intake Closure. A 7-foot high, 15-foot wide opening is provided in the cap wall at the water treatment plant at the location of the intake pipes. This opening would be closed by a panel structure as shown on Plate 57. The structure consists of one panel 7-foot high by 15-feet wide which is placed by crane and bolted to the adjacent cap wall and the existing wall.

(2) Railroad Closures. Four railroad closures are needed in the project, two at the water treatment plant, one at the I-280 underpass at the downstream end of the proposed protection work and one near Pershing Street (about Station 19+50). Three of these closures consist of panels supported by aluminum structural members and the adjacent concrete abutments, and one, at Pershing Street, is a swing gate. A single track passes through the protected area at the treatment plant and is provided with two closures, one about 9 feet high at the upstream end of the protection system and one about 5-1/2 feet high at the downstream end. Both

closures are 17 feet wide. The closures at the water treatment plant are shown on Plates 55 and 57. To erect these panels access holes are opened in the foundation and posts are set in the foundation holes. The panel itself is lifted in place by crane in one unit and bolted to the posts and foundation. Asphalt fill is packed around the rails to seal the opening. All the closure panels for the water treatment plant area will be stored on the plant grounds. The railroad closure structure at the I-280 underpass is similar to the ones at the water treatment plant except that several small aluminum panels are used instead of one large panel. This will allow manual placement of the closure without a crane at the site. The three tracks require an opening 51 1/2 feet wide by 7 feet high. Details are shown on Plate 40. These panels would be stored at the new sewage treatment plant. The railroad closure structure at Pershing Street is a single leaf swing gate 18 feet wide and 14-1/2 feet high. This gate is on the same track which passes through the protective works at the water treatment plant. Since train traffic can continue through the area until this gate is closed (assuming the railroad pumps seepage out of the LeClaire Street underpass as necessary), there is an incentive to leave the closure open as long as possible. The swinging gate is simple to operate and can be closed quickly when needed. Two small hand-operated jacks to lift the gate for closing will be stored at the city maintenance garage. Plates 21 and 41 show the proposed closure location and details.

(3) Road Closures. There are seven locations in the project where closures are provided across streets. Panels will be marked to relate it to the proper closure and markings will be described in the operation and maintenance manual. One of the closures is described in paragraph 18k(4) below. The others are described as follows:

(a) Four of the closures are similar in general construction but vary slightly in height and considerably in width. The location and size of these is as follows:

Location	Size	Reference Plates
Gaines Street (Sta. 45+50)	48 ft.	18 and 42
Main Street (Sta. 24+00)	64 ft.	20, 43, and 44
Perry Street (Sta. 14+50)	48 ft.	21 and 45
River Drive (Sta. 3+50)	80 ft.	21 and 46

These closures consist of panel units to be placed by a crane, end loader or other lifting unit. The panels are 16 feet wide and are placed in a lower layer followed by an upper layer for full design grade. Each layer is approximately half the full design height. The lower layer of panels is made to provide a level of protection equal to the permanent wall of the previously described folding wall system. Struts are placed at the ends of the lower panels, with one strut supporting the end of two adjacent panels. If the upper panels are placed, an intermediate strut is placed for the lower panel as well as struts for the upper panel. Waterstops are used between panels and at junctions with adjacent walls. Struts are bolted to the foundation after removing access covers over securing points. Panels and appurtenances would be stored at the city maintenance garage.

(b) Closures are required on Second Street and Third Street as shown on Plate 47. The Second Street closure is 70 feet wide by about 7 feet high and the Third Street closure is 82 feet wide by about 7 feet high. Details of the closures are shown on Plate 48. Panels are installed in two layers and are aluminum units small enough to be handled manually. Access covers in the street surface are removed to install the panels. Posts are inserted in holes in the foundation, and panels are bolted to the posts with waterstops between the panels. Material for these two closures would be stored at the city maintenance garage.

(4) Walk-Through Closures. The folding wall system previously described in paragraph 18j(4) is provided with five openings 10 feet high from the top of the low levee to design grade. One of these, across Beiderbecke Drive near the stadium (Station 39+00) is for bicycle and auto traffic while the others are for visual continuity between the river and landside of the protection works and for pedestrian movement from one side of the protection system to the other. The city staff feel that part of the heritage of the downtown portion of the city is its relation to the adjacent river. Thus, they feel it is desirable to have wide pedestrian openings at each street. These openings will allow people on River Drive, Second and Third Streets, as well as those close to the river in LeClaire Park to be aware of the Mississippi River which is a unique aspect of the downtown scene. The closure widths and locations are summarized as follows:

Location	Width	Reference Plates
Beiderbecke Drive (Sta. 39+00)	40 ft.	19 and 49
Bandshell (Sta. 34+50)	50 ft.	19 and 49
Ripley Street (Sta. 32+00)	50 ft.	19 and 49
Harrison Street (Sta. 28+00)	50 ft.	20 and 49
Brady Street (Sta. 19+70)	50 ft.	20 and 49

These closures consist of a series of aluminum panels 10 feet by 10 feet placed by crane and braced by struts each of which supports the edge of two adjacent panels. The same foundation is used for these closures as for the folding wall system. A small filler panel would close the gap between the folding wall and the panels of the closures. Panels are bordered by waterstops and bolted to each other and to the foundation. Details of these panels are shown on Plate 49.

1. Gatewells. There are 33 conduits through the line of protection where slide gates are provided in gatewells for closure during high river conditions. With the exception of the sewage treatment plant outfall (Gatewell B, Station 238+50), Credit Island Slough inlet (Gatewell D, Station 134+12), McManus Creek (Gatewell E, Station 123+10), and the lagoon inlet (Gatewell R1, Station 17+15), all gatewells are on storm sewer lines. Plates 34 and 35 show the typical construction of cast-in-place and precast gatewells. Precast gatewells are used for pipes of 24 inch diameter or smaller. Most of the gates will be of the rising stem type. However, a number of gates on sewers in the downtown area will be self-contained with non-rising stems in a pressurized gatewell. The stem

will be reached through a floorbox to operate the gate. Plate 37 shows a typical pressurized gatewell. Three large gates will be provided with a permanent motorized lift. Portable power units will be furnished to operate the smaller gates. With the exception of gatewell "R1", Station 174+15, which is related to the proposed rereational development, gatewells along the main Mississippi River protection unit are lettered consecutively, "A" through "Z" and "AA". The gatewells in the water treatment plan protection unit are lettered W1 through W5. Plates 32 and 33 tabulate information on sewers and gatewells throughout the project. The following table summarizes information about the gatewells.

Gatewell I.D.	Station	Conduit Size	Well Height	Reference Plates
A	I-280	120 inch x 120 inch	23.2 ft	40
B	238+50	96 inch	27.2	4
C	238+40	15	18.0	4
D	134+12	Twin 96 x 96	31.5	12
E	123+10	Twin 120 x 120	25.6	13
F	98+85	72	27.9	15
G	98+55	60		15
H	89+78	Twin 72 x 72	29.7	15
I	82+10	60	24.8	16
J	65+85	78	29.5	17
K	52+58	60	28.2	18
L	45+18	60	29.6	18
M	42+04	48	21.8	19
N	37+88	30	15.8	19
O	32+06	66	15.3	19
P	31+83	30	16.2	19
Q	29+13	48	20.2	20
R	27+33	42	15.6	20
S	25+33	48	20.0	20
T	23+75	36	14.0	20
U	19+64	36	16.5	20
V	15+21	54	16.7	21
W	14+88	36	8.6	21
X	10+12	36	23.7	21
Y	5+35	30	25.2	21
Z	5+05	66	28.5	21
AA	3+77	78	20.5	21
W1	0+30A	78 and 48	32.3	56
W2	62+08	24	27.1	56
W3	67+18	24	27.5	56
W4	0+05E	48	24.7	56
W5	0+25E	78	31.7	56
R1	174+15	24	28.5	9

Gatewells A, D, E, H, and L will be provided with permanent motorized lifts. Gatewells N through W and AA will be pressurized. Gatewells F, J, O, and Z are on pressure sewers which will not ordinarily require gate operation. Gatewells B, AA, W1 (both gates), W4, and W5 are on sanitary interceptors

which would ordinarily not require gate operation in a flood. All gatewells will be cast-in-place except W2 and W3, which will be precast. Plate 34 shows typical details for cast-in-place gatewells, and Plate 35 shows typical precast details.

m. Bridges. There are two bicycle bridges proposed in the project. One will be adjacent to Highway 61 which crosses Blackhawk Creek near the mouth. Plate 61 shows this proposed structure which will serve bicycle and pedestrian traffic exclusively. The steel and wood structure is proposed to be located on the apron and guidewalls of the existing large conduit which carries the creek under the highway. The bridge provides an 8-foot wide pathway across the creek. The other small bridge in the proposed project will carry bicycle and pedestrian traffic across the opening of the proposed harbor closure structure which is described in paragraph 18o below. This bridge provides a 10-foot wide path for use by maintenance vehicles or by bicycles. Plate 50 shows the proposed harbor closure and the associated bridge.

n. Buildings. Two small buildings are included in the project in the proposed recreation development at Crescent Park. These are concrete block, one story buildings with brick facing and a composition roof. Plate 63 shows the multi-purpose building proposed for the upstream portion of the park near the ball fields. This building will provide restrooms, storage space and a concession area. Plate 64 shows the toilet building proposed for the downstream half of the park area. Another small building is proposed by local interests on Credit Island for rental and storage of canoes and paddle boats to be used by the public on Credit Island lagoon and in Credit Island Slough. A wide area in the levee and access ramps will be provided for this building. Several picnic shelter buildings are proposed in the Crescent Park and Credit Island Park developments. These buildings will be a standard manufactured item about 30'x40' with open sides, metal frame, metal roof, and concrete slab.

o. Harbor Closure. Plates 50 and 51 show the structure proposed for the closure of the downstream end of Credit Island Slough. The closure structure is combined with a pump station which is further discussed in paragraph 18g(1) and Appendix D, Pumping Stations. To close the 40-foot wide opening of the closure structure, a crane provided at the site will be used to place steel bulkheads, which are stored on the site, across the opening. The bulkheads, shown on Plate 51, will run on steel rails in the bulkhead slot. Waterstops are used to seal between the four bulkheads and at the sides and bottom. The sill of the closure will be 7 feet below minimum pool. The opening provided will allow easy passage of pleasure boats and occasional access to the harbor by a small barge or harbor maintenance boat. A bridge across the harbor opening allows passage of bicycles or maintenance vehicles. The crane can also be used to temporarily remove the bridge. The maximum lift required of a crane for the bulkheads or bridge is 19 tons. Appendix C, Design Analysis, further discusses the harbor closure.

19. Other Plans Investigated. A study was made for a pump station to be located about 50 feet landward of Station 99+00. The station would pump the storm drainage carried to Credit Island Slough by the proposed 72-inch sewer which extends from about 180 feet right of Station 99+00 to about 150 feet right of Station 122+00. Three 42-inch pumps would be required and a sump structure about 33 feet by 38 feet. The pumps would discharge over the levee into gatewell "F." Approximate costs were derived for the pump station which showed such a plan to be over one quarter million dollars more expensive than the proposed 72-inch interceptor to carry the storm flows to the Credit Island Slough ponding area.

20. Utilities. Interference occurs at several places with existing utilities. Items of work involving utilities are tabulated on Plate 54, shown on plan and profile sheets (Plates 3 through 21) and discussed further in Appendix G, Relocations. Along the main Mississippi unit of the protection plan interference occurs principally at the upstream and downstream ends of the protection system. At the water treatment plant, all the distribution lines leave the plant on the protected side so no interference occurs with the proposed flood protection work.

21. Borrow for Levee Embankment. Dredging sites in the Mississippi River will be the principal source of material for the proposed levee along the main Mississippi protection unit. The proposed sites are shown on Plate 30. This plate also shows the proposed dredging of Credit Island Slough and Credit Island Lagoon. Material dredged from Credit Island Slough will be stockpiled on the island in a manner to allow ponding of runoff water sufficiently long enough to allow pollutants to settle out. Clarified water would be allowed to return to the slough and the excavated material, when sufficiently dried, would be transported to the location needed. This material will be used for levee crown and landside slope seed base, for an impervious cover for the Crescent Park area, and for filling and grading low spots in the existing golf and picnic areas on Credit Island. Impervious material needed for the protection system will come from borrow area No. 1 shown on Plate 1. This borrow area is the overburden stripped from an existing quarry operation. Stripping of the proposed levee site will provide some topsoil which will be stockpiled and mixed with the material dredged from Credit Island Slough for use on the levee landside slope for seeding. Environmental concerns about dredging of material from the Mississippi River and from Credit Island Slough are fully discussed in Appendix H, Environment and Cultural Resources.

22. Spoil Area. Plate 62 shows the proposed Crescent Park area, part of which will also be the project spoil area, particularly the triangular area between the railroad tracks and the downstream landward quarter of the proposed park area. This area will be used for disposal of material from the levee inspection trench which is not suitable for levee construction or as trench backfill. Debris unsuitable for this spoil area will be disposed of at a landfill approved by the local government where there will be a minimal environmental impact.

23. Corrosion Mitigation

a. Major Considerations. Important items of common steel or iron composition to be considered for protective coatings or other measures designed to lessen the possiblility of significant corrosion problems are: (1) Steel piling in walls and closure structures; (2) Slide gates together with appurtenant ferrous surfaces in gatewells; (3) Plain iron or steel surfaces below the operating room floor of pumping stations and related surfaces subject to immersion, high humidity, or condensation, e.g., slide and flap gates, pump intake pipe, float pipe, trashracks, etc.; (4) Closure structures; and (5) Miscellaneous steel exposed to the weather.

b. Environmental Conditions. The range of environmental conditions to which the above components will be subjected includes: underground exposure in both undisturbed soils and man-made fill; intermittent or continuous immersion to water, sewage or some combination of the two; ordinary exterior weathering; and interior atmospheric exposure including, in some locations, high humidity and condensation for long periods. The difficulties inherent in determining the optimum course of action with respect to corrosion on a project such as this are numerous and complex but revolve primarily around the facts that corrosion rates are not known with even a reasonable degree of accuracy and that thoroughly effective corrosion mitigation measures are likely to be so expensive as to be not justifiable on the basis of mere possiblility that they may be advisable. The problem is still further complicated by the fact that the project will be turned over to a local organization which is unlikely to have the capability of maintaining or renewing sophisticated coatings or other means of protection. Therefore, the following protective measures tend to be minimal for plain steel or iron components which are accessible for replacement or repair and more elaborate only in instances where exposure conditions are believed to be severe and repair or replacement of the metal component is not feasible.

c. Protective Measures. Protection against corrosion, of the ferrous metal items previously listed, will generally be in the form of some type of coating as indicated below:

(1) Steel piling under walls and closures will generally be left uncoated except in existing fill areas. In those areas where the need for a coating is indicated paint system 6-A (zinc-rich paint with coal tarepoxy topcoats) from Civil Works Guide Specification (Painting) System No. 7 CE-1409 will be applied to individual piles prior to driving.

(2) Slide gates, trashracks and appurtenant ferrous surfaces in intake flumes and gatewells; and slide gates, flap gates, piping and other ferrous items below the operating room floor of pumping stations will be coated with system No. 7 CE-1409 (multiple coats of heavy bodied, cold-applied coal-tar paint over a power-tool cleaned or brushoff and blast-cleaned surface). This simple, inexpensive system is all that is considered justified in view of the generally heavy material sections

involved, the lack of accurate information concerning corrosion rates, and the accessibility of most of the metal items involved for repair or replacement.

(3) Galvanizing is proposed for the steel work of the street closure structures. This coating will allow handling with minimal damage to the protective nature of the coating and will provide long term protection under the occasional immersion and atmospheric exposure conditions.

(4) Bulkheads of the Credit Island Harbor Closure will be A-588 weathering steel, resistant to atmospheric corrosion.

24. Relocations. Appendix G, Relocations, provides a full discussion of relocation matters in the proposed project. The flood project will affect railroads, roads, gas, water, electric, and telephone lines. The proposed project has been discussed with each utility and affected agency. Agreements covering railroads, roads and utilities will be finalized prior to advertising of any contract.

25. Access Roads. Existing streets will provide access to all parts of the project. The paved bicycle path on the levee crown will enhance accessibility to the levee on the downstream part of Credit Island and to the pump station at the downstream end of Credit Island Slough.

26. Construction Materials. Information on the availability of construction materials is included in Appendix B, Geotechnical Design. No problems are anticipated with obtaining sufficient material. Environmental concerns involved with proposed dredging are discussed in Appendix H, Environment and Cultural Resources.

27. Environmental and Cultural Analysis. Evaluation and discussion of environmental impacts of the proposed project, including compliance with the Federal Water Pollution Control Act Amendments of 1972, are fully discussed in Appendix H, Environment and Cultural Resources. The appendix also discusses the project relationship to historical and archaeological resources of the area. In summary, primary environmental concerns relate to dredging of the Mississippi River and Credit Island Slough to obtain material for construction. Initial coordination has been made with the US Fish and Wildlife Service concerning threatened or endangered species. If adverse impacts are discovered, procedures will be developed to avoid or mitigate such impacts. Positive environmental aspects of the project are seen in the preservation of Nahant Marsh wetlands area and in the conversion of the Crescent Park area from a landfill to a recreation site. Cultural and archaeological impacts of the project are minimal. Final specifications for the project will include provisions for environmental protection to minimize pollution caused by construction of the proposed plan. These provisions will include landscape protection, burning, dust, and erosion control, restoration of construction areas and limitations on discharges into streams and waterways. Motors proposed in project pump stations will be electric, eliminating the possibility of local air pollution by combustion engines.

28. Public Use and Beautification. Appendix I, Recreation and Aesthetics, fully discusses the proposed recreation developments. Proposed recreation developments have been coordinated with local interests and are compatible with the long range development plans of the city. Proposed recreation features include development of Crescent Park at a former landfill site, enhancement of facilities at Credit Island Park including water related activities and a boat launching site, construction of about 6 miles of hiking and bicycle paths, and constructing about 1-1/2 miles of scenic road along previously inaccessible shoreline. In addition, preservation of Nahant Marsh will promote recreational and educational use of that area. Beautification efforts will focus on landscaping the proposed park areas and Nahant Marsh, and enhancing the appearance of the proposed flood protection work in the downtown reach. Federal and Non-Federal costs for recreation and beautification are shown in Appendix E, Detailed Estimate of Cost.

29. Real Estate Requirements. Local interests are required to obtain the right-of-way necessary for the project. Some lands are required in fee for construction of proposed facilities, some on a temporary basis for construction accessibility and some only for occasional ponding. The City of Davenport already owns a considerable portion of the required land along the Mississippi River.

30. Appraisal of Lands and Damages. The following appraisal of lands and damages includes the cost of acquisition (including severance, appraisal, negotiation and title evidence) and a contingency allowance where appropriate. Valuations are based on current transactions for similar property in the immediate area. This gross appraisal is considered preliminary since the exact location and amounts of all areas have not been rigorously determined. Costs of road, railroad and utility relocations are not included in the costs of right-of-way.

Mississippi River Unit		
Levee Right-of-Way, 91 acres and temporary Construction R.O.W., 8 acres and Borrow Area #1		$ 821,000
Ponding Area, 150 acres		150,000
Nahant Marsh, 163 acres		313,000
	Subtotal	$ 1,284,000
Water Treatment Plant Unit		
Levee and floodwall R.O.W., 2½ acres		$ 35,000
	Subtotal	$ 35,000

Recreation Facilities

R.O.W. at Credit Island, Crescent Park, Scenic Road, and Bicycle Path and Nahant Marsh		$ 1,532,000
	Subtotal	$ 1,532,000
Total all Lands and Damages		$ 2,851,000

31. Estimate of Costs. The following summary is the estimated costs of the Davenport Local Flood Protection Project as described in this design memorandum. The cost estimate is based on July 1981 prices. A detailed estimate of costs is presented in Appendix E, Detailed Estimate of Costs. The recent resolution by the city to buy Nahant Marsh (see Exhibit 3) is not reflected in the costs tabulated here. Purchase of the marsh by the city would increase non-Federal costs approximately 1/4 million dollars and decrease Federal costs by the same amount.

Reach	(Costs in Thousands) Federal	Non-Federal
Mississippi River Unit (other than Nahant Marsh)	$21,810	$1,846
Nahant Marsh	358(1)	-263
Water Treatment Plant Unit	964	35
Recreation Facilities	2,438(2)	2,543(3)
Subtotal	25,570	4,161
Engineering and Design	2,363	
Supervision and Administration	1,767	
Total	29,700	4,161

(1) Additional Nahant costs classified under Rec. and E&D, S&A
(2) Includes 326 for E&D, S&A on Rec. facilities
(3) Includes 118 for E&D, S&A on Rec. facilities

32. Construction Stages. Construction is proposed in the following stages.

Stage I	Water Treatment Plant
Stage II	Credit Island Pump Station
Stage III	Structural Work from I-280 to Gaines Street
Stage IV	Earthwork from I-280 to Gaines Street
Stage V	All work from Gaines Street to the upstream end of the project
Stage VI	Beautification and Recreation Features

Some of these stages would be underway concurrently with one or more of the others.

33. Schedule of Construction. Subject to the availability of funds the project is scheduled as follows:

Item	Submit P & S	R.O.W.	Adv.	Award	Start Const.	Complete Const.
Stage I	Dec 82	Jan 83	Jan 83	Feb 83	Mar 83	Dec 83
Stage II	Nov 83	Dec 83	Jan 84	Feb 84	Mar 84	Dec 85
Stage III	Apr 84	May 84	Jun 84	Jul 84	Aug 84	Jul 86
Stage IV	Oct 84	Nov 84	Dec 84	Jan 85	Feb 85	Dec 87
Stage V	Jun 86	Jul 86	Aug 86	Sep 86	Oct 86	Sep 88
Stage VI	Jun 87	Jul 87	Aug 87	Sep 87	Oct 87	Dec 88

Expenditure of Federal funds would be as follows:

Fiscal Year	Costs
Previous Years	$1,400,000
1982	90,000
1983	900,000
1984	2,445,000
1985	4,375,000
1986	5,414,000
1987	7,740,000
1988	6,486,000
1989	525,000

34. Non-Federal Construction Schedule. Non-Federal work regarding pressurizing of sewers should be approximately concurrent with the associated flood control work. Pressurizing Marquette and Division Street sewers should be complete in the summer of 1987. Pressurizing of Ripley Street sewer should be complete in the fall of 1988.

35. Comparison of Estimates. Table 1 shows the transitions in cost from the Phase I GDM to the latest PB-3 and to the Phase II GDM plan described in this report.

36. Operation and Maintenance. 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 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 $180,000 including recreation features.

37. Operation Estimate. Estimated time, manpower, and equipment required to operate the flood control system is shown in table 2. Since there is a long warning time (3 weeks or more) for a major flood on the Mississippi River, the various tasks can be done sequentially depending on the elevation at which flooding would begin to affect the structure. The forecast elevation in Column 2 shows when a task would need attention. This elevation is selected 3 to 4 feet below the base elevation (column 4) when water would actually affect the structure. Column 3 indicates how often it would be necessary to accomplish the task based on comparing column 2 with elevation-frequency charts for the Mississippi River at Lock and Dam 15. Of course, considerations such as the predicted final elevation, the rate of rise, and general weather conditions would influence the actual time to begin a task. Several groups of workers could proceed with a number of tasks at the same time if desired. The estimates listed assumed the principle city workers would be familar with the structures from previous practice sessions and inspection tours. The time estimate includes moving material from storage to the site. The equipment list does not show the common hand tools such as wrenches necessary to bolt closures in place. An end loader is listed for most closures since this item is readily available to city workers and would provide adequate lifting force to assist in moving panels into position. A crane rather than an end loader is shown for the folding wall since lateral movement is required.

38. Emergency Flood Fighting. All levees and floodwalls are designed for a static water levee to the top of freeboard (4 feet upstream of Gaines Street, 3 feet downstream) with stresses limited to customary working levels and normal factor of safety for stability. In an emergency flood fight, it is conceivable some additional head could be held. Additional height could be added to levees using fill or sandbags, although the extensive length of levee would make this work a considerable effort. I-walls, T-walls, folding walls, and closures might be increased in height to a limited extent by plywood flashboards backed on the landside by pipe or timber struts. Such emergency work would be a major effort because of the length of walls and closures.

39. Benefits and Annual Charges. Current project benefits are evaluated in Appendix F, Economic Analysis. Interest and amortization charges are based on a rate of 7-5/8 percent and an economic life of 100 years. Annual costs are tabulated in Table F-4, Appendix F, Economic Analysis. The ratio of total annual benefits to total annual costs is 1.17.

40. Statement of Findings. I have reviewed and evaluated, in light of the overall public interest, the proposed local flood protection project at Davenport, Iowa. I have also evaluated the views of interested agencies and the concerned public in selecting the recommended plan of protection. The proposed project is currently in the advanced engineering and design stage. The plan has been evaluated to determine possible consequences relating to the environment and social well-being. Also considered were the engineering feasibility and the economic viability of the plan including regional and national development. Included in the evaluation of the plan was the preservation of wetlands and wooded areas

and the harmony of the proposal with existing facilities and future plans. The following considerations and evaluations were made in development of the plan.

a. Environment. The only remaining natural area in the project is in the downstream portion at the end of Credit Island and in the Nahant Marsh area. The proposed levee would eliminate the natural periodic flooding of the marsh. The plan recommends purchase of the wetland area for preservation. Proposed construction features would allow controlled flooding of the marsh and inhibit entry of undesirable runoff from developed areas. The levee construction will displace some lowland wooded area at the downstream end of Credit Island, but landscaping throughout the project will, in part, mitigate the loss. The potential detrimental effects of the proposed dredging of Credit Island Slough and the Mississippi River and the shoreline filling due to the levee construction have been care fully monitored and merit continued evaluation. Dredging areas have been selected to minimize the environmental impact and more detailed analysis of the benthos is proposed prior to actual construction. Elutriate testing is proposed prior to construction to evaluate the most effective plan to minimize undesirable discharges from possibly polluted dredge water. Test results will be coordinated with appropriate agencies.

b. Social Well-Being. The project will benefit the local community by greatly reducing flood damage to the residential, commercial and industrial devlopment in the flood plain of the Mississippi River. The protection plan would insure against disruption of the water treatment plant which serves a wide region of several communities. While the levee and wall construction will form a new visual and physical barrier between the land and the river, the detail features in the downtown area will allow interaction with the river visually and physically at important locations. Also, the bicycle and hiking paths, the new scenic road on top of the levee, the new Crescent Park area in place of a landfill and the enhancement of park development at Credit Island will promote closer contact between the community and the Mississippi River than what is now available. Proposed beautification of the project works will mitigate the visual impact of the plans and enhance the enjoyment in the use of the recreation features.

c. Engineering. The structural plan for flood protection as presented in this report represents a balanced solution to the problem reflecting many social, environmental, economic and engineering factors. Adequate investigations, analysis, and design efforts have been made to determine the plan to be a sound solution. The city of Davenport has provided input to the development of the plan at all levels and has indorsed the resulting flood control system as being the most desirable solution to the flooding problem considering the many factors involved.

d. Economics. The proposed project is near the optimum economic level of flood protection. It presents the best economic solution to the flooding problem while giving appropriate consideration to social and environmental factors.

41. Recommendation. I find that the proposed action, as developed in this design memorandum, is based on thorough analysis and evaluation of various practicable alternative courses of action for achieving the stated objectives, that wherever adverse effects are found to be involved they cannot be avoided by following reasonable alternative courses of action which would achieve the congressionally specified purposes; that where the proposed action has an adverse effect, this effect is either ameliorated or substantially outweighed by other considerations; that the recommended action is consonant with national policy, statutes, and administrative directives; and that on balance the total public interest should best be served by the implementation of this plan.

I recommend that the local flood protection project at Davenport, Iowa, be constructed substantially as described in this memorandum and that necessary funds be made available.

BERNARD P. SLOFER
Colonel, Corps of Engineers
Commanding

TABLE 1

COMPARISON OF ESTIMATES

DAVENPORT LOCAL FLOOD PROTECTION

FEDERAL COSTS (In Thousands)

ITEM	Phase I GDM (Jul 76 Prices)	PB-3 (Oct 81 Prices)	Phase II GDM (Jul 81 Prices)	EXPLANATION OF CHANGE: Phase I GDM to PB-3		EXPLANATION OF CHANGE: PB-3 to Phase II GDM	
Relocations	50.0	110.0	0.0	+ 26.0	Price level; 34.0 more detailed analysis of requirements	+ 23.8	Price level; -73.8 reclassified work to levees & floodwalls
Channels	1,380.0	4,710.0	0.0	+ 718.6	Price level; +2,611.4 more detailed analysis of requirements	+ 656.3	Price level; -2,036.3 deleted channel work
Levees and Floodwalls	11,212.0	20,000.0	19,172.0	+5,838.0	Price level; +2,950.0 reanalysis of requirements	+5,332.4	Price level; +73.8 reclassified work from relocations; +2,553.8 reanalysis of requirements
Pumping Plants	2,616.0	4,080.0	3,960.0	+1,362.2	Price level; +101.8 reanalysis of requirements	+1,244.2	Price level; +99.8 reanalysis of requirements
Recreation Facilities	4,223.0	3,020.0	2,112.0	+2,198.9	Price level; -2,229.0 erroneous inclusion of land costs; -1,172.9 more detailed analysis of requirements	+2,008.5	Price level; -4,119.5 reduction in facilities
Engineering & Design	1,736.0	2,750.0	2,543.0	+ 903.9	Price level; +110.1 reanalysis of requirements	+ 825.6	Price level; -18.6 reanalysis of requirements
Supervision & Administration	1,071.0	2,020.0	1,913.0	+ 557.7	Price level; +391.3 reanalysis of requirements	+ 509.4	Price level; +332.6 reanalysis of requirements
Total Federal Funds and Non-Federal Contributions	22,288.0	36,690.0	30,325.0	Note: PB-3 prices complied in April 1981 and extrapolated to October prior to Phase II Changes.			
Total Non-Federal Contributions	2,279.0	690.0	625.0				
TOTAL FEDERAL COSTS	20,009.0	36,000.0	29,700.0				

NON-FEDERAL COSTS (In Thousands)

Lands & Damages	1,270.0	1,612.0	2,570.0	+ 661.3	Price level; -319.3 more detailed analysis of requirements	+ 604.0	Price level; +696.0 adjustment of unit prices
Relocations	1,011.0	1,230.0	562.0	+ 526.4	Price level; -307.4 reanalysis of requirements	+ 480.8	Price level; -929.8 reduction of facilities
Recreation Facilities	2,354.0	2,550.0	1,011.0	+1,225.7	Price level; -1,029.7 reanalysis of requirements	+1,119.6	Price level; -2,462.6 reanalysis of requirements
Mitigation	36.0	18.0	18.0	+ 18.7	Price level; -36.7 reanalysis of requirements	+ 17.1	Price level; -35.1 reanalysis of requirements
TOTAL NON-FEDERAL COSTS	4,671.0	5,410.0	4,161.0				

TABLE 2

Operating Labor, Time, and Equipment Estimate

Task No.	Forecast Elevation at L&D 15	Frequency of Task (times/100 years)	Base Elev.	Task	Equipment	No. of Workers	Time to Complete Task	Cumulative Worker-hours
1	554.0	yearly (100)	556.8	Install lower panels Main Street Closure	Flatbed Truck, end loader or small crane	4	3 hours	12
2	556.0	2 years (50)	559.2	Install lower panels Gaines Street Closure	Same as Task 1	4	3	24
3	556.0	2 years (50)	559.2	Install lower panels Perry Street Closure	Same as Task 1	4	4	40
4	556.0	2 years (50)	559.0	Install lower panels River Drive Closure	Same as Task 1	4	5	60
5	557.0	2 years (50)	557.0	Install Bulkheads at Credit Island Harbor Closure; Activate Pump Station	None	3	4	72
6	557.0	2 years (50)	557.0	Close Slide Gates in Gatewells (23 required)	2 pickup trucks 2 portable generators 2 power wrenches 2 wrench adapters	4	4	88
7	557.0	2 years (50)	557.0	Activate Main Street Pump Station	Pickup truck, tripod, and chain hoist	2	2	92
8	557.0	2 years (50)	557.0	Activate Gaines Street Pump Station	None	2	1	94
9	558.5	4 years (25)	559.8	Close Gate on RR near Pershing Street; place asphalt around rails	2 hand-operated jacks, road patching truck	3	3	103
10	559.5	5 years (20)	563.3	Install Walk-Through Closures (5)	Same as Task 1	4	15	163
11	560.0	8 years (13)	565.1 (Approx. equal to 563.5 at L&D 15)	Install RR Closures (2) at Water Treatment Plant; Place asphalt around rails	End loader, road patching truck	4	10	203

TABLE 2 (Cont'd)

Operating Labor, Time, and Equipment Estimate

Task No.	Forecast Elevation at L&D 15	Frequency of Task (times/100 years)	Base Elev.	Task	Equipment	No. of Workers	Time to Complete Task	Cumulative Worker-hours
12	562.5	15 years (7)	564.0 (Approx. equal to 565.5 at L&D 15)	Install Closure on RR at I-280; Place asphalt around rails	Flatbed truck, road patching truck	4	8 hours	235
13	562.5	15 years (7)	565.5	Install Closure on Second Street	Flatbed Truck	4	6	259
14	562.5	15 years (7)	566.7 (Approx. equal to 565.2 at L&D 15)	Install Intake Closure at Water Treatment Plant	End loader	4	2	267
15	562.5	15 years (7)	566.0	Install Closure on Third Street	Flatbed truck	4	6	291
16	563.0	20 years (5)	566.5	Install Upper Panels, Main Street Closure	End loader, flatbed truck, 2 ladders	4	4	307
17	563.0	20 years (5)	566.5	Install Upper Panels, Gaines Street Closure	Same as 16	4	4	323
18	563.0	20 years (5)	566.5	Install Upper Panels, Perry Street Closure	Same as 16	4	5	343
19	563.0	20 years (5)	566.5	Install Upper Panels, River Drive Closure	Same as 16	4	6	367
20	563.0	20 years (5)	566.5	Install Folding Wall, Lower Panels (102)	Small crane, step ladder	6	22	499
21	566.0	50 years (2)	570.0	Install Folding Wall, Upper Panels (102)	Small crane, 3 step ladders	6	26	655
22	566.0	50 years (2)	570.9 (Approx. equal to 569.2 at L&D 15)	Place sandbag closure at Water Treatment Plant	Truck, 600 sandbags 5 shovels, 9 cy sand, end loader	10	10	755

TABLE 2 (Cont'd)

Operating Labor, Time, and Equipment Estimate

Task No.	Forecast Elevation at L&D 15	Frequency of Task (times/100 years)	Base Elev.	Task	Equipment	No. of Workers	Time to Complete Task	Cumulative Worker-hours
23	566.0	50 years (2)	569.0	Place sandbag closure at Second Street	Truck, 500 sandbags 5 shovels, 8 cy sand, end loader	10	8 hours	835
24	566.0	50 years (2)	567.4 (Approx. equal to 569.0 at L&D 15)	Place sandbag closure at South Concord Street	Truck, 1,400 sandbags 5 shovels, 22 cy sand, end loader	10	24	1075
25	568.0	100 years (1)	571.5	Place sandbag closure in alley between Third and Fourth Streets	Truck, 300 sandbags 5 shovels, 4-1/2 cy sand, end loader	10	5	1125

CITY OF DAVENPORT

OFFICE OF THE MAYOR

DAVENPORT, IOWA 52801

CHARLES J. WRIGHT
MAYOR

March 22, 1979

District Engineer
U.S. Army Engineer District
Rock Island Arsenal
Clock Tower Building
Rock Island, Illinois 61201

Dear Sir:

This is to advise you that the requirements of local cooperation for the proposed Davenport, Iowa, Local Flood Protection have been presented to the City Council of Davenport. I have been authorized to notify you that the City of Davenport is ready, willing and legally and financially able to:

a. Provide without cost to the United States all lands, easements, and rights-of-way necessary for the construction of the project;

b. Hold and save the United States free from damages due to the construction of the project, except for damages due to the fault or negligence of the United States or its contractors;

c. Maintain and operate the works (including the beautification and mitigation measures) after completion, in accordance with regulations prescribed by the Secretary of the Army;

d. Bear the cost of all relocations and alterations to the buildings, utilities (except the parts of drainage structures that pass over or under the protective works), roads, and other facilities except railroad bridges, ramps, and approaches thereto, where necessary in the construction of the project;

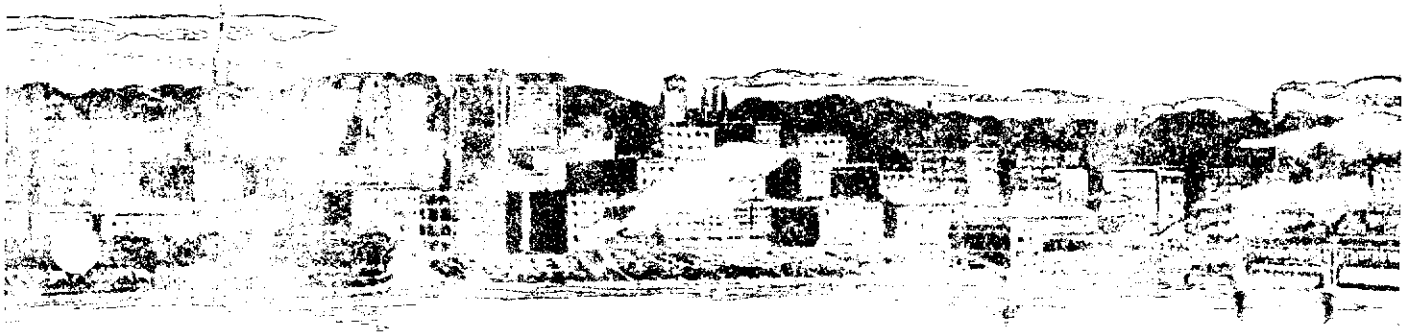


EXHIBIT 1

e. Bear not less than one-half of the separable first cost of recreational development, and all the cost of operation, maintenance, and replacement incurred therefor;

f. Prevent encroachment on the construction works and the ponding area that would interfere with the proper functioning of the project and, if the ponding area is impaired, provide promptly and without cost to the United States a substitute ponding area of equivalent pumping capacity;

g. Provide at local expense pressurization of the Marquette Street Sewer and construct pressurized sewers at Iowa, Ripley, and Division Streets, as described in the report;

h. In acquiring lands, easements and rights-of-way for construction of the project, the City will 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; and

i. Give the Government a right to enter upon, at reasonable times and in a reasonable manner, lands which the City owns or controls, for access to the project for the purpose of inspection, and for the purpose of completing, operating, repairing, and maintaining the Project, if such inspection shows that the City for any reason is failing to complete, operate, repair, or 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 Mayor of Davenport. No completion, operation, repair, or maintenance by the Government in such event shall operate to relieve the City of responsibility to meet its obligations as set forth or to preclude the Government from pursuing any other remedy at law or equity.

If preservation of Nahant Marsh is incorporated as part of the flood control project, the City will provide the required local cooperation agreements which are:

a. To bear 16.5 percent of the Nahant Marsh preservation cost attributable to mitigation of fish and wildlife features,

b. To bear 50 percent of the preservation cost attributable to recreation features,

c. To acquire all land, easements, and rights-of-way necessary for the Nahant Marsh preservation plan, with the City receiving a credit for the land acquisition cost that exceeds

EXHIBIT 1

the City's share. This credit will be applied to other cost-sharing features or reimbursed to the City.

d. To maintain and manage Nahant Marsh for fish and wildlife purposes after the project is completed, with the City receiving a lump sum payment to provide for the estimated annual cost of maintenance of fish and wildlife features.

It is my understanding that the City's costs are presently estimated to be $57,300 for mitigation of fish and wildlife features and $3,700 for recreation features.

I also understand that the lump sum payment to the City for future operation and maintenance of fish and wildlife features is presently estimated at $22,000.

It is understood by the City of Davenport that a continuous, two-way communication will be maintained between the Corps of Engineers and the City. The purpose of this communication will be to keep the City and the public informed of the study progress and provide a means for all elements of the community to raise questions and make suggestions concerning the various aspects of the project.

This statement of our position is submitted with the understanding that the $26,125,000 Federal cost and the $5,009,000 non-Federal cost estimate are preliminary and are subject to refinement as a result of your further planning. We further understand that, at the time a formal local cooperation agreement is requested of the City of Davenport, we will be furnished a more detailed and firm cost estimate for our review and further consideration. The City of Davenport reserves the right of final review and consent prior to initiation of construction on the proposed project.

Sincerely yours,

Charles J. Wright
Mayor
CITY OF DAVENPORT

CJW:jk

EXHIBIT 1

AGREEMENT BETWEEN
THE UNITED STATES OF AMERICA
AND
THE CITY OF DAVENPORT, IOWA
FOR LOCAL COOPERATION AT
DAVENPORT, IOWA

THIS AGREEMENT, entered into this _____ day of _____, 19__, by and between THE UNITED STATES OF AMERICA (hereinafter called the "Government"), represented by the Contracting Officer executing this agreement, and THE CITY OF DAVENPORT, IOWA, (hereinafter called the "City"),

WITNESSETH, that

WHEREAS, construction of a flood control project on the Mississippi River at Davenport, Iowa, (hereinafter called the "Project"), was authorized by the Flood Control Act of 1970, Public Law 91-611, approved 31 December 1970, in accordance with the plans and recommendations of the Chief of Engineers in House Document No. 92-161, 92nd Congress; and

WHEREAS, the City hereby represents that it has the authority and capability to furnish the non-Federal cooperation required by the Federal legislation authorizing the Project and by other applicable law;

NOW THEREFORE, the parties agree as follows:

1. The City agrees that, upon notification that the Government will commence construction of the Davenport, Iowa, Local Flood Protection Project substantially in accordance with Federal legislation authorizing such Project (Section 201 of Public Law 91-611), the City shall, in consideration of the Government commencing construction of such Project, fulfill the requirements of non-Federal cooperation specified in such legislation, to wit;

a. Provide without cost to the United States all lands, easements, and rights-of-way necessary for the construction of the project, currently estimated at $2,851,000.

b. Hold and save the United States free from damages due to the construction of the project, except for damages due to the fault or negligence of the United States or its contractors;

c. Maintain and operate the works (including the beautification and mitigation measures) after completion, in accordance with regulations prescribed by the Secretary of the Army;

d. Bear the cost of all relocations and alterations to buildings, utilities (except the parts of drainage structures that pass over or under the protective works), roads, and other facilities except railroad bridges, ramps, and approaches thereto, where necessary in the construction of the project, estimated at $36,000.

e. Bear not less than one-half of the separable first cost of recreational development, estimated at $2,543,000, and all the costs of operation, maintenance, and replacement incurred therefor;

f. Prevent encroachment on the constructed works and the ponding area that would interfere with the proper functioning of the project and, if the ponding area is impaired, provide promptly and without cost to the United States a substitute ponding area or equivalent pumping capacity;

g. Provide at local expense pressurization of the Marquette Street sewer and construct pressurized sewers at Iowa, Ripley, and Division Streets, as described in the report; and

h. In acquiring lands, easements, and rights-of-way for construction of the project, the City will 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.

2. The City hereby gives the Government a right to enter, at reasonable times and in a reasonable manner, upon lands which it owns or controls, for access to the Project for the purpose of inspection, and for the purpose of completing, operating, repairing, and maintaining the Project, if such inspection shows that the City for any reason is failing to complete, operate, repair, or 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 Mayor of Davenport. No completion, operation, repair, or maintenance by the Government in such event shall operate to relieve the City of responsibility to meet its obligations as set forth in paragraph 1 of the Agreement or to preclude the Government from pursuing any other remedy at law or equity.

IN WITNESS WHEREOF, the parties hereto have executed this contract as of the day and year first above written.

THE UNITED STATES OF AMERICA

By _____
BERNARD P. SLOFER
Colonel, Corps of Engineers
District Engineer

THE CITY OF DAVENPORT, IOWA

By _____
Mayor

ATTEST:

_____
City Clerk

APPROVED:

_____
Secretary of the Army

Date: _____

CITY OF DAVENPORT

OFFICE OF THE MAYOR

DAVENPORT, IOWA 52801

CHARLES J. WRIGHT
MAYOR

April 16, 1981

Colonel Joseph F. Manzi
District Engineer
Rock Island District Office
U.S. Army Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Re: Davenport Flood Protection Project

Dear Colonel Manzi:

During our meeting with OCE on March 31, 1981, we were advised that the Corps of Engineers could express a construction capability for the FY1982 federal budget if the Nahant Marsh feature was acquired locally and if the fee title interest in the property was provided to the Corps. It is my understanding that OCE has briefed members of your command on this issue.

The attached resolution was passed at the City Council meeting of April 15, 1981 to commit the City to this act. We are prepared to enter into a Section 221 Agreement, and will comply with the cost participation, maintenance and management responsibilities of the mitigation plan.

We would appreciate your assistance in expediting this matter within the Corps so that the City's request of $750,000 appropriation can be considered by Congress.

Please contact me if you have any questions.

Sincerely,

Charles J. Wright

cc: Senator Jepsen
Senator Grassley
Congressman Leach

EXHIBIT 3

RESOLUTION OF INTENT PERTAINING TO
THE DAVENPORT FLOOD CONTROL PROJECT

WHEREAS the need to obtain Federal authorization to include the acquisition and mitigation of a portion of the Nahant Marsh has prevented the Davenport Flood Control Project from being funded for several years and;

WHEREAS the Davenport Flood Control Project could be funded if the City on its own were to acquire fee simple title to the Nahant Marsh for preservation and;

WHEREAS the Davenport Flood Control Project is of crucial importance to the health, safety and welfare of the City of Davenport.

NOW BE IT RESOLVED by the Council of the City of Davenport:

1. That the City Council does express its willingness to acquire fee simple title to that portion of the Nahant Marsh identified in the Special Report of the District Engineer (October 1977) and transfer clear title of same to the Corps of Engineers to permit mitigation and preservation of the Marsh.

2. That the City will acquire fee simple title to said Marsh area prior to construction of the project.

3. That the Mayor of Davenport is authorized to communicate the City's intent to the Corps of Engineers to acquire fee simple title to the Marsh area and to cooperate in the mitigation and preservation of the Nahant Marsh an order to expedite funding of the Davenport Flood Control Project.

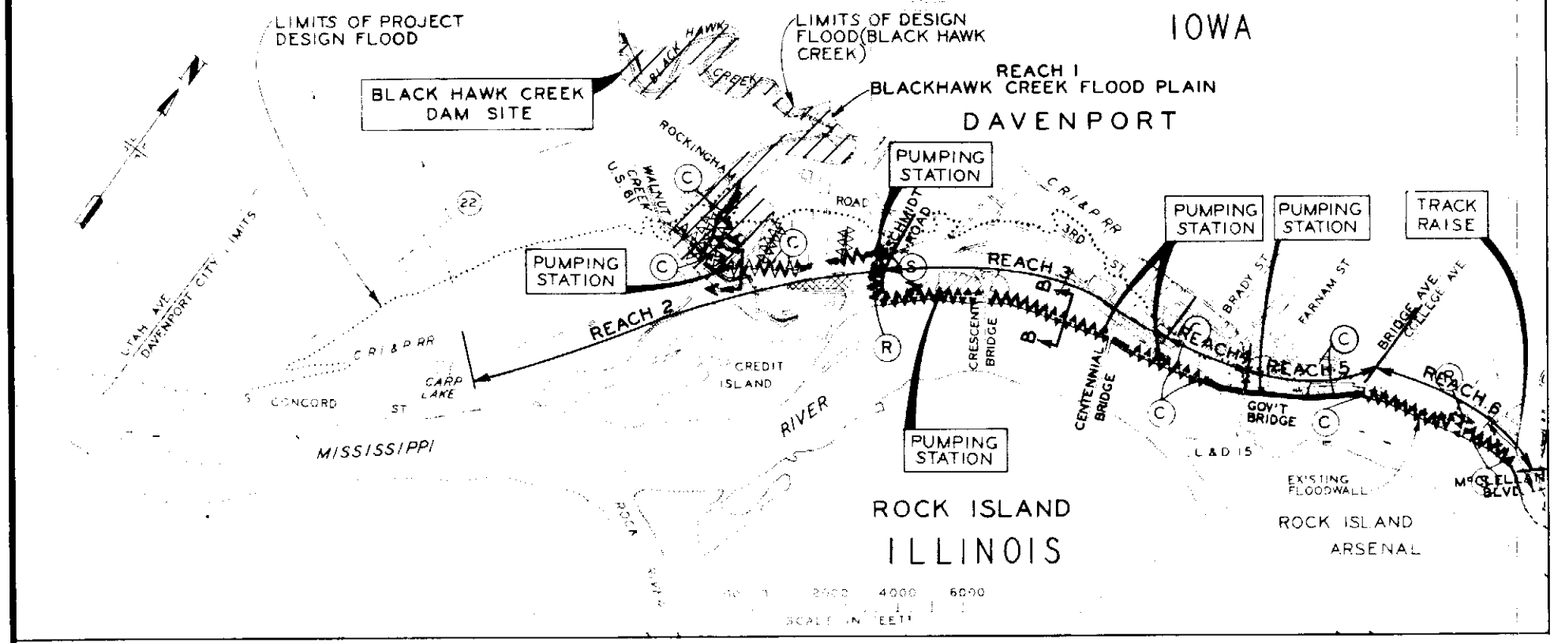
PASSED THIS 15th day of April, 1981.

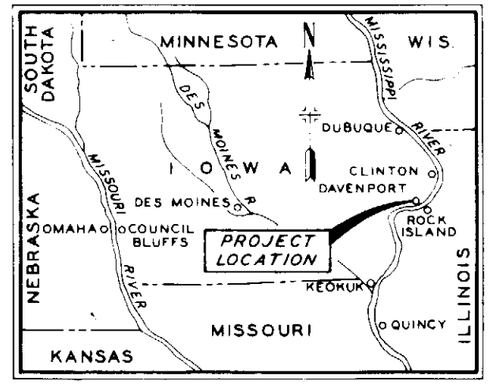
APPROVED:

Charles J. Wright, Mayor

ATTEST:

Ruth E. Reynolds, Deputy City Clerk

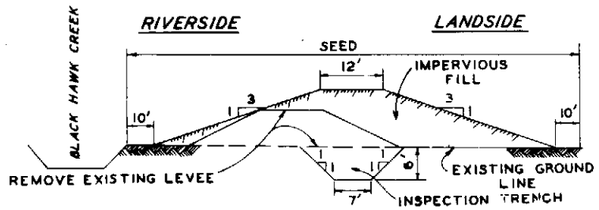




VICINITY MAP

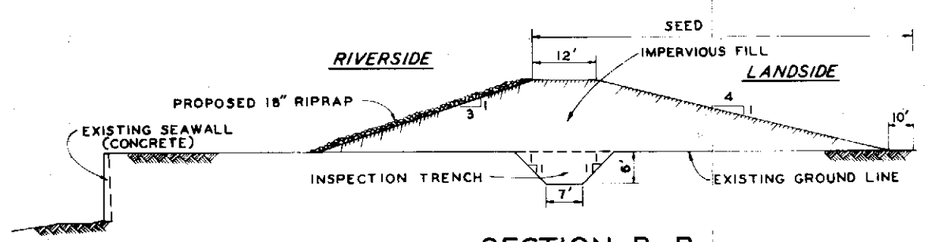
25 0 25 50 75

SCALE IN MILES



SECTION A-A

NO SCALE



SECTION B-B

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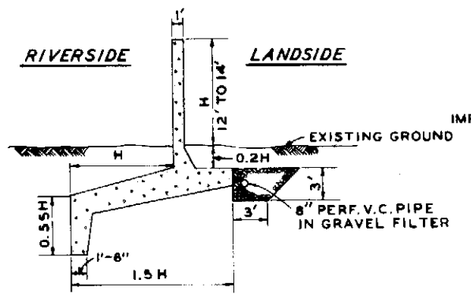
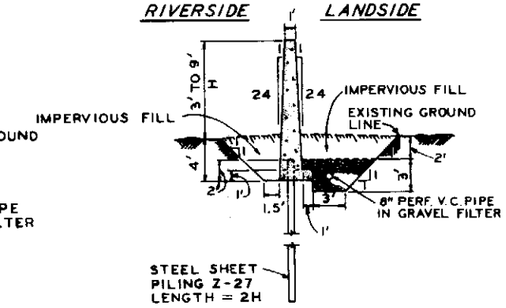


TYPICAL T-WALL

NO SCALE



TYPICAL I-WALL

NO SCALE

LEGEND

- NEW LEVEE
- EXISTING LEVEE
- EXISTING LEVEE TO BE IMPROVED
- NEW FLOODWALL
- (C) CLOSURE STRUCTURE
- (S) SANDBAG CLOSURE
- (R) RAMP
- SPOIL AREA
- PONDING AREA

REACH	DESCRIPTION
1	BLACKHAWK CREEK FLOOD PLAIN
2	INTERSTATE 280 TO SCHMIDT ROAD
3	SCHMIDT ROAD TO RIPLEY ST.
4	RIPLEY ST. TO GOVERNMENT BRIDGE
5	GOVERNMENT BRIDGE TO BRIDGE AVENUE
6	BRIDGE AVENUE TO McCLELLAN BLVD.

MISSISSIPPI RIVER

DAVENPORT, IOWA

FLOOD CONTROL PROJECT

SCALE AS SHOWN

ROCK ISLAND DISTRICT

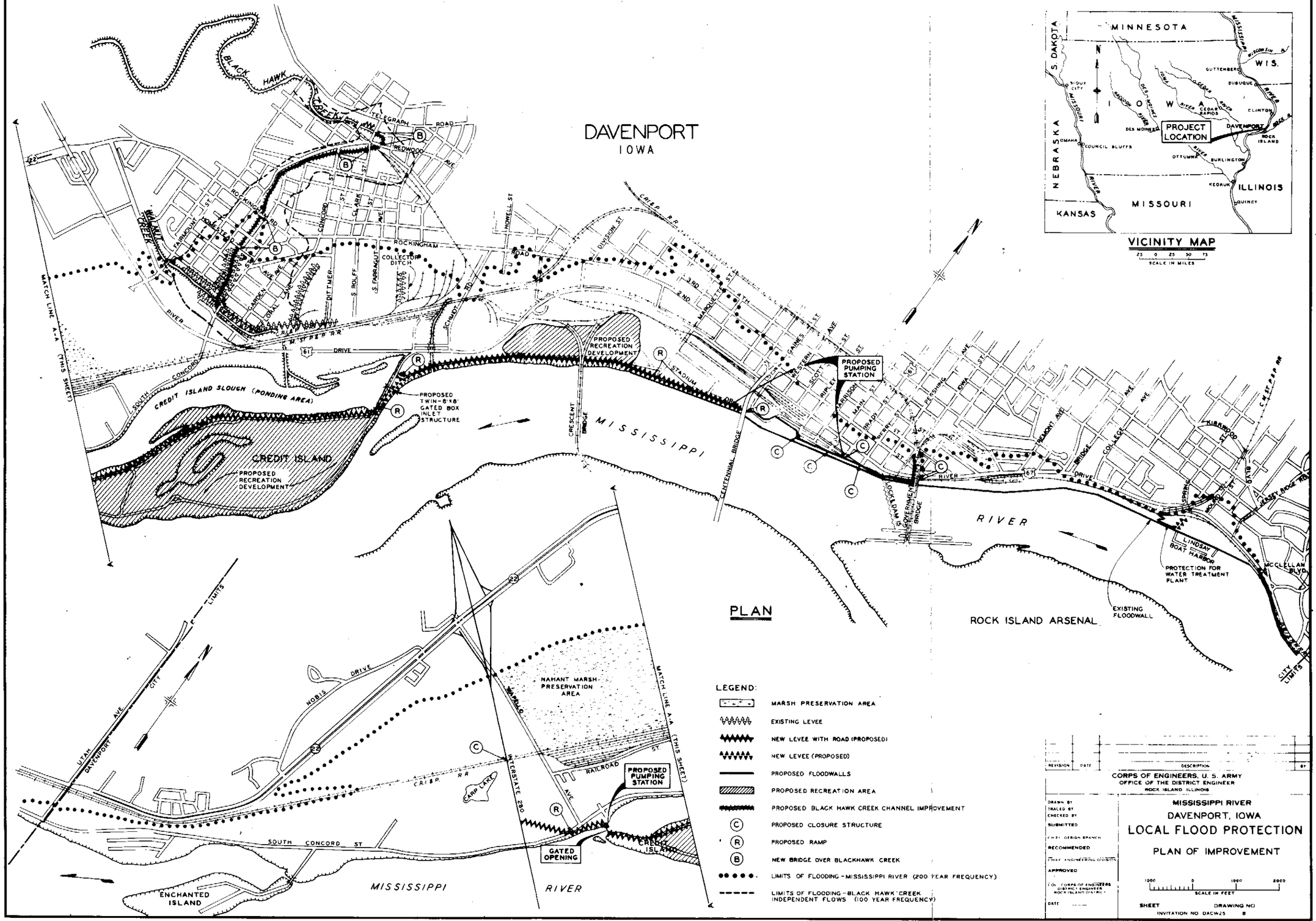
30 JUNE 1971

PLATE A

CORPS OF ENGINEERS

U. S. ARMY

DAVENPORT
IOWA



VICINITY MAP

25 0 25 50 75
SCALE IN MILES

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY
TRACED BY
CHECKED BY
SUBMITTED
CHIEF, DESIGN BRANCH
RECOMMENDED
CHIEF, ENGINEERING DIVISION
APPROVED
FOR: CORPS OF ENGINEERS
DISTRICT ENGINEER
ROCK ISLAND, ILLINOIS
DATE

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN OF IMPROVEMENT

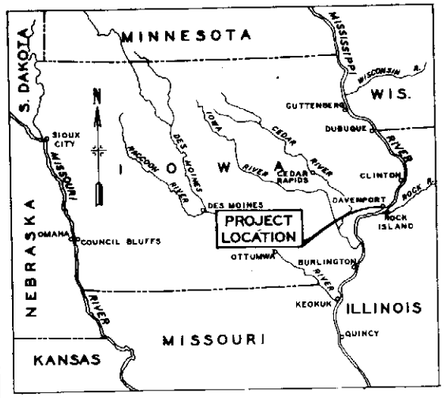
1000 0 1000 2000
SCALE IN FEET

SHEET
DRAWING NO
INVITATION NO DACW25 B

PLATE B

CORPS OF ENGINEERS

U. S. ARMY



VICINITY MAP

SCALE IN MILES

DAVENPORT

IOWA

RIVER

ROCK ISLAND ARSENAL

ROCK ISLAND, ILLINOIS

MISSISSIPPI

BLACK HAWK CREEK

TELEGRAPH ROAD

REDWOOD AVE.

ROCKINGHAM RD

HOMESTEAD AVE

WALNUT CREEK

RIVER

NAHANT MARSH PRESERVATION AREA

WAPELLO

RAILROAD ST

INTERSTATE 280

NOBIS DRIVE

CARP LAKE

CRIEP RR

SOUTH CONCORD

CREDIT ISLAND SLOUGH (PONDING AREA)

CREDIT ISLAND

PROPOSED RECREATION DEVELOPMENT

PROPOSED DIVERSION DITCH

PROPOSED INLET STRUCTURE

PROPOSED PUMPING STATION

GATED OPENING

6'X 10' BOX

HOWELL ST

DIVISION ST

MARQUETTE ST

GAINES ST

WESTERN AVE

SCOTT ST

RIPLEY ST

HARRISON ST

MAIN ST

BRADY ST

PERRY ST

PERSHING AVE

KIMBERLY AVE

TREMONT AVE

COLLEGE AVE

4TH

3RD

2ND

STADIUM

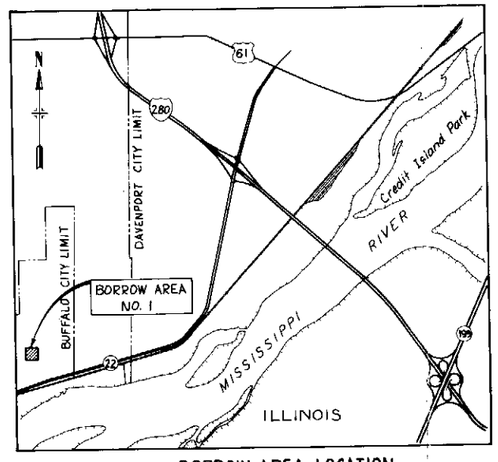
CENTENNIAL BRIDGE

CRESCENT BRIDGE

EXISTING FLOODWALL

LOCK & DAM 15

PROPOSED PUMPING STATIONS



BORROW AREA LOCATION

SCALE IN MILES

LEGEND:

- LIMITS OF FLOODING - MISSISSIPPI RIVER (200 YEAR FREQUENCY)
- NEW FLOODWALL (PROPOSED)
- PROPOSED NEW LEVEE WITH ROAD ON TOP
- EXISTING LEVEE
- NEW LEVEE (PROPOSED)
- MARSH PRESERVATION AREA
- PROPOSED RECREATION AREA
- NEW LEVEE AND WALL COMBINATION
- (C) PROPOSED CLOSURE STRUCTURE
- (L) PROPOSED BOAT LAUNCHING RAMP
- (SC) PROPOSED SANDBAG CLOSURE
- (61) PROPOSED BIKE TRAIL
- (R) PROPOSED RAMP

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
GENERAL PLAN

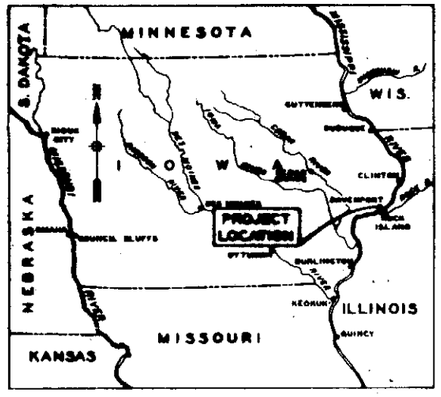
SCALE IN FEET

SHEET
DRAWING NO
INVITATION NO DACW25 - 8 -

PLATE 1

CORPS OF ENGINEERS U. S. ARMY

U. S. ARMY



VICINITY MAP

SCALE IN MILES

DAVENPORT IOWA

RIVER

ROCK ISLAND ARSENAL

MISSISSIPPI

ROCK ISLAND, ILLINOIS

BLACK HAWK CREEK

WALNUT CREEK

NAHANT MARSH PRESERVATION AREA

CREDIT ISLAND

CREDIT ISLAND SLOUGH (PONDING AREA)

PROPOSED RECREATION DEVELOPMENT

PROPOSED SEDIMENTATION DEVELOPMENT

PLATE 1 · PLATE 2 · PLATE 3 · PLATE 4 · PLATE 5 · PLATE 6 · PLATE 7 · PLATE 8 · PLATE 9 · PLATE 10 · PLATE 11 · PLATE 12 · PLATE 13 · PLATE 14 · PLATE 15 · PLATE 16 · PLATE 17 STADIUM · PLATE 18 · PLATE 19 · PLATE 20 · PLATE 21 · PLATE 22

EXISTING FLOODWALL

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
INDEX OF PLAN AND PROFILE PLATES

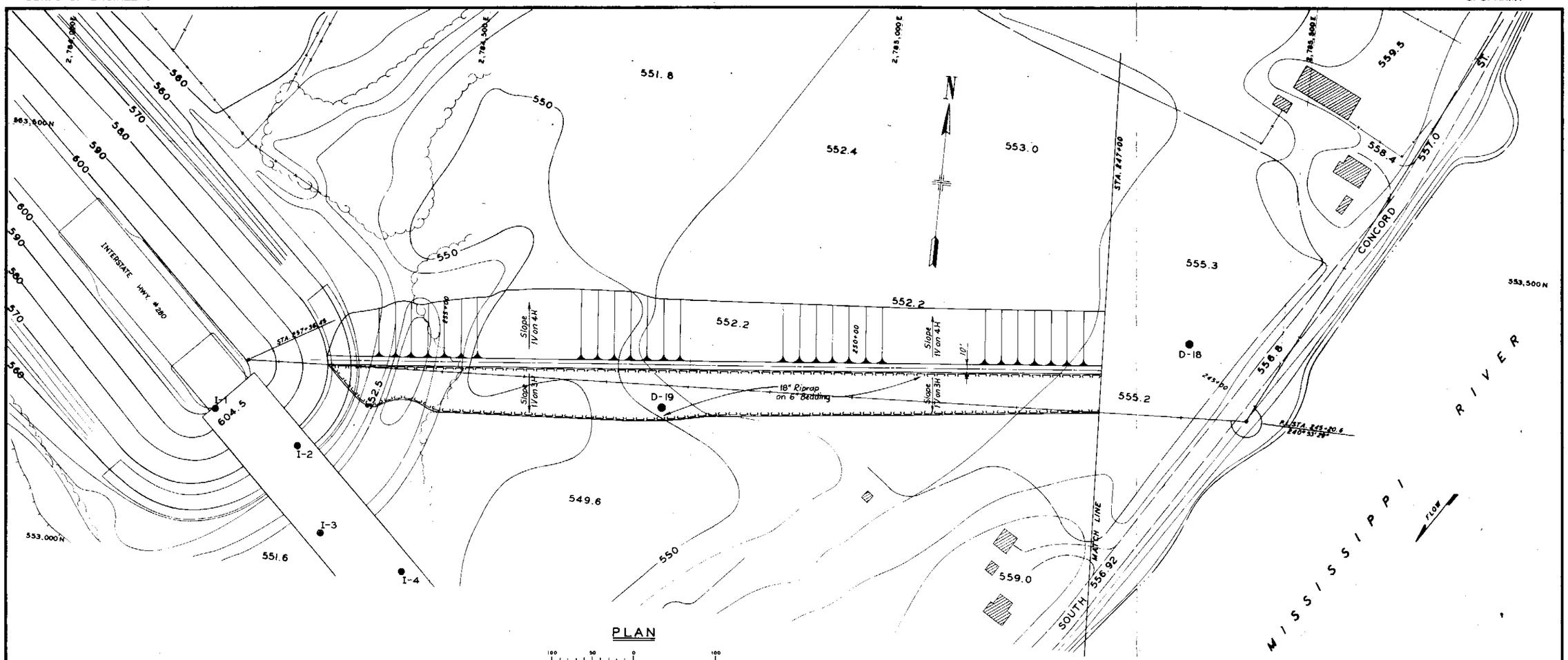
1000 0 1000 2000
SCALE IN FEET

SHEET
DRAWING NO
INVITATION NO DACW25 - - B -

PLATE 2

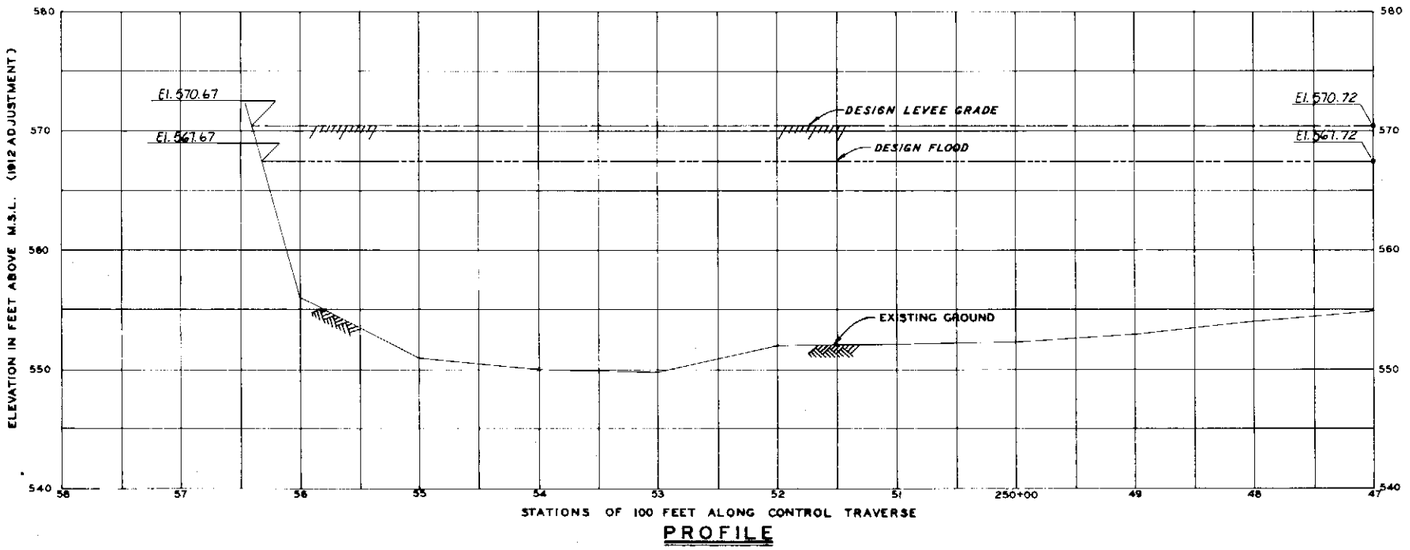
CORPS OF ENGINEERS

U. S. ARMY



PLAN

SCALE IN FEET



PROFILE

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF,
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 257+36.45 TO STA. 247+00

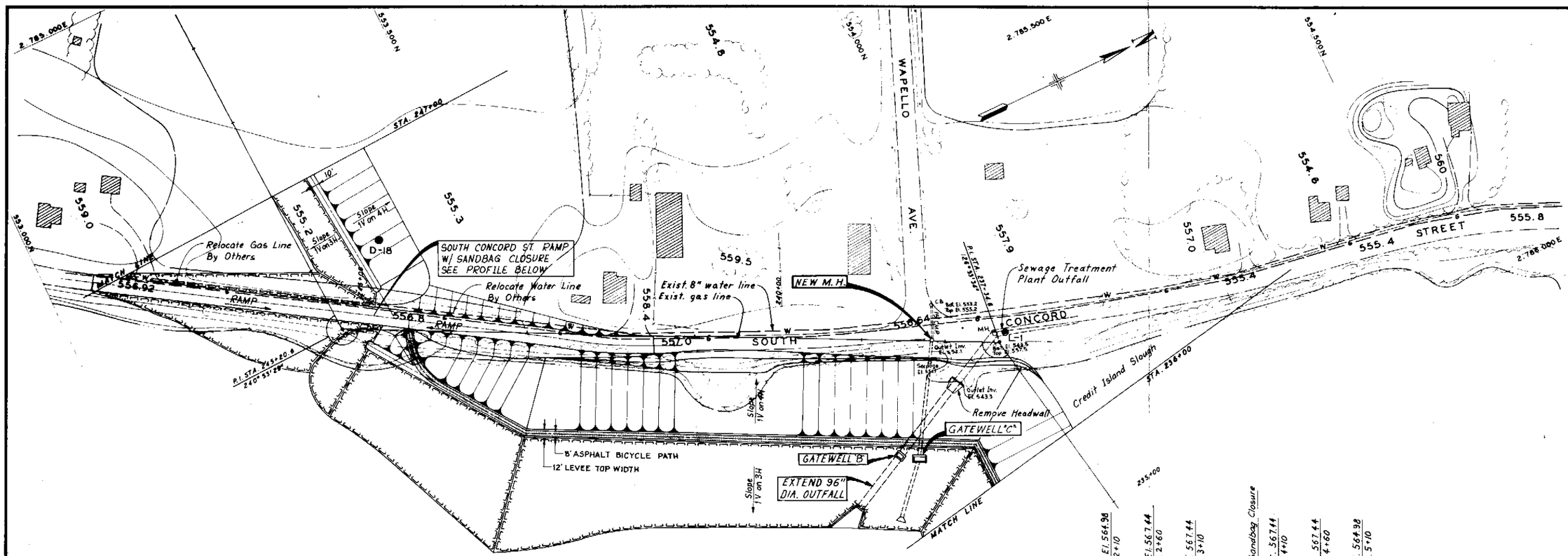
SCALE AS SHOWN

SHEET DRAWING NO.

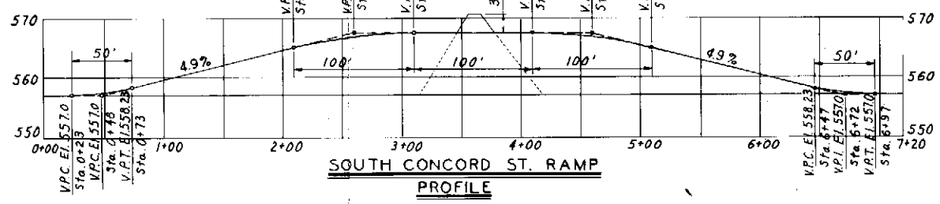
INVITATION NO. DACW25- -B-

CORPS OF ENGINEERS

U. S. ARMY



V.P.C. El. 567.98 Sta. 2+10
V.P.I. El. 567.44 Sta. 2+60
V.P.T. 567.44 Sta. 3+10
3' Sandbag Closure
V.P.C. 567.44 Sta. 4+10
V.P.I. 567.44 Sta. 4+60
V.P.T. 564.98 Sta. 5+10

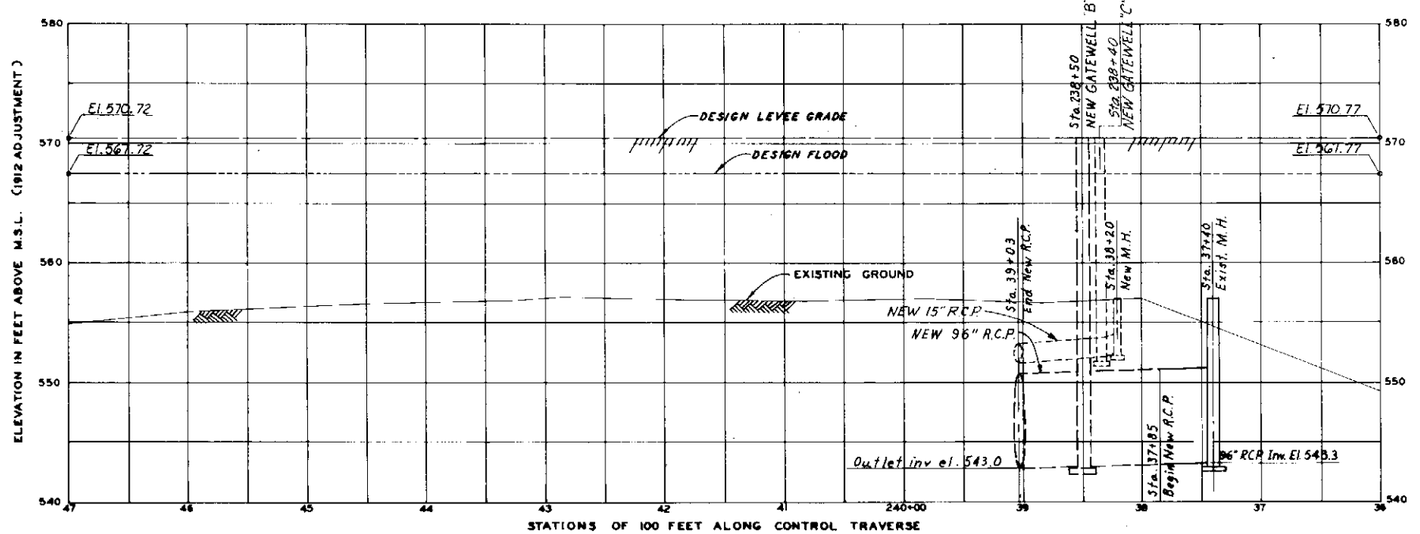


SOUTH CONCORD ST. RAMP

PROFILE

PLAN

SCALE IN FEET 100 50 0 100



STATIONS OF 100 FEET ALONG CONTROL TRAVERSE

PROFILE

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF,
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

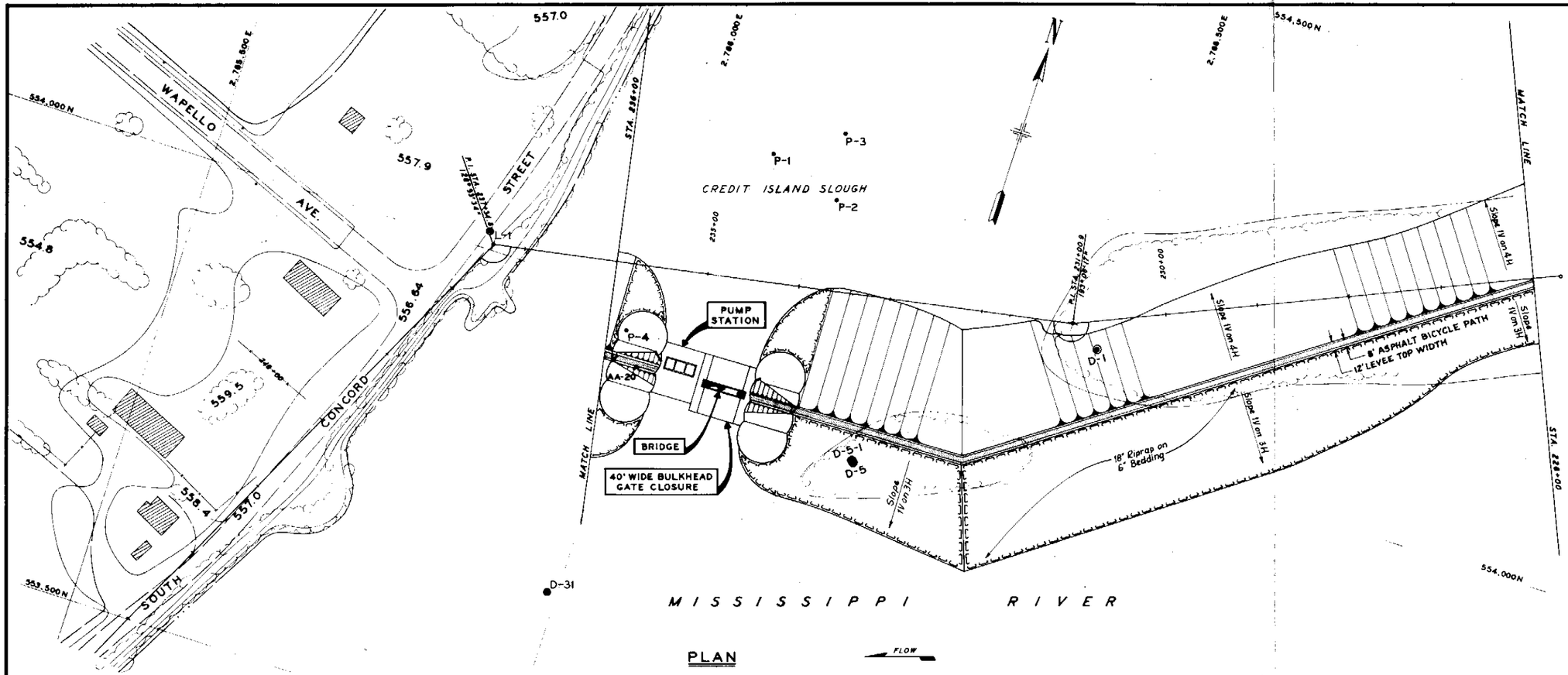
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 247+00 TO STA. 236+00

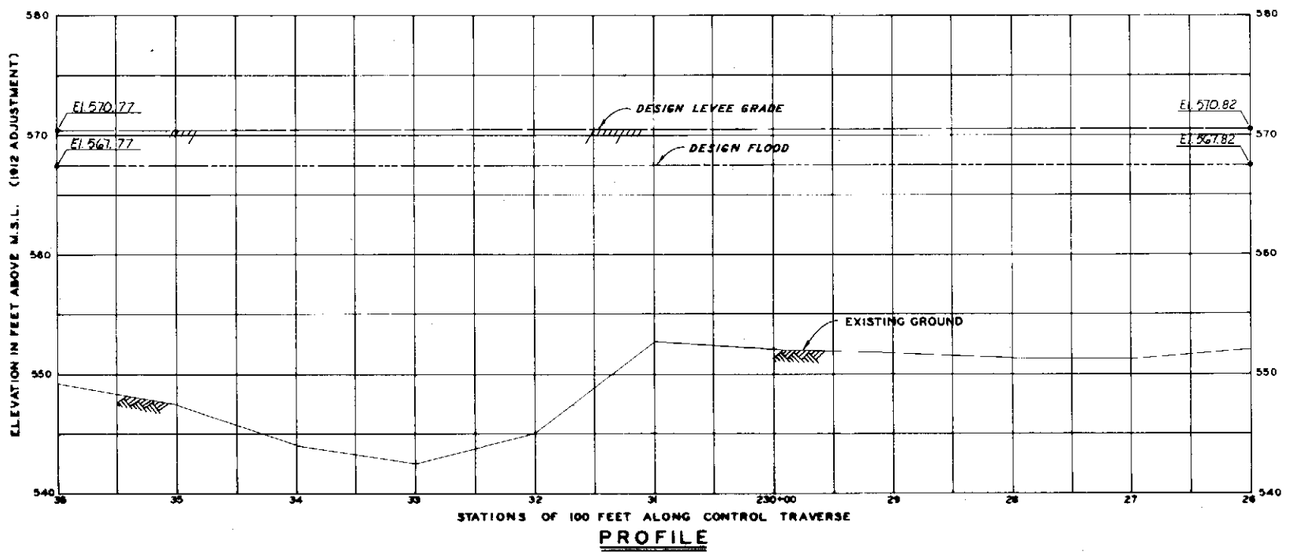
SCALE AS SHOWN

SHEET DRAWING NO.
INVITATION NO. DACW25- -B-

PLATE 4

CORPS OF ENGINEERS U. S. ARMY





REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF,
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 236+00 TO STA. 226+00

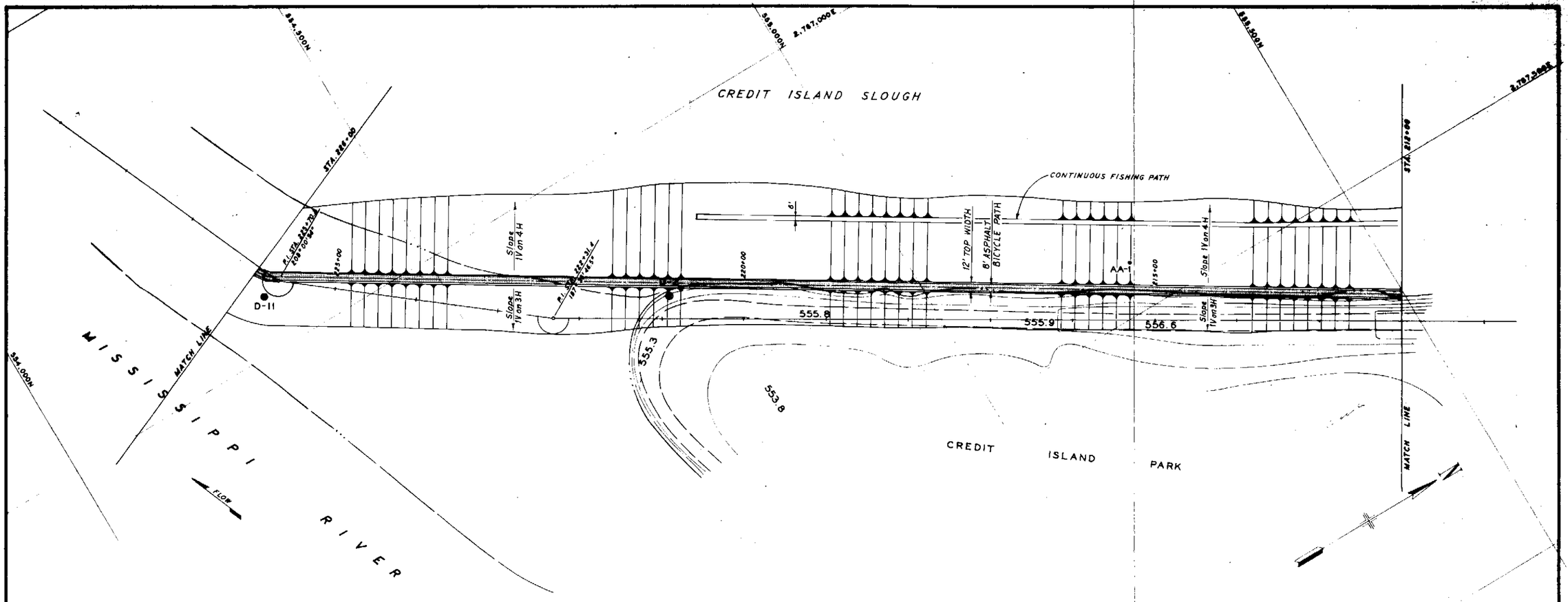
SCALE AS SHOWN

SHEET DRAWING NO.
INVITATION NO. DACW25- -B-

PLATE 5

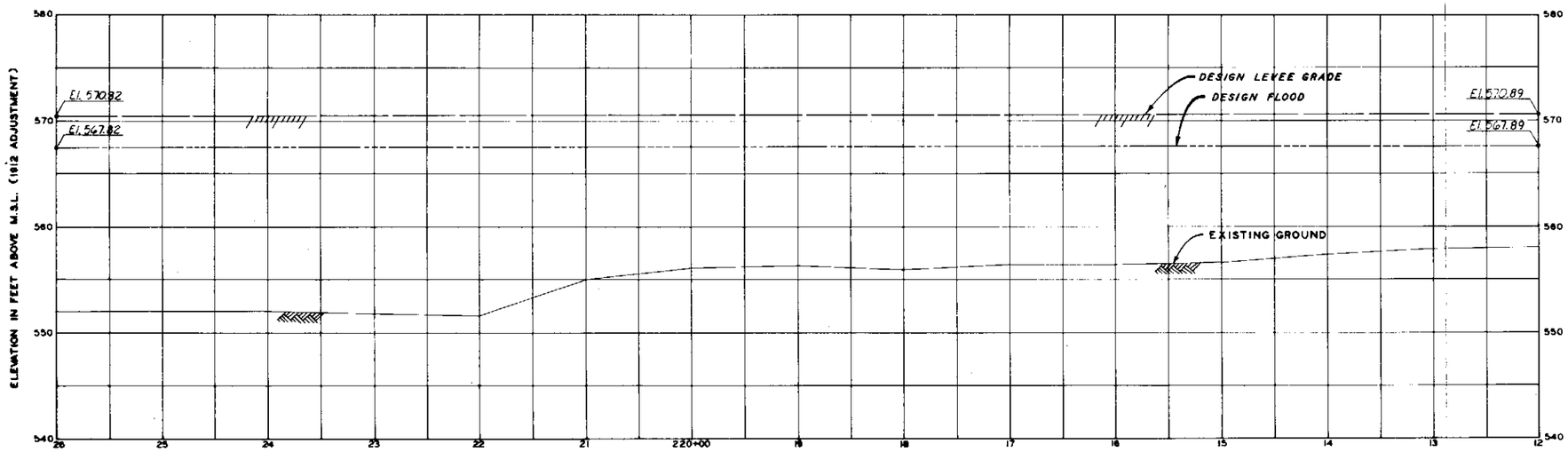
CORPS OF ENGINEERS U. S. ARMY

PLAN



SCALE IN FEET 100 50 0 100

PROFILE



REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF,
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

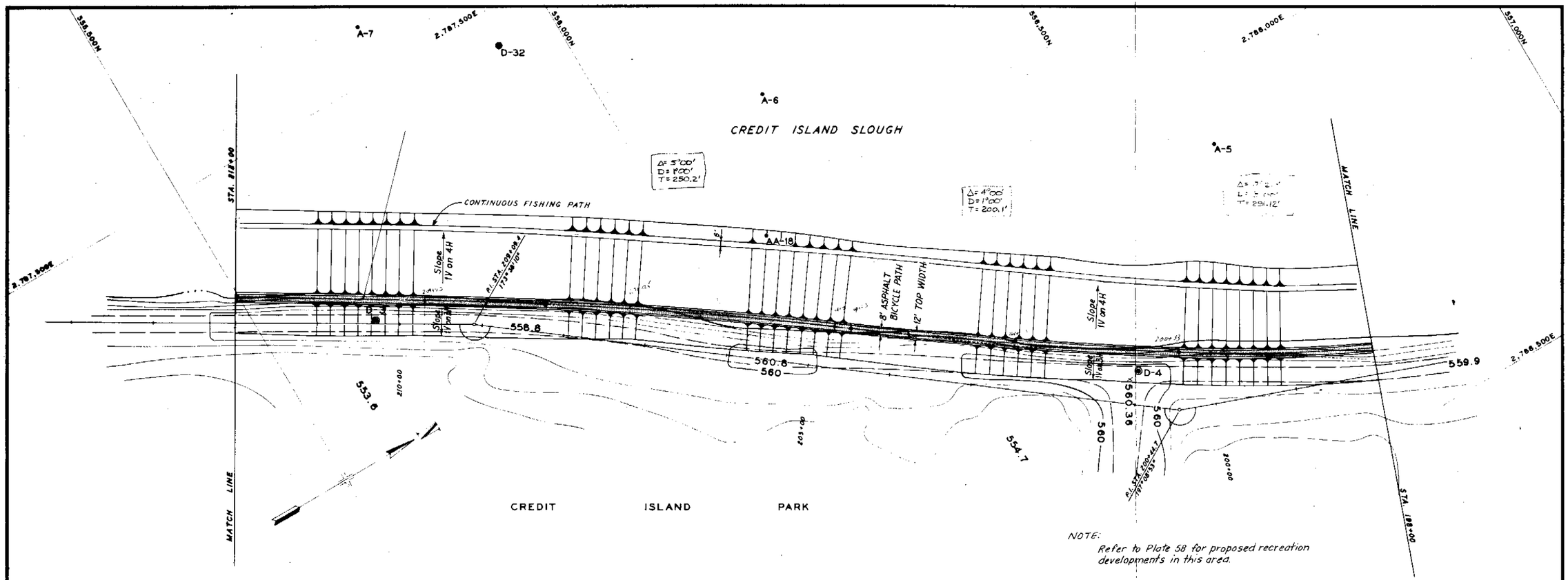
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 226+00 TO STA. 212+00

SCALE AS SHOWN

SHEET DRAWING NO.
INVITATION NO. DACW25- -B-

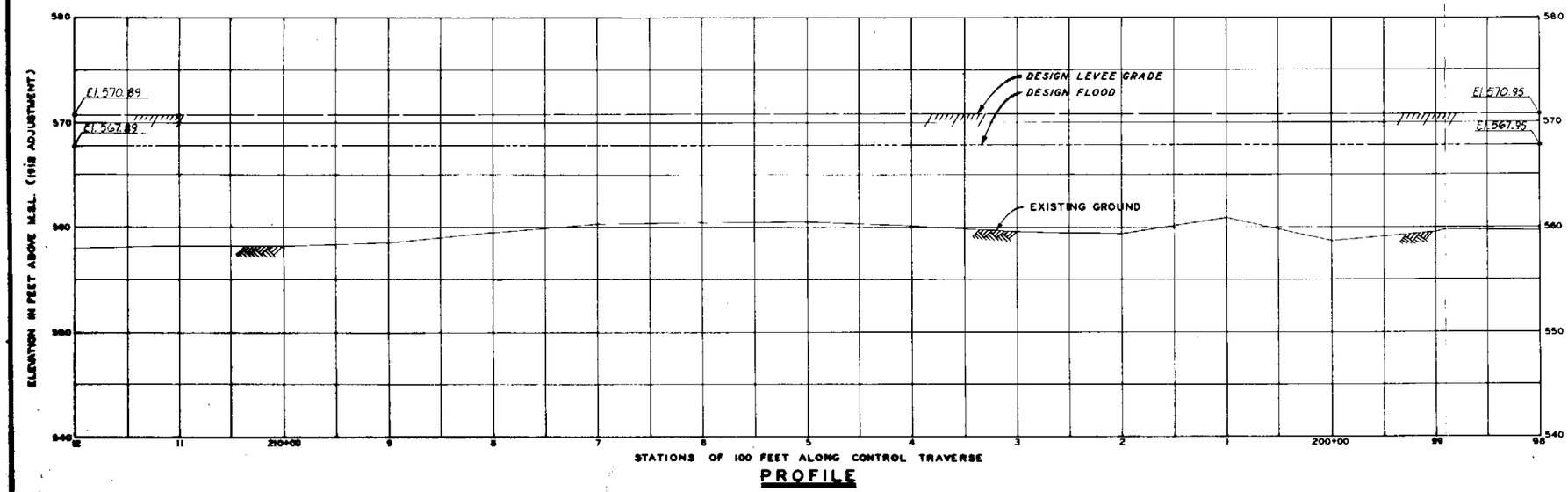
CORPS OF ENGINEERS

U. S. ARMY



PLAN

SCALE IN FEET



PROFILE

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF,
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 212+00 TO STA. 198+00

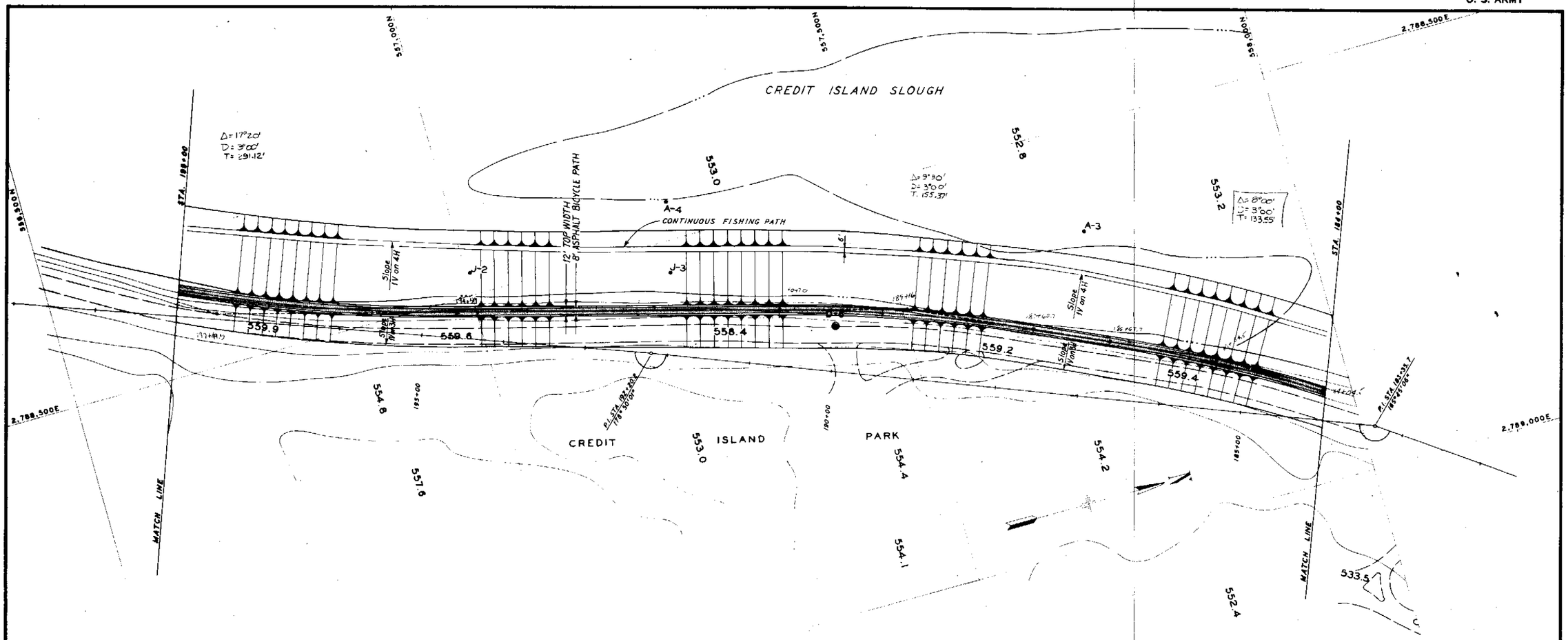
SCALE AS SHOWN

SHEET
DRAWING NO
INVITATION NO. DACW25 - - B -

PLATE 7

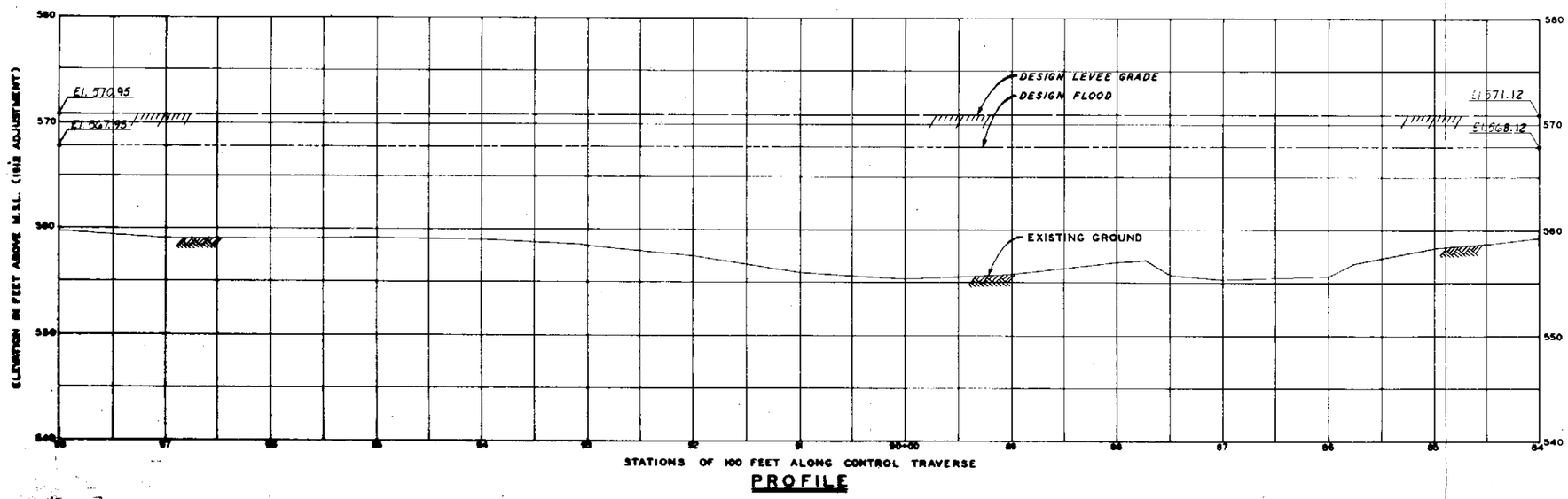
CORPS OF ENGINEERS

U. S. ARMY



PLAN

SCALE IN FEET



PROFILE

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF,
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 198+00 TO STA. 184+00

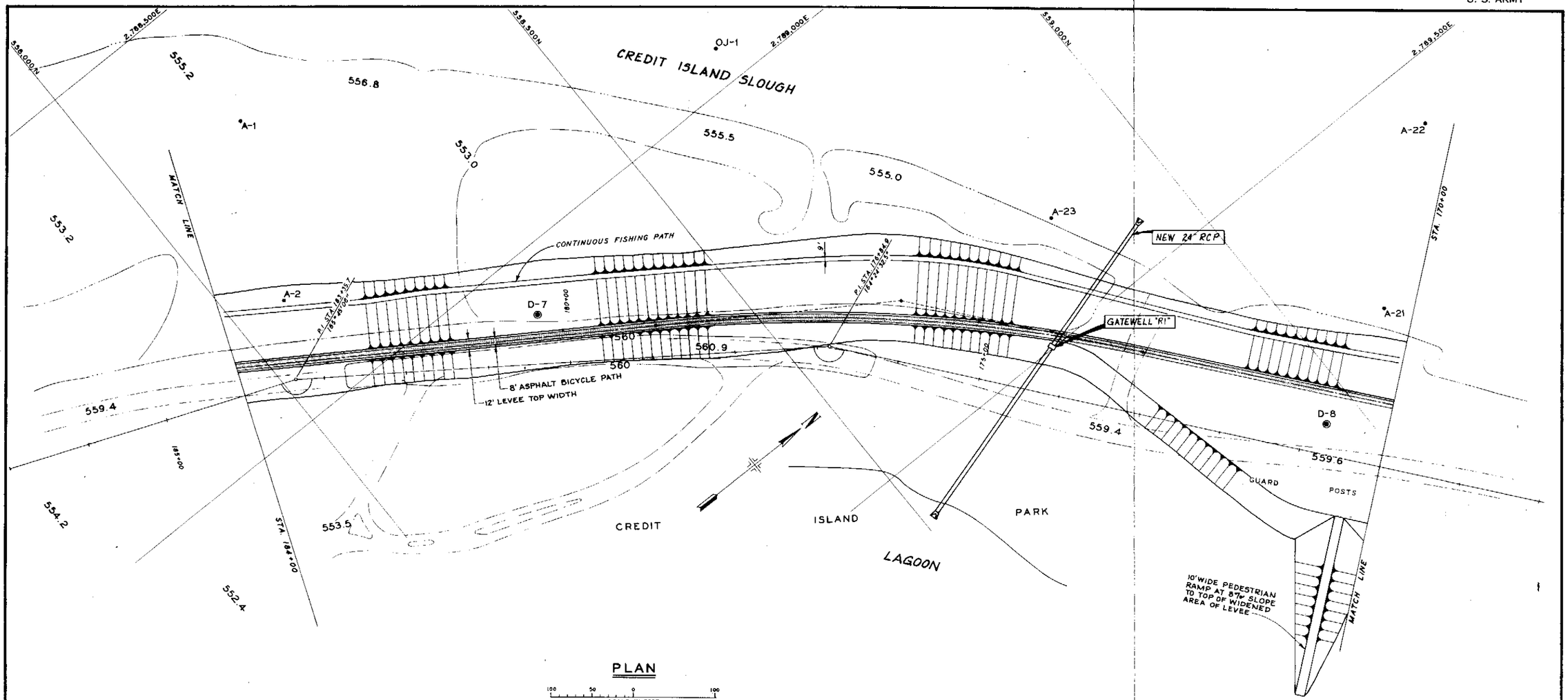
SCALE AS SHOWN

SHEET
DRAWING NO.
INVITATION NO. DACW25-

PLATE 8

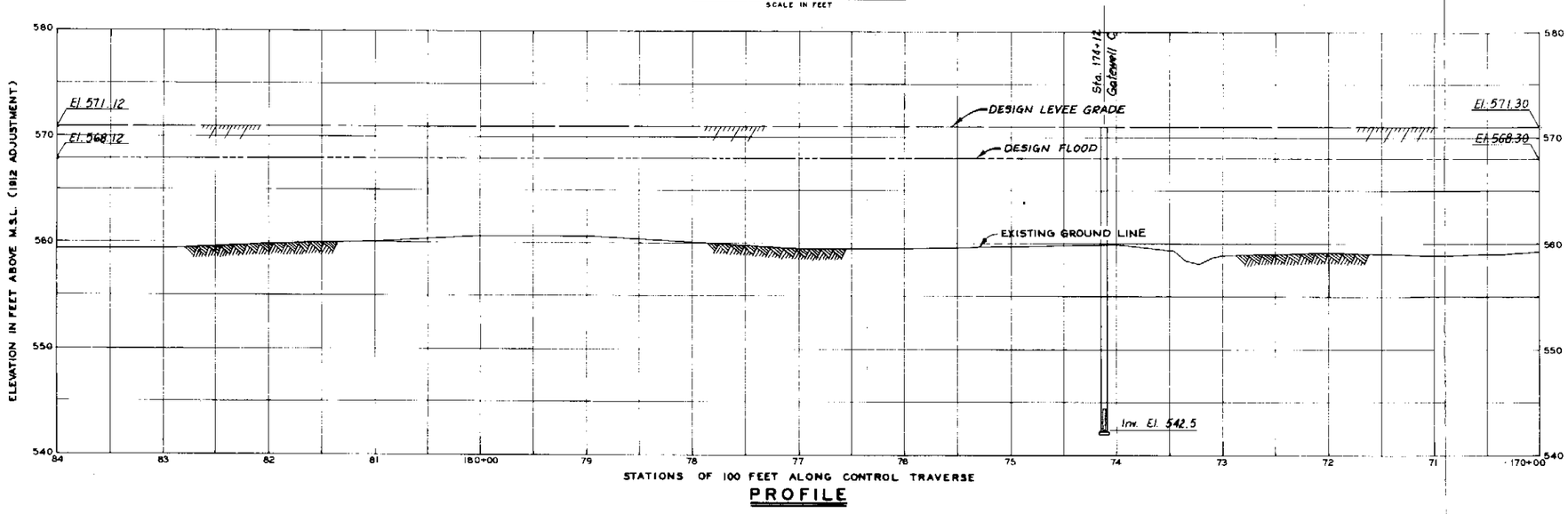
CORPS OF ENGINEERS

U. S. ARMY



PLAN

SCALE IN FEET 100 50 0 100



PROFILE

NOTE:

1. Refer to Plate 59 for proposed recreation developments in this area.

REVISION	DATE	DESCRIPTION	BY

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

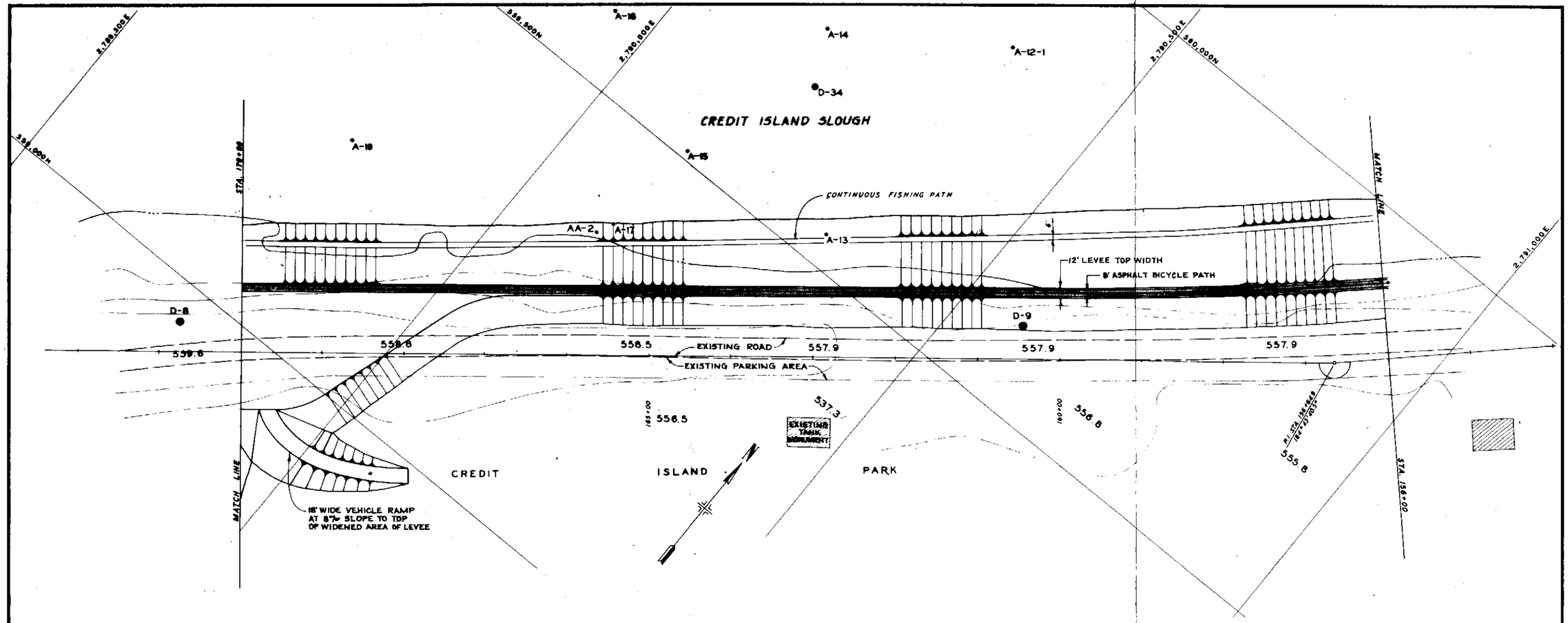
DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 184+00 TO STA. 170+00

SCALE AS SHOWN

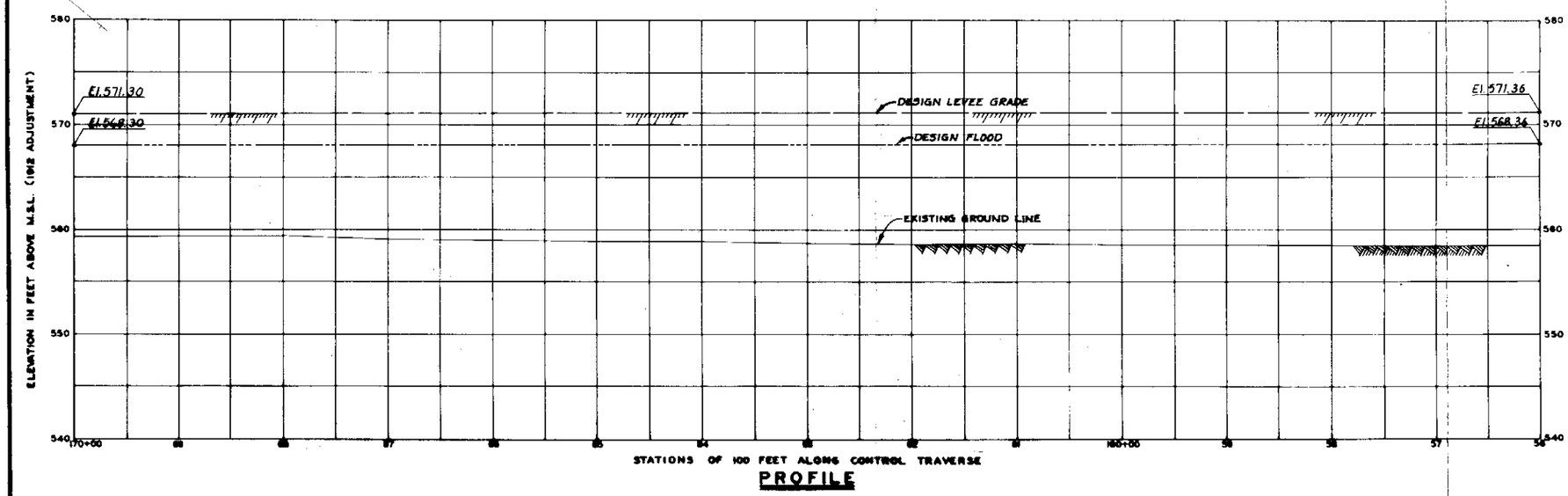
SHEET DRAWING NO.
INVITATION NO. DACW25 - - 8 -

CORPS OF ENGINEERS U. S. ARMY



PLAN

SCALE IN FEET



PROFILE

NOTE:

1. Refer to Plate 59 for proposed recreation developments in this area.

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
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SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 170+00 TO STA. 156+00

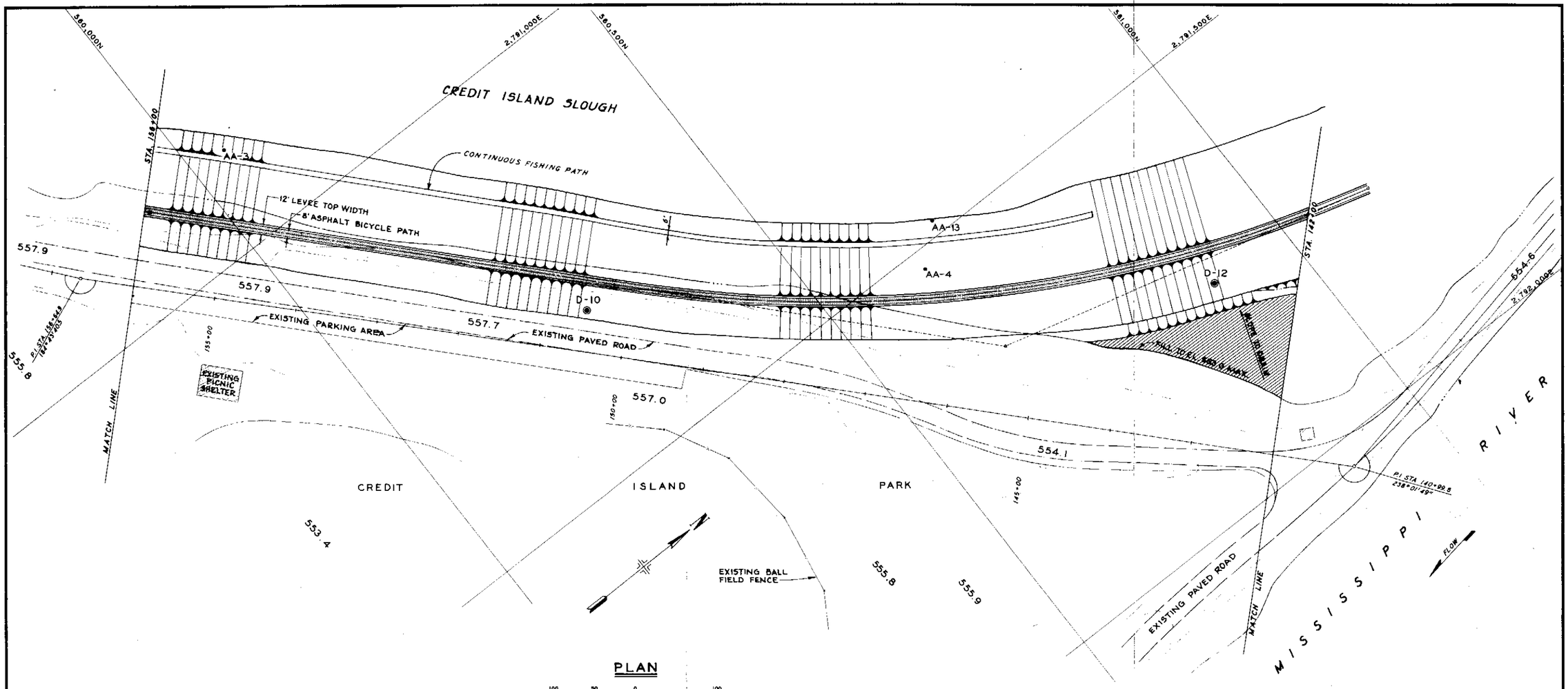
SCALE AS SHOWN

SHEET DRAWING NO.
INVITATION NO. DACW25- -B-

PLATE 10

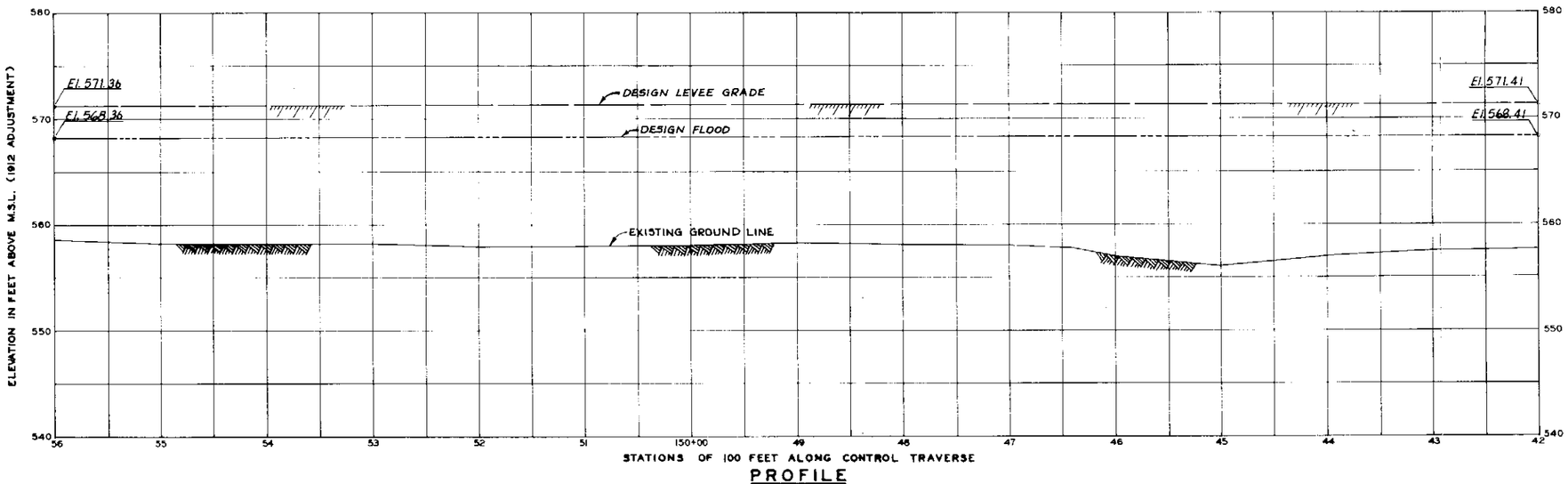
CORPS OF ENGINEERS

U. S. ARMY



PLAN

SCALE IN FEET



PROFILE

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
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APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 156+00 TO STA. 142+00

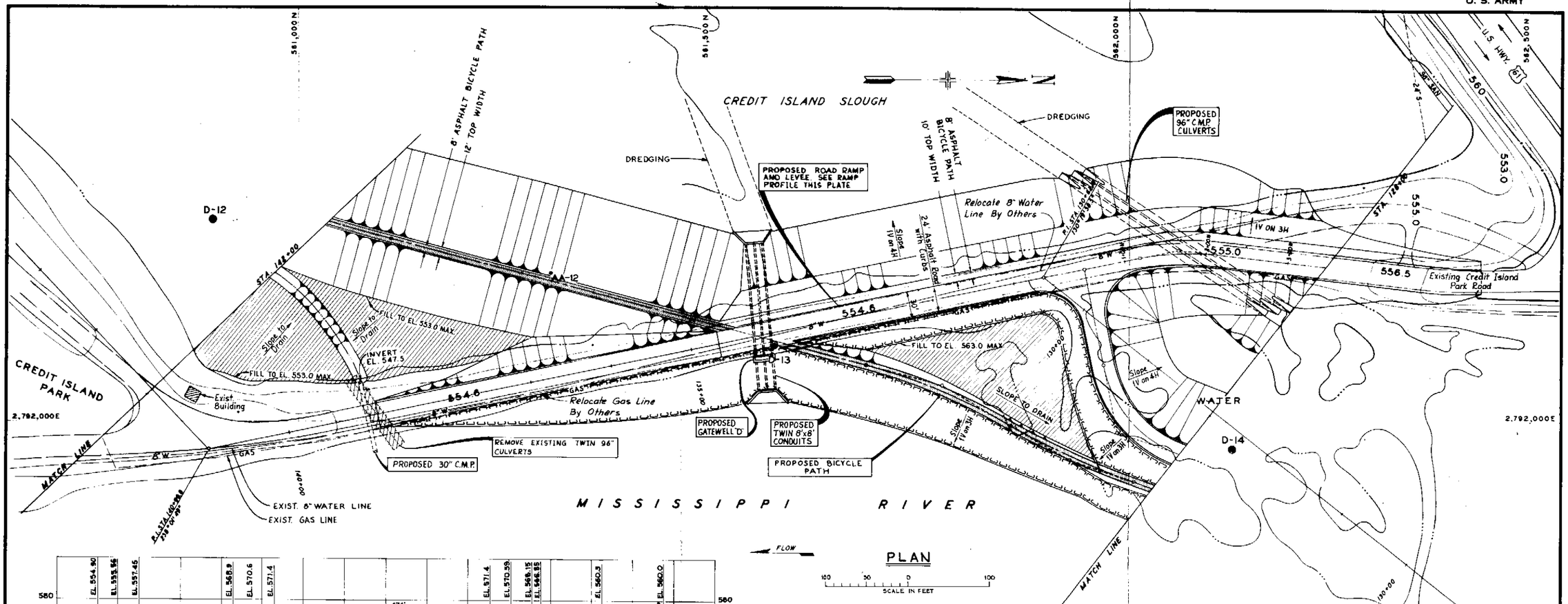
SCALE AS SHOWN

SHEET DRAWING NO.
INVITATION NO. DACW25 - -8-

PLATE 11

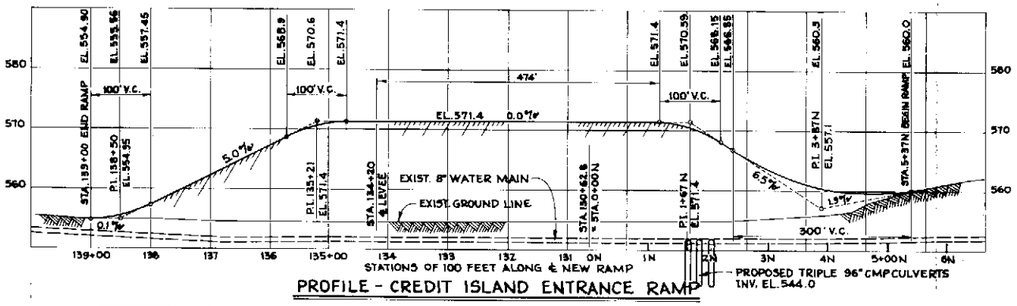
CORPS OF ENGINEERS

U. S. ARMY

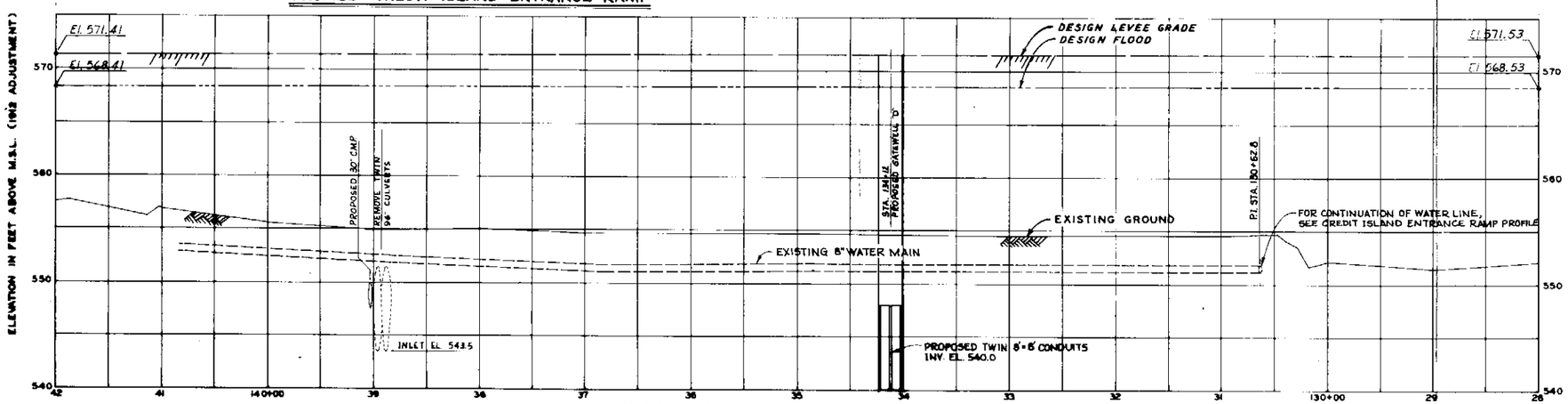


PLAN

SCALE IN FEET



PROFILE - CREDIT ISLAND ENTRANCE RAMP



PROFILE

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APPROVED:
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MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 142+00 TO STA. 128+00

SCALE AS SHOWN

SHEET DRAWING NO
INVITATION NO. DACW25 - - B -

CORPS OF ENGINEERS

U. S. ARMY

PROPOSED BICYCLE PATH

Existing Credit Island Park Road

McMANUS CREEK DIVERSION PROPOSED DITCH

PROPOSED 72" RCP STORM SEWER

PROPOSED TWIN 10'x10' RCB with GATEWELL "E"

Twin 10'x10' box culvert

U. S. HWY. 61

RIVER DRIVE

McMANUS CREEK

SCHMIDT ROAD

PARKING

WATER

Fill to El. 556.0

24° Curve - Sta. 117+75 to Sta. 128+00

PROPOSED BICYCLE PATH

℄ PROPOSED LEVEE AND ROAD

MATCH LINE

MISSISSIPPI RIVER

PLAN

SCALE IN FEET

FLOW

PROPOSED GATEWELL "E" SEE PLATE 43

STA. 123+10 ℄ GATEWELL INV. EL. 544.8

DESIGN LEVEE AND ROAD SHOULDER GRADE

DESIGN FLOOD

BICYCLE PATH GRADE

EXSTING GROUND

El 571.53

El 568.53

El 544.7

McManus Creek Diversion Ditch Slope = 0.002%

El 545.8

Inv. El. 545.9

593' of 72" RCP Slope = 0.001%

164' of 72" RCP

Inv El 546.49

M.H. #5 Sta. 121+65

M.H. #4 Sta. 115+64.5

El 571.65

El 568.65

ELEVATION IN FEET ABOVE M.S.L. (1912 ADJUSTMENT)

STATIONS OF 100 FEET ALONG CONTROL TRAVERSE

PROFILE

REVISION	DATE	DESCRIPTION	BY

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MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 128+00 TO STA. 114+00

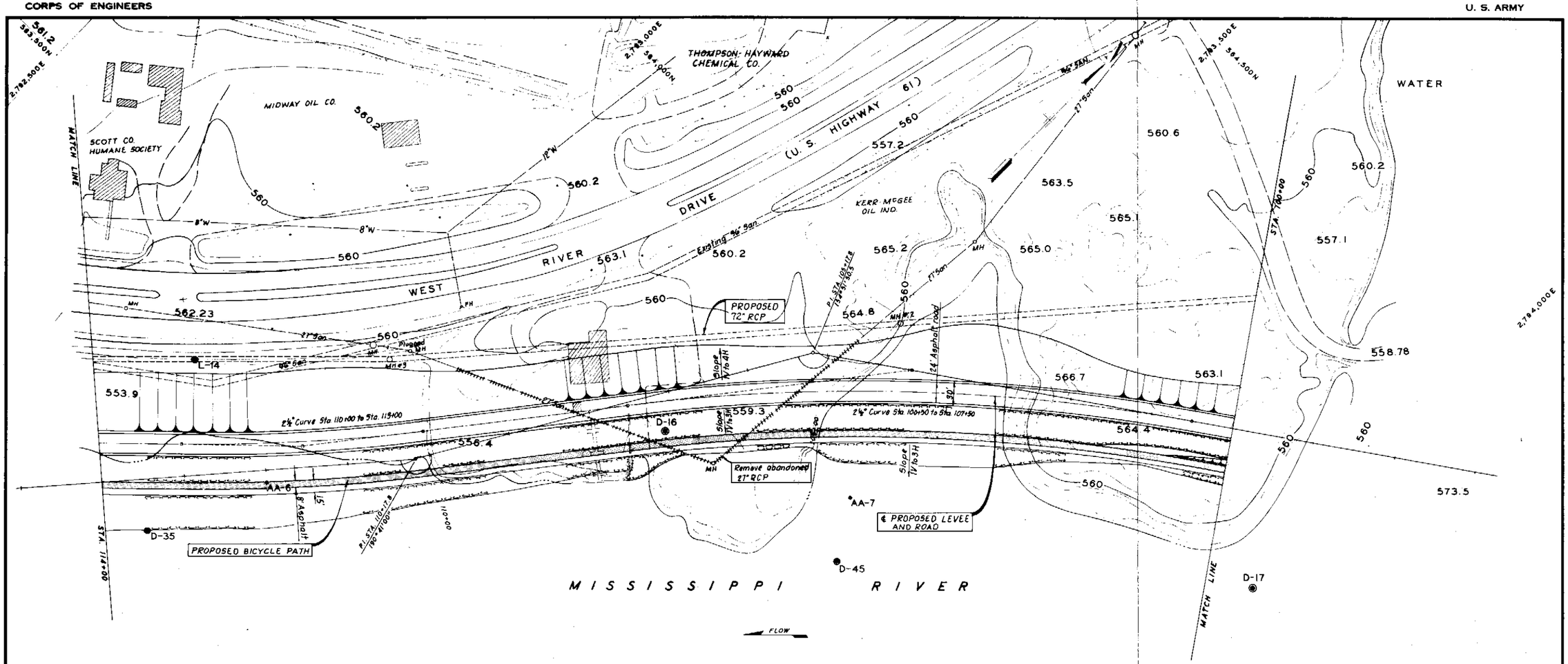
SCALE AS SHOWN

DATE

SHEET DRAWING NO
INVITATION NO. DACW25

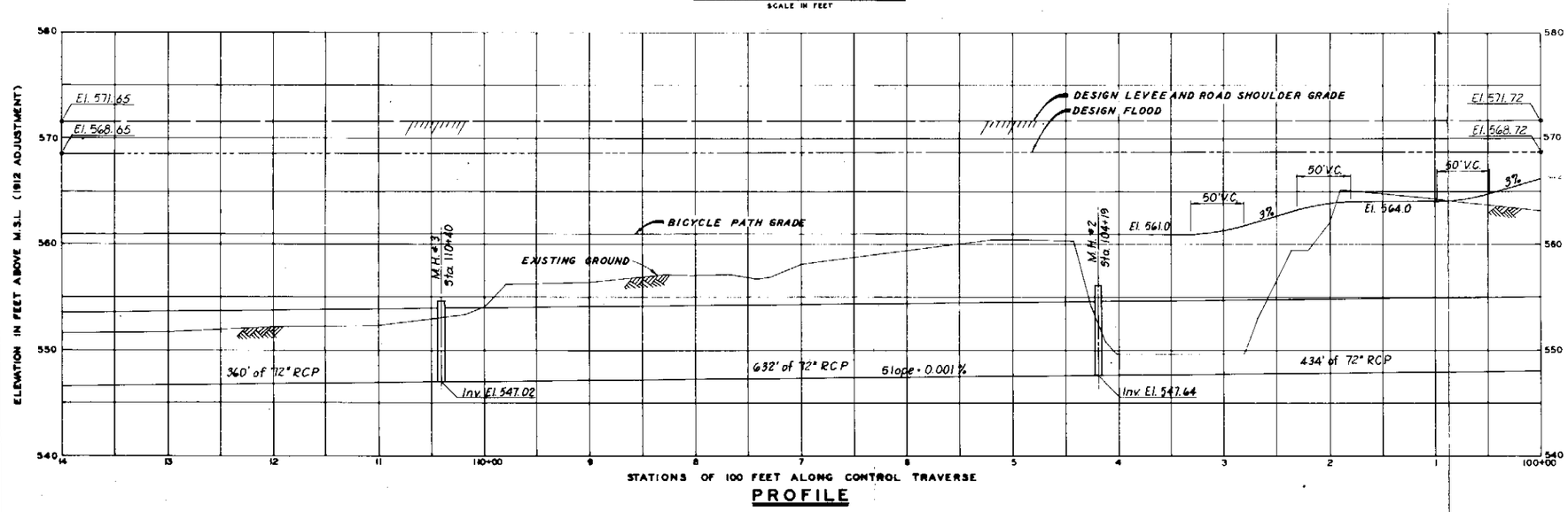
CORPS OF ENGINEERS

U. S. ARMY



PLAN

SCALE IN FEET



PROFILE

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MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 114+00 TO STA. 100+00

SCALE AS SHOWN

SHEET
DRAWING NO.
INVITATION NO. DACW25 - -B -

PLATE 14

CORPS OF ENGINEERS

U. S. ARMY

WATER

NOTE: CONTOURS OF LOWER ELEVATIONS IN THIS AREA ARE NOT CORRECT DUE TO RECENT FILLING.

FOR PROPOSED RECREATIONAL DEVELOPMENT IN THIS AREA SEE PLATE 62

PROPOSED 30" RCP STORM SEWER

PROPOSED 72" RCP STORM SEWER

PROPOSED MANHOLE

REMOVE MANHOLE

PROPOSED GATEWELL "F"

PROPOSED GATEWELL "G"

PROPOSED GATEWELL "H"

PROPOSED BICYCLE PATH

PROPOSED EXTENSION OF 72" RCP

72" Sewer Inv. El. 547.6

PRESSURE SEWER

OLD TREATMENT PLANT OUTFALL

Transition

Slope 1V to 3H

Slope 1V to 4H

Slope 1V to 5H

AA-8

AA-9

AA-10

D-17

MISSISSIPPI RIVER

PLAN

SCALE IN FEET

FLOW

PROFILE

ELEVATION IN FEET ABOVE M.S.L. (1912 ADJUSTMENT)

STATIONS OF 100 FEET ALONG CENTRAL TRAVERSE

DESIGN LEVEE GRADE El. 571.72

DESIGN FLOOD El. 568.72

BICYCLE PATH GRADE

ROAD GRADE

EXISTING GROUND

Top of MH El. 563.9 Sta. 98+53

Manhole to be Removed

18'-6" of 72" RCP Inv. El. 552.57

Slope = 0.00%

Inv. El. 548.20

Inv. El. 545.8 72"

60" Inv. El. 544.2

72" Inv. El. 543.8

60" Outlet Inv. El. 536.6

1358' of 30" RCP

Slope = 0.0025%

Top of headwall El. 553.66

Inv. El. 547.6

Inv. El. 546.86

Inv. El. 545.76

72" main conc. pipes

Gatewell "H" Sta. 89+78

300'VC

200'VC

90'VC

Slope = 1.5%

Slope = 1.0%

Slope = 1.75%

El. 571.79

El. 568.79

Sta. 93+60

Sta. 90+60

Sta. 86+01

REVISION	DATE	DESCRIPTION	BY

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MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 100+00 TO STA. 86+00

SCALE AS SHOWN

SHEET
DRAWING NO.
INVITATION NO. DACW25 - -B-

PLATE 15

CORPS OF ENGINEERS

U. S. ARMY

NOTE: LOWER CONTOURS NOT ACCURATE IN THIS AREA DUE TO RECENT FILLING AND GRADING.

PROPOSED 30" RCP STORM SEWER

Exist. M.H. inv. elev. 516.9

60" Storm Sewer

Transition

Transition

℄ PROPOSED LEVEE AND ROAD WITH CURB

PROPOSED GATEWELL I

℄ PROPOSED BICYCLE PATH

RELOCATE F.H.

STA. 72+80

STA. 86+00

Slope 1V to 3H

Slope 1V to 4H

Slope 1V to 5H

Existing concrete wall top El. 558.2±

D-20

D-21

D-22

MISSISSIPPI RIVER

MATCH LINE

FLOW

PLAN

SCALE IN FEET

ROAD GRADE

PROPOSED GATEWELL "I"

250' VC

Slope = 1.0%

El. 571.79

El. 568.79

Slope = 1.5%

DESIGN LEVEE GRADE

DESIGN FLOOD

El. 571.97

El. 568.97

BICYCLE PATH GRADE

EXISTING GROUND

300' VC

420' of 90" RCP

Slope = 0.0025%

Inv. El. 557.0

Exist. 60" R.C.P. Outlet inv. elev. 547.26

Approx. inv. elev. 547.0

℄ Gatewell I Sta 82+10

ELEVATION IN FEET ABOVE M.S.L. (1912 ADJUSTMENT)

STATIONS OF 100 FEET ALONG CONTROL TRAVERSE

PROFILE

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CORPS OF ENGINEERS, U. S. ARMY
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DATE:

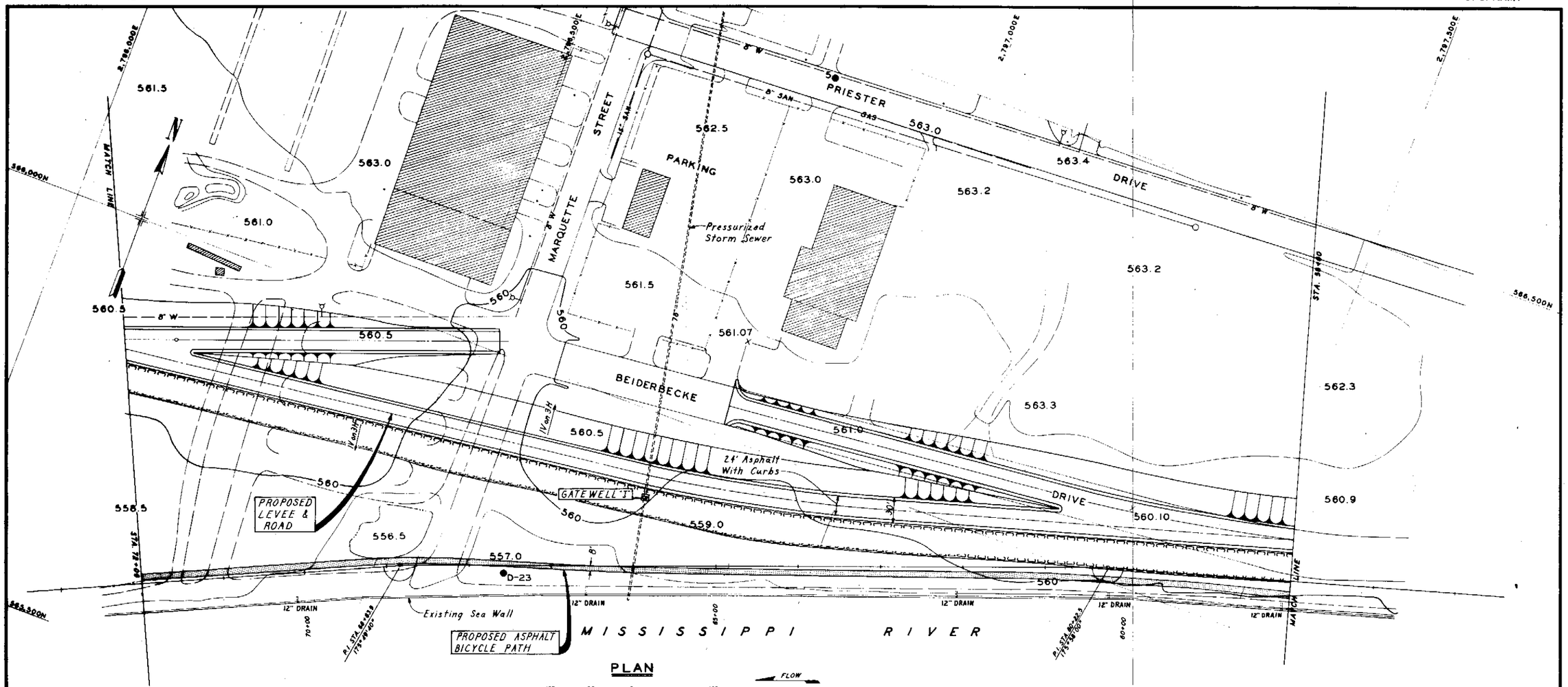
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 86+00 TO STA. 72+00

SCALE AS SHOWN

SHEET DRAWING NO.
INVITATION NO. DACW25 B

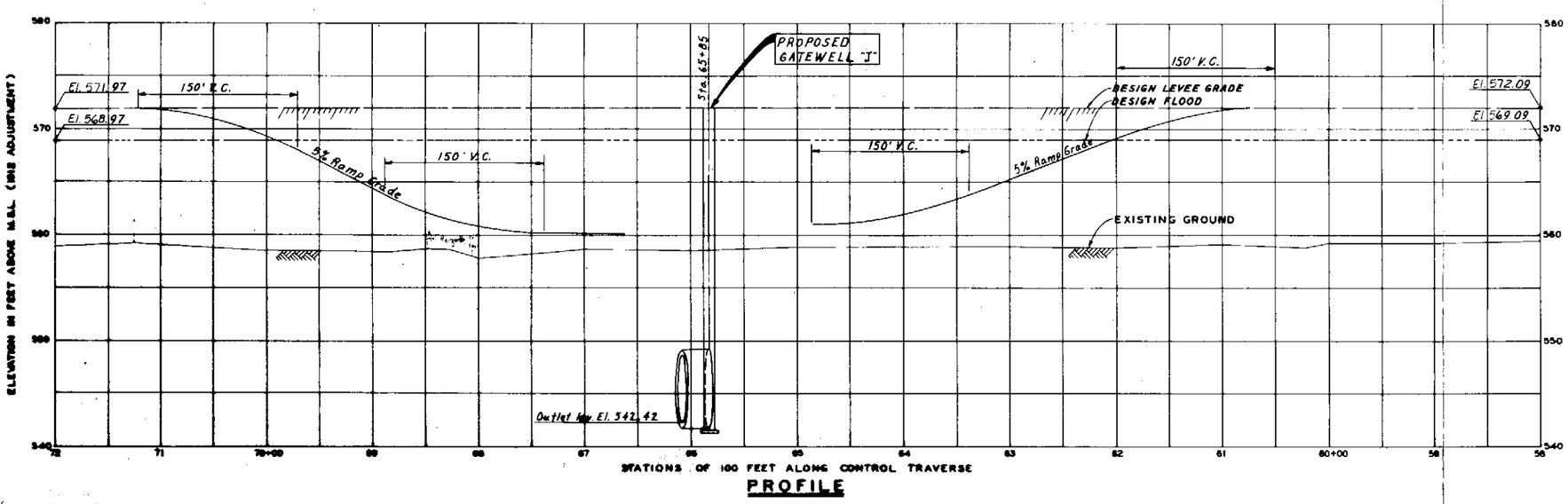
CORPS OF ENGINEERS

U. S. ARMY



PLAN

SCALE IN FEET



PROFILE

REVISION	DATE	DESCRIPTION	BY

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

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APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

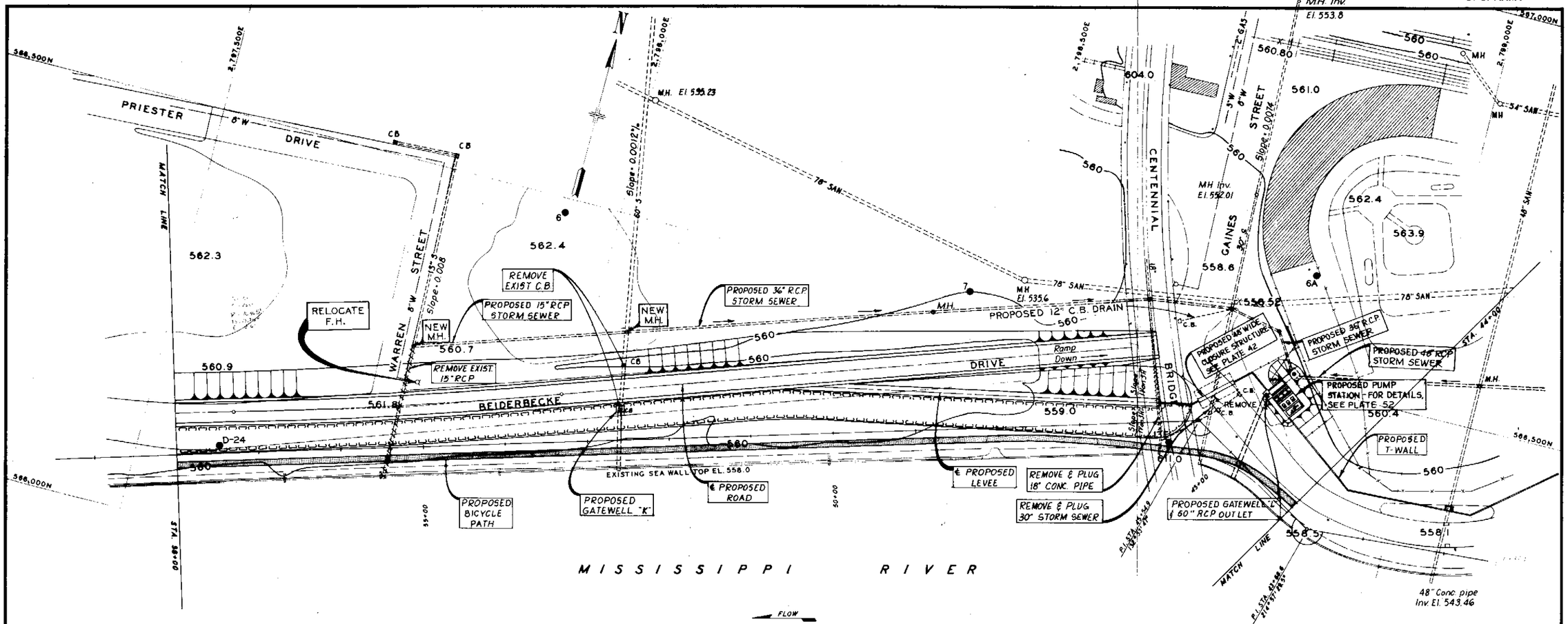
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 72+00 TO STA. 58+00

SCALE AS SHOWN

SHEET DRAWING NO.
INVITATION NO. DACW25-

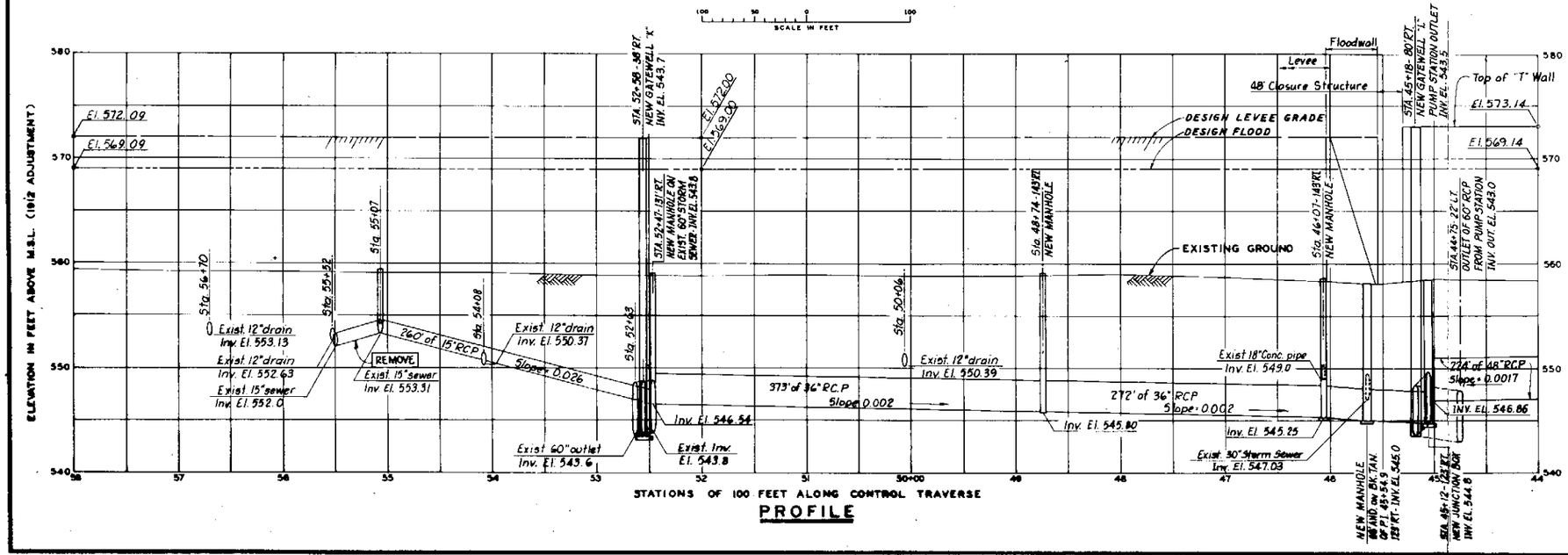
PLATE 17

CORPS OF ENGINEERS — U. S. ARMY



PLAN

SCALE IN FEET 100 50 0 100



PROFILE

NOTE:
1. Arrows, → indicate storm sewer flow in blocked gravity conditions.

REVISION	DATE	DESCRIPTION	BY

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

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CHIEF, ENGINEERING DIVISION
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MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 58+00 TO STA. 44+00

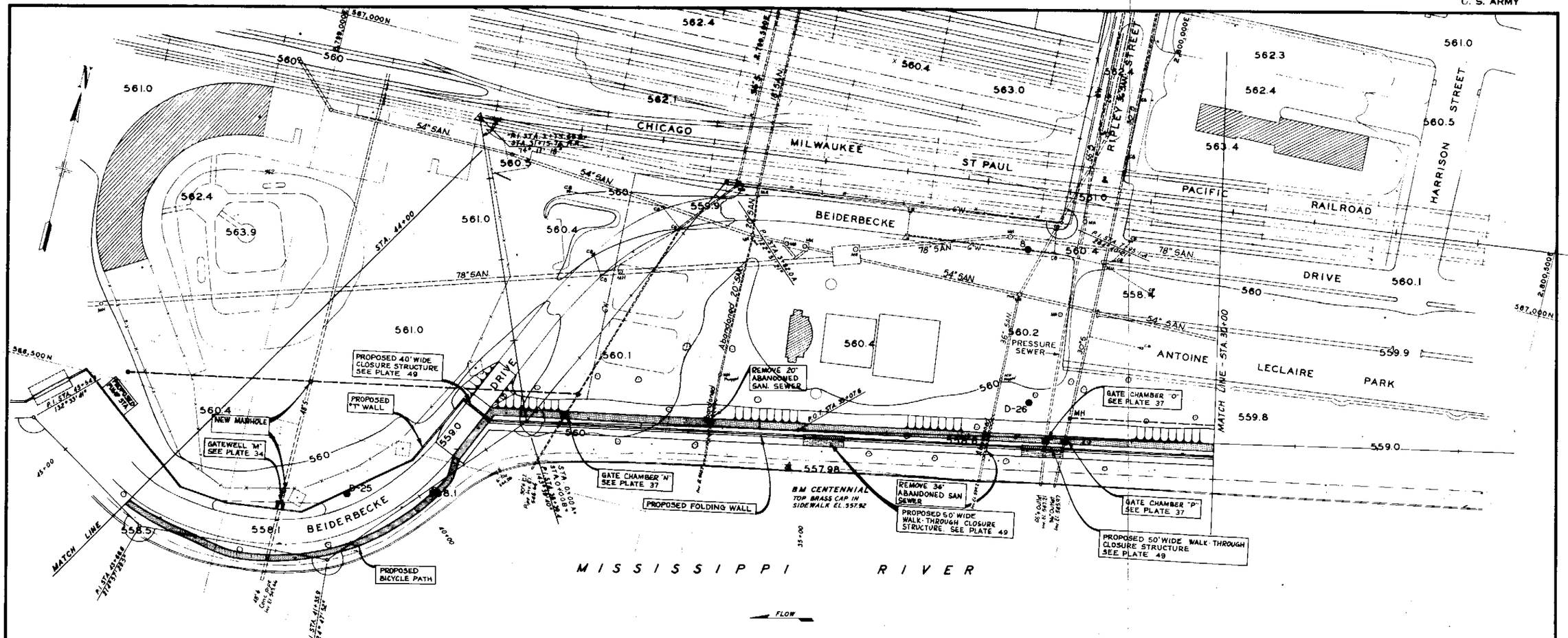
SCALE AS SHOWN

SHEET — DRAWING NO.
INVITATION NO. DACW25 - - B -

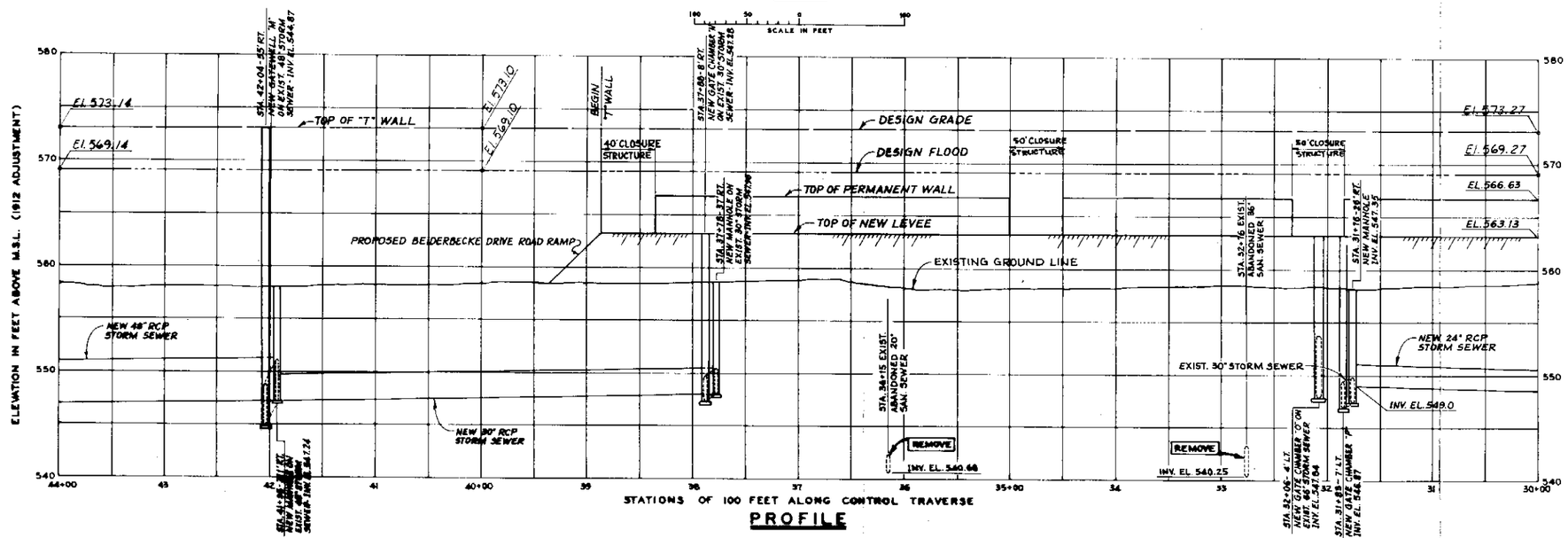
PLATE 18

CORPS OF ENGINEERS

U. S. ARMY



PLAN



PROFILE

NOTE:
1. Arrows, → indicate storm sewer flow in blocked gravity conditions.

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MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 44+00 TO STA. 30+00

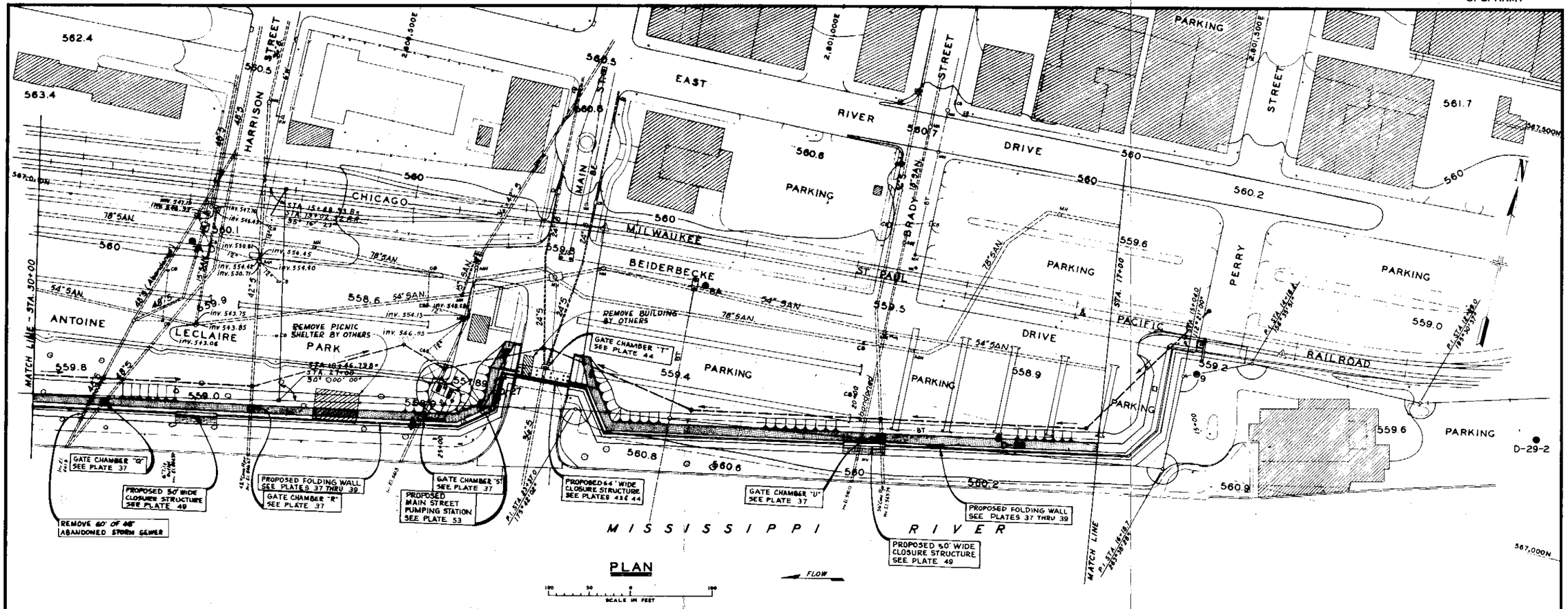
SCALE AS SHOWN

SHEET
DRAWING NO.
INVITATION NO. DACW25 - - B -

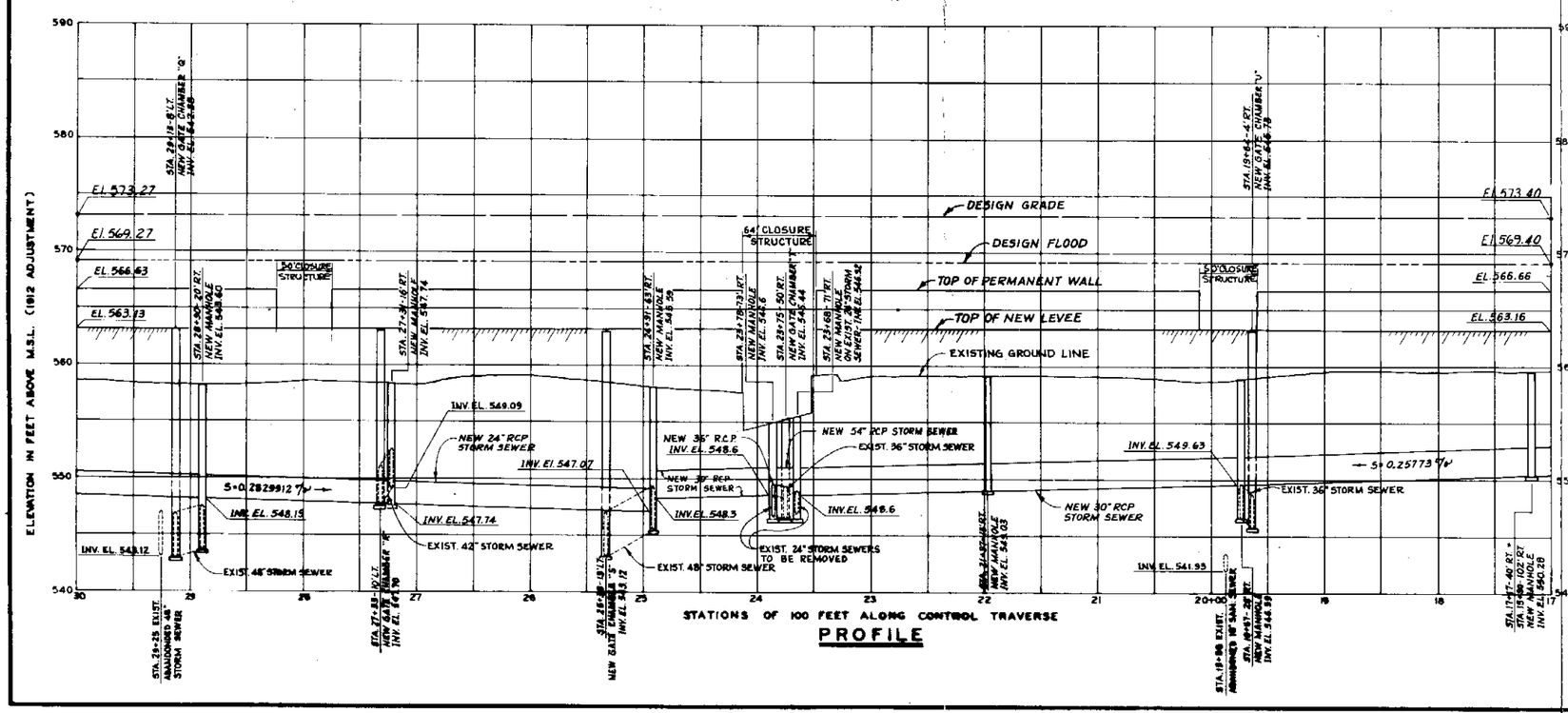
PLATE 19

CORPS OF ENGINEERS

U. S. ARMY



PLAN



PROFILE

NOTE:
1. Arrows, → indicate storm sewer flow in blocked gravity conditions.

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CHIEF, ENGINEERING DIVISION
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MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 30+00 TO STA. 17+00

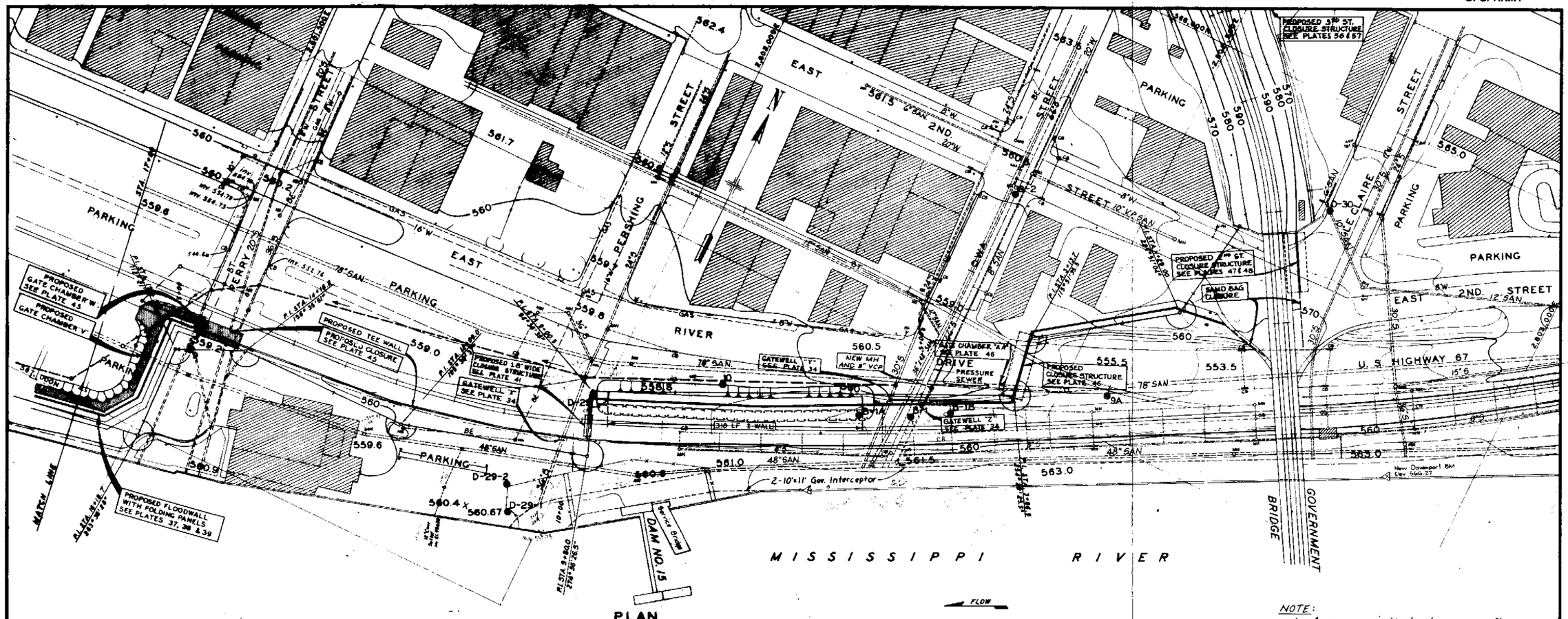
SCALE AS SHOWN

SHEET
DRAWING NO
INVITATION NO. DACW25 - - B -

PLATE 20

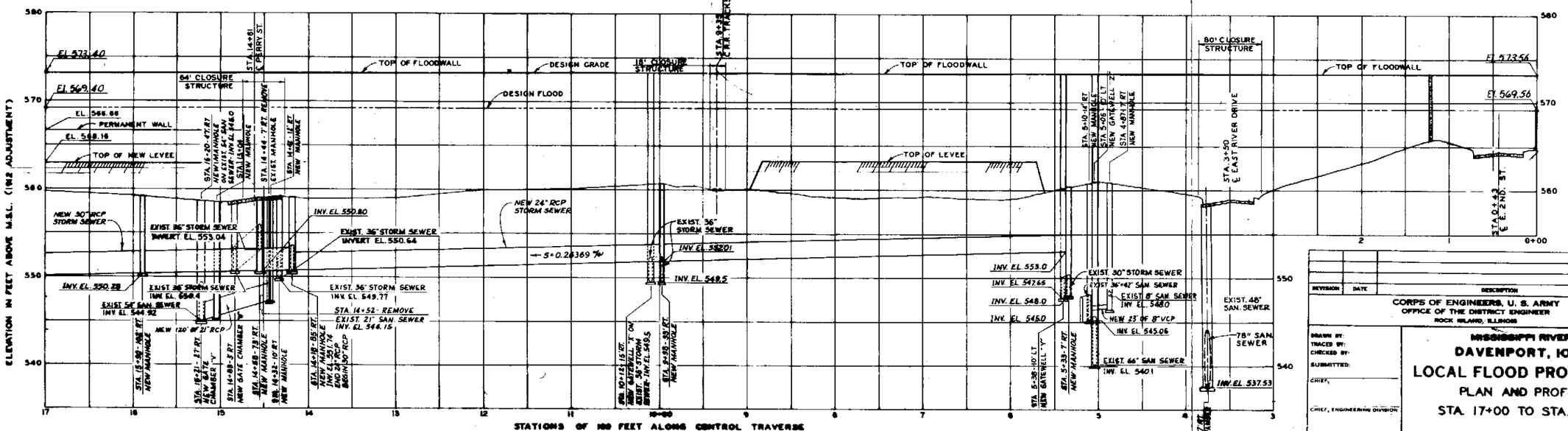
CORPS OF ENGINEERS

U. S. ARMY



PLAN

SCALE IN FEET



PROFILE

FLOW

NOTE:
1. Arrows, → indicate storm sewer flow in blocked gravity conditions.

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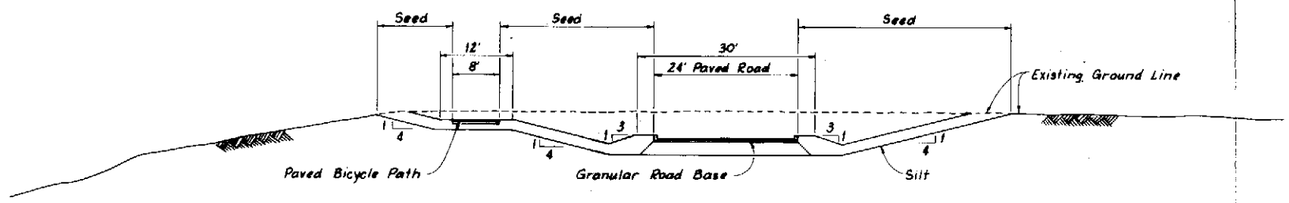
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
PLAN AND PROFILE
STA. 17+00 TO STA. 0+00

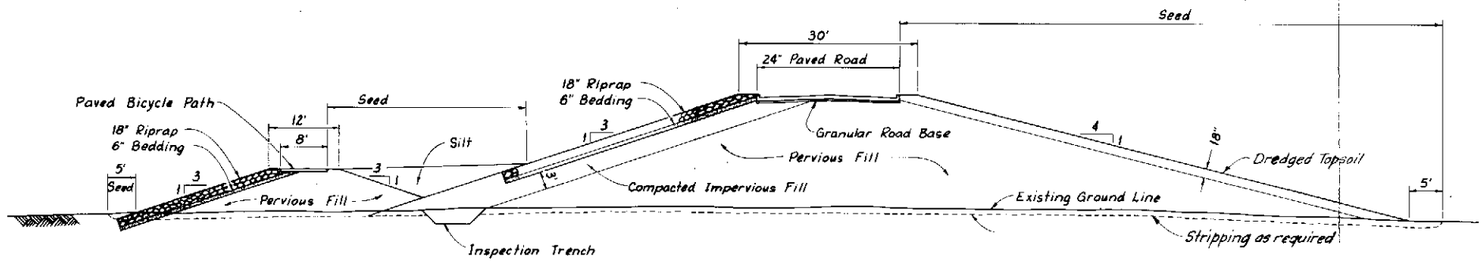
SCALE AS SHOWN

SHEET DRAWING NO.
INVITATION NO DACW25 - -9-

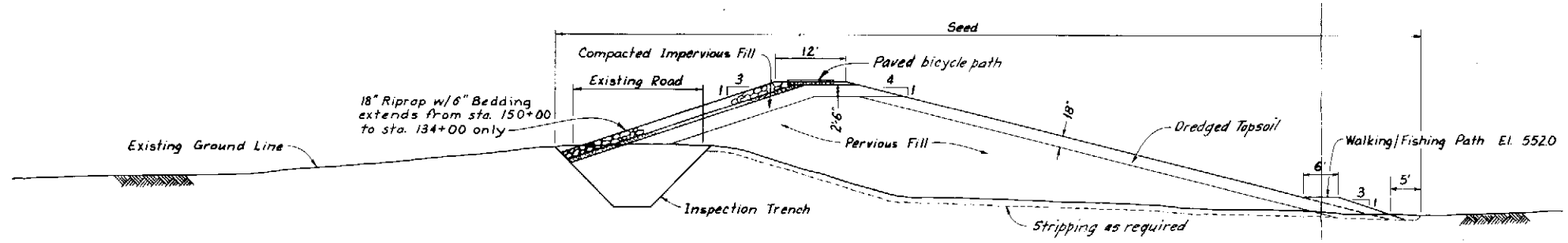
PLATE 21



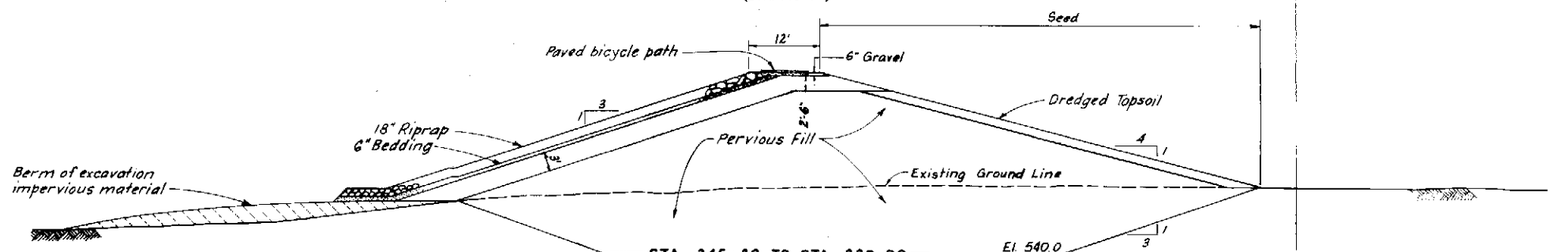
STA. 95+00 TO STA. 92+50
(STA. 94+00)



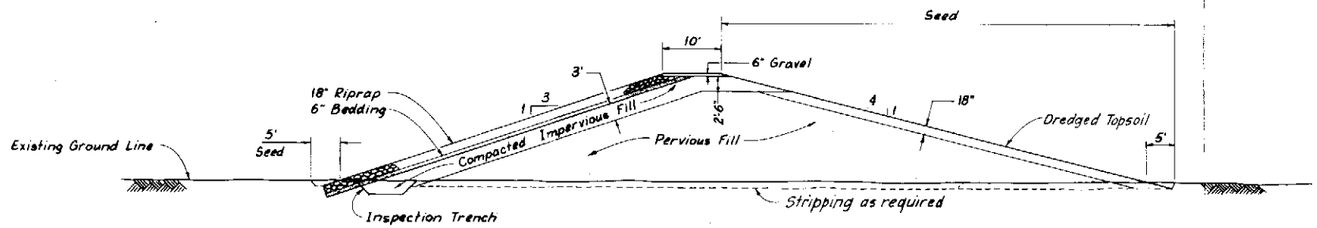
STA. 134+00 TO STA. 95+00
(STA. 129+00)



STA. 220+00 TO STA. 134+00
(STA. 140+00)



STA. 245+20 TO STA. 220+00
(STA. 229+00)



STA. 256+40 TO STA. 245+20
(STA. 250+00)

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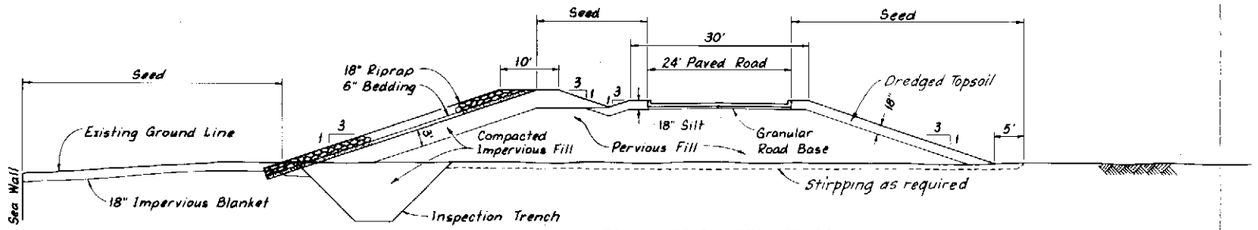
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
TYPICAL SECTIONS I

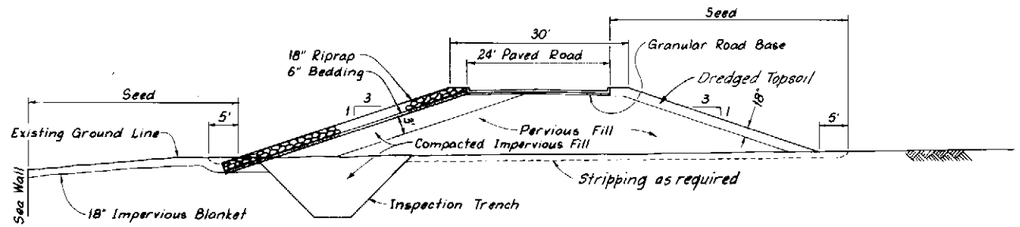
10 0 10 20 30
SCALE IN FEET

SHEET
DRAWING NO.
INVITATION NO. DACW29 - - 8 -



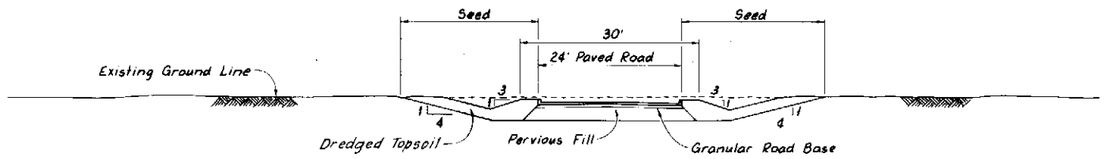
STA. 50+00 TO STA. 45+50

(STA. 49+00)



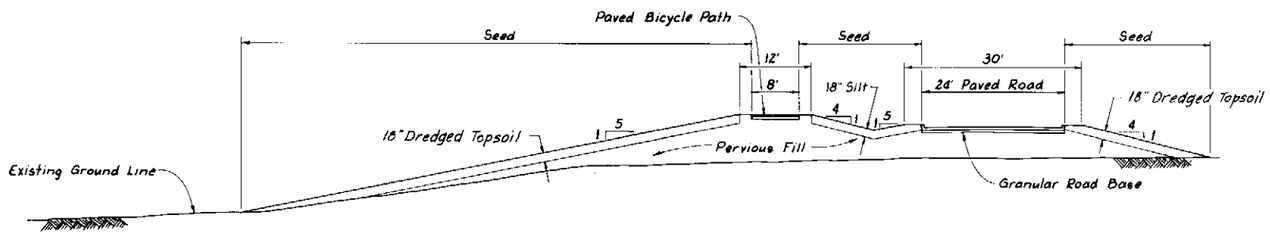
STA. 75+00 TO STA. 50+00

(STA. 57+00)



STA. 81+20 TO STA. 75+00

(STA. 11+00C)



STA. 92+50 TO STA. 81+20

(STA. 89+00)

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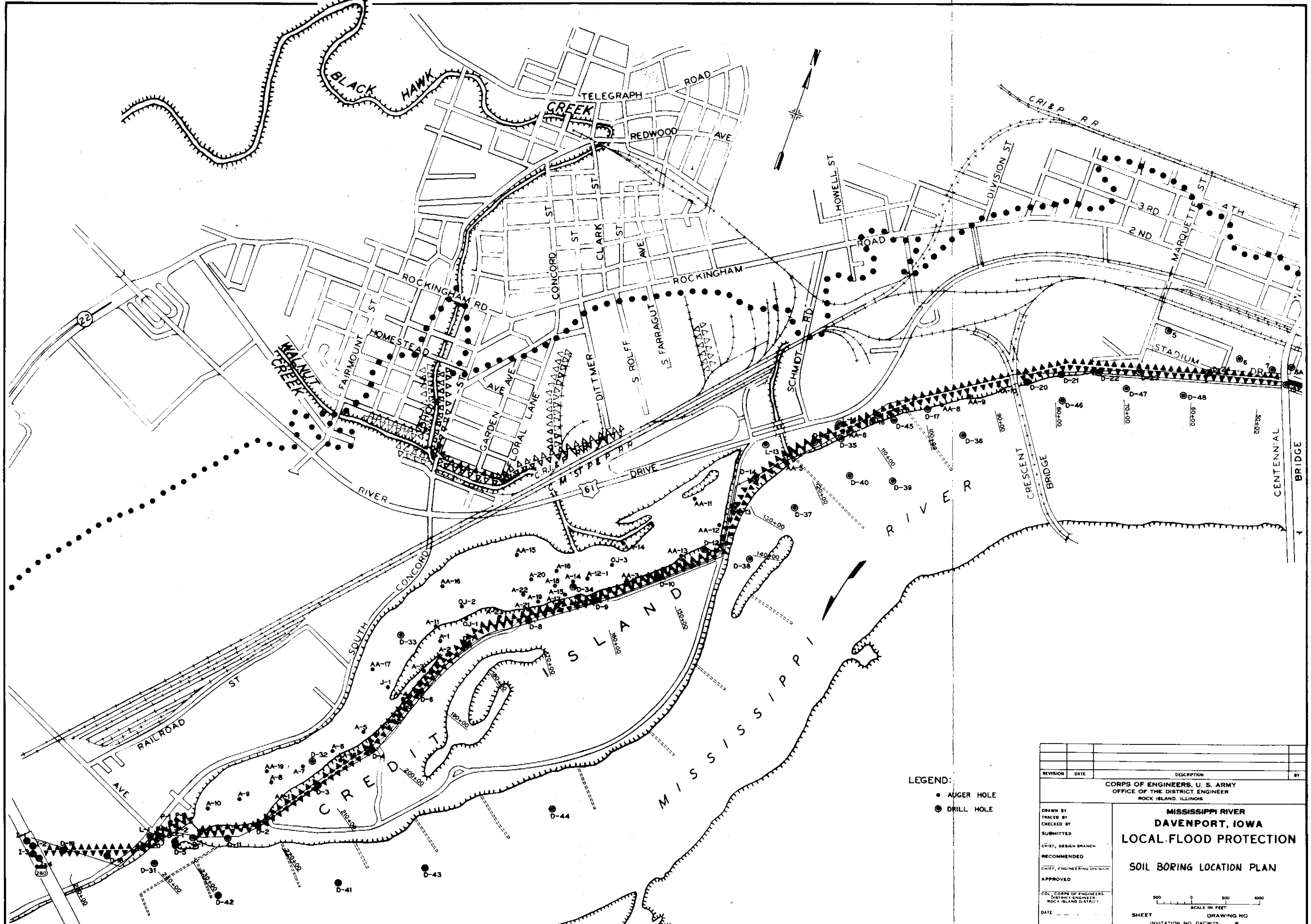
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
TYPICAL SECTIONS II

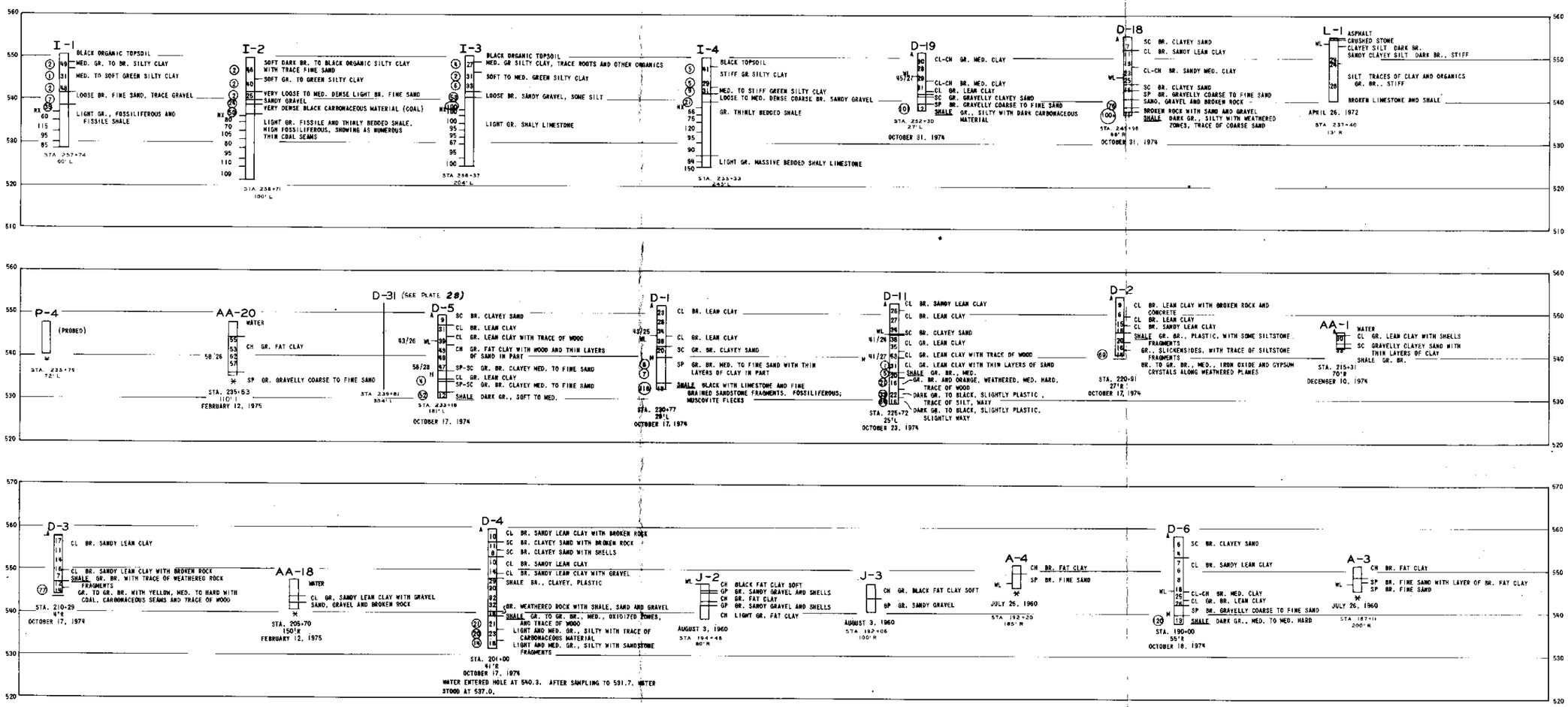
10 0 10 20 30
SCALE IN FEET

SHEET DRAWING NO.
INVITATION NO. DACW25 - - -


BLACK HAWK CREEK
TELEGRAPH ROAD
REDWOOD AVE
ROCKINGHAM RD
ROCKINGHAM
HOMESTEAD AVE
FAIRMOUNT ST
WALNUT CREEK
CONCORD ST
CLARK ST
HOWELL ST
DIVISION ST
MARQUETTE ST
3RD
2ND
4TH
ROAD
SCHMIDT RD
DITTMER
S. ROLFF
S. FARRAGUT
GARDEN AVE
LORAL LANE
C.R.I. & P. R.R.
C.M. ST. P. & P. R.R.
RIVER DRIVE
STADIUM DR
SOUTH CONCORD
RAILROAD ST
AVE
CREDIT ISLAND
MISSISSIPPI RIVER
CRESCENT BRIDGE
CENTENNIAL BRIDGE
LEGEND:
AUGER HOLE
DRILL HOLE
REVISION
DATE
DESCRIPTION
BY
CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
ROCK ISLAND, ILLINOIS
DRAWN BY
TRACED BY
CHECKED BY
SUBMITTED
CHIEF, DESIGN BRANCH
RECOMMENDED
CHIEF, ENGINEERING DIVISION
APPROVED
COL., CORPS OF ENGINEERS DISTRICT ENGINEER ROCK ISLAND DISTRICT
DATE
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
SOIL BORING LOCATION PLAN
500 0 500 1000
SCALE IN FEET
SHEET
DRAWING NO
INVITATION NO DACW25 B

CORPS OF ENGINEERS

U. S. ARMY



REVISION	DATE	DESCRIPTION	BY

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OFFICE OF THE DISTRICT ENGINEER
ROCK ISLAND, ILLINOIS

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CHIEF, ENGINEERING DIVISION
APPROVED:
COL., CORPS OF ENGINEERS
DISTRICT ENGINEER
ROCK ISLAND DISTRICT
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

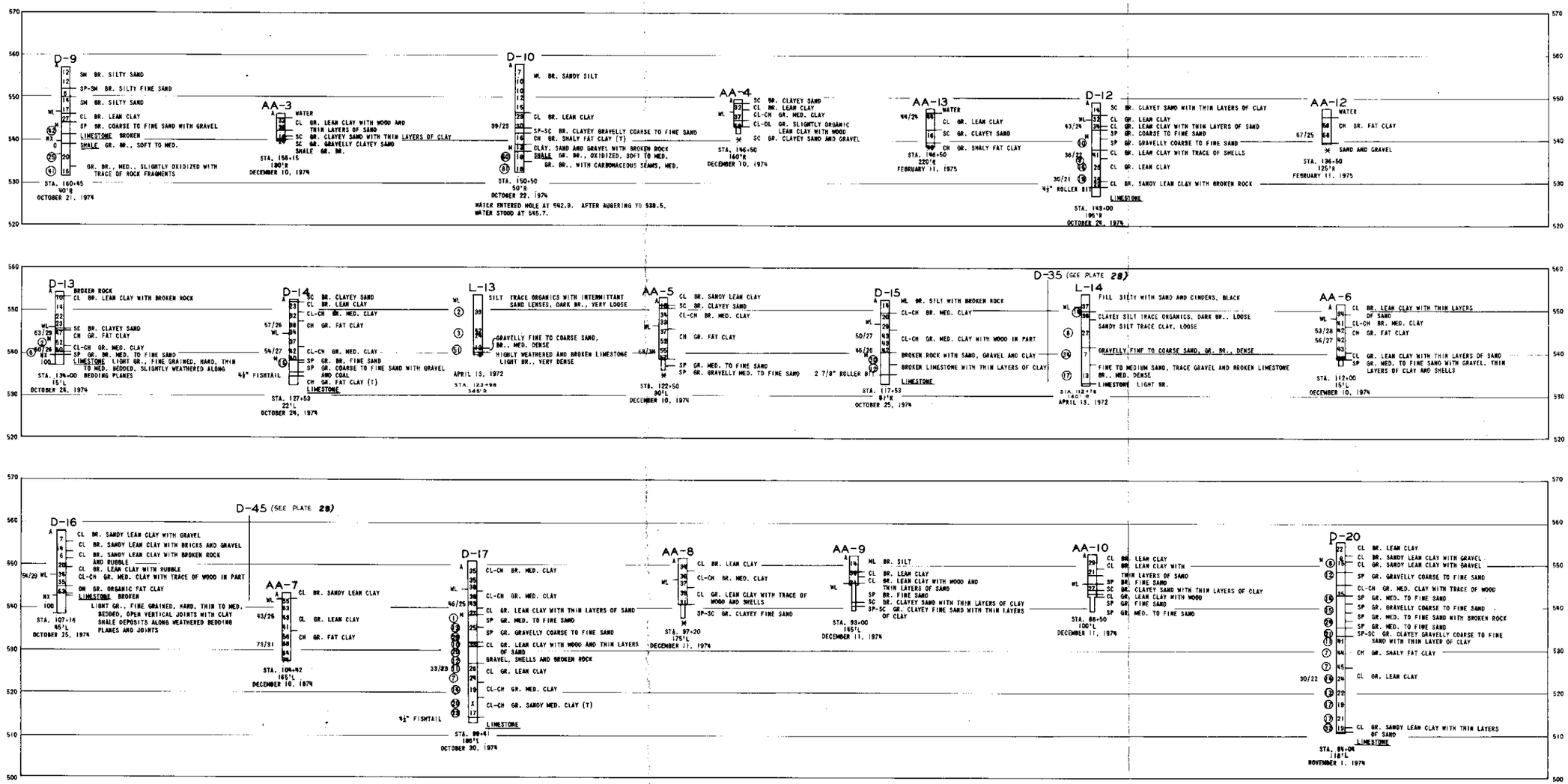
BORING LOGS I

SHEET
DRAWING NO.
INVITATION NO. DACW25- -C-

PLATE 25

CORPS OF ENGINEERS

U. S. ARMY



*UNIFIED SOIL CLASSIFICATION

MAJOR DIVISION		TYPE	LETTER SYMBOL	TYPICAL NAMES
COARSE GRAINED SOILS >50% OF MATERIAL IS 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
FINE GRAINED SOILS >50% OF MATERIAL PASSES #200 SIEVE		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.

LEGEND

D-1 BORING NUMBER

20 NATURAL MOISTURE CONTENT IN PERCENT DRY WEIGHT

WATER LEVEL WL

LIQUID AND PLASTIC LIMIT 46/23

MAJOR STRATA CHANGE

MINOR STRATA CHANGE

D_{10} SIZE (MM) 0.18

PERCENT PASSING #200 SIEVE (6.7)

NUMBER OF BLOWS TO DRIVE STANDARD SPLIT SPOON (2" O.D.) ONE FOOT WITH 140 LB. HAMMER AND 30 INCH DROP (17)

77 PERCENT RECOVERY OF CORE FOR RUN INDICATED BY BRUSER LINE

HOLE EXTENDED BY DRIVING 2 INCH PIPE

2-8-66 APPROX. DATE OF DRILLING, ALSO DATE WATER LEVEL NOTED

NO RECORD OF WATER LEVEL

UNABLE TO AUGER OR PROBE FURTHER AT HARD

REVISION	DATE	DESCRIPTION	BY

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
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CHIEF, ENGINEERING DIVISION
APPROVED:
COL., CORPS OF ENGINEERS DISTRICT ENGINEER ROCK ISLAND DISTRICT
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

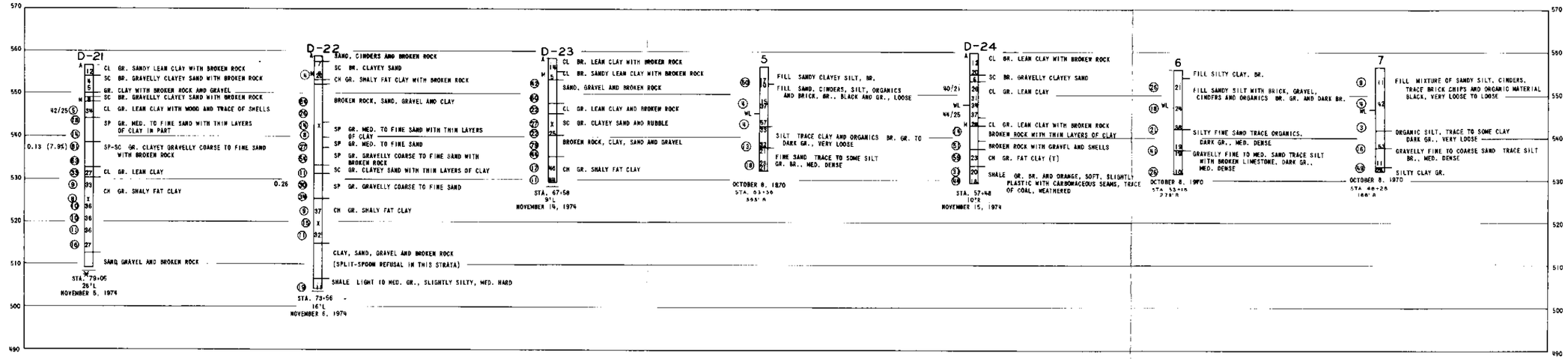
BORING LOGS II

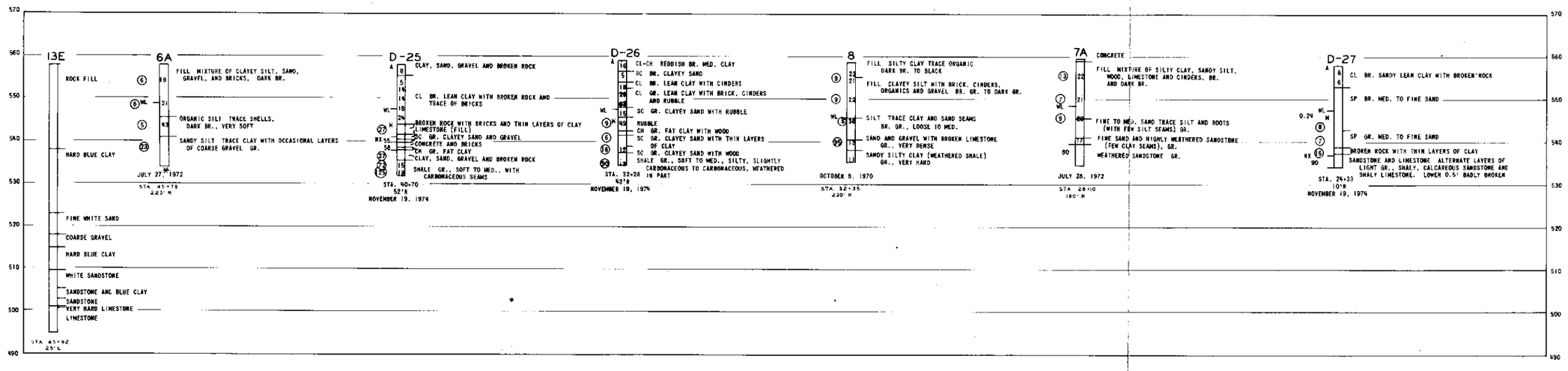
SHEET DRAWING NO.
INVITATION NO. DACW29 - - 8 -

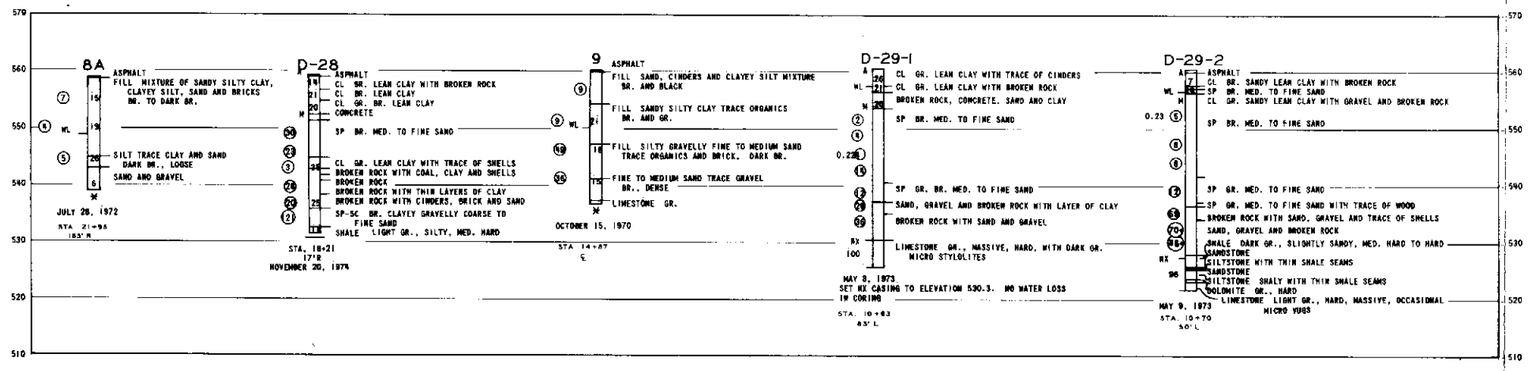
PLATE 26

CORPS OF ENGINEERS

U. S. ARMY







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APPROVED:
COL, CORPS OF ENGINEERS
DISTRICT ENGINEER
ROCK ISLAND DISTRICT
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

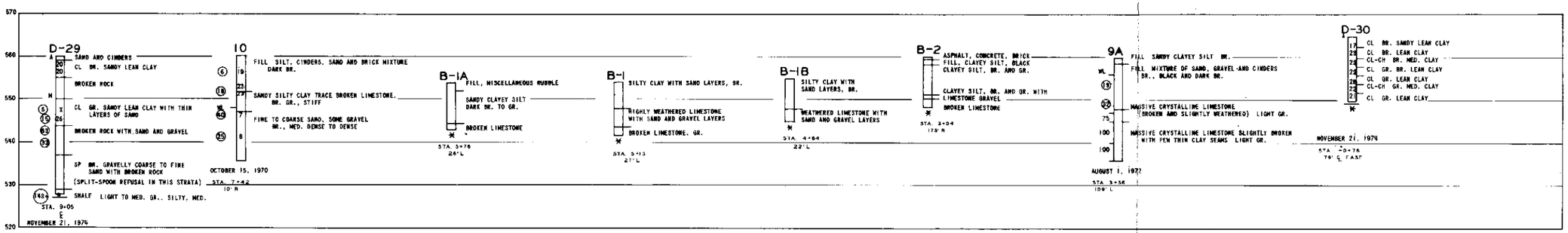
BORING LOGS III

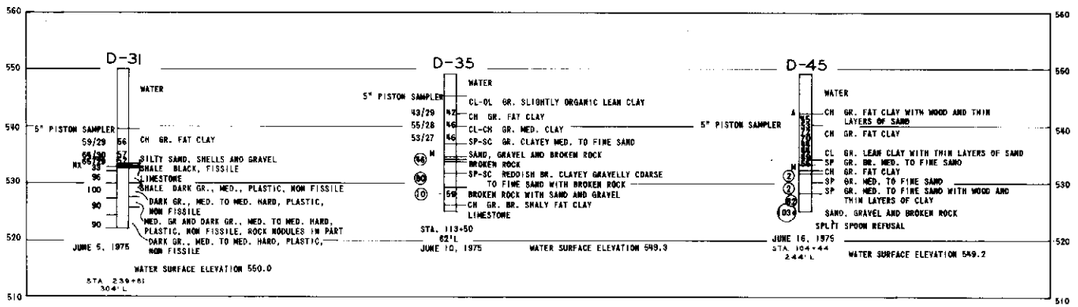
SHEET
DRAWING NO
INVITATION NO. DACW25 - - B -

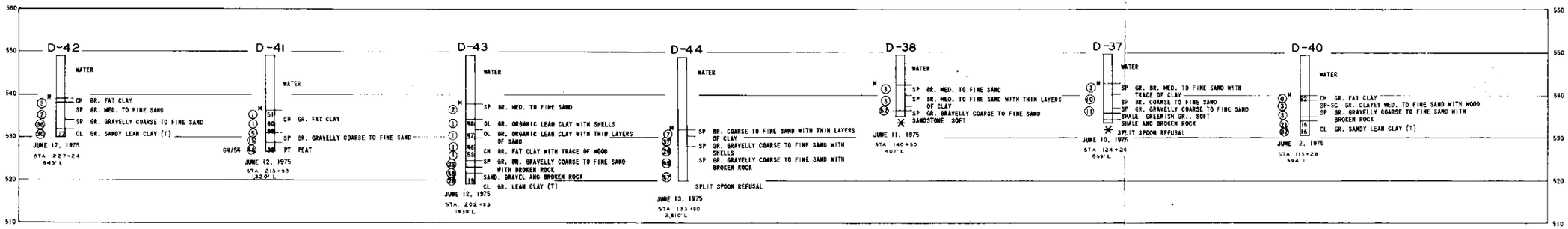
PLATE 27

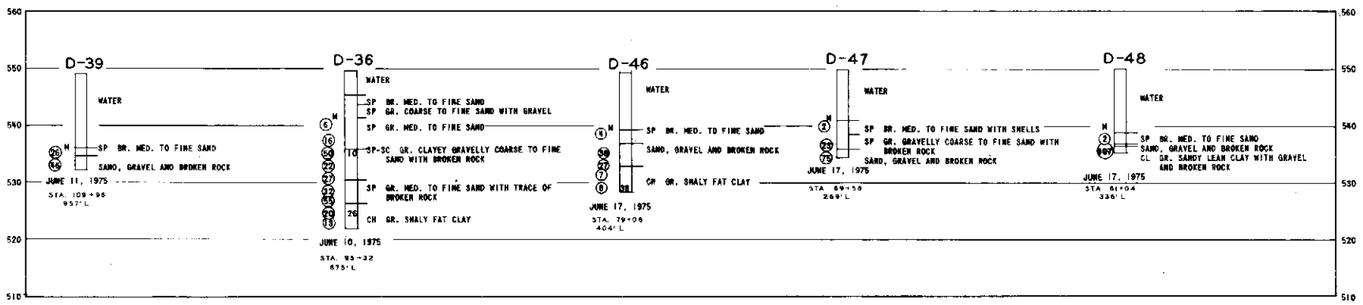
CORPS OF ENGINEERS

U. S. ARMY









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DISTRICT ENGINEER
ROCK ISLAND DISTRICT
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

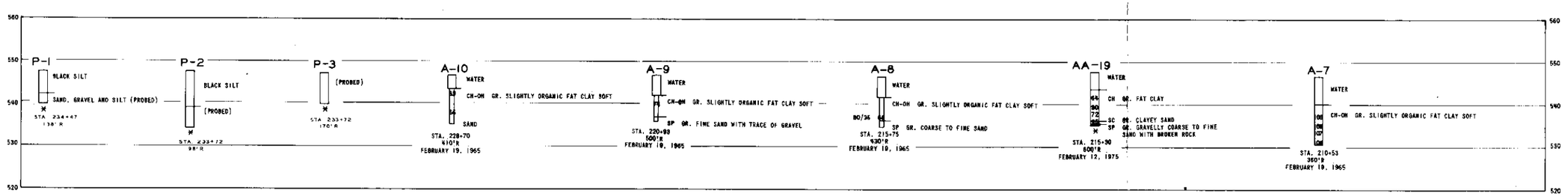
BORING LOGS IV

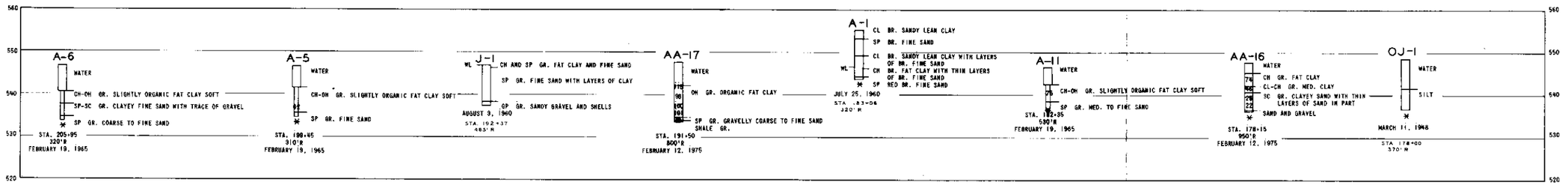
SHEET
DRAWING NO.
INVITATION NO. DACW25 - - 8 -

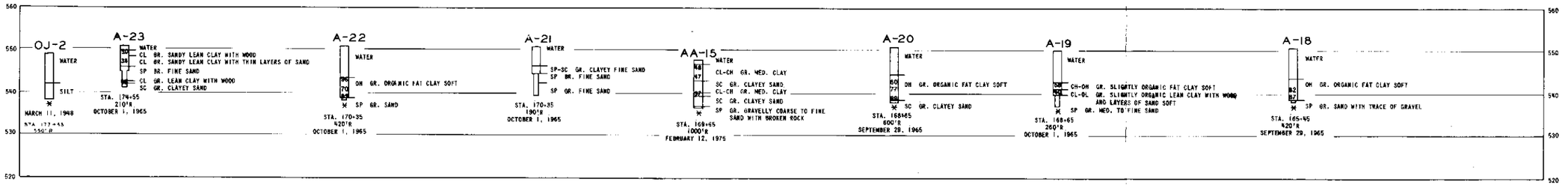
PLATE 28

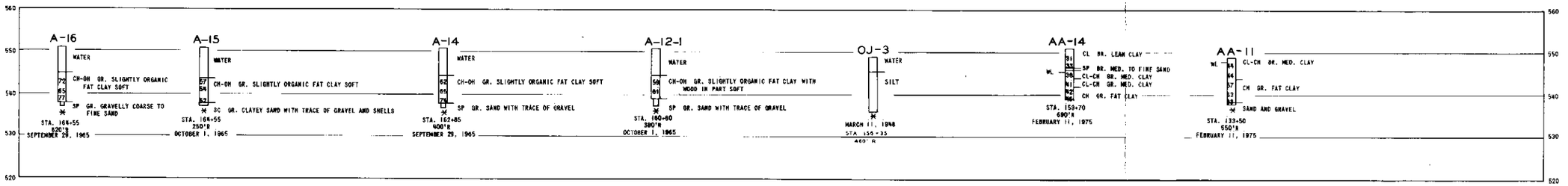
CORPS OF ENGINEERS

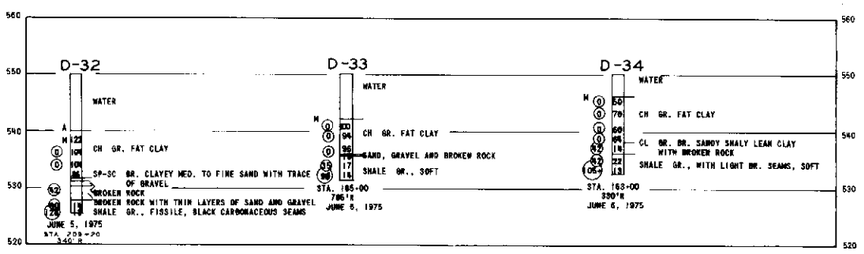
U. S. ARMY











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DISTRICT ENGINEER
ROCK ISLAND DISTRICT
DATE

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

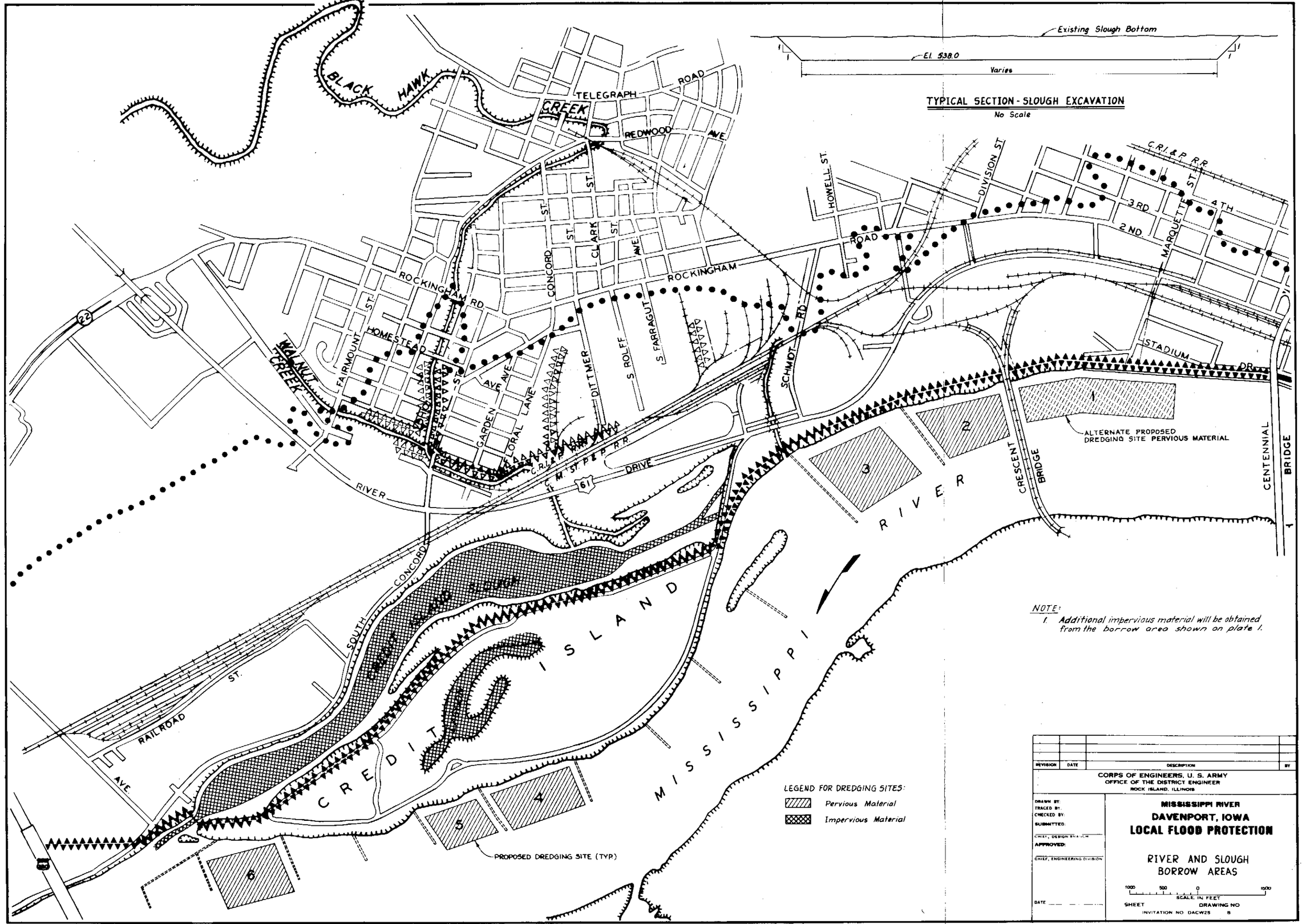
BORING LOGS V

SHEET
DRAWING NO.
INVITATION NO. DACW25 - B -

PLATE 29

CORPS OF ENGINEERS

U. S. ARMY



TYPICAL SECTION - SLOUGH EXCAVATION

No Scale

NOTE:

1. Additional impervious material will be obtained from the borrow area shown on plate 1.

REVISION	DATE	DESCRIPTION	BY

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DATE

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

RIVER AND SLOUGH
BORROW AREAS

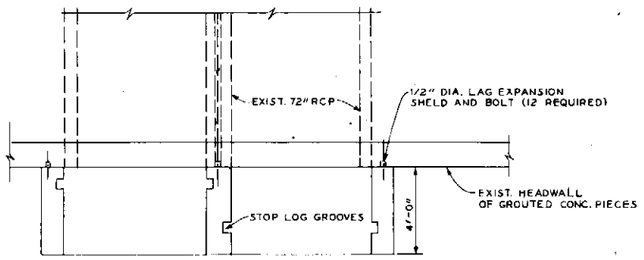
1000 500 0 1000
SCALE: IN FEET

SHEET
DRAWING NO
INVITATION NO DACW25 8

PLATE 30

CORPS OF ENGINEERS

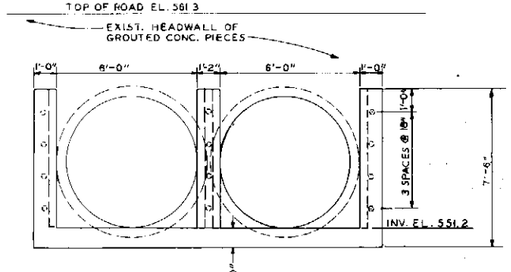
U. S. ARMY



WAPELLO AVE. OUTLET CLOSURE

PLAN

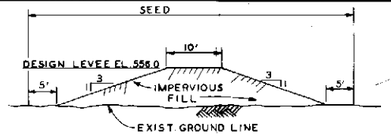
SCALE IN FEET



WAPELLO AVE. OUTLET CLOSURE

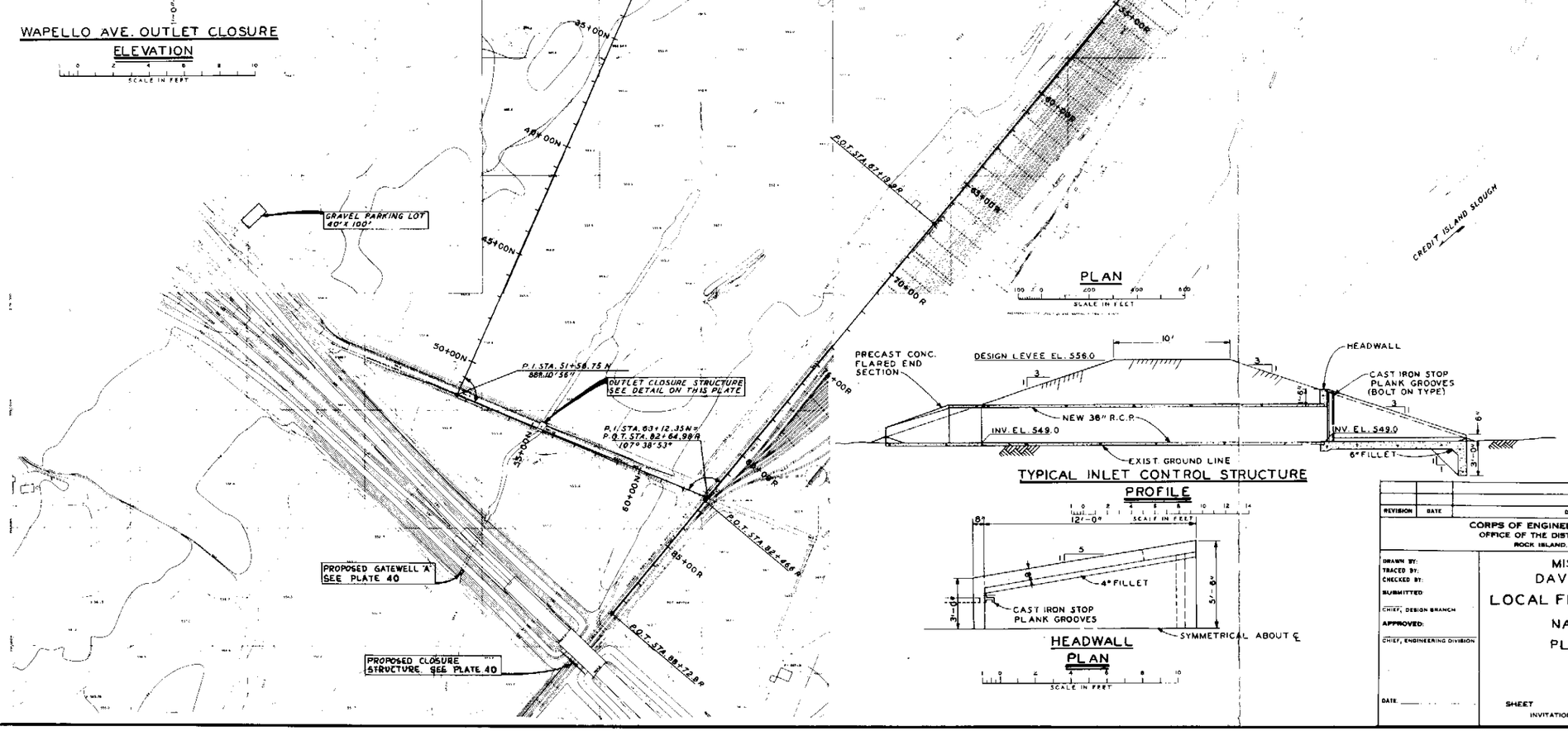
ELEVATION

SCALE IN FEET



TYPICAL LEVEE SECTION

NO SCALE



PLAN

SCALE IN FEET

TYPICAL INLET CONTROL STRUCTURE

PROFILE

SCALE IN FEET

HEADWALL

PLAN

SCALE IN FEET

REVISION	DATE	DESCRIPTION	BY

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DATE

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
NAHANT MARSH
PLAN & DETAILS

SCALE AS SHOWN

SHEET
DRAWING NO.
INVITATION NO. DACW25- - B -

CORPS OF ENGINEERS

U. S. ARMY

SCHEDULE OF SEWERS, GATEWELLS, DRAINAGE STRUCTURES, AND APPURTENANCES

LOCATION ALONG C.B.L.		EXISTING PIPE NOM. SIZE	EXISTING PIPE TYPE	TYPE OF LIQUID	NEW PIPE NOM. SIZE	NEW PIPE TYPE	PIPE LENGTH L1	PIPE LENGTH L2	ITEM	IDENT. LTR.	TYPE	GATEWELL INSIDE DIM.	GATEWELL OPER. DECK ELEV.	GATEWELL H	GATEWELL PIPE INV. ELEV.	SLIDE GATE SIZE	SLIDE GATE TYPE	GATE HEAD REQUIREMENTS SEATING HEAD	GATE HEAD REQUIREMENTS UNSEATING HEAD	GATE HEAD REQUIREMENTS UNBALANCED HEAD	REFERENCE DRAWINGS	REMARKS
258+58	1620'R	10'X10'	RCB	STORM WATER	10'X10'	RCB	7'	0'		A	CIP	4'X12'	570.4	20.4	550.0	10'X10'	FB	16'	5'	5'	40	PEDESTAL LIFT MOTOR OPERATED, RISING STEM, CRS
238+50	138'L		RCP	SANITARY EFFLUENT	96"	RCP	70'	120'		B	CIP	4'X10'	570.5	27.4	543.1	96"	FB	24'	10'	15'	4	PEDESTAL LIFT MOTOR OPERATED, RISING STEM, SS. REMOVE HEADWALL
238+40	141'L		RCP	STORM WATER	15"	RCP	85'	145'		C	PRECAST	48"	570.5	18.4	552.1	15"	FLAT BACK	19'	5'	5'	4	PEDESTAL LEFT, RISING STEM, CRS, NEW MH
174+12			NONE	RIVER WATER	24"	RCP	140'	180'		R-1	PRECAST	48"	571.1	28.6	542.5	24"	FLAT BACK	28'	5'	5'	9	PEDESTAL LIFT, RISING STEM, CRS
139+03			NONE	SURFACE DRAINAGE	30"	CMP															12	NEW 30" CMP, 90' LONG
138+92		96"	CMP																		12	SALVAGE EXISTING TWIN 96" CULVERTS
134+12	28'L		CMP		TWIN 8'X8'	RCB	35'	135'		D	CIP	5'X20'	571.3	31.3	540.0	TWIN 96"X96"	FB	28'	5'	5'	12	PEDESTAL LIFTS, MOTOR OPERATED, RISING STEM, CRS
129+50	145'R	96"	NONE	STORM WATER	THREE 96"	CMP																PIPES 305' LONG UNDER CREDIT ISLAND ROAD
123+10	15'R		NONE		TWIN 10X10	RCB	50'	110'		E	CIP	5'X23'	571.5	27.5	544.0	TWIN 120"X120"	FB	23'	5'	5'	13	PEDESTAL LIFTS, MOTOR OPERATED, RISING STEMS, CRS
122+50	54'R				72"	RCP															14	BEGIN 2377' OF NEW INTERCEPTOR
108+10		27"	SANITARY																		14	REMOVE APPROX. 570' OF EXIST. 27" SEWER WITHIN LEVEE LIMITS
98+85	22'L	72"	RCP	STORM WATER	72"	RCP				F	CIP	4'X8'	571.7	27.9	543.8	72"	FB	25'	10'	15'	15	PEDESTAL LIFT, RISING STEM, CRS, NEW OUTLET HEADWALL
98+55	23'L	60"	RCP	SANITARY INTERCEPTOR OVERFLOW						G	CIP	4'X7'	571.7	27.4	544.3	60"	FB	25'	10'	15'	15	PEDESTAL LIFT, RISING STEM, CRS
98+53	9'L	60"	RCP																		15	EXIST. MH TO BE REMOVED
98+50	81'R	60"	RCP																		15	NEW MH ON EXIST. 60" SEWER
89+78			RCP	STORM WATER	TWIN 72"	NONE				H	CIP	4'X16'	571.7	24.9	546.8	TWIN 72"	FB	22'	10'	15'	15	PEDESTAL LIFTS, RISING STEMS, CRS
82+10	198'R	60"	RCP	STORM WATER		NONE				I	CIP	4'X7'	571.8	24.8	547.0	60"	FB	23'	10'	15'	16	PEDESTAL LIFT, RISING STEM, CRS
82+00	488'R				30"	RCP															16	BEGIN 1772' OF NEW 30" INTERCEPTOR
65+85	83'R	78"	RCP	STORM WATER	78"	RCP	20'	75'		J	CIP	4'X9'	571.9	29.5	542.4	78"	FB	27'	10'	15'	17	PEDFSTAL LIFT, RISING STEM, CRS
55+07	123'R	15"	RCP	STORM WATER	15"	RCP															18	REMOVE APPROX. 164' OF EXIST. 15" SEWER, BEGIN 260' OF NEW 15" INTERCEPTOR
52+58	38'R	60"	RCP	STORM WATER	60"	RCP	25'	65'		K	CIP	4'X7'	572.0	28.3	543.7	60"	FB	26'	10'	15'	18	PEDESTAL LIFT, RISING STEM, CRS, REMOVE CATCH BASIN
52+47	131'R		NONE	STORM WATER	36"	RCP															18	INSTALL MH, BEGIN 825' OF NEW INTERCEPTOR
46+06		18"	RCP																		18	REMOVE APPROX. 90' OF EXIST. 18" PIPE WITHIN LEVEE LIMITS
45+56.9	35'R	12"	RCP	STORM WATER																	18	REMOVE APPROX. 50' OF EXIST. 50" SEWER WITHIN CLOSURE LIMITS
45+18	80'R		NONE	STORM WATER	60"	RCP	110'	0'		L	CIP	4'X7'	573.1	29.6	543.5	60"	FB	27'	5'	15'	18	PEDESTAL LIFT, RISING STEM, CRS, PUMP STATION GRAVITY OUTLET
45+12	123'R			STORM WATER	60"	RCP															18	NEW JUNCTION BOX CONNECTING NEW 6 " RCP TO NEW 48" AND 36" INTERCEPTOR
45+08				STORM WATER	48"	RCP																BEGIN 220' OF NEW INTERCEPTOR
42+04	55'R	48"	RCP	STORM WATER		NONE				M	CIP	4'X6'	573.1	28.3	544.8	48"	FB	27'	5'	15'	19	PEDESTAL LIFT, RISING STEM, CRS
37+88	8'R	30"	RCP	STORM WATER		RCP	20'	30'		N	CIP	4'X5'	563.1	15.8	547.3	30"	FB	25'	5'	15'	19	PORTABLE LIFT, NON RISING STEM, CRS, PG
36+15		20"	RCP	ABANDONED																	19	REMOVE APPROX. 60' WITHIN LEVEE LIMITS
32+76		36"	RCP	ABANDONED																	19	REMOVE APPROX. 60' WITHIN LEVEE LIMITS
32+06	4'L	66"	RCP	STORM WATER	66"	RCP	20'	30'		O	CIP	4'X7.5'	563.1	15.3	547.8	66"	FB	23'	5'	15'	19	PEDESTAL LIFT, RISING STEM, CRS, PG
31+83	7'L	30"		STORM WATER	30"	RCP	20'	30'		P	CIP	4'X5'	563.1	16.2	546.9	30"	FB	24'	5'	15'	19	PEDESTAL LIFT, RISING STEM, CRS, PG
31+76	26'R	30"	RCP	STORM WATER	24"	RCP															19	BEGIN 676' OF NEW INTERCEPTOR
29+25		48"	RCP	ABANDONED																	20	REMOVE APPROX. 60' WITHIN LIMITS OF LEVEE
29+13	8"L	48"	RCP	STORM WATER	48"	RCP	20'	30'		Q	CIP	4'X6'	563.1	20.2	542.9	48"	FB	28'	5'	15'	20	PORTABLE LIFT, NON-RISING STEM, CRS, PG,
27+33	10'L	42"	RCP	STORM WATER	42"	RCP	20'	30'		R	CIP	4'X6'	563.1	15.4	547.7	42"	FB	24'	5'	15'	20	PORTABLE LIFT, NON-RISING STEM, CRS, PG
25+33	13'L	48"	RCP	STORM WATER	48"	RCP	20'	35'		S	CIP	4'X6'	563.1	20.0	543.1	48"	FB	28'	5'	15'	20	PEDESTAL LIFT, NON-RISING STEM, CRS, PG, PUMP STATION GRAVITY OUTLET
24+91	63'R			STORM WATER	30"	RCP															20	BEGIN 986' OF NEW INTERCEPTOR
23+78	73'R	24"	RCP	STORM WATER	36"	RCP															20	INSTALL 2 MH AND 25' OF 36" PIPE TO JOIN TWO 24" SEWERS
23+75	50'R	36"	RCP	STORM WATER	36"	RCP	35'	0'		T	CIP	4'X6'	558.0	14.0	544.0	36"	FB	23'	5'	15'	20	PORTABLE LIFT, NON-RISING STEM, CRS, PG
19+88		18"	RCP	ABANDONED																	20	REMOVE APPROX. 60' OF PIPE
19+64	4'R	36"	RCP	STORM WATER	36"	RCP	20'	30'		U	CIP	4'X5'	563.1	17.3	545.8	36"	FB	26'	5'	15'	20	PEDESTAL LIFT, NON RISING STEM, CRS, PG
15+21	27'R	48"	RCP	SANITARY	48"	RCP				V	CIP	4'X6'	562.1	18.2	544.9	48"	FB	27'	5'	15'	20	PEDESTAL LIFT, NON-RISING STEM, SS, PG

ABBREVIATIONS

RCB	REINFORCED CONCRETE BOX
CIP	CAST IN PLACE
CRS	COLD ROLLED STEEL
SS	STAINLESS STEEL
RCP	REINFORCED CONCRETE PIPE
FB	FLANGE BACK
MH	MANHOLE
CMP	CORREGATED METAL PIPE
PG	PRESSURIZED GATEWELL

REVISION	DATE	DESCRIPTION

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

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MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

SEWER AND GATEWELL
SCHEDULE I

SHEET DRAWING NO.
INVITATION NO. DACW25 - - B -

SCHEDULE OF SEWERS, GATEWELLS, DRAINAGE STRUCTURES, AND APPURTENANCES

LOCATION ALONG C.B.L.	EXISTING PIPE NOM. SIZE	EXISTING PIPE TYPE	TYPE OF LIQUID	NEW PIPE NOM. SIZE	NEW PIPE TYPE	PIPE LENGTH L_1	PIPE LENGTH L_2	ITEM	GATEWELL IDENT. LTR.	GATEWELL TYPE	GATEWELL INSIDE DIM.	GATEWELL OPER. DECK ELEV.	GATEWELL H	GATEWELL PIPE INV. ELEV.	SLIDE GATE SIZE	SLIDE GATE TYPE	GATE HEAD REQUIREMENTS SEATING HEAD	GATE HEAD REQUIREMENTS UNSEATING HEAD	GATE HEAD REQUIREMENTS UNBALANCED HEAD	REFERENCE DRAWINGS	REMARKS
15+20 47'R			SANITARY	21"	RCP															21	INSTALL 120' NEW PIPE TO DIRECT EXIST. SEWER AROUND CLOSURE
14+88 3'R	36"	RCP	STORM WATER	36"	RCP	35'	55'		W	CIP	4'X5'	559.2	8.8	550.4	6'-6"X2'-0"	FB	23'	5'	15'	21	PEDESTAL LIFT, NON-RISING STEM, CRS, PG, REMOVE 150' PIPE 20" TO 36", INSTALL 50' OF 12" PIPE AND CATCH BASIN
14+18 85'R			STORM WATER	24"	RCP															21	BEGIN 808' OF NEW INTERCEPTOR
10+12 15'R	36"	RCP	STORM WATER		NONE				X	CIP	4'X5'	573.2	23.7	549.5	36"	FB	22'	5'	10'	21	PEDESTAL LIFT, RISING STEM, CRS
5+38 10'L	30"	RCP	STORM WATER		NONE				Y	CIP	4'X5'	573.2	25.6	547.6	30"	FB	24'	5'	15'	21	PEDESTAL LIFT, RISING STEM, CRS
5+10 9'R	8"	VCP	SANITARY	8"	VCP															21	INSTALL 23' OF PIPE AND MH, REMOVE 20' OF 8" PIPE UNDER FLOOD WALL
5+08 14'R		RCP	SANITARY		NONE															21	NEW MH, CONNECT 36"X42" SEWER TO EXIST. INTERCEPTOR
5+05 10'L	66"	RCP	STORM WATER		NONE				Z	CIP	4'X8'	573.2	33.1	540.1	66"	FB	31'	5'	15'	21	PEDESTAL LIFT, RISING STEM, CRS
3+77 17'R	78"	RCP	SANITARY		NONE				A A	CIP	4'X8.5'	559.0		537.5	78"	FB	33'	5'	15'	21	PORTABLE LIFT, NON-RISING STEM, SS, PG
WATER TREATMENT PLANT																					
0+40A	78" 48"	RCP	SANITARY						W1	CIP	4.5'X24.5'	573.9	32.3 25.4	541.6 548.5	78" 48"	FB FB	26' 21'	5' 5'	25' 20'	55	PEDESTAL LIFT, RISING STEMS, SS
61+25 35'L			PROCESS WATER	16"	CIP															55	BEGIN 15' NEW PIPE
61+45 35'L			PROCESS WATER	24"	CIP															55	BEGIN 60' NEW PIPE
62+10 30'L		NONE	PROCESS WATER						W2	PRECAST	48"ϕ	573.9	27.1	546.8	24"	FLAT BACK	23'	5'	20'	55	PEDESTAL LIFT, RISING STEM, CRS
66+00 65'L				12"	RCP															55	BEGIN APPROX. 125' OF NEW PIPE
67+10 30'L	24"	RCP	STORM WATER						W3	PRECAST	48"ϕ	573.9	27.6	546.3	24"	FLAT BACK	23'	5'	20'	55	PEDESTAL LIFT, RISING STEM, CRS
0+10E 45'L	48"	RCP	SANITARY						W4	CIP	4'X6'	573.9	24.7	549.2	48"	FB	20'	5'	20'	55	PEDESTAL LIFT, RISING STEM, SS
0+50 48'L	78"	RCP	SANITARY						W5	CIP	4'X9'	573.9	31.7	542.2	78"	FB	27'	5'	25'	55	PEDESTAL LIFT, RISING STEM, SS
3+60E 12'L	24"	RCP	ABANDONED																	55	REMOVE APPROX. 90'
4+00E	36"	RCP	ABANDONED																	55	REMOVE APPROX. 120' AND MH
5+55E 25'L	24"	RCP	ABANDONED																	55	REMOVE APPROX. 60'

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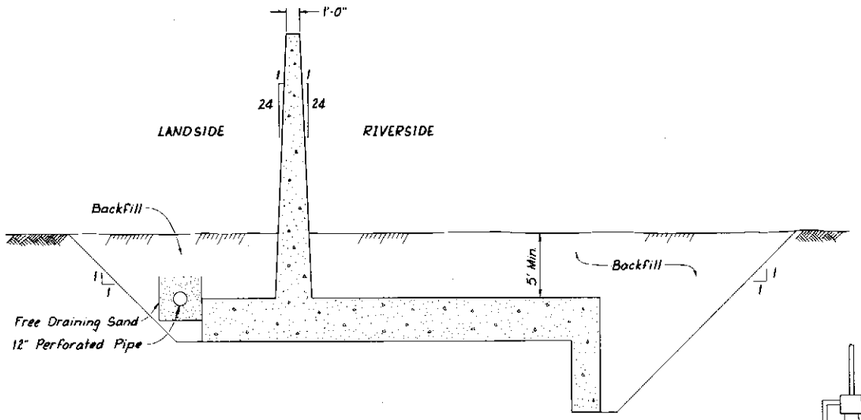
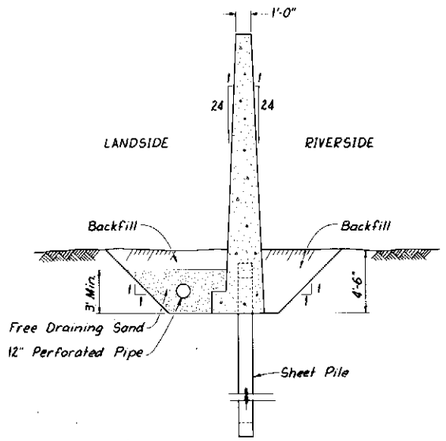
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

SEWER AND GATEWELL
SCHEDULE II

SHEET DRAWING NO.
INVITATION NO. DACW25 - -B-

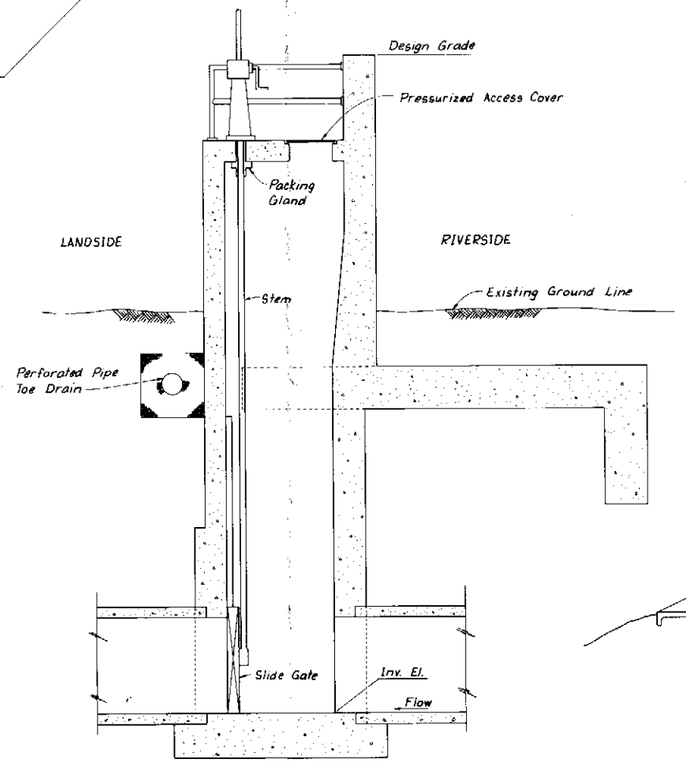


TEE WALL

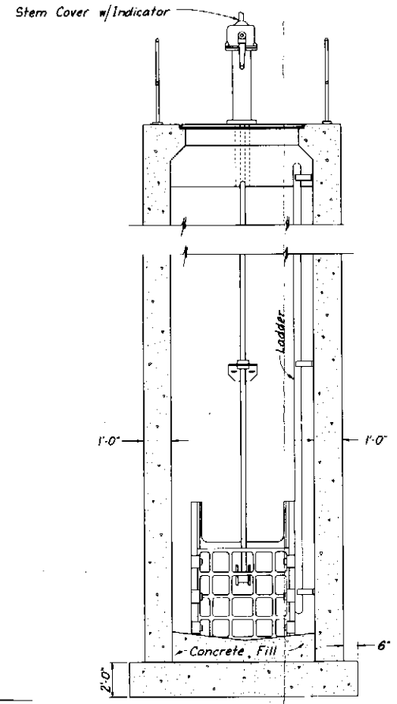


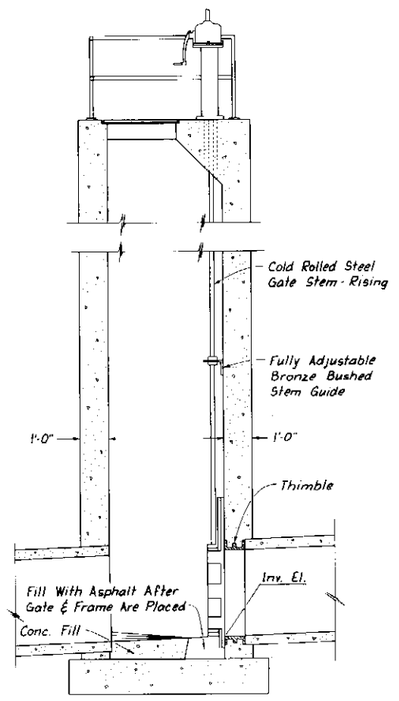
I - WALL

TYPICAL FLOODWALL DETAILS

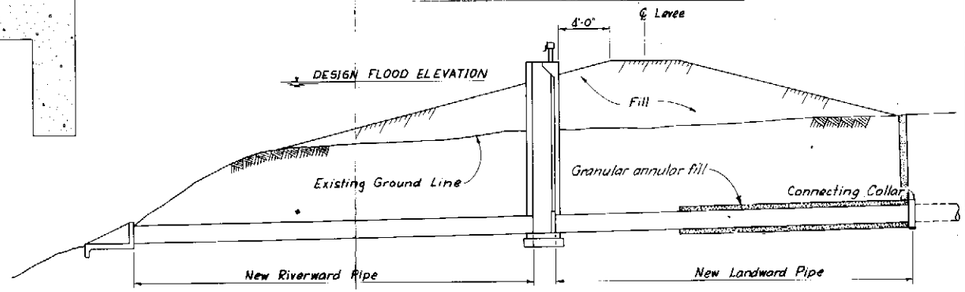


TYPICAL CAST-IN-PLACE GATEWELL - FLOOD WALL SECTION





TYPICAL CAST-IN-PLACE GATEWELL



TYPICAL GATEWELL - LEVEE SECTION

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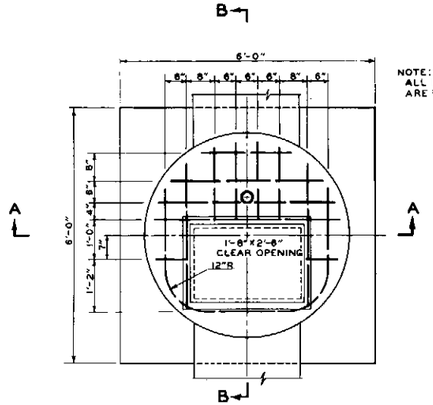
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

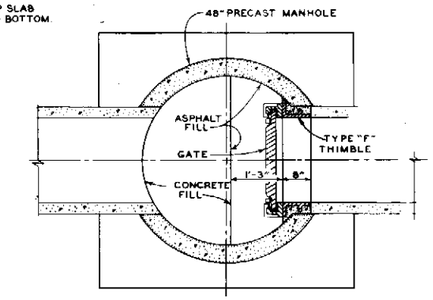
TYPICAL FLOODWALL
AND GATEWELL SECTIONS

No Scale

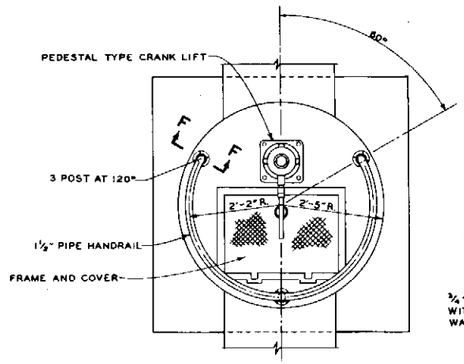
SHEET DRAWING NO.
INVITATION NO. DACW25 - - 8 -



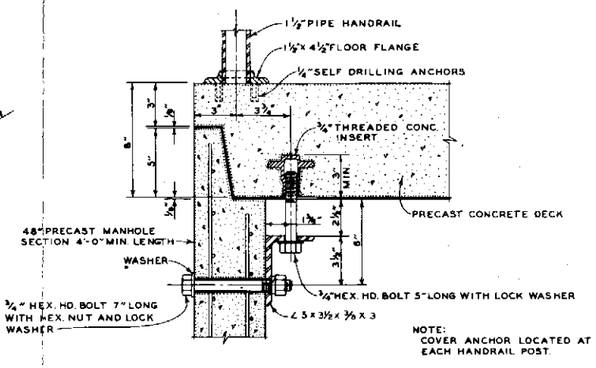
PLAN OF TOP SLAB



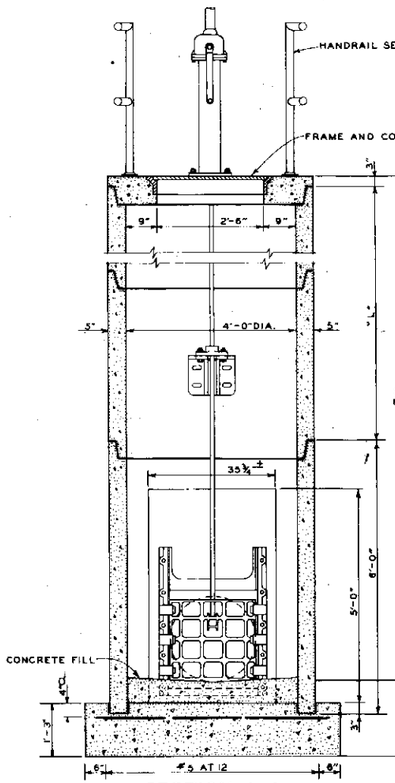
SECTION C-C



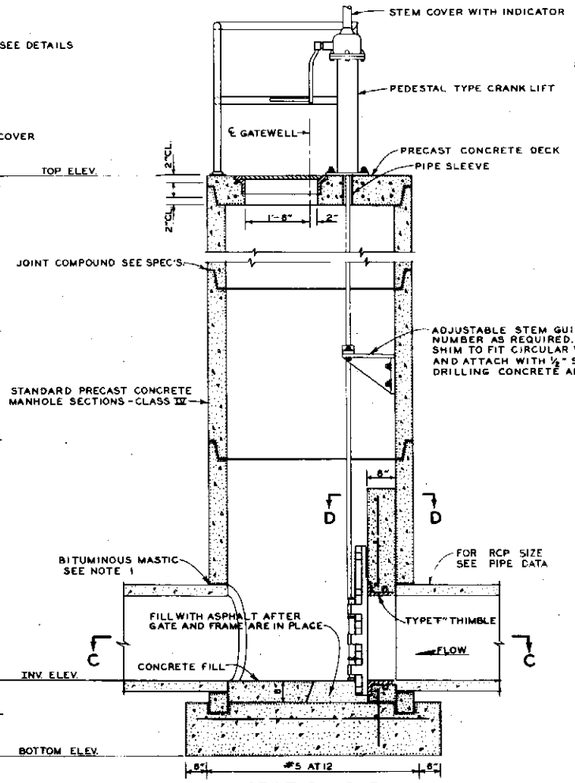
RAILING LOCATION PLAN



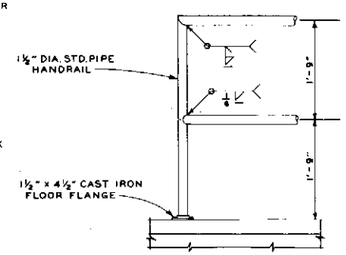
SECTION F-F
NO SCALE



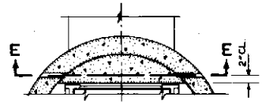
SECTION A-A



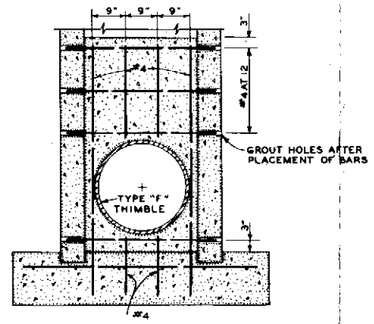
SECTION B-B



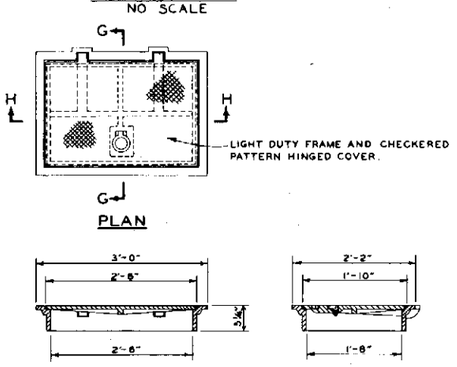
RAILING DETAIL
NO SCALE



SECTION D-D



SECTION E-E



PLAN

SECTION H-H

SECTION G-G

MANHOLE FRAME AND COVER DETAILS
NO SCALE

NOTES:

1 PLACE ⅜" PREMOLDED BITUMINOUS JOINT FILLER AT ALL POINTS OF CONTACT BETWEEN GATEWELL AND PIPE.
2 ALL ANCHOR BOLTS FOR GATES AND ACCESSORIES SHALL BE SUPPLIED BY THE GATE MANUFACTURER.
3 CONCRETE FILL IN BOTTOM OF GATEWELLS SHALL BE SLOPED TO DRAIN.

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MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

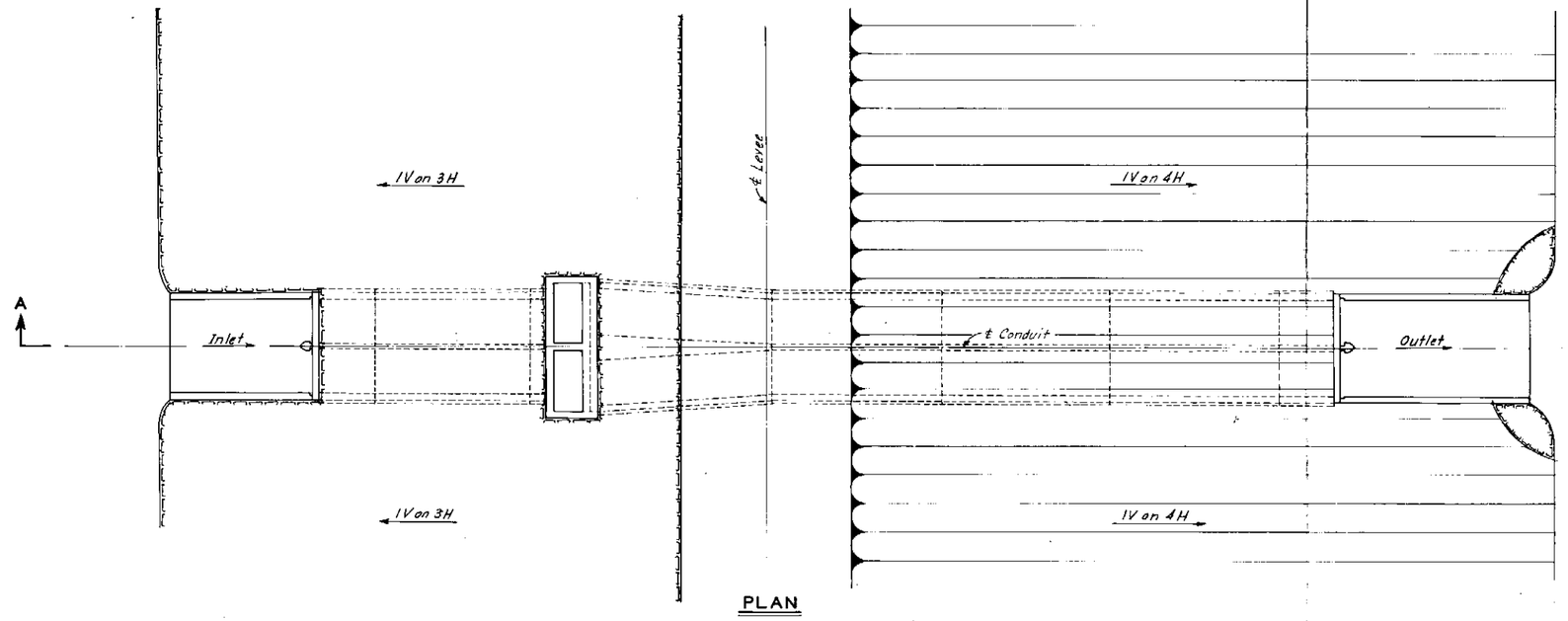
STANDARD PRECAST GATEWELLS

SCALE IN FEET

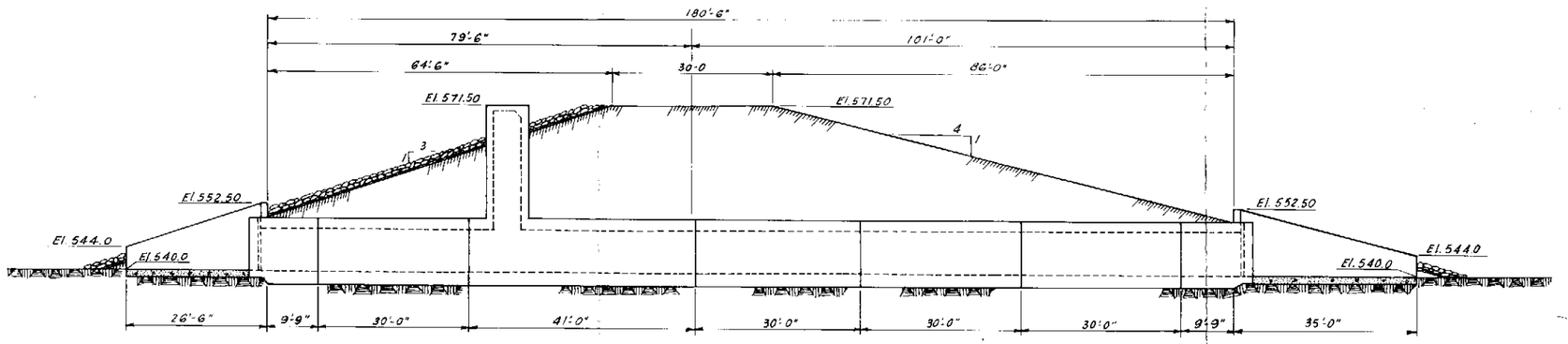
SHEET
DRAWING NO.
INVITATION NO. DACW25 R-

PLATE 35

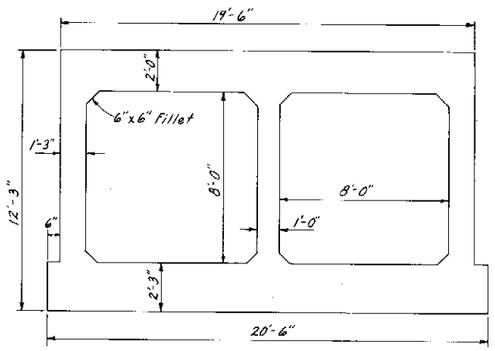
CORPS OF ENGINEERS U. S. ARMY



PLAN



SECTION A-A



TYPICAL SECTION

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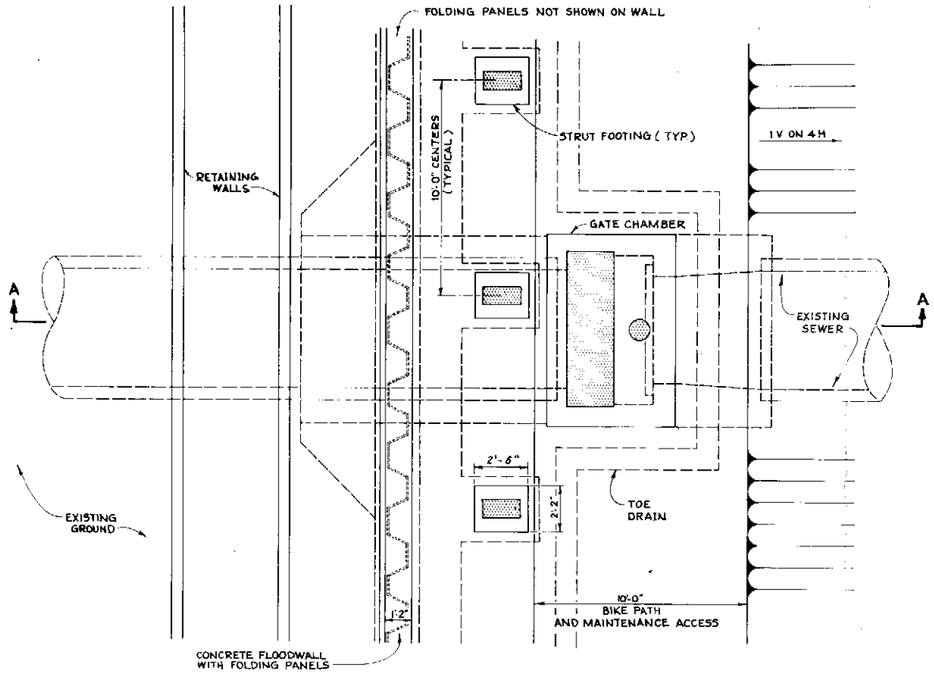
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
CREDIT ISLAND SLOUGH
INLET
PLAN AND PROFILE

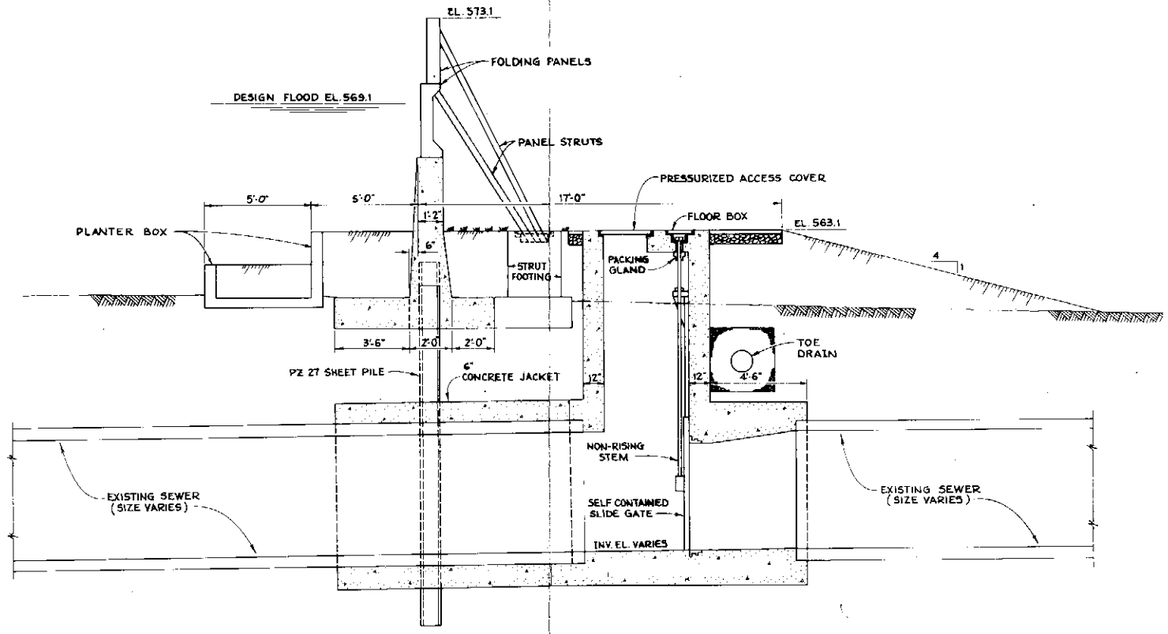
10 0 10 20
SCALE IN FEET

SHEET DRAWING NO.
INVITATION NO. DACW25 - - -

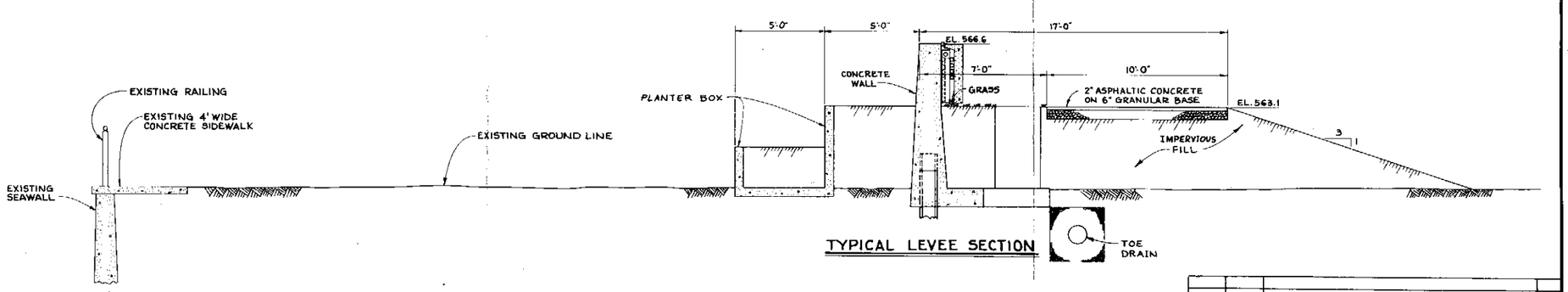
PLATE 36



DETAIL PLAN
FLOODWALL AT SEWER LINE CROSSING



SECTION A-A



TYPICAL LEVEE SECTION

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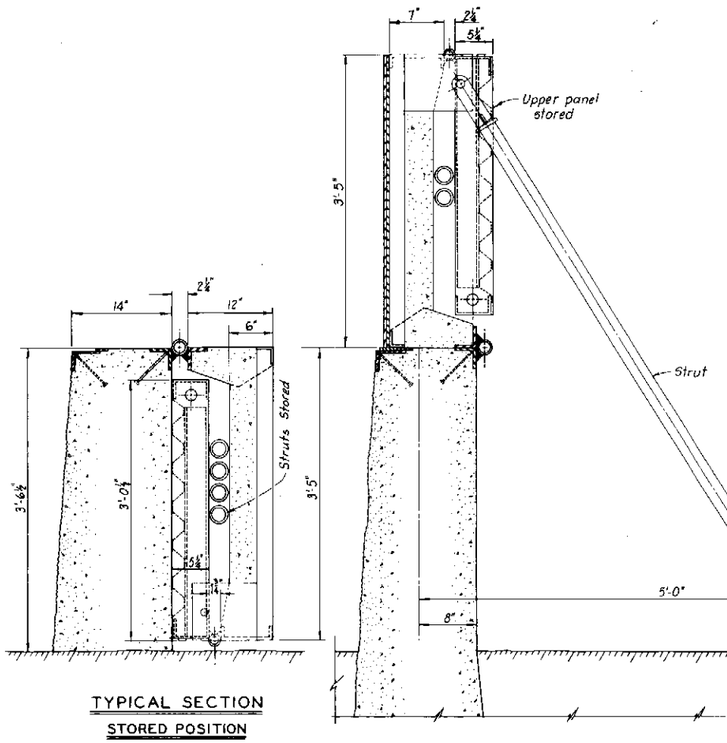
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
FOLDING WALL
TYPICAL SECTIONS

SCALE IN FEET

SHEET
DRAWING NO.
INVITATION NO DACW25 - -B-

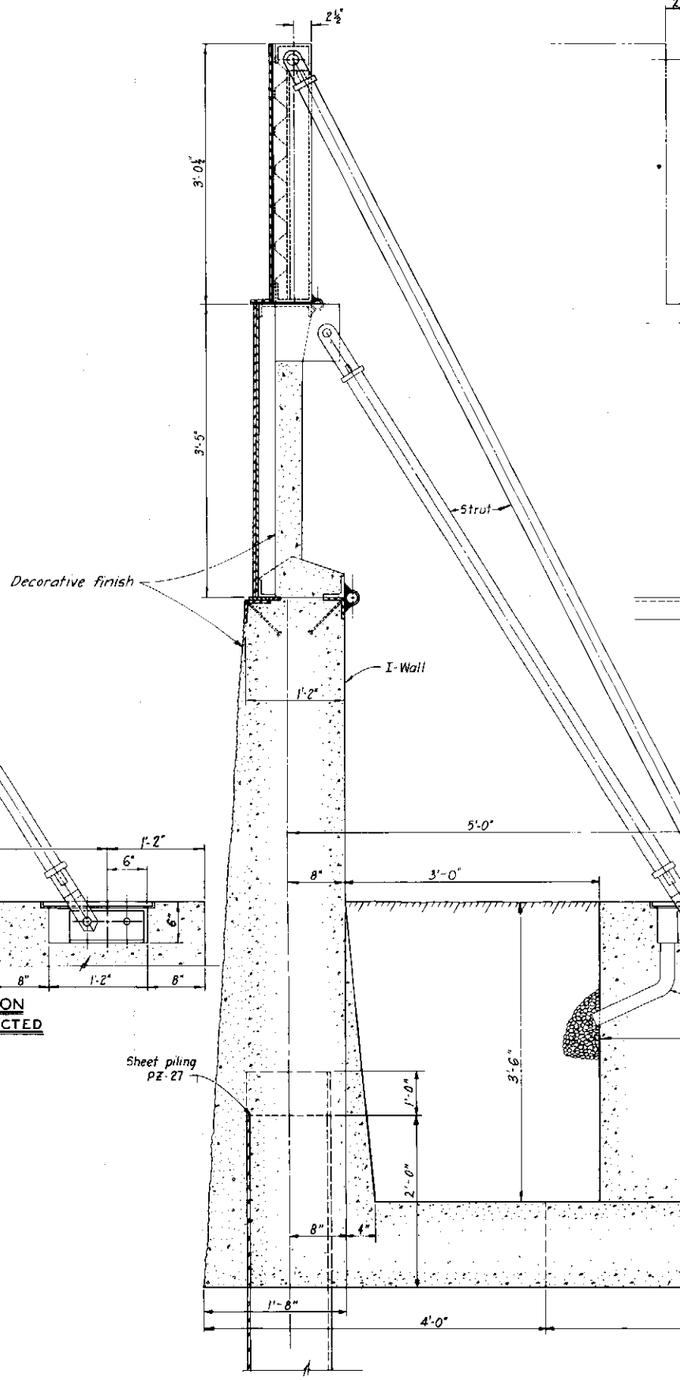
CORPS OF ENGINEERS

U. S. ARMY

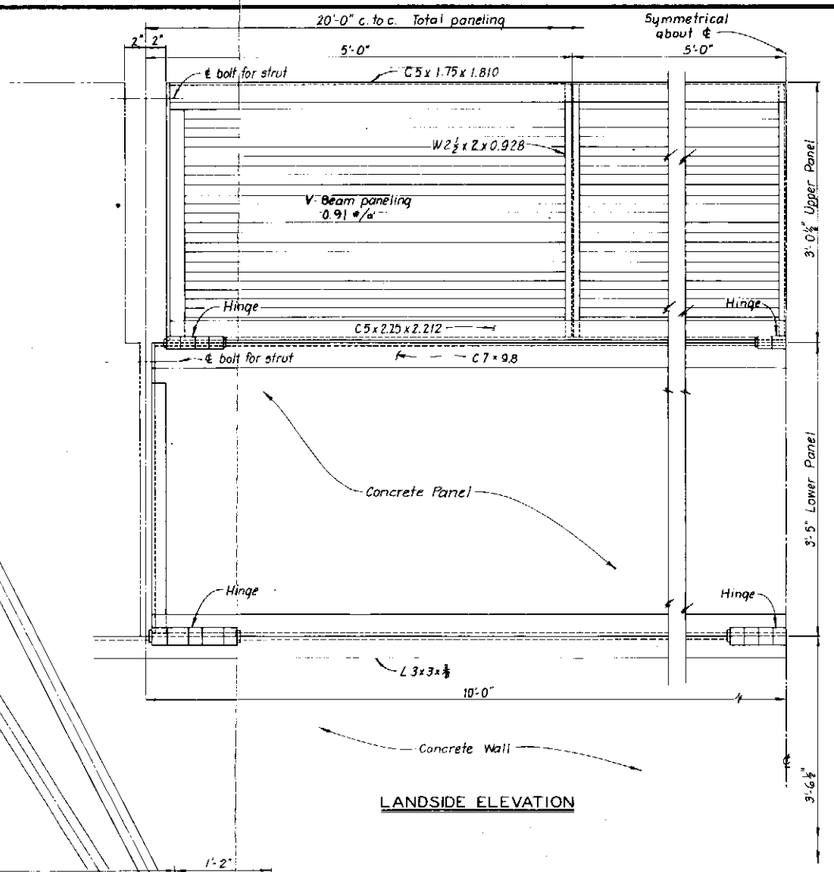


TYPICAL SECTION
STORED POSITION

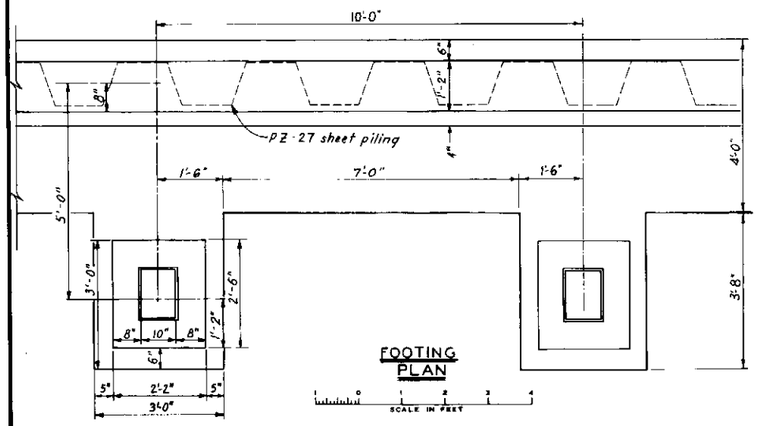
TYPICAL SECTION
LOWER PANELS ERECTED



TYPICAL SECTION
WALL W/ UPPER & LOWER
PANELS ERECTED



LANDSIDE ELEVATION



FOOTING
PLAN

SCALE IN FEET

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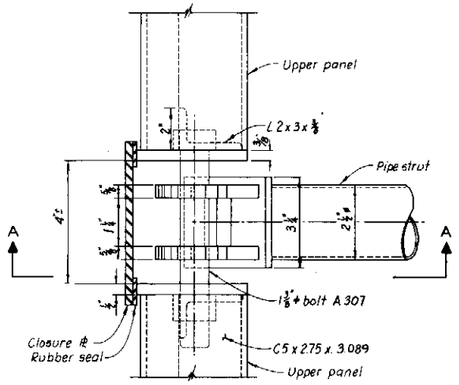
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
FOLDING WALL

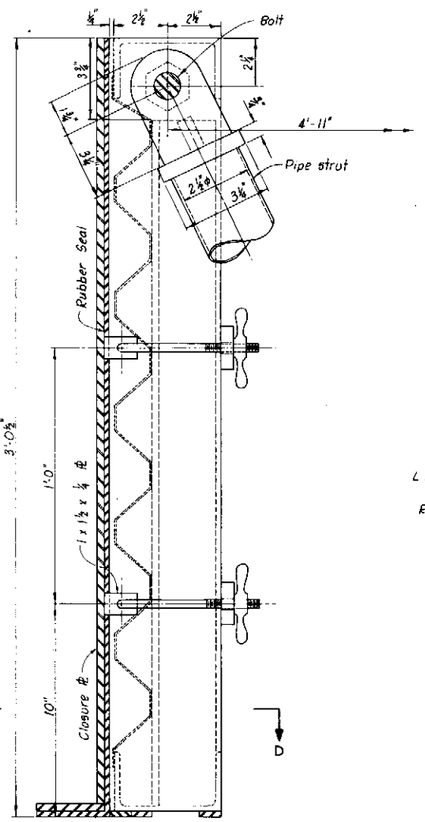
SCALE IN INCHES

SHEET
DRAWING NO.
INVITATION NO. DACW25 - - B -

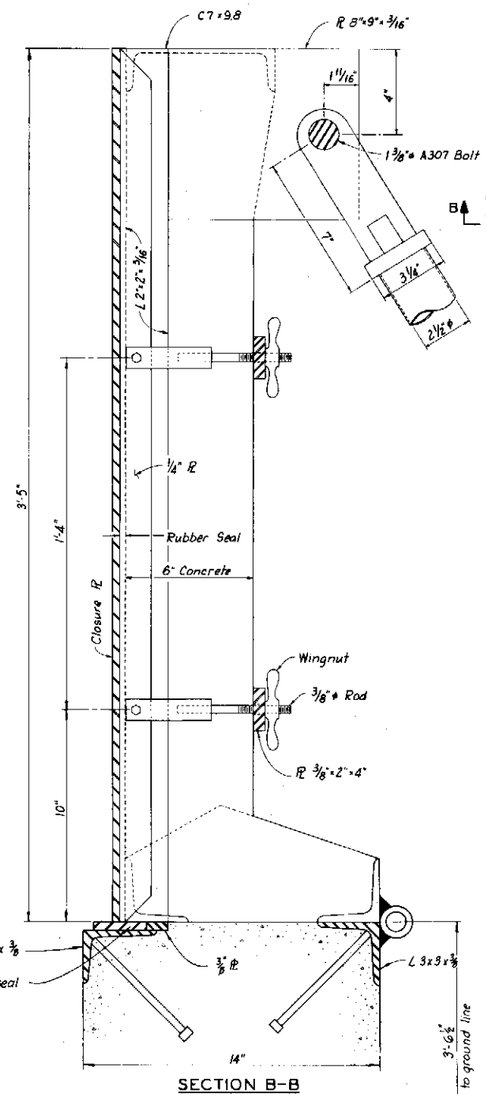
PLATE 38



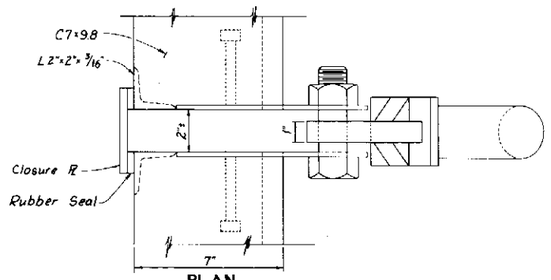
PLAN
UPPER PANEL
STRUT CONNECTION



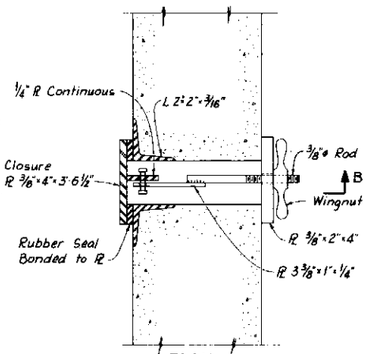
SECTION A-A



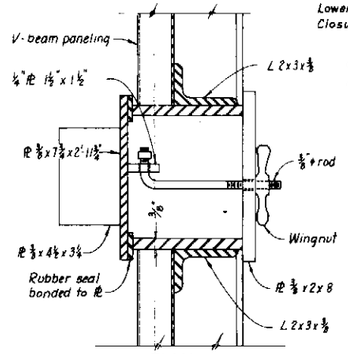
SECTION B-B



PLAN
LOWER PANEL
STRUT CONNECTION

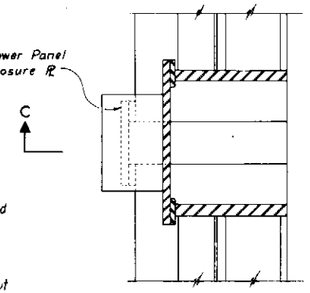


PLAN
LOWER PANELS

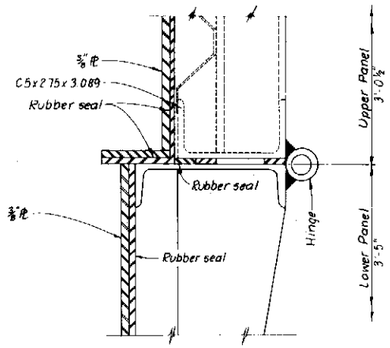


PLAN
UPPER PANELS

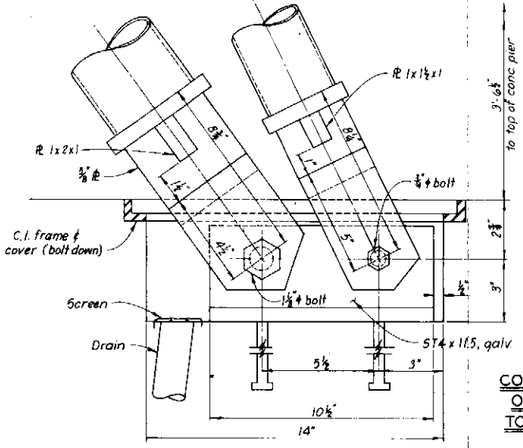
CLOSURE BETWEEN PANELS



SECTION D-D

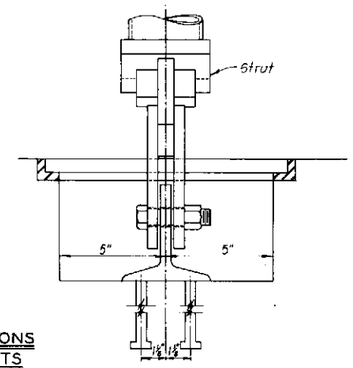


SECTION C-C



ELEVATION VIEW

CONNECTIONS OF STRUTS TO FOOTINGS



END VIEW

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
RECOMMENDED:
CHIEF, ENGINEERING DIVISION
APPROVED:
COL., CORPS OF ENGINEERS
DISTRICT ENGINEER
ROCK ISLAND DISTRICT
DATE:

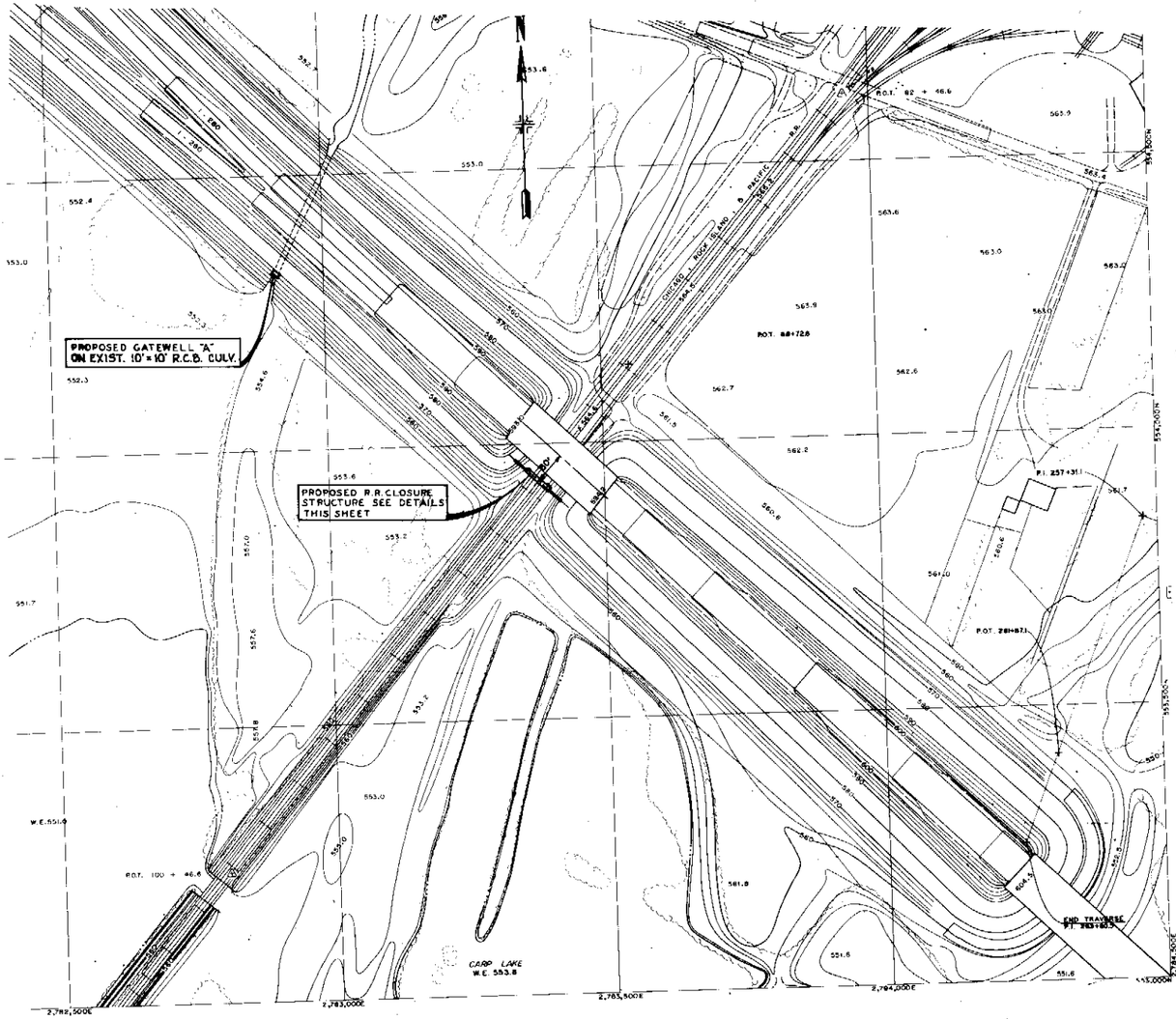
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
FOLDING WALL
DETAILS

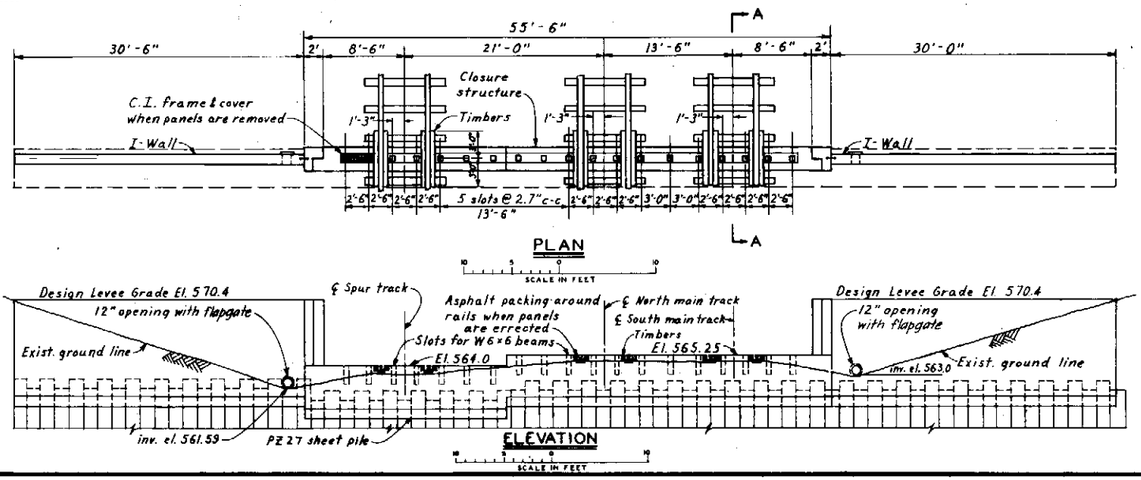
SCALE IN INCHES

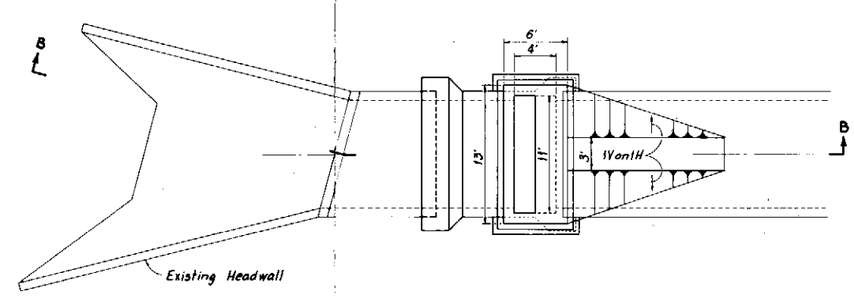
SHEET
DRAWING NO.
INVITATION NO. DACW25 - - B -

CORPS OF ENGINEERS

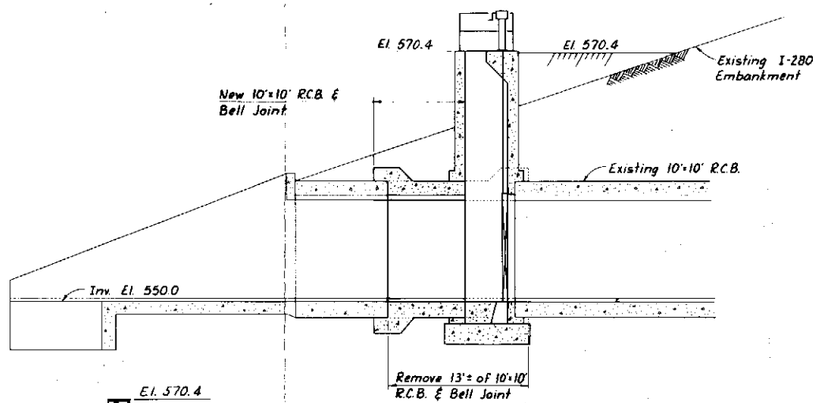
U. S. ARMY







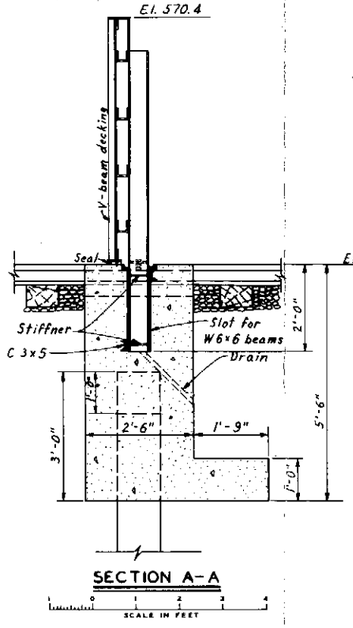
PLAN



SEC. B-B

GATEWELL "A"

SCALE IN FEET



SECTION A-A

SCALE IN FEET

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

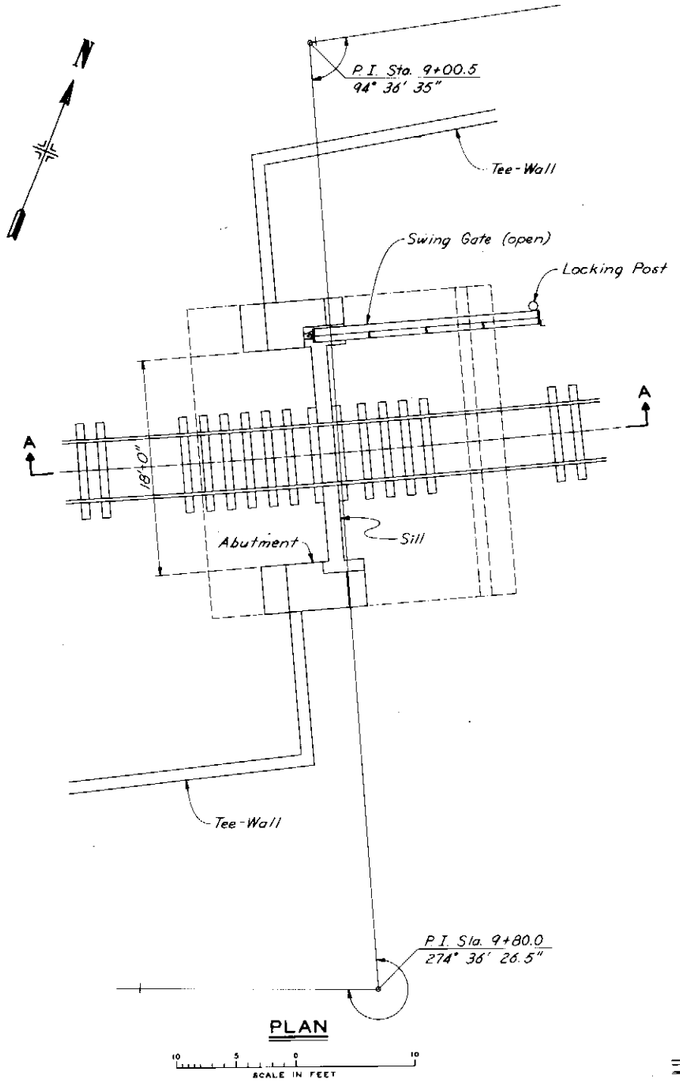
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
I-280 RAILROAD CLOSURE AND GATEWELL

SCALE AS SHOWN

SHEET
DRAWING NO
INVITATION NO DACW25 - -B-

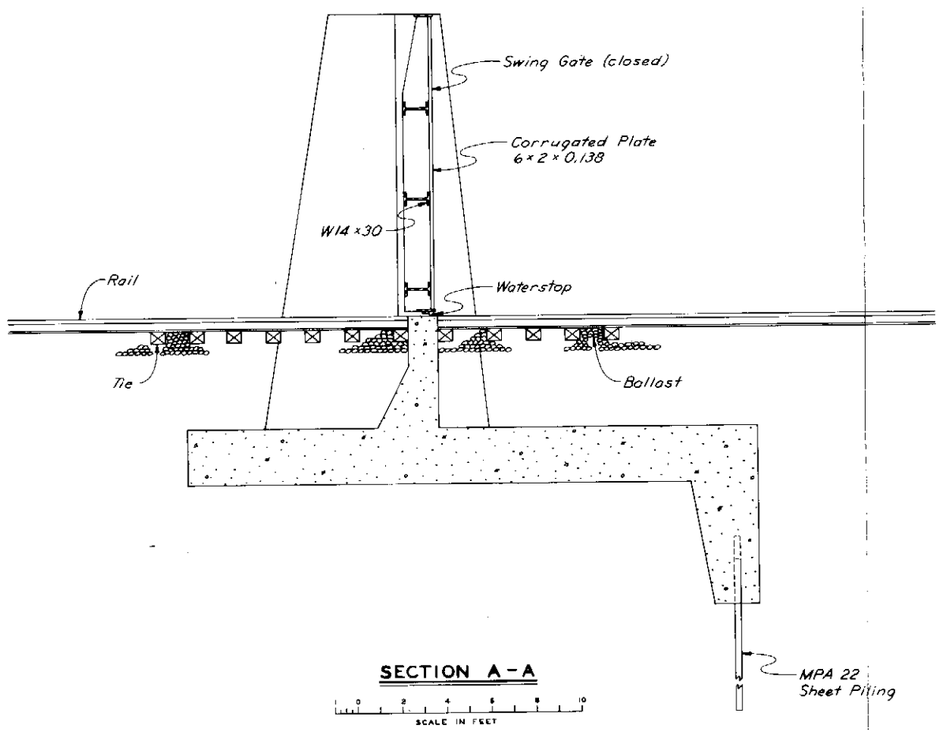
CORPS OF ENGINEERS

U. S. ARMY



PLAN

10 5 0 10
SCALE IN FEET



SECTION A-A

0 2 4 6 8 10
SCALE IN FEET

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY: B.P.
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

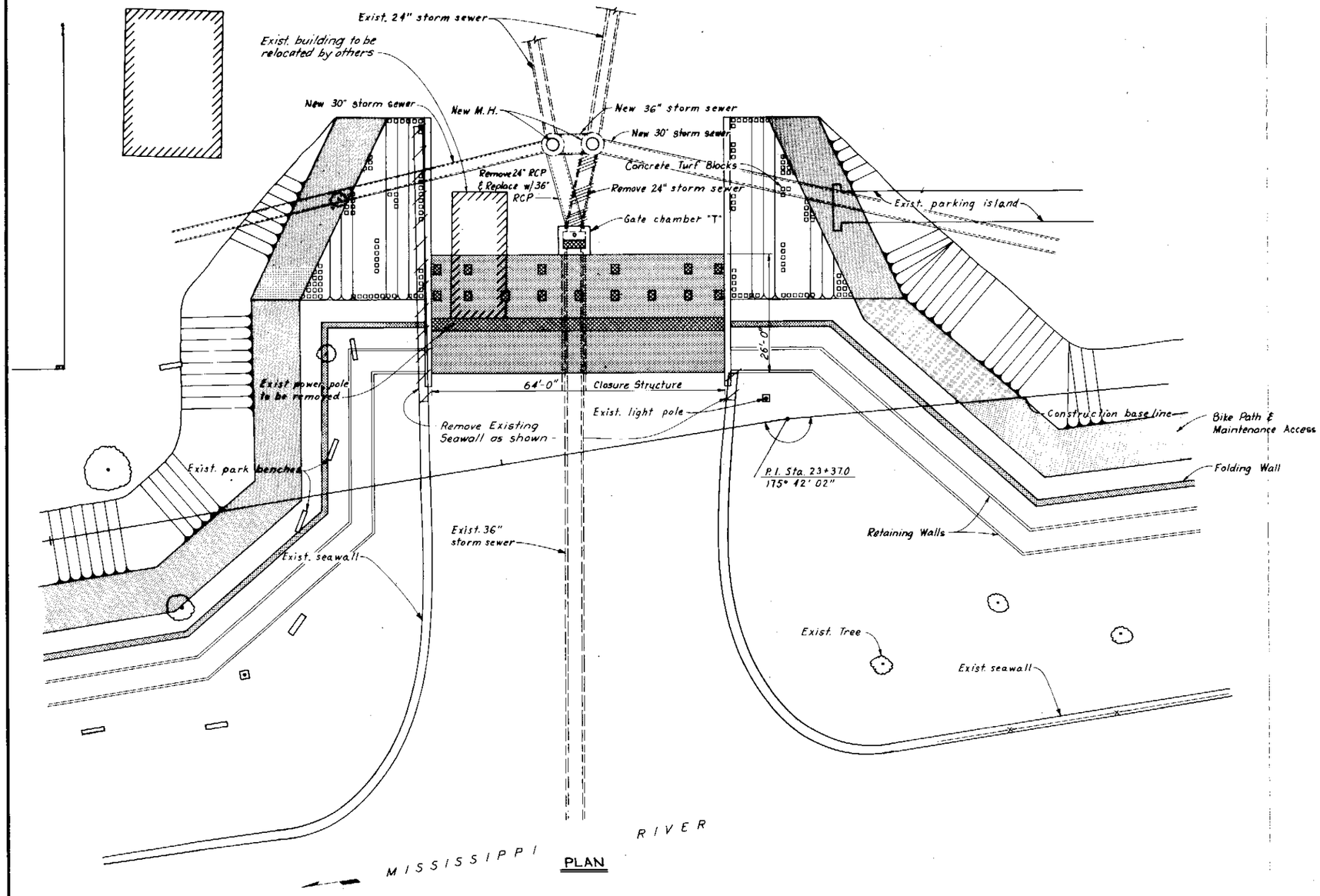
RAILROAD CLOSURE
NEAR
PERSHING STREET

SCALE AS SHOWN
SHEET DRAWING NO.
INVITATION NO. DACW25 - 8 -

PLATE 41

CORPS OF ENGINEERS

U. S. ARMY



PLAN

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

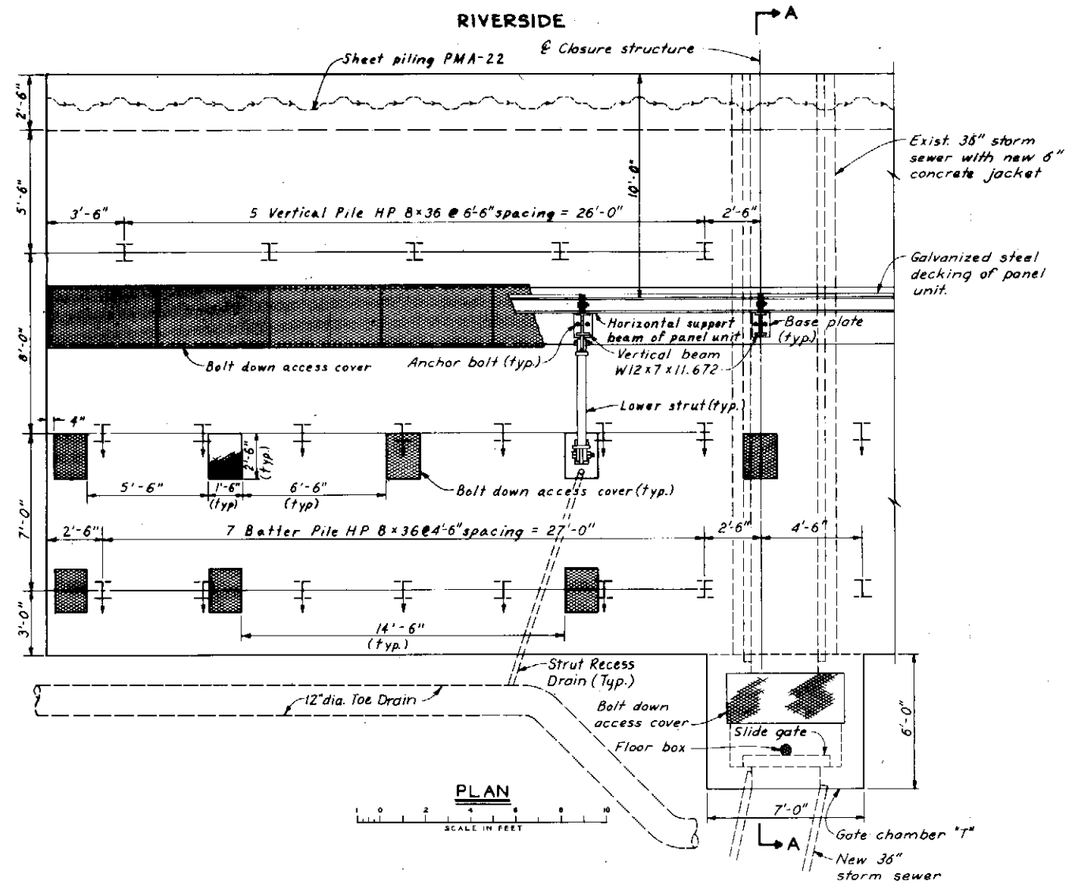
MAIN STREET
CLOSURE STRUCTURE

10 0 10 20 30
SCALE IN FEET

SHEET DRAWING NO.
INVITATION NO. DACW25 - - B -

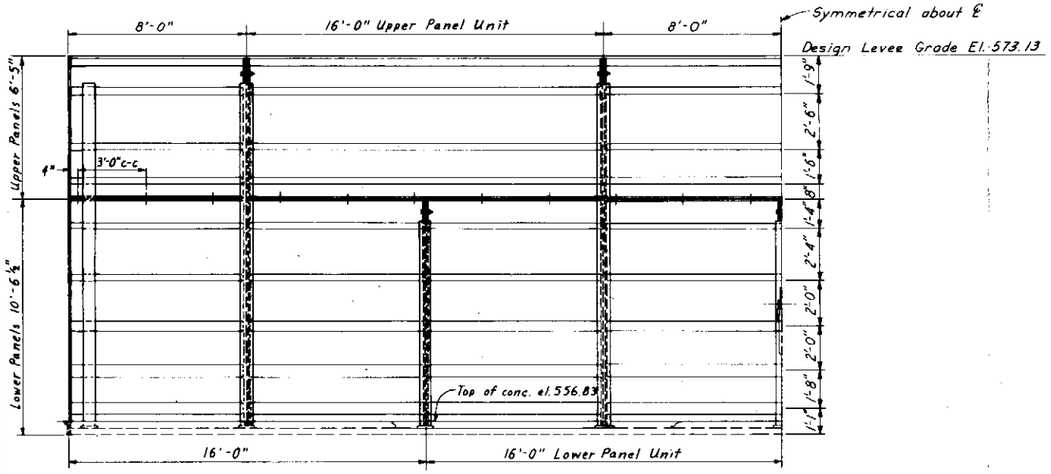
PLATE 43

RIVERSIDE



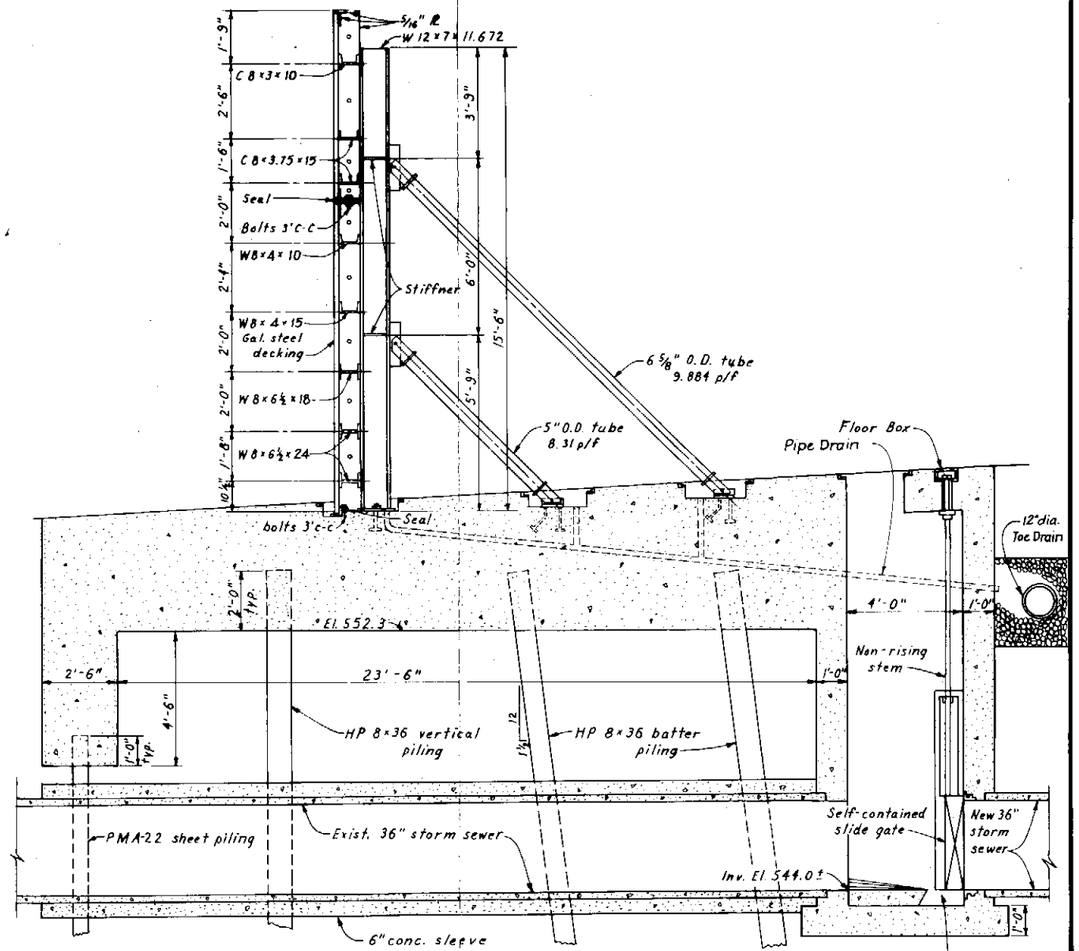
PLAN

SCALE IN FEET



ELEVATION

SCALE IN FEET



SECTION A-A

SCALE IN FEET

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

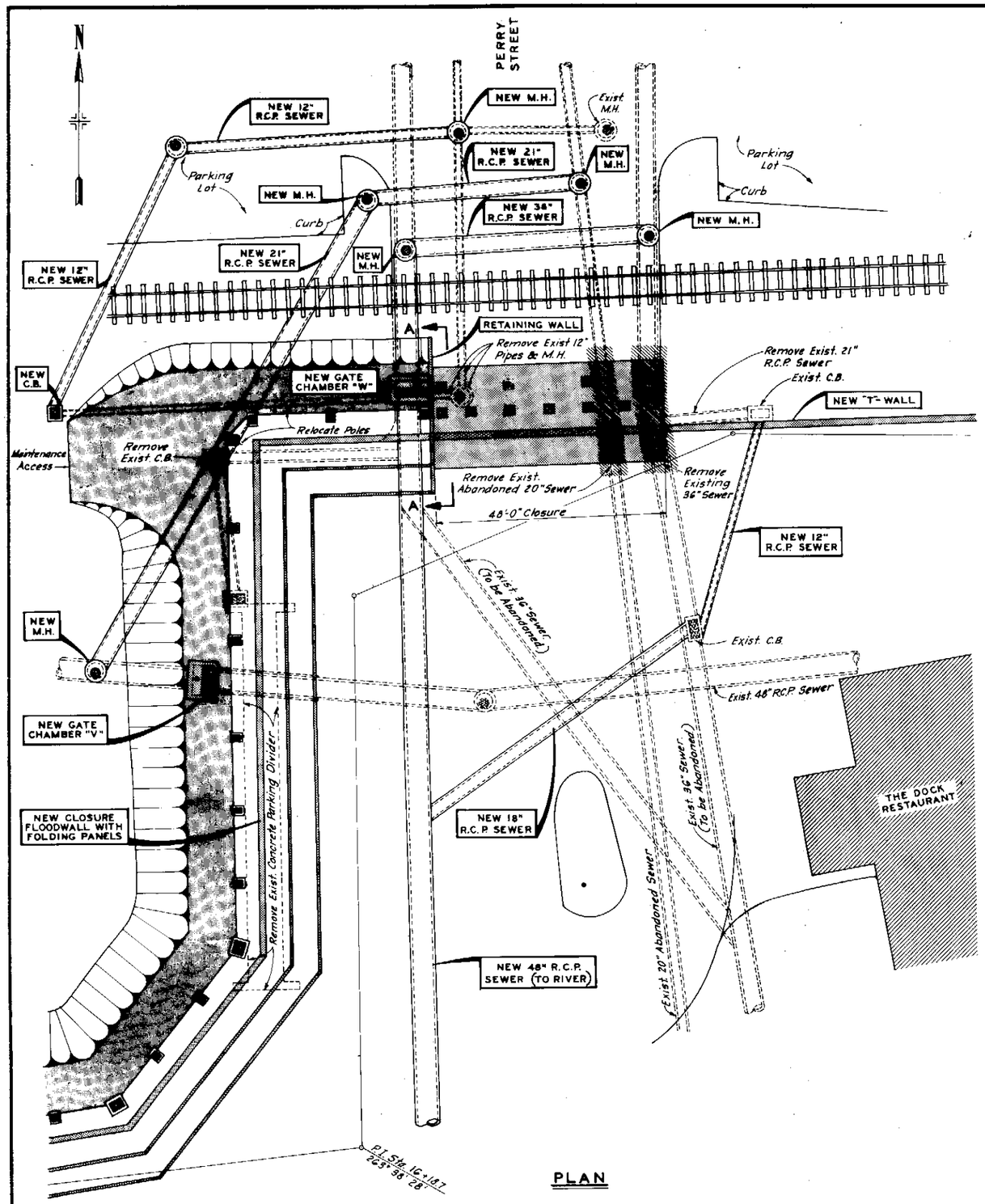
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
MAIN ST.
CLOSURE STRUCTURE
DETAILS

SCALE AS SHOWN

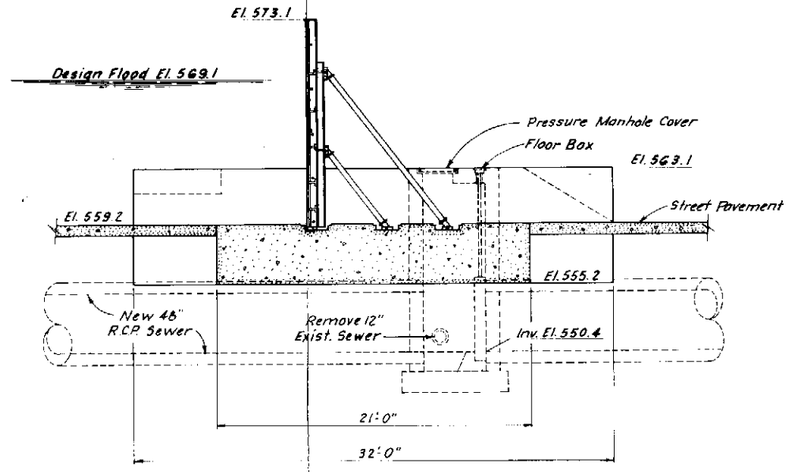
SHEET DRAWING NO.
INVITATION NO. DACW25- -B-

CORPS OF ENGINEERS

U. S. ARMY



PLAN



SECTION A-A

SCALE IN FEET

REVISION	DATE	DESCRIPTION	BY

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

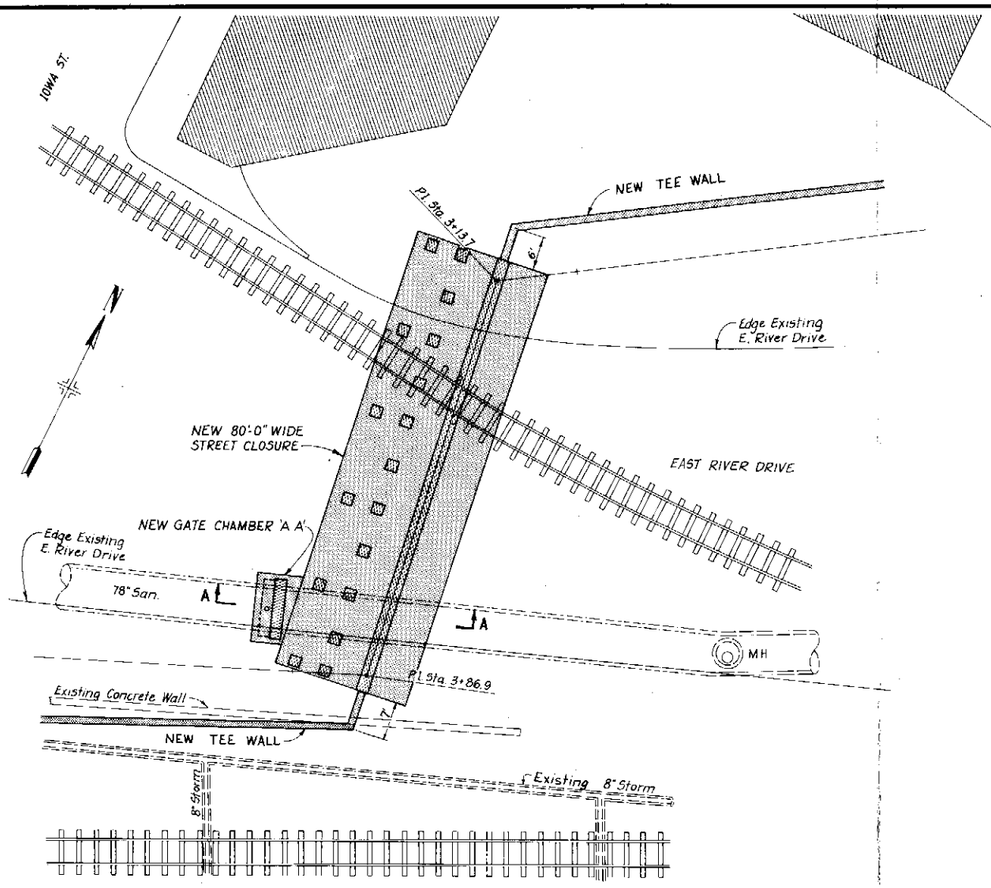
DRAWN BY: A.W.M'S.
TRACED BY:
CHECKED BY
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

PERRY STREET
CLOSURE STRUCTURE

SCALE IN FEET

SHEET DRAWING NO.
INVITATION NO. DACW25 - - B -



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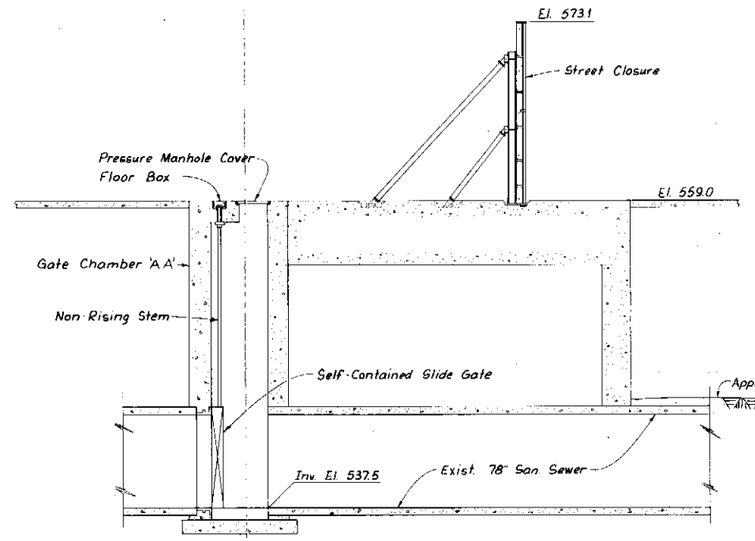

SECTION A-A

SCALE IN FEET

REVISION	DATE	DESCRIPTION	BY

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

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CHECKED BY:
SUBMITTED:
CHIEF DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

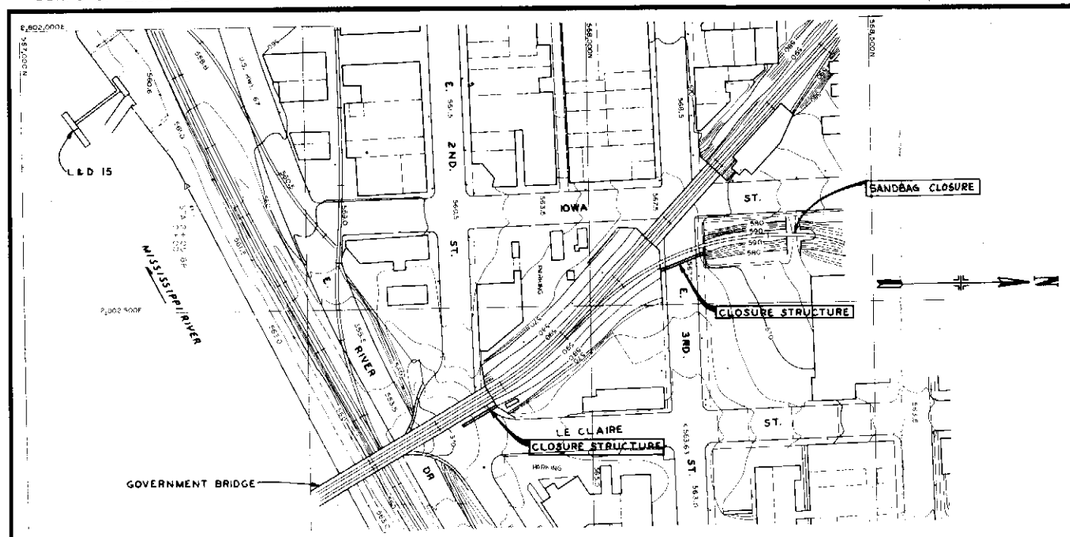
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
RIVER DRIVE
CLOSURE STRUCTURE

SCALE IN FEET

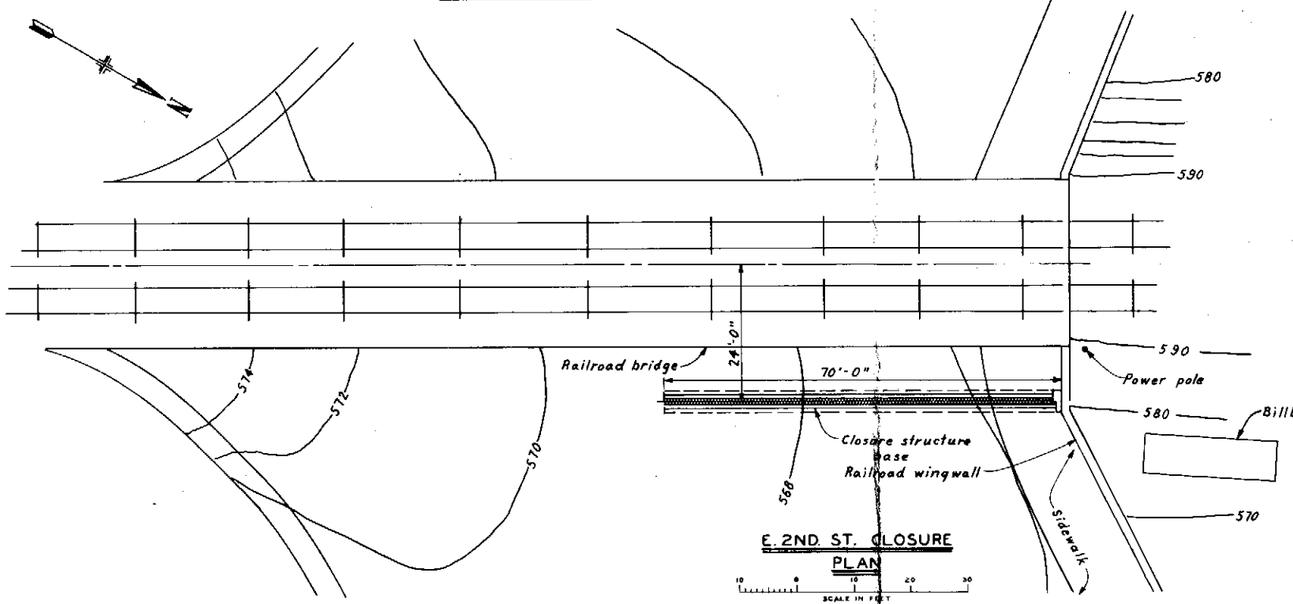
SHEET DRAWING NO.
INVITATION NO. DACW25 - - B -

CORPS OF ENGINEERS

U. S. ARMY

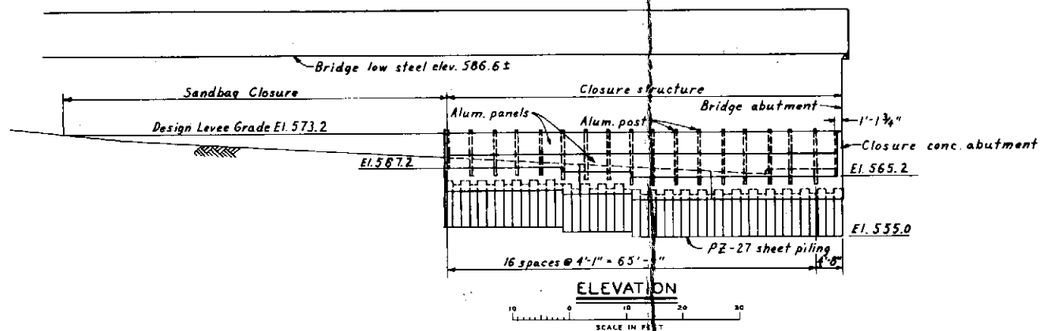


LOCATION PLAN



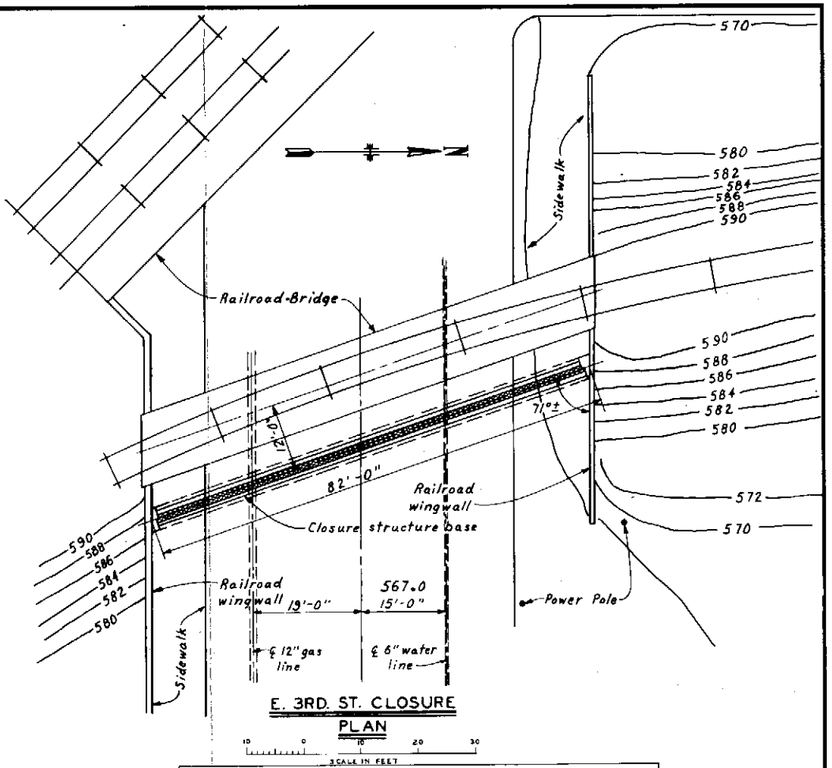
E. 2ND. ST. CLOSURE PLAN

SCALE IN FEET



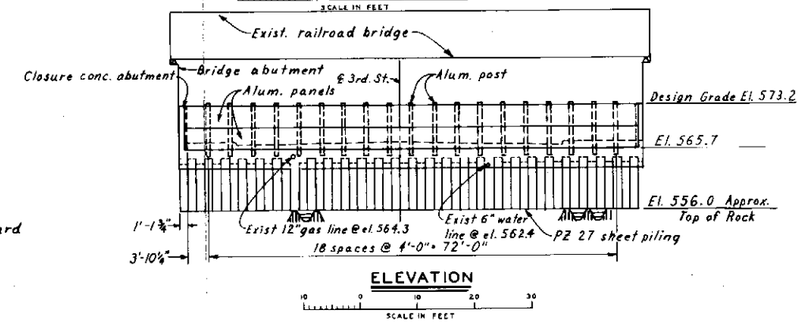
ELEVATION

SCALE IN FEET



E. 3RD. ST. CLOSURE PLAN

SCALE IN FEET



ELEVATION

SCALE IN FEET

REVISION	DATE	DESCRIPTION	BY

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

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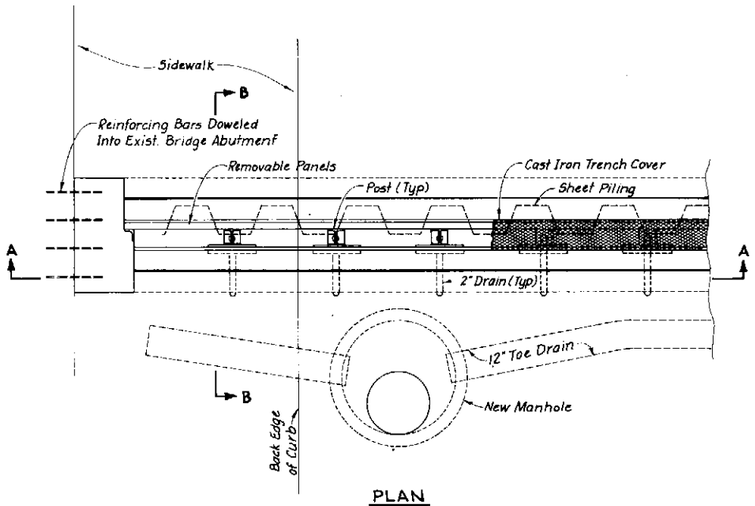
CHECKED BY:
SUBMITTED:
CHIEF DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
E. 3RD. ST. & E. 2ND. ST.
CLOSURE STRUCTURES

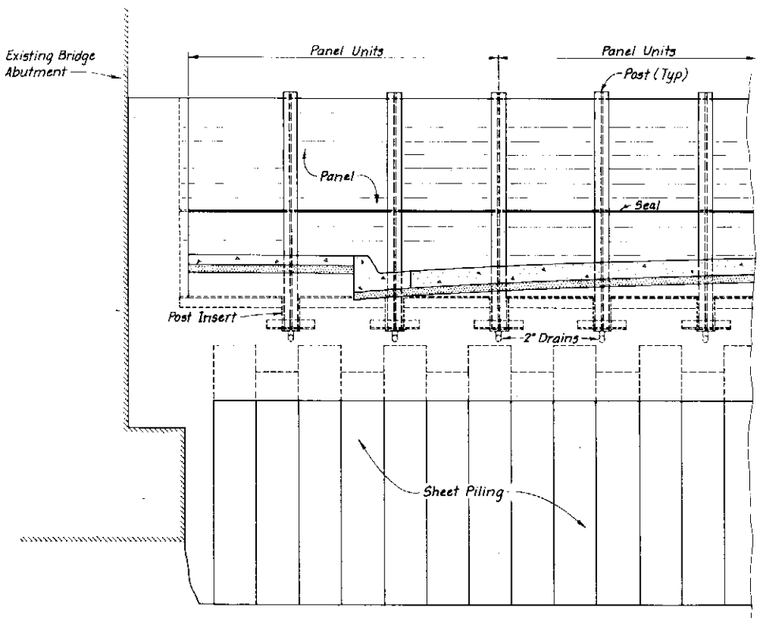
SCALE AS SHOWN

SHEET DRAWING NO.
INVITATION NO. DACW25- -B-

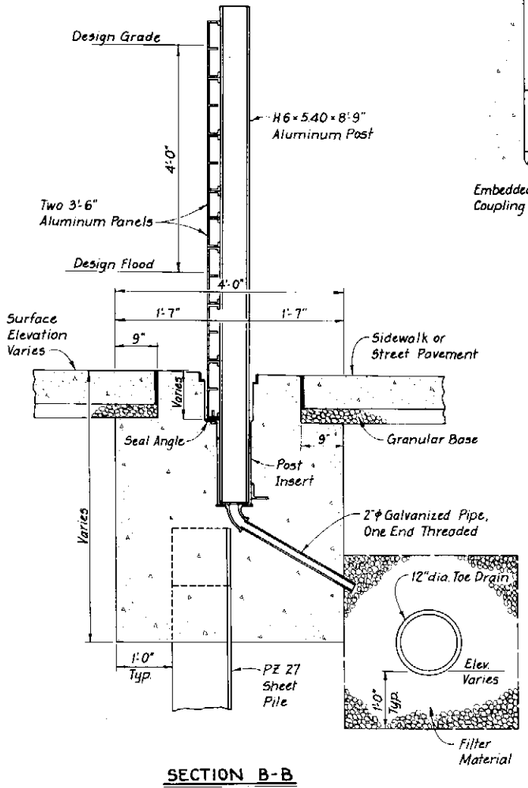
PLATE 47



PLAN

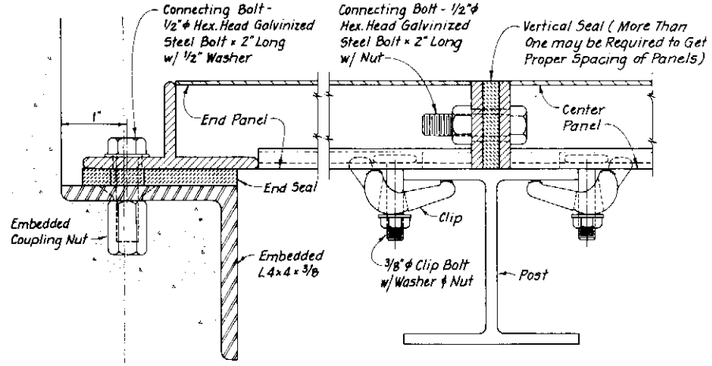


SECTION A-A



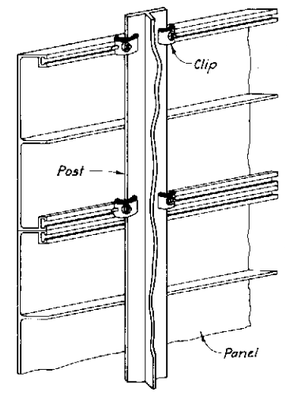
SECTION B-B

SCALE IN FEET



TYPICAL CONNECTION AND SEAL DETAIL

SCALE IN FEET



GENERAL VIEW
PANEL AND POST ASSEMBLY
(NO SCALE.)

REVISION	DATE	DESCRIPTION	BY

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

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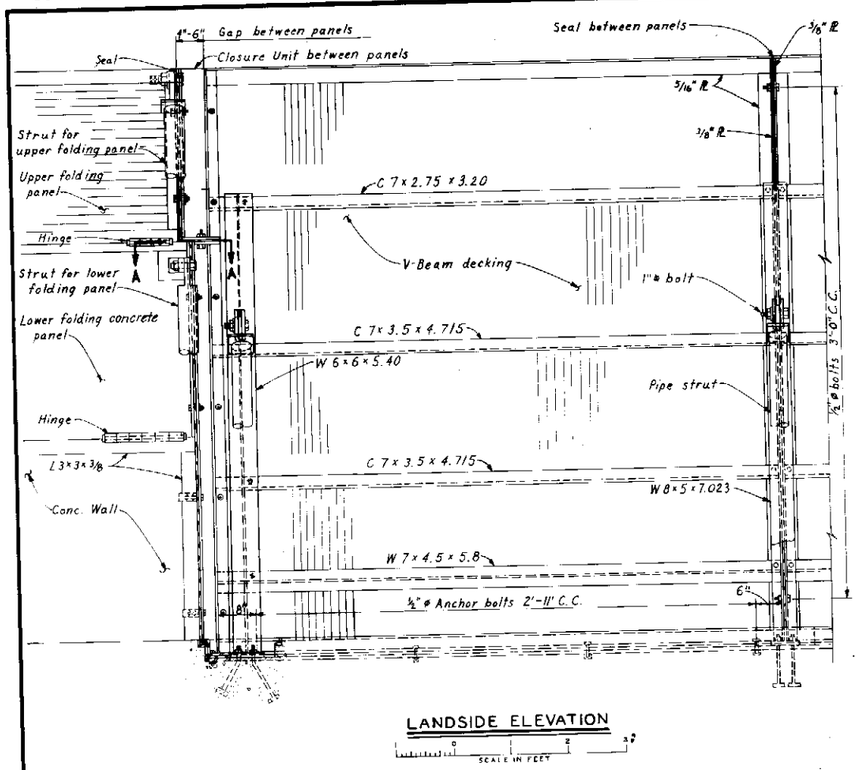
CHIEF DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
E. 3RD ST. & E. 2ND ST.
CLOSURE STRUCTURE DETAILS

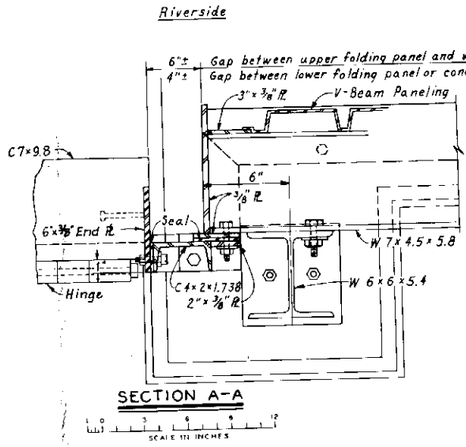
SCALE IN FEET

SHEET
DRAWING NO.
INVITATION NO DACW25 - - 8 -



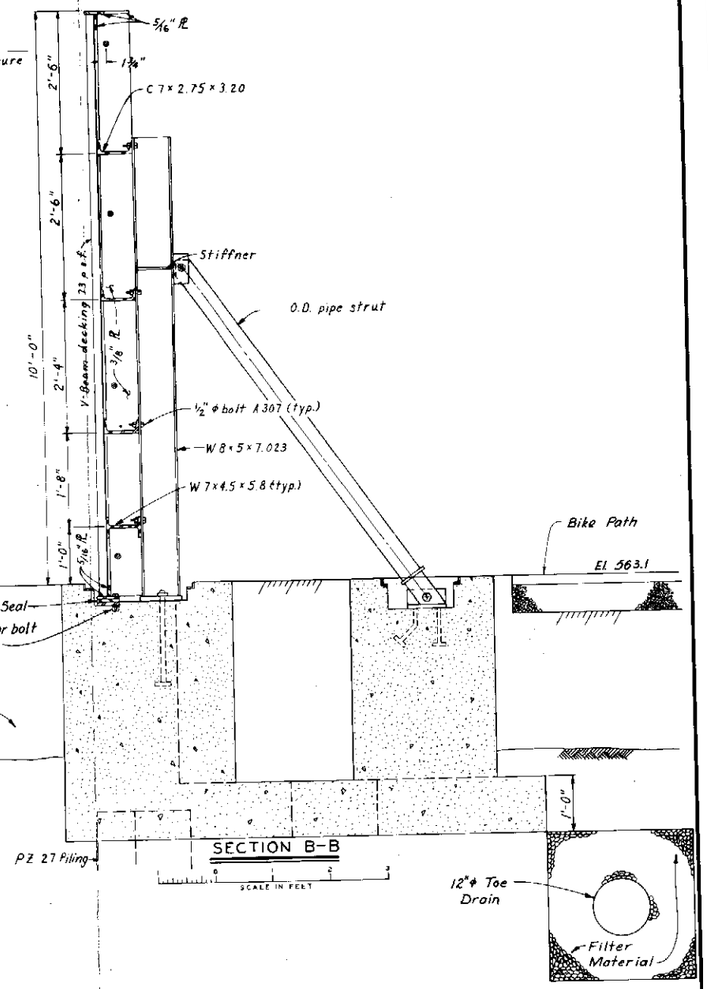
LANDSIDE ELEVATION

SCALE IN FEET



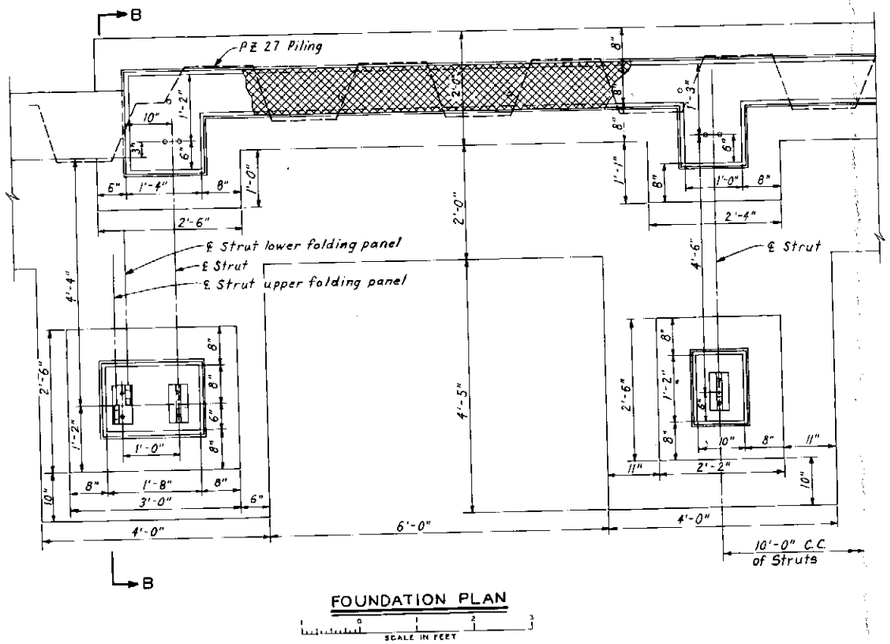
SECTION A-A

SCALE 1½ INCHES



SECTION B-B

SCALE IN FEET



FOUNDATION PLAN

SCALE IN FEET

REVISION	DATE	DESCRIPTION	BY

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

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TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

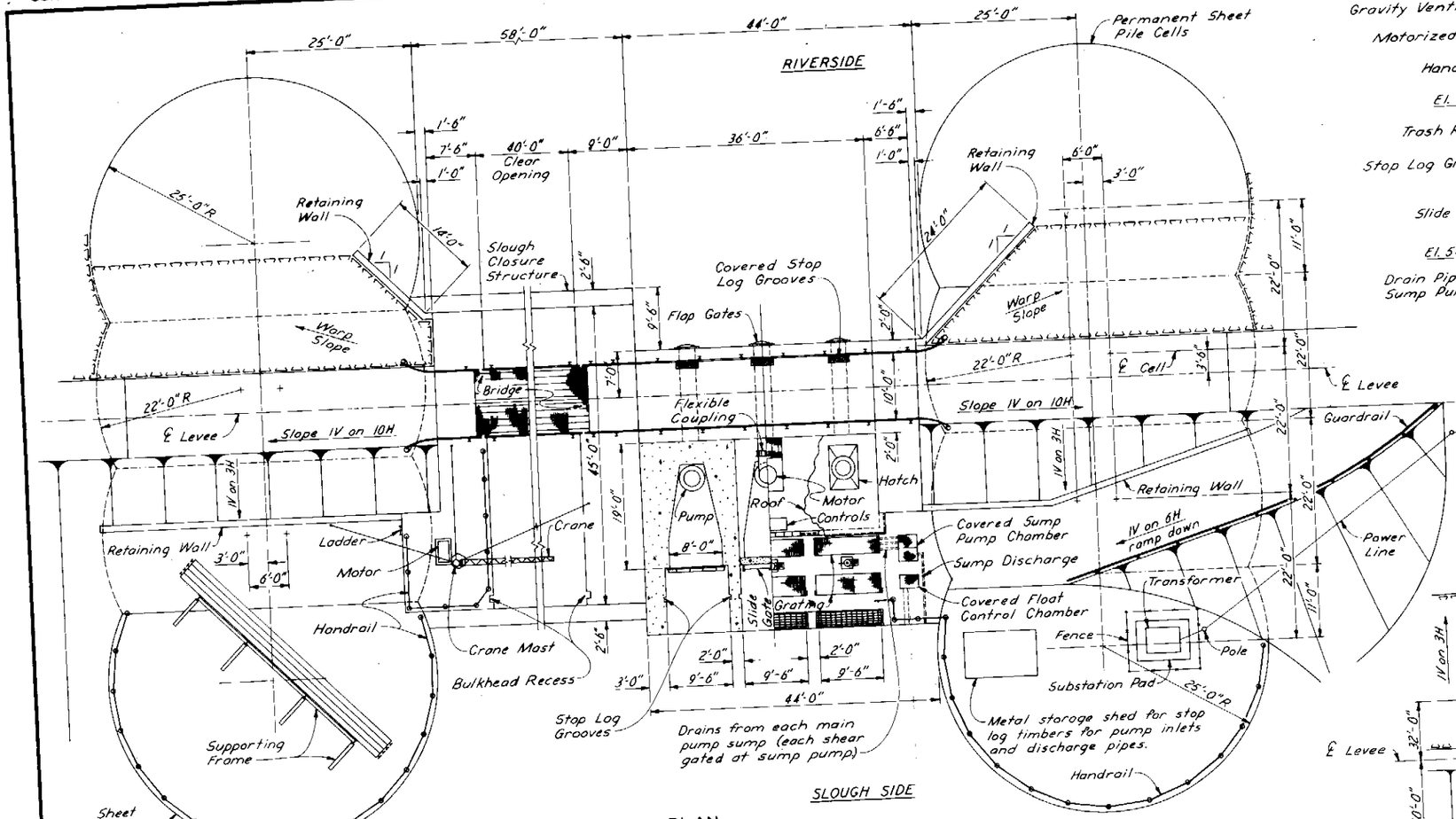
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
TYPICAL WALK-THROUGH
CLOSURE STRUCTURE

SCALE AS SHOWN

SHEET
DRAWING NO.
INVITATION NO. DACW25 - - 8 -

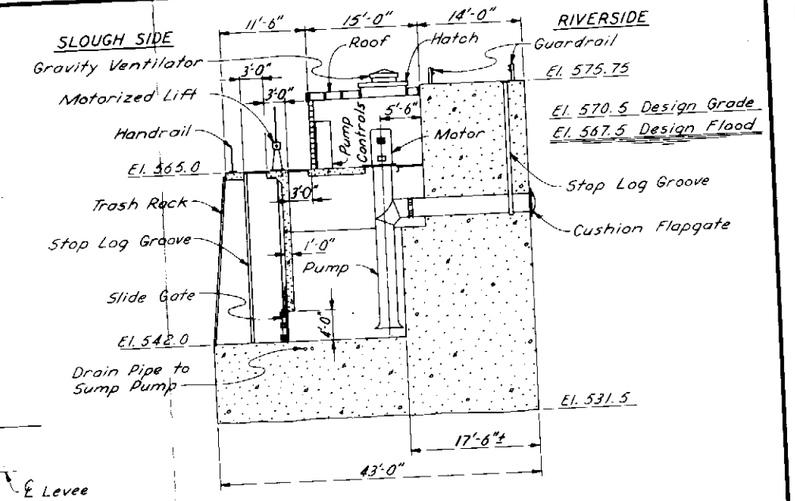
PLATE 49

CORPS OF ENGINEERS

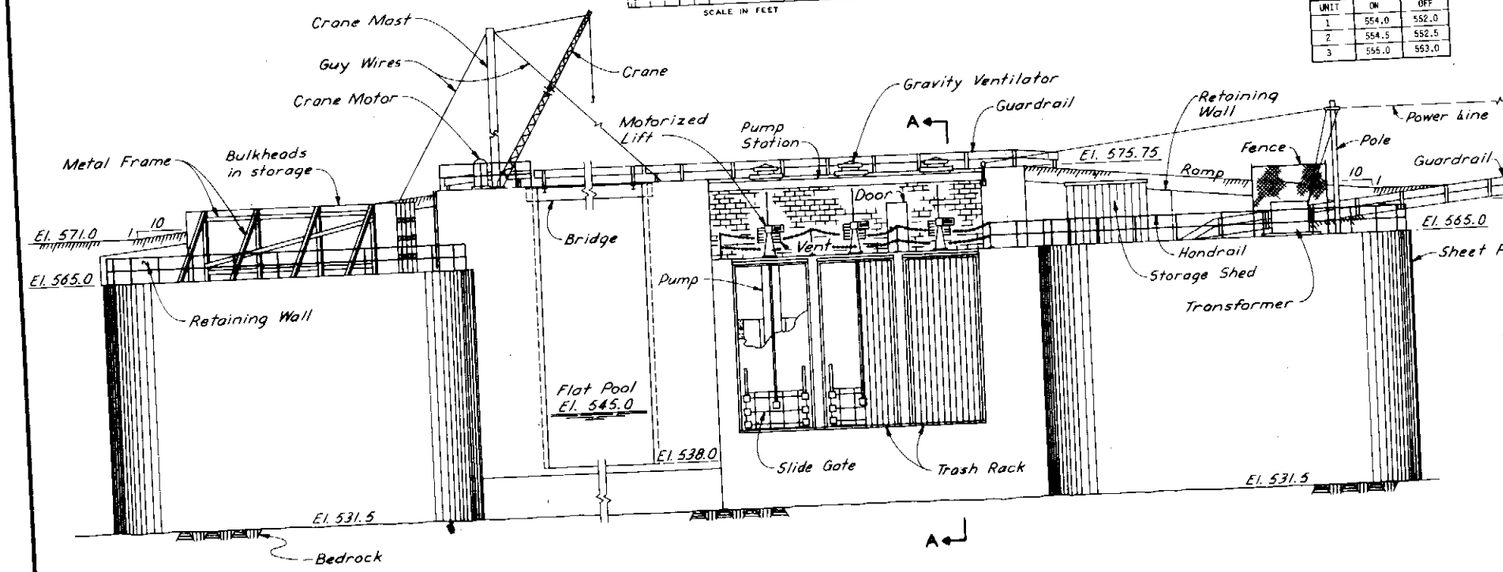


PLAN

SCALE IN FEET

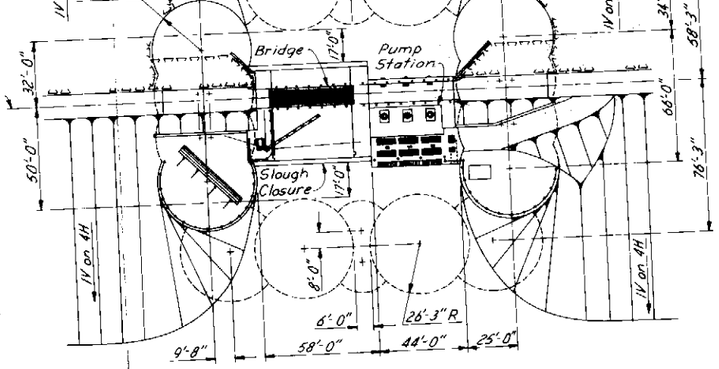


SECTION A-A



ELEVATION

PUMP OPERATION SCHEDULE		
UNIT	ON	OFF
1	554.0	552.0
2	554.5	552.5
3	555.0	553.0



PLAN

SCALE IN FEET

PERTINENT DATA	
DISCHARGE PIPE ℄	EL. 559.25
OPERATING FLOOR	EL. 565.0
DESIGN PONDING LIMIT	EL. 557.0
GRAVITY OUTLET CLOSURE	EL. 557.0
PUMP ACTIVATION *	EL. 555.0
MINIMUM SUMP WATER	EL. 552.0
SUMP FLOOR	EL. 542.0
REQUIRED PUMPING CAPACITY, (GPM)	106,000
NUMBER OF PUMPS	3

* AFTER INITIAL CLOSURE

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA

LOCAL FLOOD PROTECTION

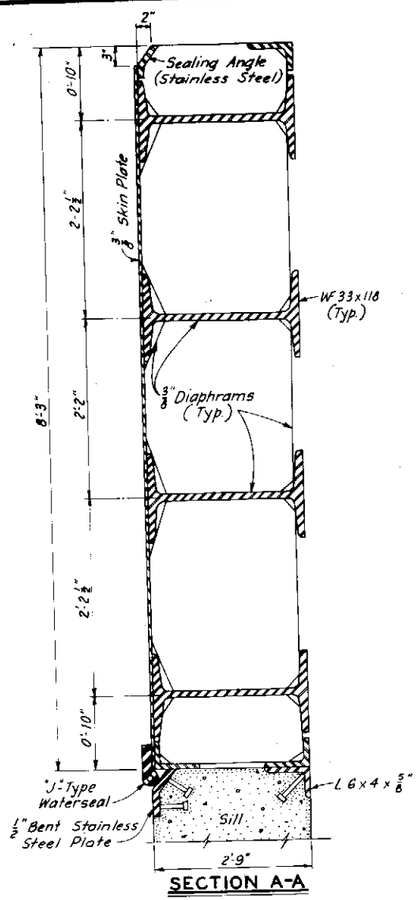
CREDIT ISLAND SLOUGH CLOSURE AND PUMP STATION

SCALE AS SHOWN

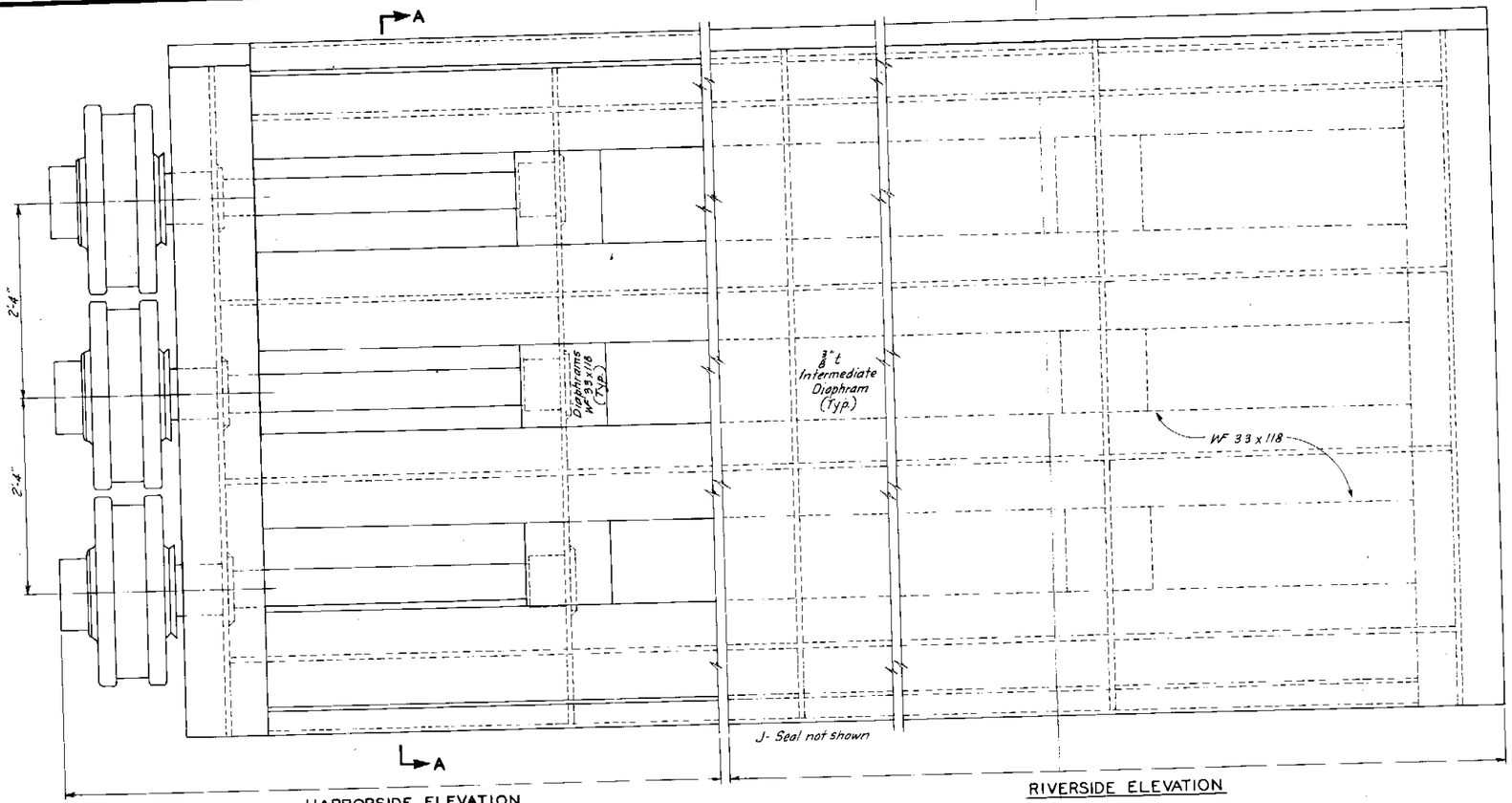
SHEET DRAWING NO.
INVITATION NO. DACW25-

PLATE 50

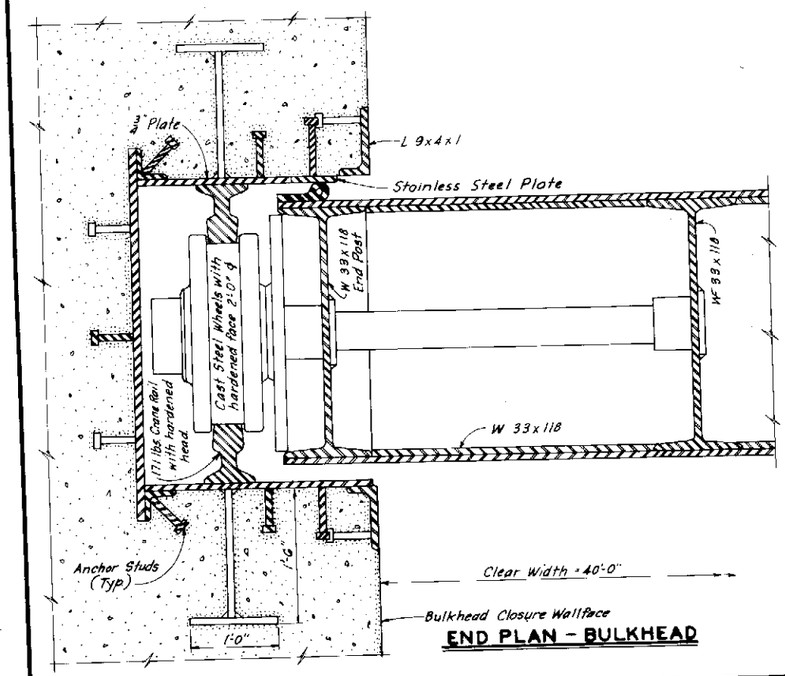
CORPS OF ENGINEERS



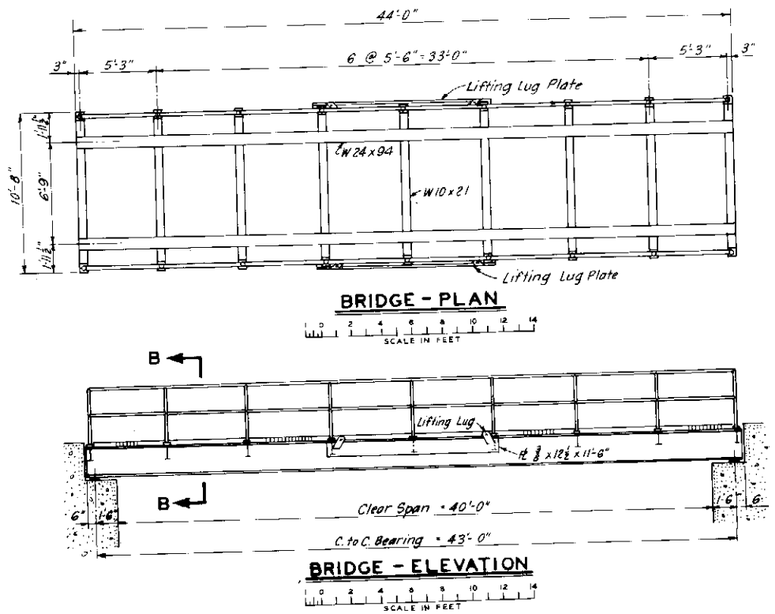
SECTION A-A



TYPICAL BULKHEAD SECTION



END PLAN - BULKHEAD

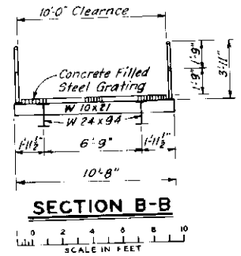


BRIDGE - PLAN

SCALE IN FEET

BRIDGE - ELEVATION

SCALE IN FEET



SECTION B-B

SCALE IN FEET

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY: A.W. MT.
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

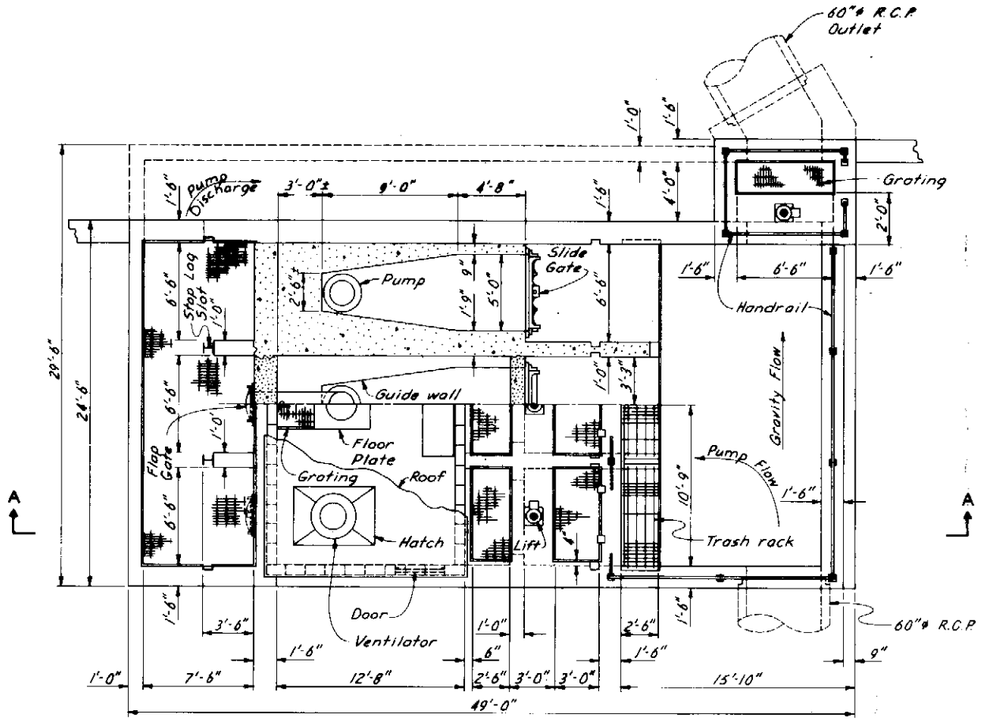
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

CREDIT ISLAND SLOUGH
BULKHEADS AND APPURTENANT DETAIL

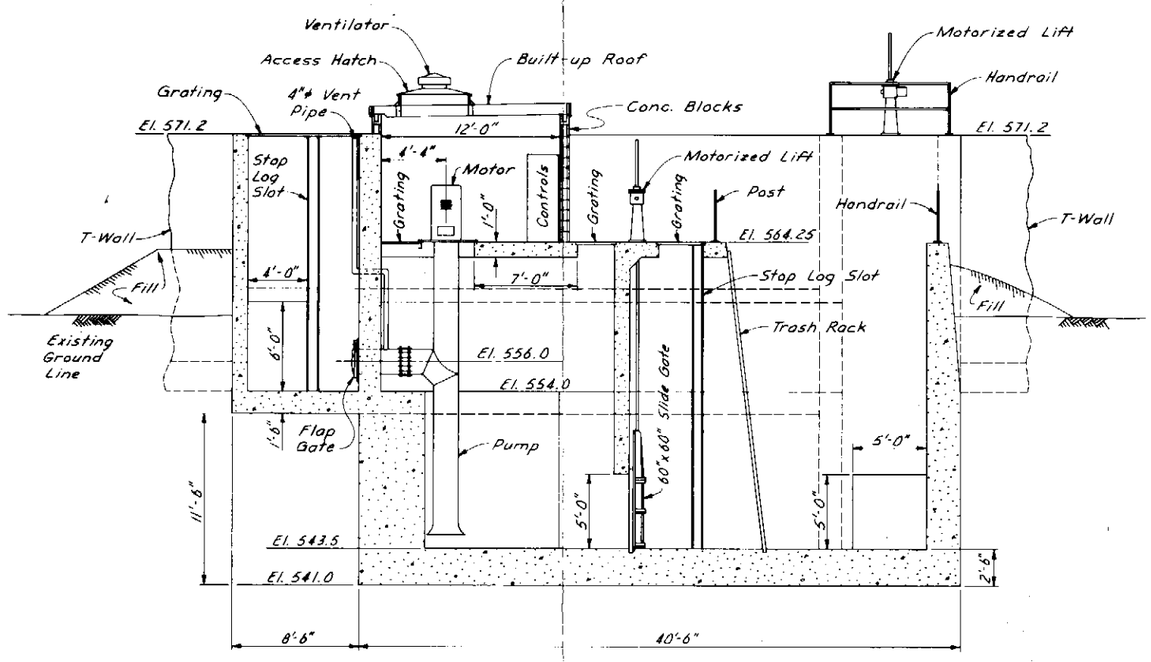
SCALE IN INCHES

SHEET
DRAWING NO
INVITATION NO. DACW25 - - B -

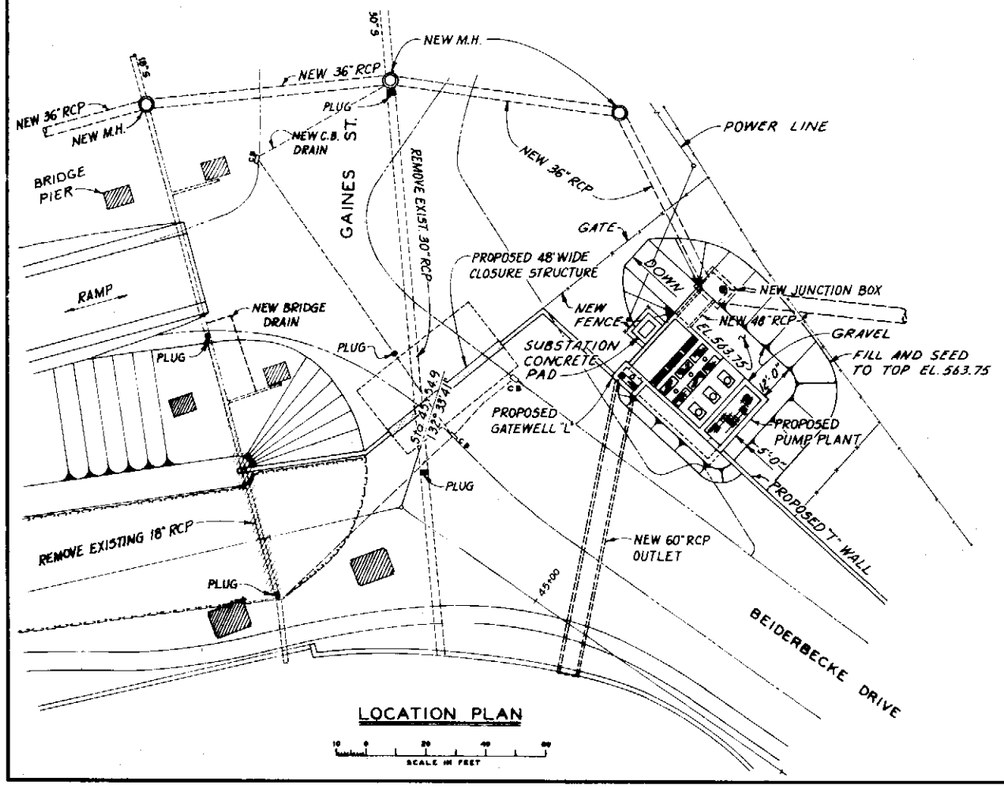
PLATE 51



PLAN



SECTION A-A



LOCATION PLAN

PERTINENT DATA	
DISCHARGE PIPE ℄	EL. 556.0
OPERATING FLOOR	El. 564.25
DESIGN PONDING LIMIT	EL. 557.0
GRAVITY OUTLET CLOSURE	EL. 557.0
PUMP ACTIVATION *	EL. 555.0
MINIMUM SUMP WATER	EL. 547.0
SUMP FLOOR	El. 543.5
REQUIRED PUMPING CAPACITY, (GPM)	45,000
NUMBER OF PUMPS	3

* AFTER INITIAL CLOSURE

PUMP OPERATION SCHEDULE		
UNIT	ON	OFF
1	555.0	547.0
2	556.0	547.5
3	557.0	548.0

REVISION	DATE	DESCRIPTION	BY

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

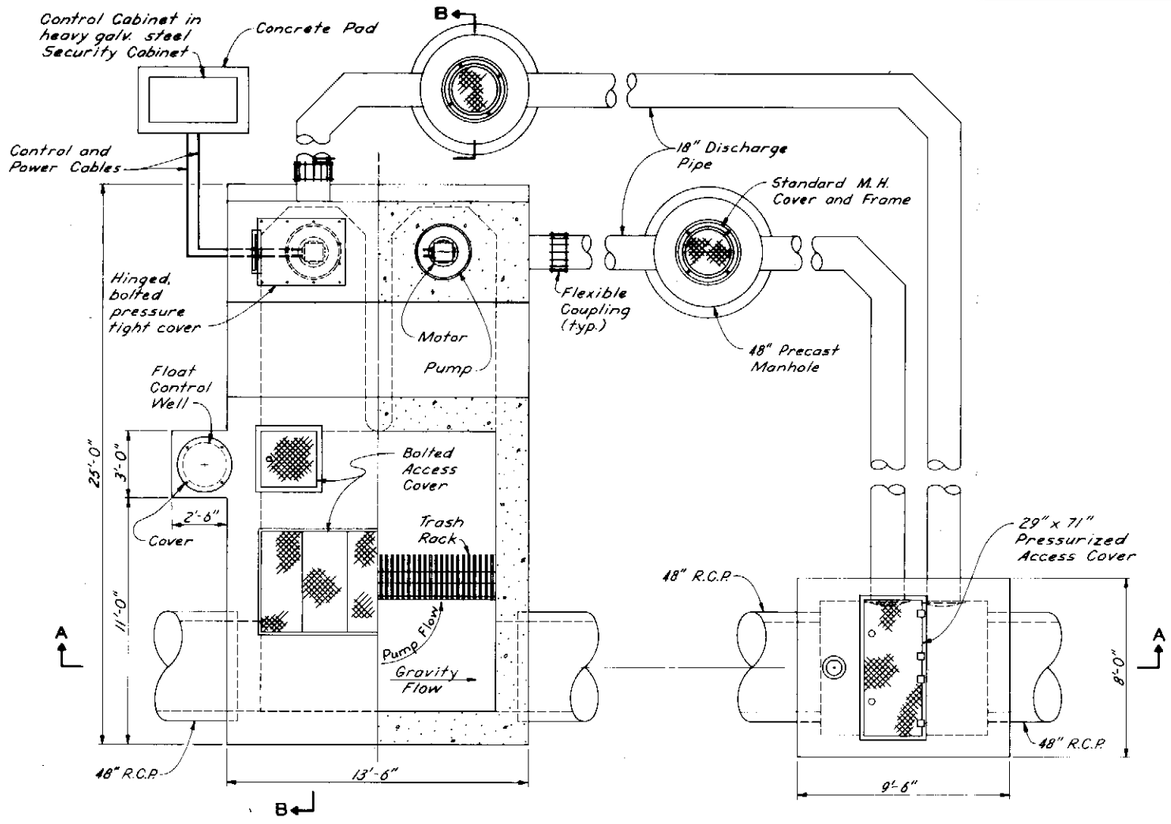
DRAWN BY: R.M.P.
TRACED BY
CHECKED BY
SUBMITTED
CHIEF, DESIGN BRANCH
APPROVED
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
GAINES STREET
PUMPING STATION

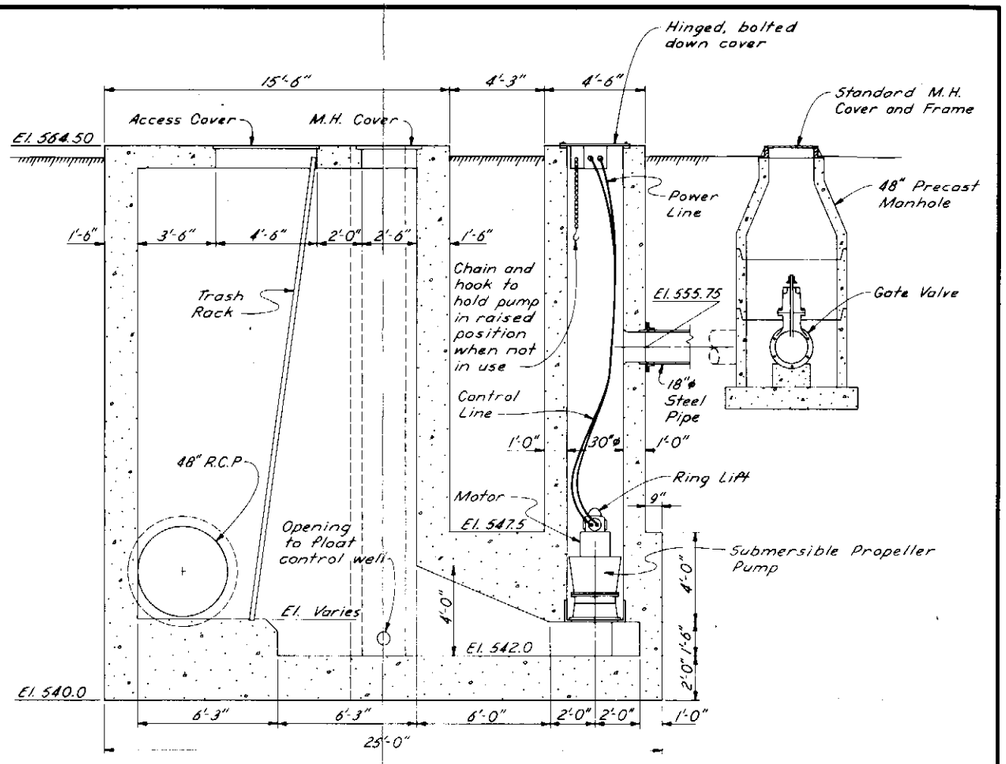
SCALE IN FEET

SHEET DRAWING NO
INVITATION NO. DACW25 -B

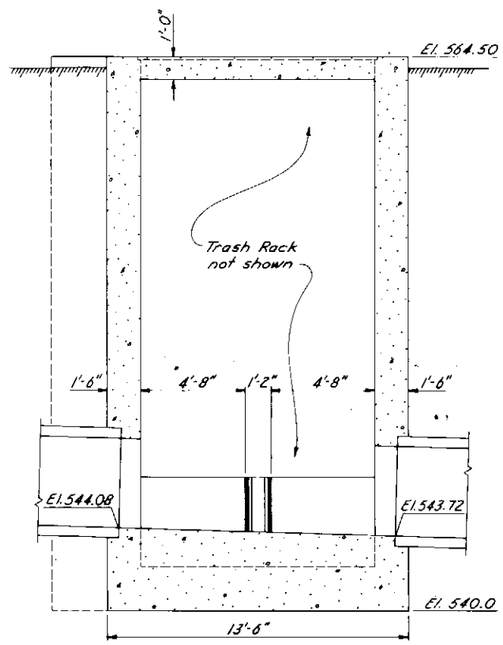
PLATE 52

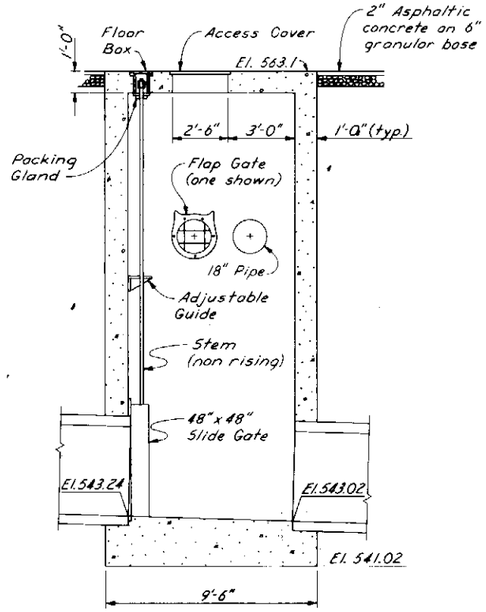


PLAN



SECTION B-B





SECTION A-A

PUMP OPERATION SCHEDULE		
UNIT	ON	OFF
1	555.0	547.0
2	557.0	548.0

PERTINENT DATA	
DISCHARGE PIPE ℄	El. 555.75
OPERATING FLOOR	El. 564.50
GRAVITY OUTLET CLOSURE	EL. 557.0
PUMP ACTIVATION *	EL. 555.0
MINIMUM SUMP WATER	EL. 547.0
SUMP FLOOR	El. 542.0
REQUIRED PUMPING CAPACITY (GPM)	12,000
NUMBER OF PUMPS	2

* AFTER INITIAL CLOSURE

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY: G. B. P.
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

MAIN STREET
PUMP STATION

SCALE IN FEET 0 1 2 3 4 5 6 7 8

SHEET DRAWING NO.
INVITATION NO. DACW25 - - B -

UTILITIES SCHEDULE

GAS - WATER - POWER - TELEPHONE

STATION	EXISTING FACILITY	DISPOSITION	RESPONSIBILITY	REMARKS	REFERENCE DWG. NO.
LEVEE					
247+00 TO 241+00	8" WATER LINE	PROVIDE FLEXIBLE JOINTS BELOW LEVEE AND ANNULAR GRANULAR FILL ON LANDSIDE	FEDERAL	LOCATED 6'R OF TRAVERSE AT STA. 241+00. RUNS PARALLEL AT APPROX. 15'R TO L OF CONCORD ST. TO STA. 247+00.	4
247+00 TO 241+00	3" GAS LINE	RELOCATE TO LEVEE FREEBOARD ZONE	LOCAL	LOCATED 3'L OF TRAVERSE AT STA. 241+00. RUNS PARALLEL AT APPROX. 8'R TO L OF CONCORD ST. TO STA. 247+00.	4
139+00 TO 128+00	8" WATER LINE	PROVIDE FLEXIBLE JOINTS BELOW LEVEE AND ANNULAR GRANULAR FILL ON LANDSIDE	FEDERAL	LOCATED 315R OF TRAVERSE AT STA. 128+00. RUNS UNDER CREDIT ISLAND PARK RD. TO STA. 140+00 AT APPROX. 10'L OF TRAVERSE	12
139+00 TO 128+00	3" GAS LINE	RELOCATE TO LEVEE FREEBOARD ZONE	LOCAL	LOCATED 20'L OF TRAVERSE AT STA. 128+00. RUNS PARALLEL AT APPROX. 17'L OF TRAVERSE TO STA. 140+00, UNDER CREDIT ISLAND ROAD.	12
72+94	FIRE HYDRANT	RELOCATE OUTSIDE LEVEE	LOCAL	LOCATED 342'R OF TRAVERSE	16
55+05	FIRE HYDRANT	RELOCATE OUTSIDE LEVEE	LOCAL	LOCATED 72'R OF TRAVERSE	18
38+00	STREET LIGHT	RELOCATE OUTSIDE LEVEE	LOCAL		19
22+25	BURIED TELEPHONE LINE	PROVIDE PROTECTION AROUND CABLE AND ANNULAR GRANULAR FILL ON LANDSIDE OF LEVEE	FEDERAL		20
12+95 TO 10+65	BURIED ELECTRICAL LINE	RELOCATE LINE BEYOND TOE OF TEE WALL	LOCAL		21
10+60	BURIED ELECTRIC CABLE	PROVIDE CABLE PROTECTION AND ANNULAR GRANULAR FILL LANDSIDE OF WALL	FEDERAL		21
0+26	8" WATER LINE	PROVIDE ANNULAR GRANULAR FILL LANDSIDE OF CLOSURE	FEDERAL	LOCATED UNDER 2ND ST.	21
IOWA ST. & 3RD ST.	6" WATER LINE	PROVIDE ANNULAR GRANULAR FILL AROUND PIPE LANDSIDE OF CLOSURE	FEDERAL		46
IOWA ST. & 3RD ST.	12" GAS LINE	PROVIDE ANNULAR GRANULAR FILL AROUND PIPE LANDSIDE OF CLOSURE	FEDERAL		46

REVISION	DATE	DESCRIPTION	BY

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

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CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE

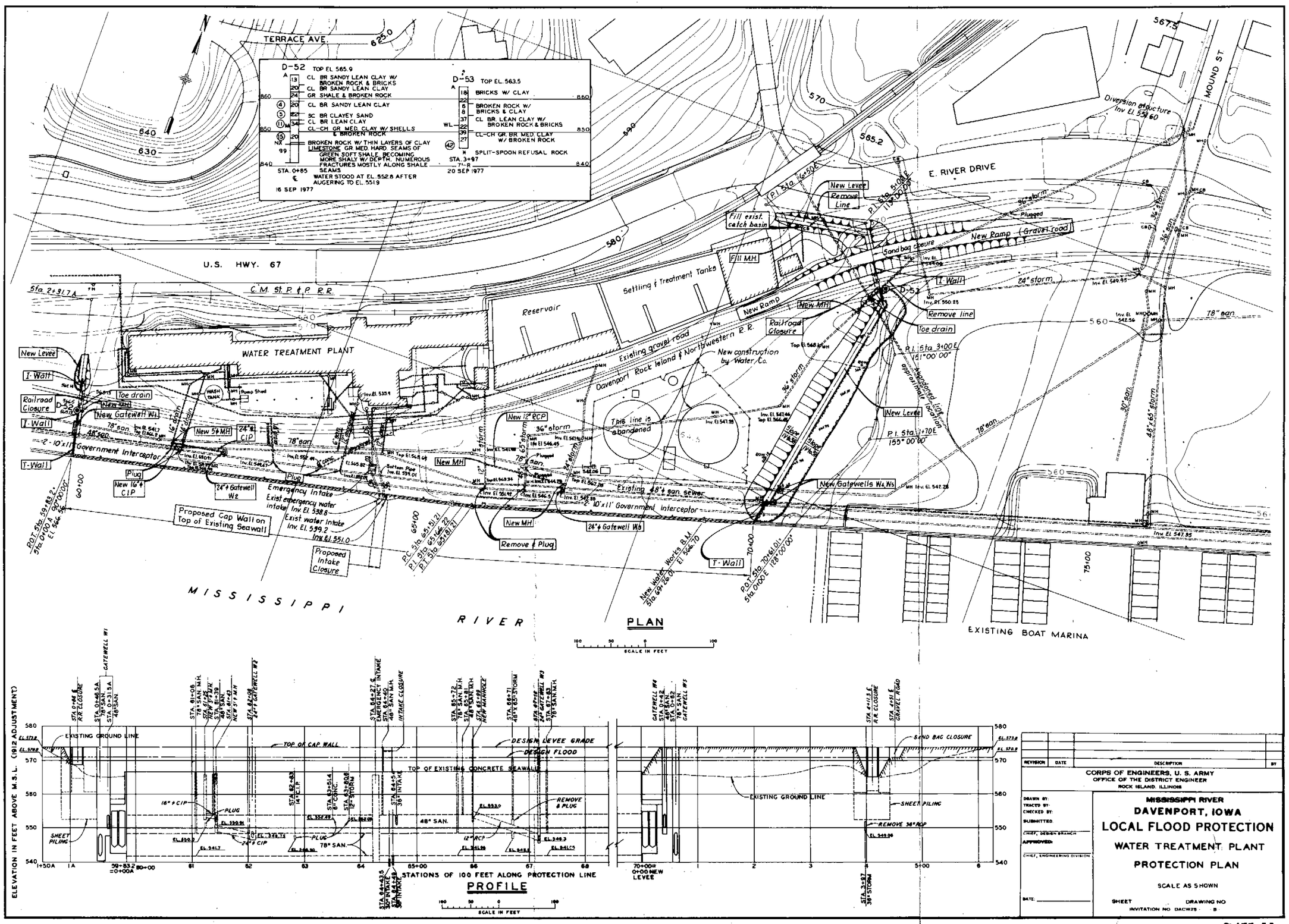
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

UTILITIES SCHEDULE

SHEET DRAWING NO.
INVITATION NO. DACW25- -B-

CORPS OF ENGINEERS

U. S. ARMY



REVISION	DATE	DESCRIPTION	BY

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

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SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
WATER TREATMENT PLANT
PROTECTION PLAN

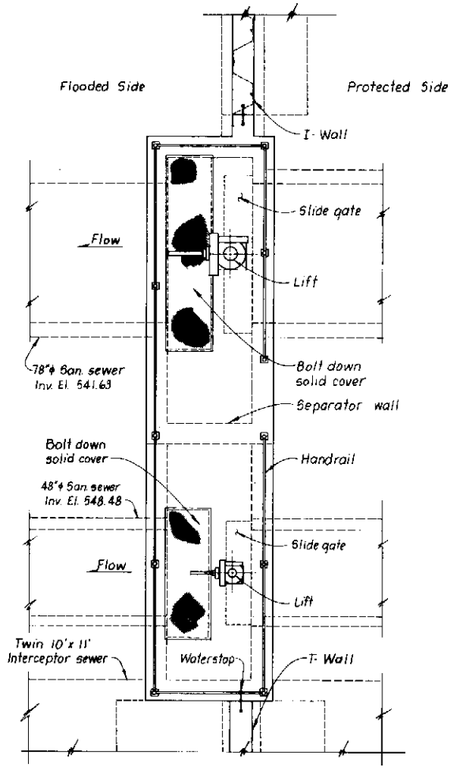
SCALE AS SHOWN

SHEET DRAWING NO
INVITATION NO DACW25-

PLATE 55

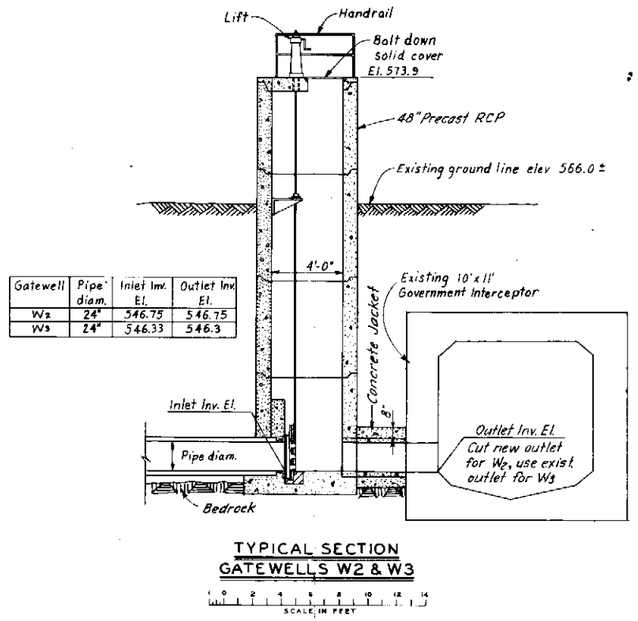
CORPS OF ENGINEERS

U. S. ARMY



GATEWELL W1 PLAN DETAIL
VICINITY STA. 0+30 A

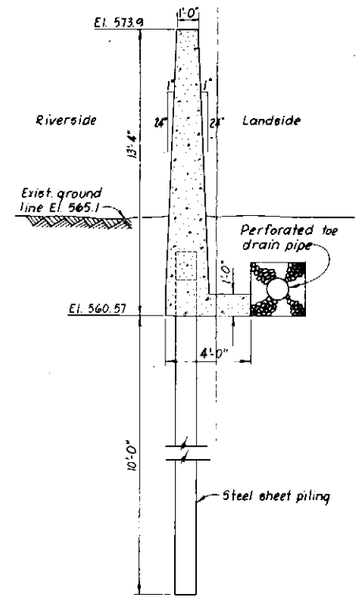
SCALE IN FEET 0 2 4 6 8 10



Gatewell	Pipe diam.	Inlet Inv. El.	Outlet Inv. El.
W2	24"	546.75	546.75
W3	24"	546.33	546.3

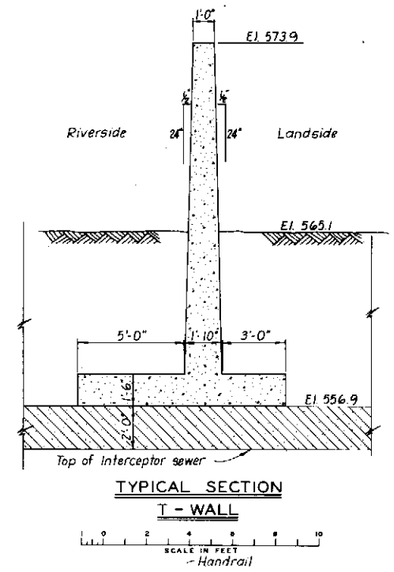
TYPICAL SECTION
GATEWELLS W2 & W3

SCALE IN FEET 0 2 4 6 8 10 12 14



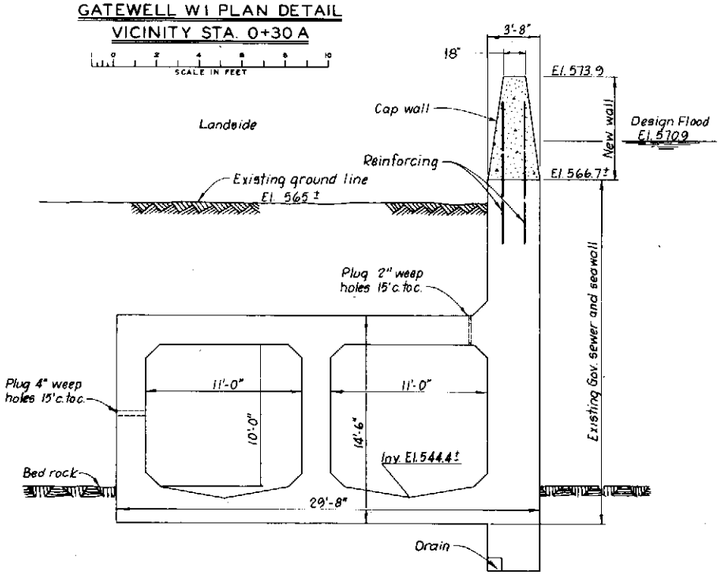
TYPICAL SECTION
I - WALL

SCALE IN FEET 0 2 4 6 8 10



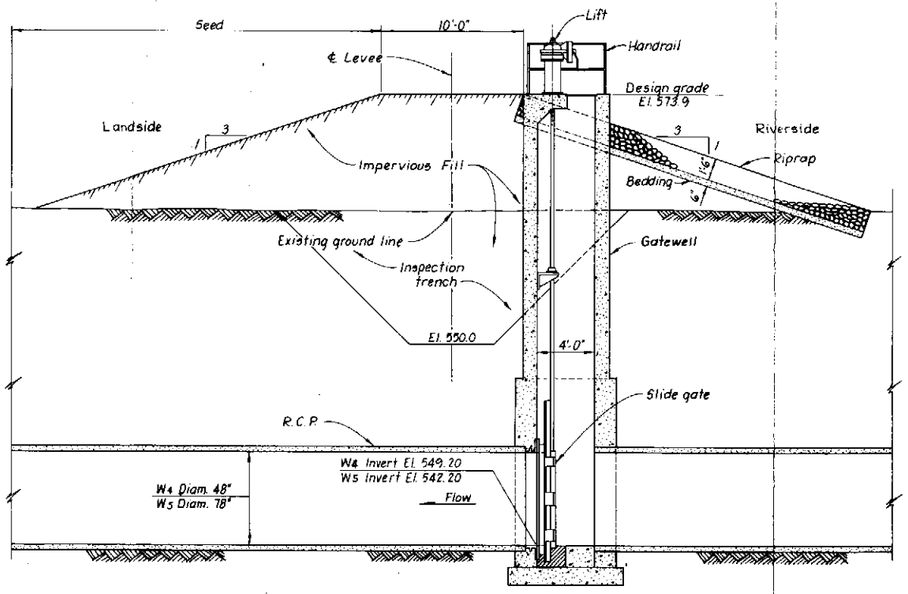
TYPICAL SECTION
T - WALL

SCALE IN FEET 0 2 4 6 8 10



TYPICAL SECTION
CAP WALL

SCALE IN FEET 0 2 4 6 8 10 12 14



TYPICAL LEVEE SECTION
W/ GATEWELLS W4 & W5

SCALE IN FEET 0 2 4 6 8 10 12 14

REVISION	DATE	DESCRIPTION	BY

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

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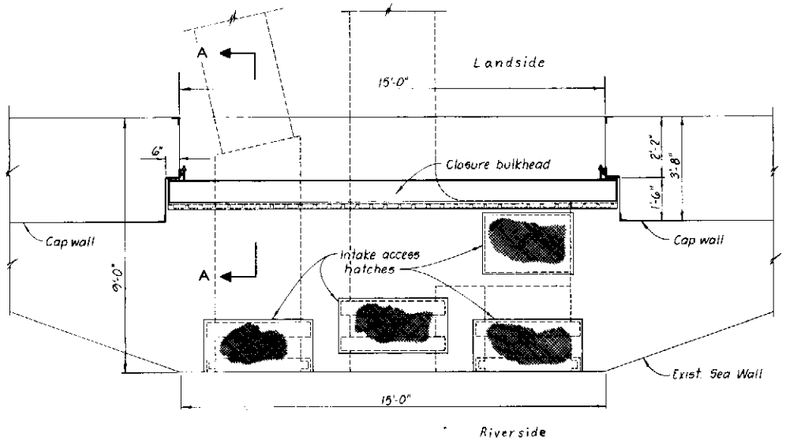
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
WATER TREATMENT PLANT
GATEWELLS, WALLS AND LEVEE

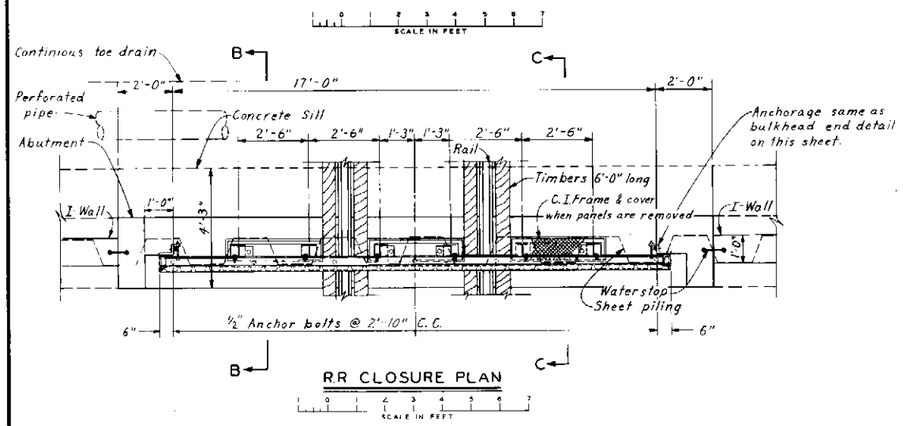
SCALE AS SHOWN

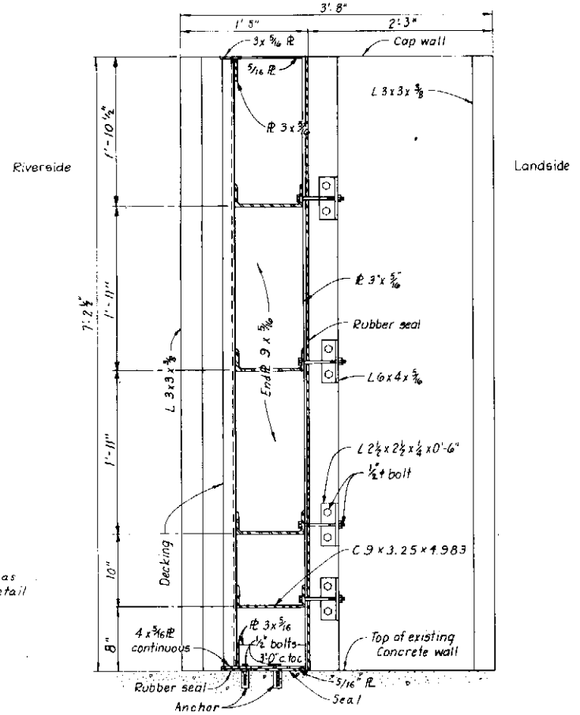
SHEET
DRAWING NO.
INVITATION NO. DACW25 - - B -

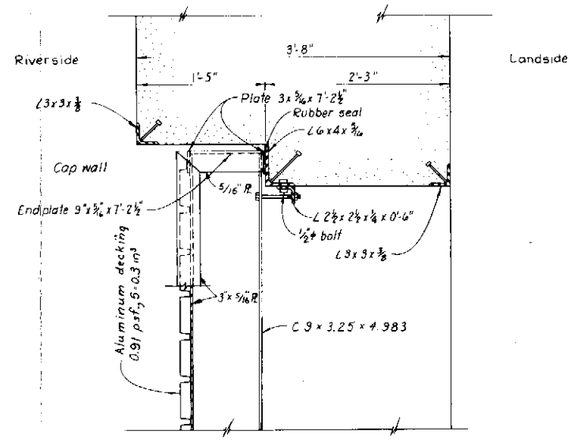
PLATE 56



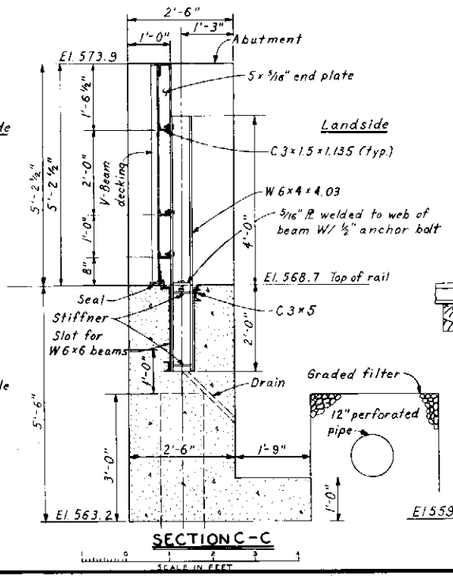
PLAN
INTAKE AREA CLOSURE

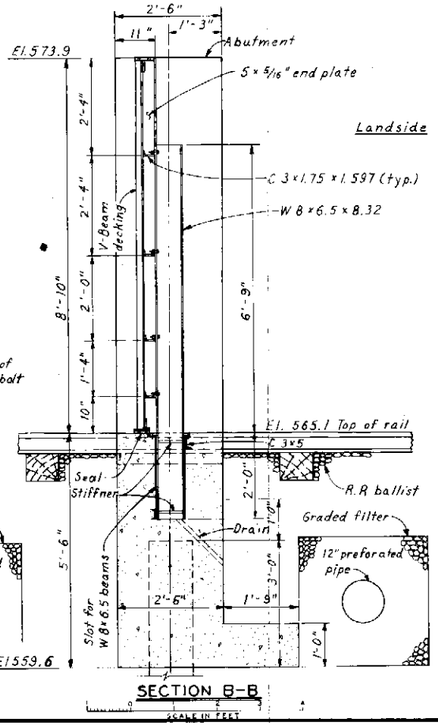






PLAN VIEW
BULKHEAD END DETAILS
SCALE IN INCHES





REVISION	DATE	DESCRIPTION	BY

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

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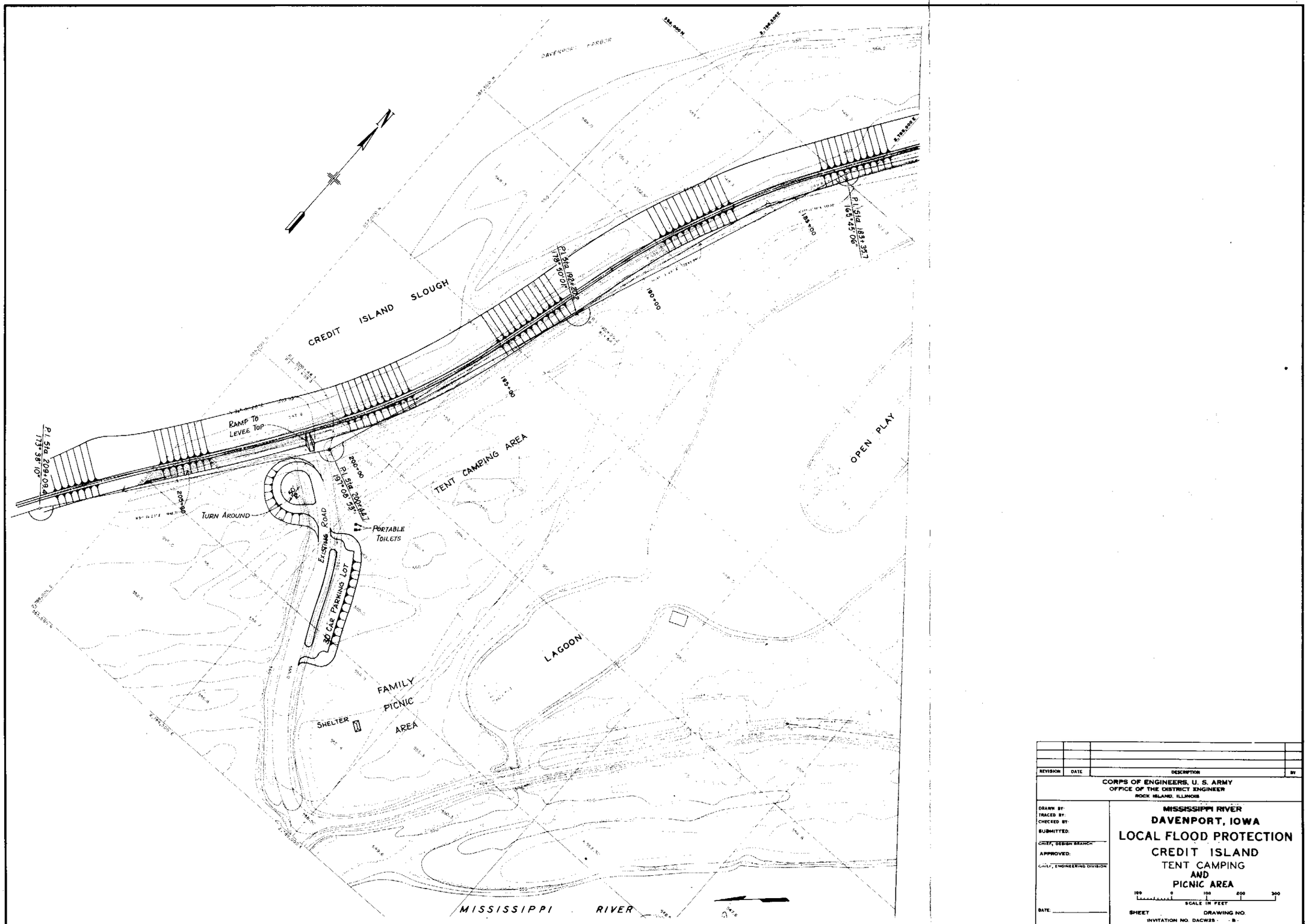
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
WATER TREATMENT PLANT
INTAKE AREA AND
RAILROAD CLOSURES
SCALE AS SHOWN

SHEET DRAWING NO.
INVITATION NO. DACW25- - B -

CORPS OF ENGINEERS

U. S. ARMY



REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
CREDIT ISLAND
TENT CAMPING
AND
PICNIC AREA

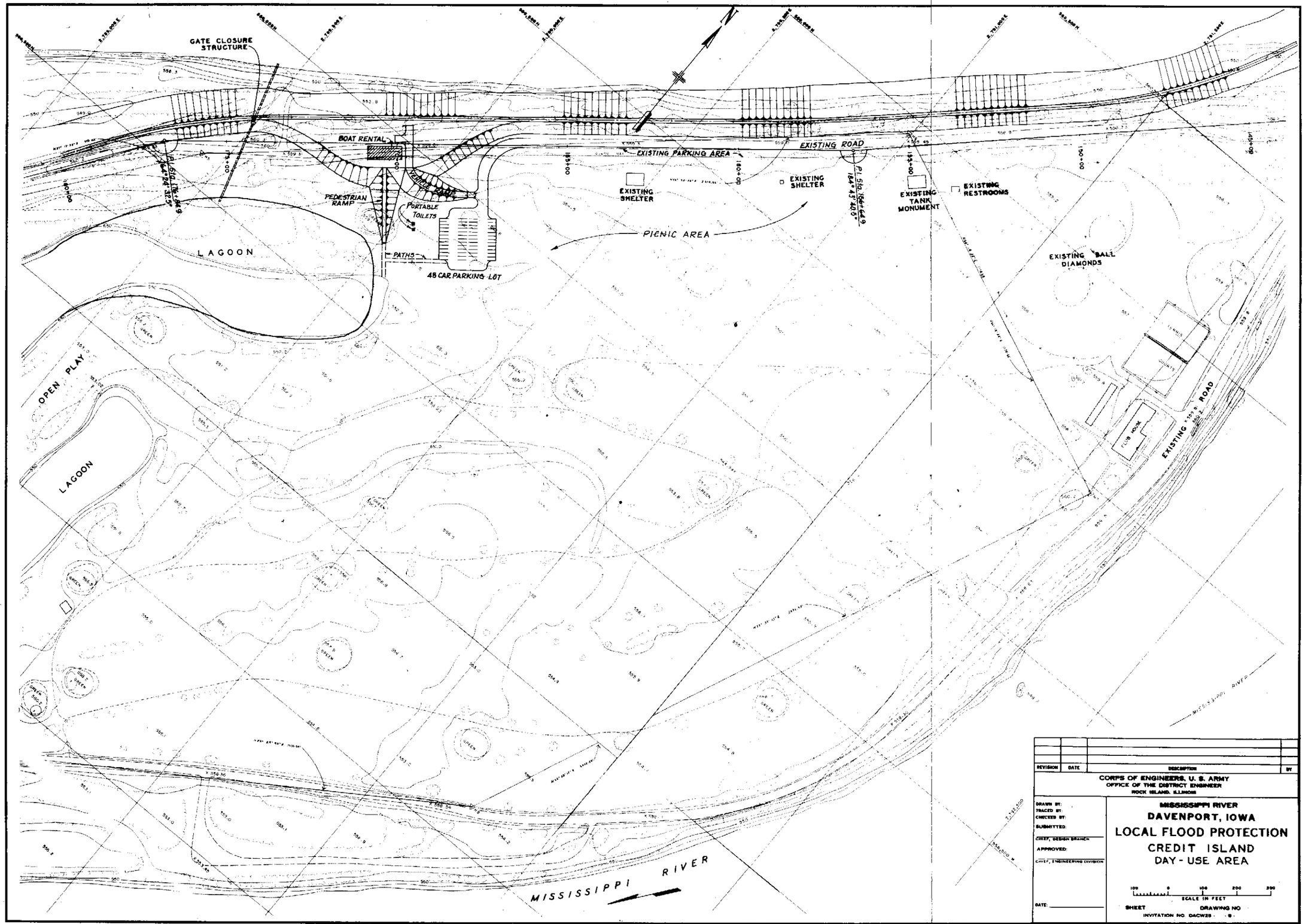
100 0 100 200 300
SCALE IN FEET

SHEET
DRAWING NO.
INVITATION NO. DACW25- - B -

PLATE 58

CORPS OF ENGINEERS

U. S. ARMY



REVISION	DATE	DESCRIPTION	BY

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

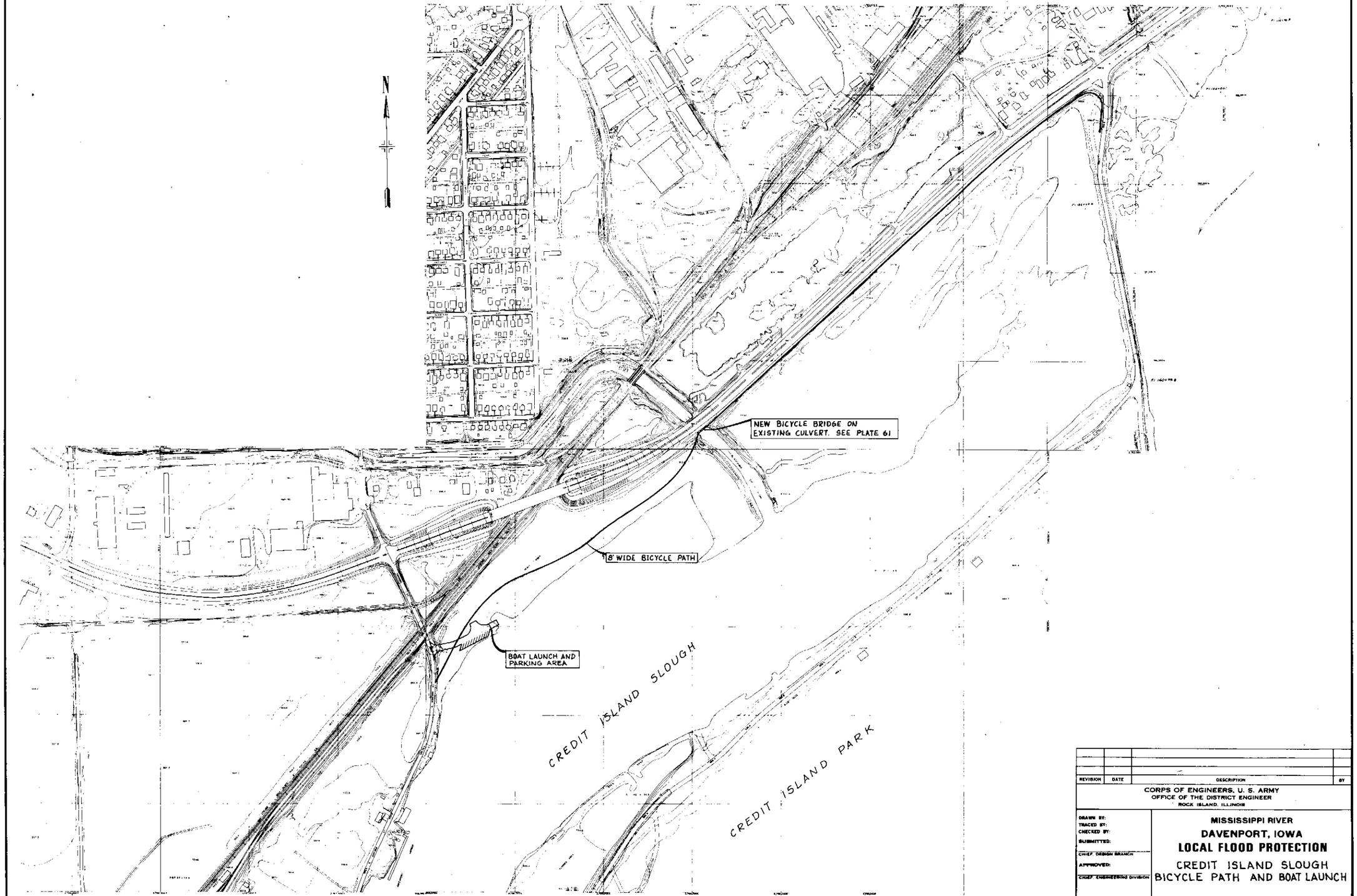
DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
CREDIT ISLAND
DAY-USE AREA

100 0 100 200 300
SCALE IN FEET

SHEET DRAWING NO.
INVITATION NO. DACW25 - -

PLATE 59



REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

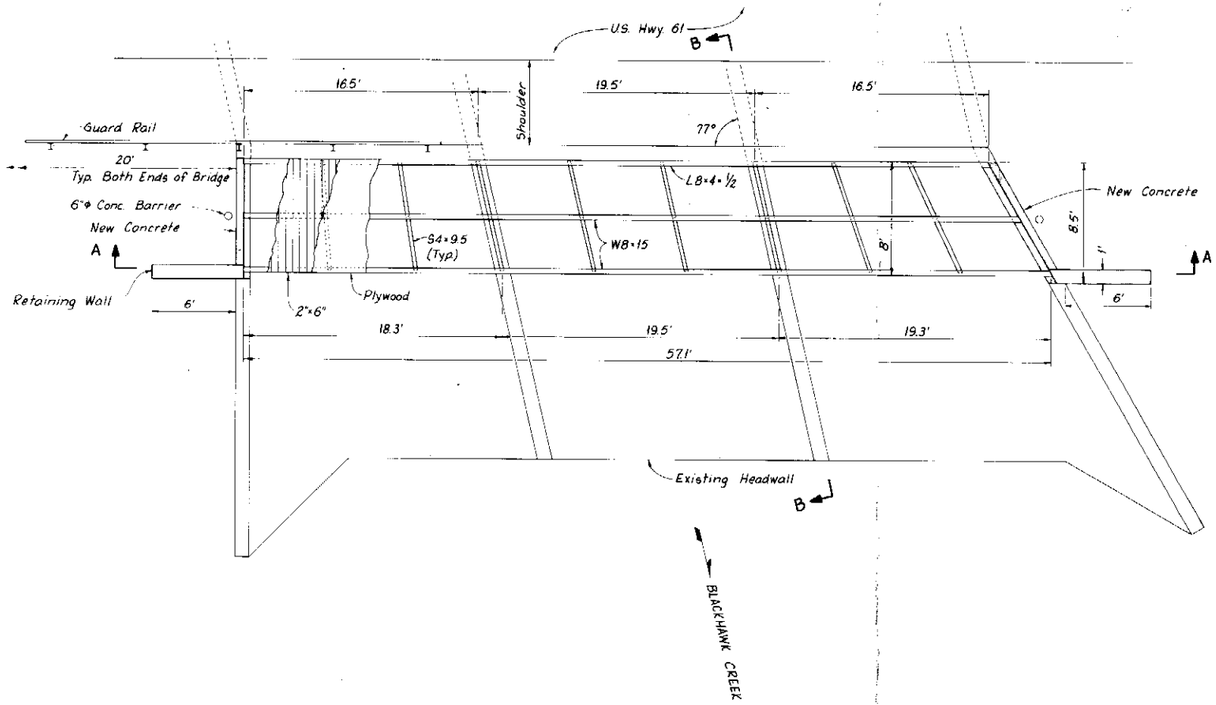
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
CREDIT ISLAND SLOUGH
BICYCLE PATH AND BOAT LAUNCH

100 0 200 400 600
SCALE IN FEET

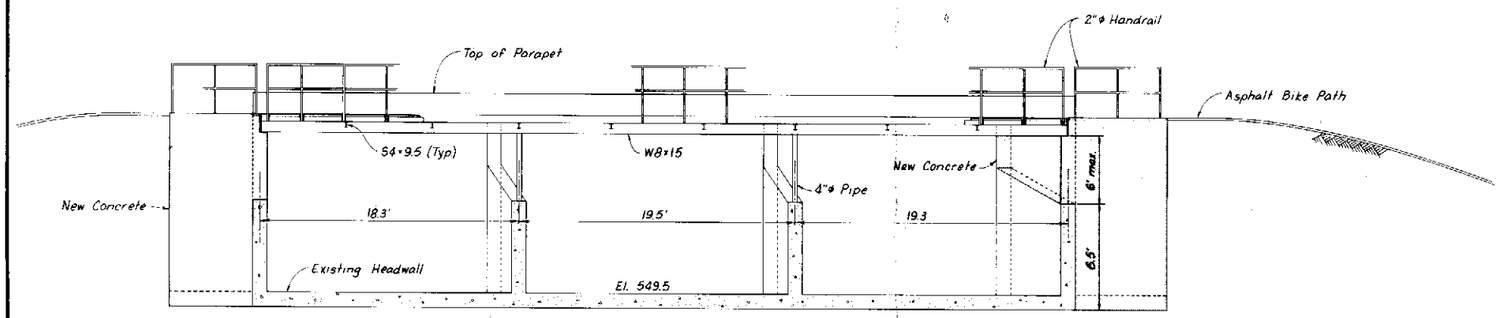
SHEET DRAWING NO.
INVITATION NO DACW25 - - 8 -

CORPS OF ENGINEERS

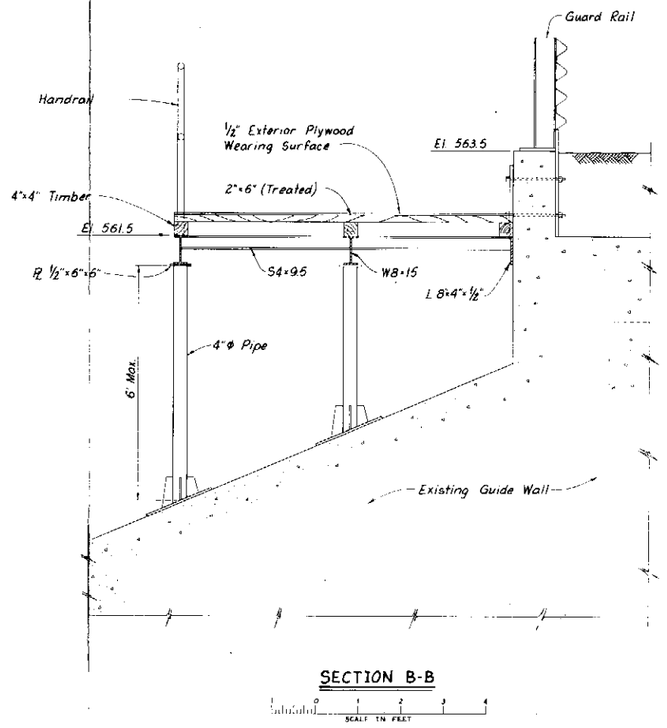
U. S. ARMY



PLAN



SECTION A-A



SECTION B-B

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
RECOMMENDED:
CHIEF, ENGINEERING DIVISION
APPROVED:
COL., CORPS OF ENGINEERS
DISTRICT ENGINEER
ROCK ISLAND DISTRICT
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

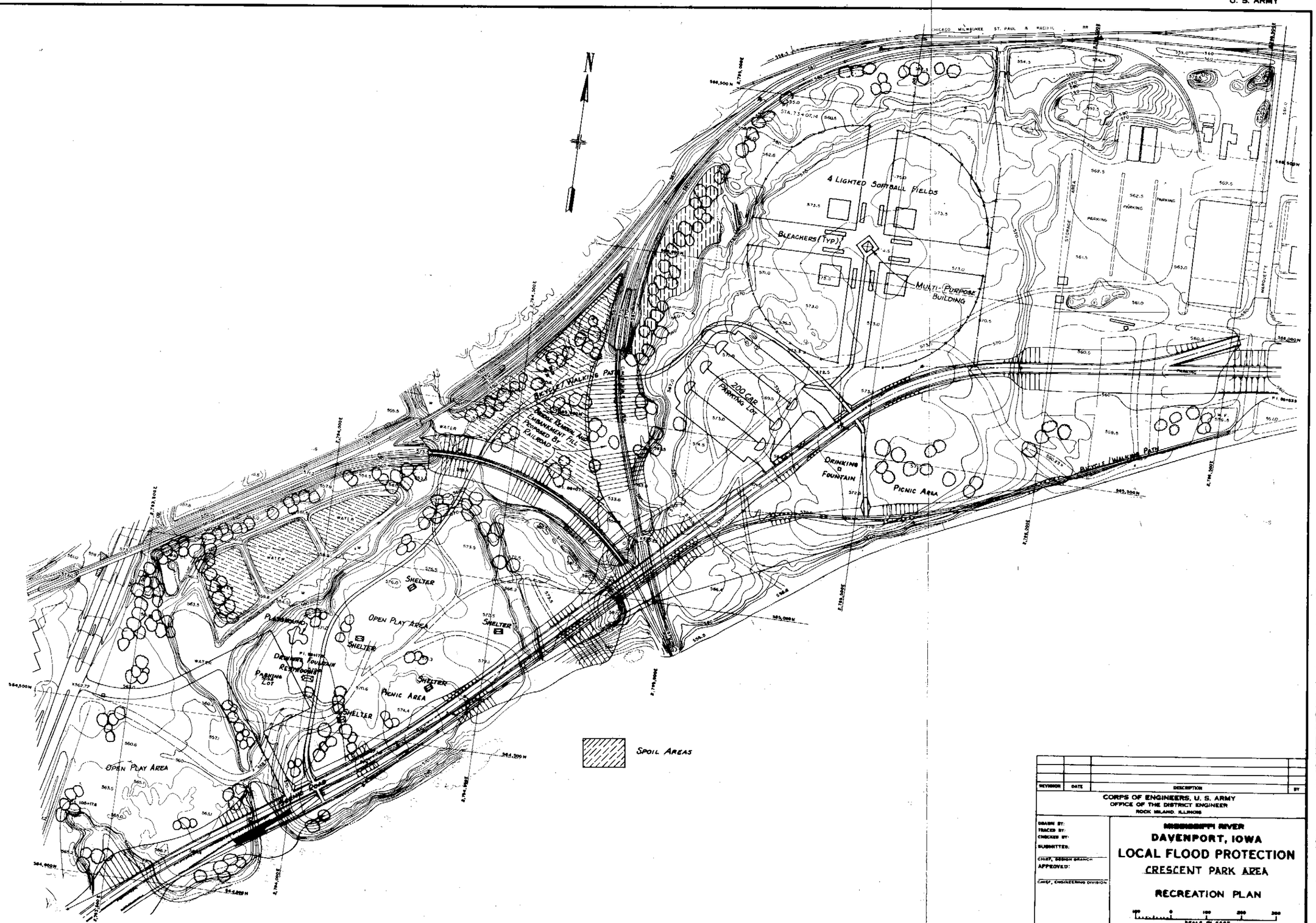
BICYCLE BRIDGE
AT
BLACKHAWK CREEK

1 0 2 4 6 8 10
SCALE IN FEET

SHEET DRAWING NO.
INVITATION NO. DACW25- -B-

CORPS OF ENGINEERS

U. S. ARMY



REVISION	DATE	DESCRIPTION	BY

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

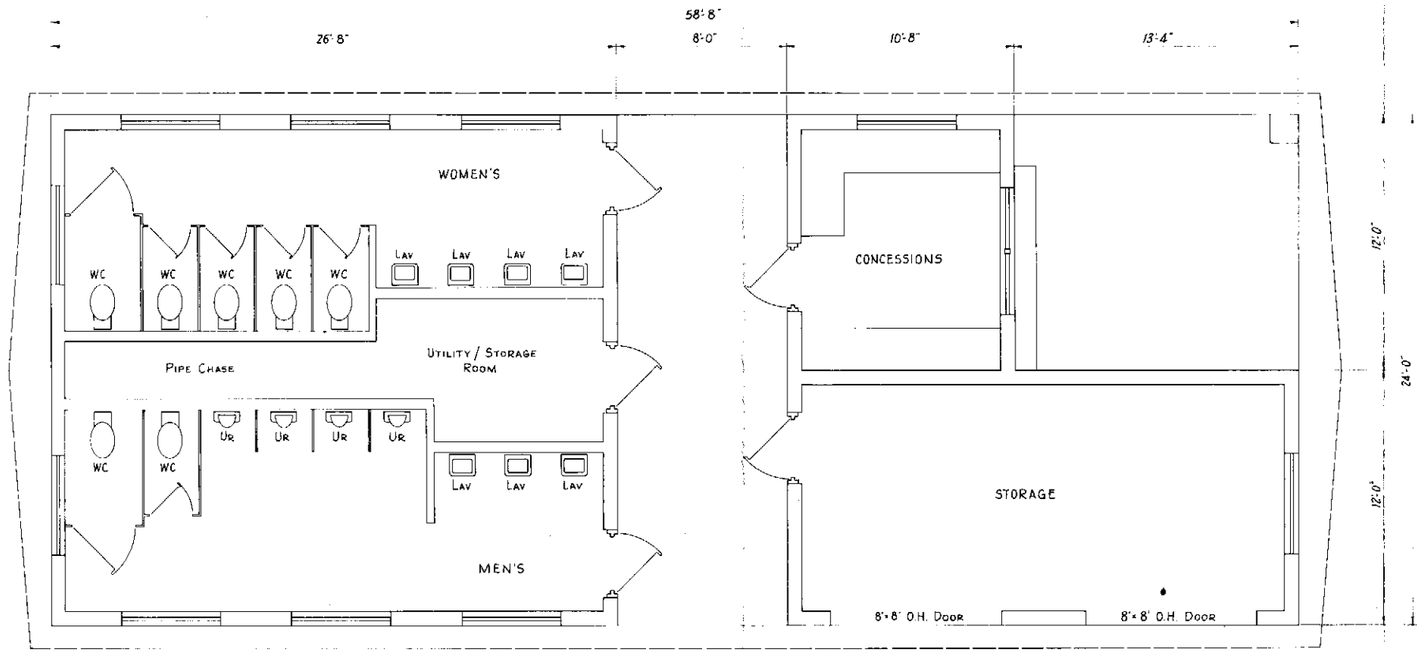
DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
CRESCENT PARK AREA
RECREATION PLAN

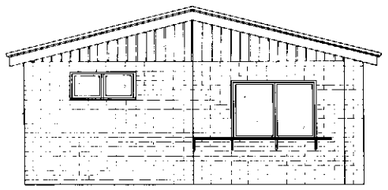
SCALE IN FEET

SHEET DRAWING NO.
ELEVATIONS ARE BASED ON

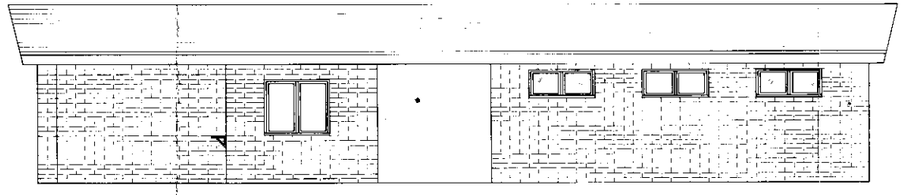
PLATE 62



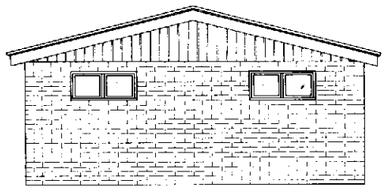
FLOOR PLAN



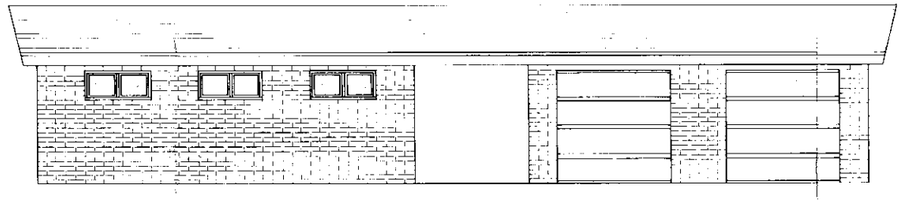
SIDE ELEVATION



BACK ELEVATION



SIDE ELEVATION



FRONT ELEVATION

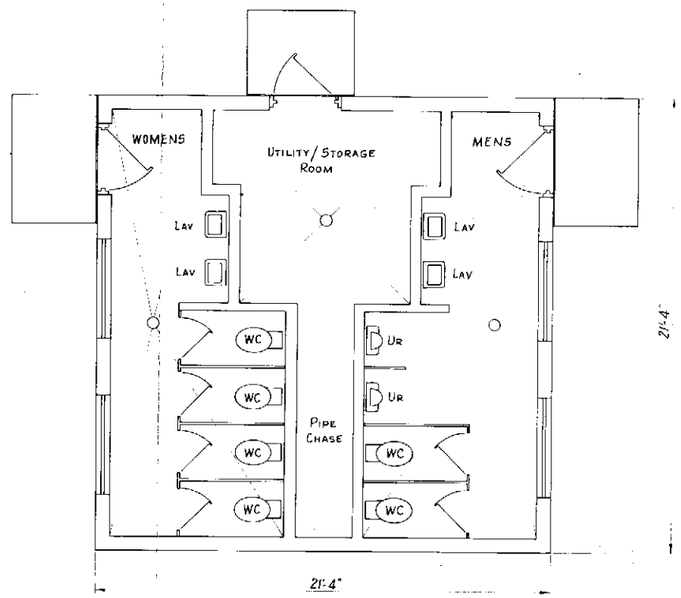
REVISION	DATE	DESCRIPTION	BY

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

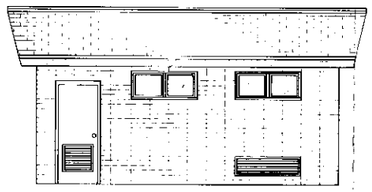
DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
CRESCENT PARK AREA
MULTI - PURPOSE BUILDING

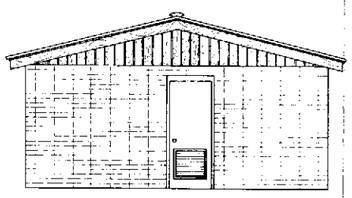
SCALE IN FEET
SHEET DRAWING NO
INVITATION NO DACW25 - - B -



FLOOR PLAN



FRONT ELEVATION



SIDE ELEVATION

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
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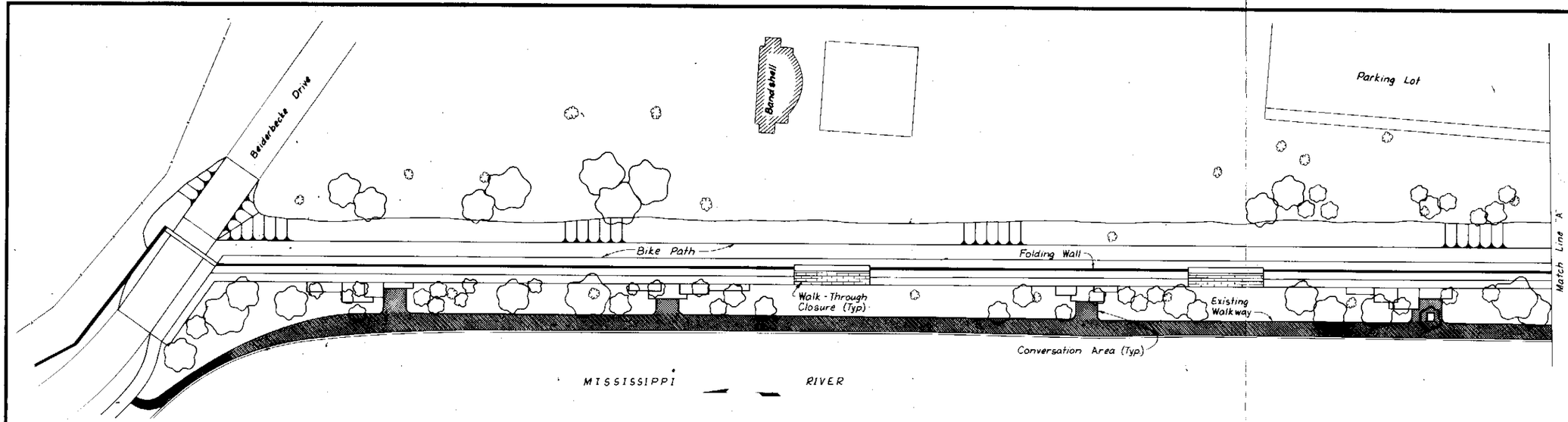
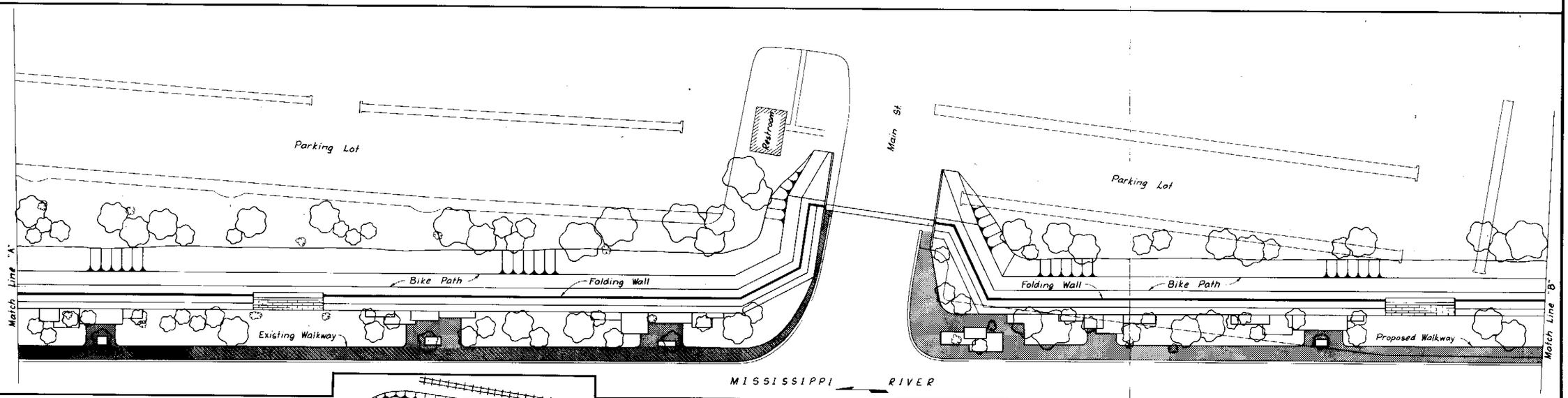
SUBMITTED
CHIEF, DESIGN BRANCH
APPROVED:
CHIEF, ENGINEERING DIVISION
DATE:

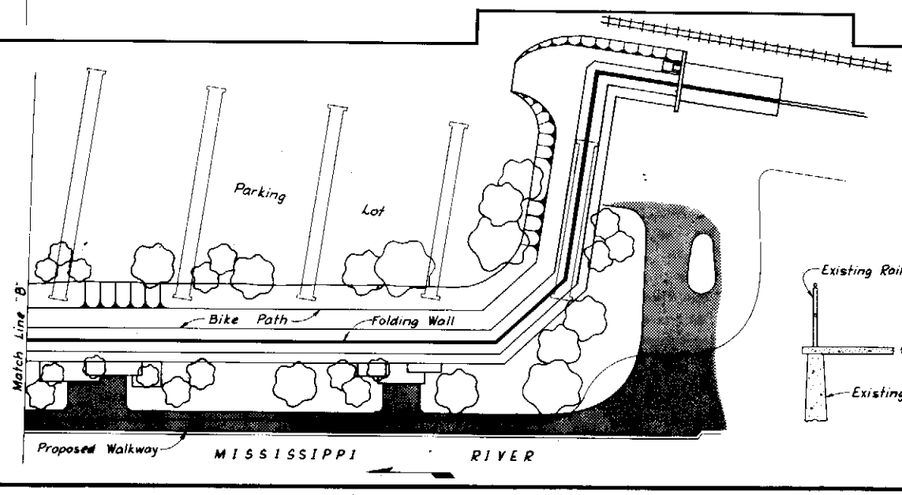
MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION
CRESCENT PARK AREA
RESTROOM
PLAN AND ELEVATIONS

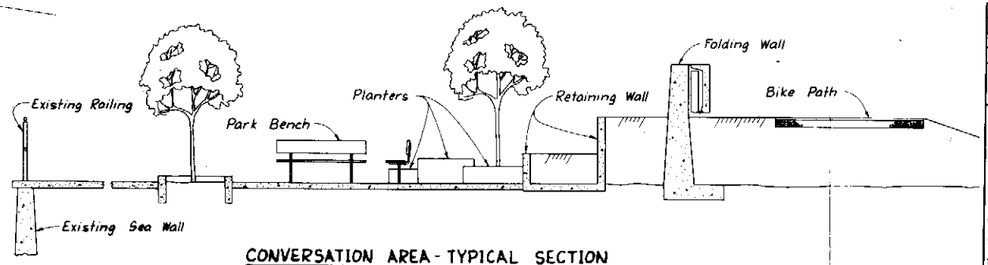
0 2 4 6 8 10
SCALE IN FEET

SHEET
DRAWING NO
INVITATION NO. DACW25 - - B -









CONVERSATION AREA - TYPICAL SECTION

No Scale

LEGEND:

Existing Trees

Proposed Plantings

REVISION	DATE	DESCRIPTION	BY

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

DRAWN BY:
TRACED BY:
CHECKED BY:
SUBMITTED:
CHIEF, DESIGN BRANCH
RECOMMENDED:
CHIEF, ENGINEERING DIVISION
APPROVED:
COL., CORPS OF ENGINEERS
DISTRICT ENGINEER
ROCK ISLAND DISTRICT
DATE:

MISSISSIPPI RIVER
DAVENPORT, IOWA
LOCAL FLOOD PROTECTION

LE CLAIRE PARK
LANDSCAPING

10 0 20 40 60 80 100
SCALE IN FEET

SHEET DRAWING NO.
INVITATION NO. DACW25- -B-