

OPERATION AND MAINTENANCE MANUAL

LOCAL FLOOD PROTECTION PROJECT TOWN OF SCOTTSVILLE, VIRGINIA



**US Army Corps
Of Engineers**
Norfolk District

September 1993

FOREWORD

The Scottsville, Virginia, Local Flood Protection project was constructed to operate in conjunction with the Mink Creek Dam to provide protection to the town of Scottsville from flooding on the James River and in the Mink Creek Watershed. However, the construction of an adequate earthen levee and floodwall, closure gates, pumping plant, and dam does not provide complete security for the town against floods. Flood damages will still occur if the project is improperly operated prior to and during a flood event and if it is overtopped by events larger than the design flood. In order to assure a high level of protection against flooding and to reduce the threat to public health and safety, it is necessary that the project be carefully maintained at all times and be properly operated prior to and during flood periods. The necessity for proper maintenance is also imperative, since extensive damage or even the loss of life may be incurred through failure of a critical element of the project at flood time, caused by deterioration or damage that could have been avoided by proper maintenance. Faulty operation at flood time can cause considerable damage and may nullify the functions of the entire protective works. Proper maintenance and correct operation of the flood protection system require that responsible local persons have a thorough understanding of the functions of the various units of the system and the best methods of maintaining and operating the system. The potential for project overtopping requires that the appropriate evacuation measures be taken as necessary during a flood event.

This manual provides the operation and maintenance requirements that must be observed at the pumping station, the two street closure gates, the levee discharge structure sluice gate and flap gate, the Mink Creek Dam sluice gate, and the two sanitary sewer valves to assure that the project provides a high level of protection during flood events. Maintenance and operation shall be provided in strict accordance with the regulations prescribed by the Secretary of the Army and as amplified by this manual.

A complete set of manufacturers' instructions, bulletins, and shop drawings and a complete set of detailed construction drawings relating to the various phases of construction embodied in this project have been furnished to the Town of Scottsville, Virginia, and are therefore omitted from this manual in the interest of brevity.

Future work by or under the jurisdiction of the Town of Scottsville in connection with the installation of new streets or underground utilities, etc., or in connection with the modification of existing streets and underground utilities shall be carefully evaluated by the appropriate authorities to determine their effect on the flood protection system as presently installed and described in this manual.

SCOTTSDALE LOCAL PROTECTION PROJECT - OPERATION AND MAINTENANCE MANUAL

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1 PERTINENT READY-REFERENCE INFORMATION

1-1 INTRODUCTION

This section of the manual presents pertinent information for ready reference and use in the event of the threat of major flooding.

1-2 VICINITY AND PROJECT MAPS

The vicinity map of Scottsville is shown in figure 1-1. A plan view of the Local Flood Protection project is shown in figure 1-2.

1-3 FLOOD RESPONSE PROCEDURES

Table 1-1 presents for ready reference a summary of the flood response procedures that must be followed during the threat of a flood. **The reader is referred to Section 7 of this manual for a more detailed description of the appropriate actions that must be taken.**

1-4 TOWN ROSTER OF KEY PERSONNEL

Table 1-2 presents for ready reference pertinent information on the key flood response team personnel in the town of Scottsville. Home and business telephone numbers are listed.

1-5 PERTINENT CONTACTS

Table 1-3 presents the telephone numbers for pertinent contacts in the town of Scottsville, the city of Charlottesville, the counties of Albemarle and Fluvanna, the state of Virginia, and the Federal Government.

1-6 LIST OF BUSINESSES AND RESIDENTS IN THE FLOOD PLAIN

Table 1-4 presents a list of the residents located in the flood plain and table 1-5 presents a list of the businesses located in the flood plain.

1-7 SAND SOURCE LOCATION (FOR SANDBAGS)

Sandbags for use with the erection of the stop log closures are stored at the Pump House at 205 Lumber Street in downtown Scottsville.

A source of sand is the VDOT Keene Area Office. Directions: Route 20 north to 6 miles north of Scottsville, to Keene. Go right on Route 714. Travel on 712 for 1/4 mile. On left. Telephone Number: (434) 286-3201.

1-8 EMERGENCY SHELTER LOCATIONS

The Scottsville Volunteer Rescue Squad is the designated emergency shelter for residents forced to evacuate the downtown area of Scottsville during a flood threat. The school is located on State Route 6 (805 Irish Road), approximately 1.2 miles west of the town corporate limits. The contact regarding use of the emergency shelter is as follows (to be filled in by town officials):

Name:	<u>Red Cross (Central VA Chapter)</u>
Phone number (Local):	<u>(434) 979-7143</u>
Phone number (Emergency):	<u>(855) 853-8272</u>

1-9 UPDATES OF SECTION 1 TABLES

Tables 1-2, 1-3, 1-4, and 1-5 shall be reviewed and updated as needed. Blank copies of the tables are provided in appendix B to facilitate updating. A complete set of updated pages shall be provided to the District Engineer and shall clearly indicate the dates on which updates were made.

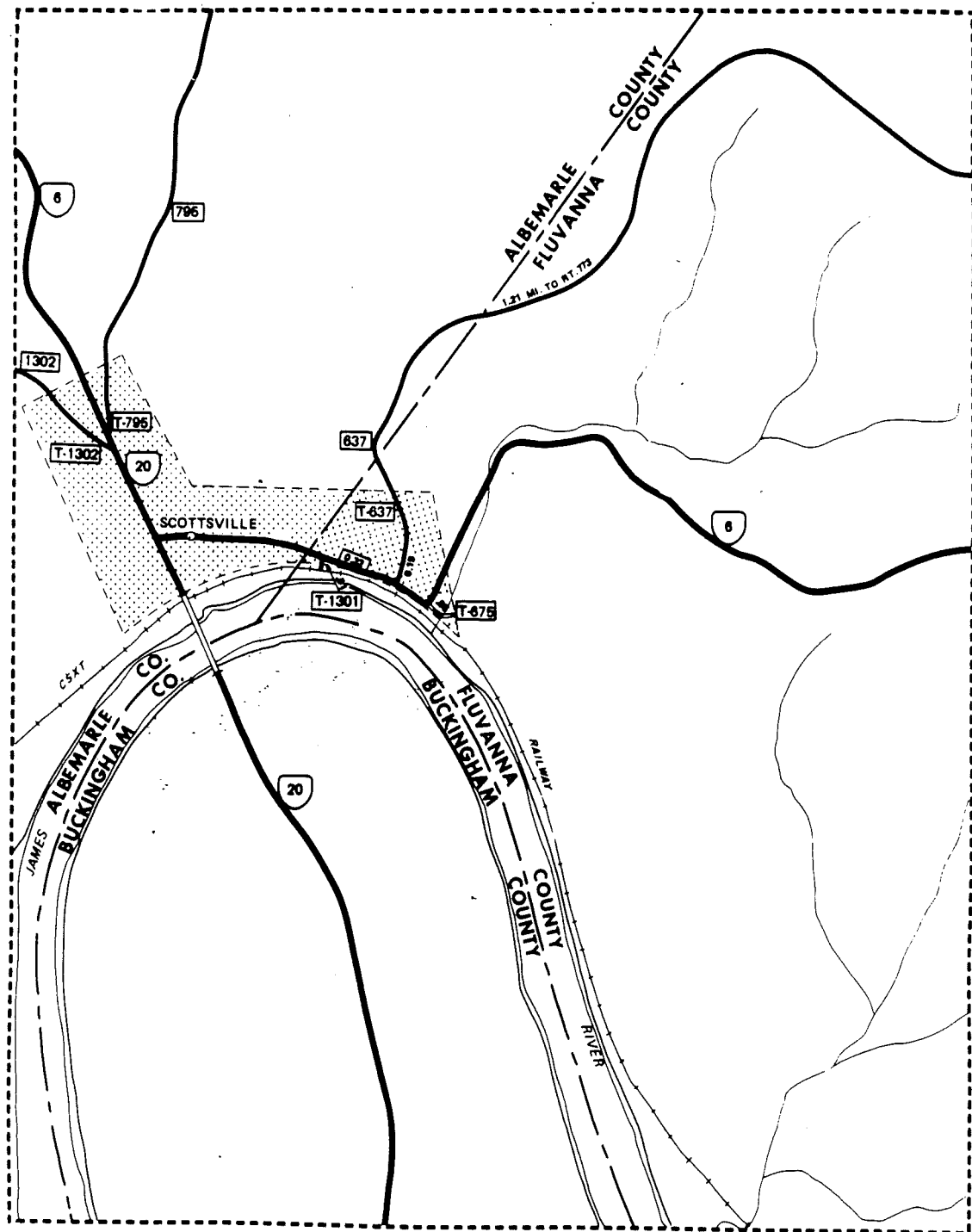


Figure 1.1--SCOTTSVILLE AND VICINITY, VIRGINIA

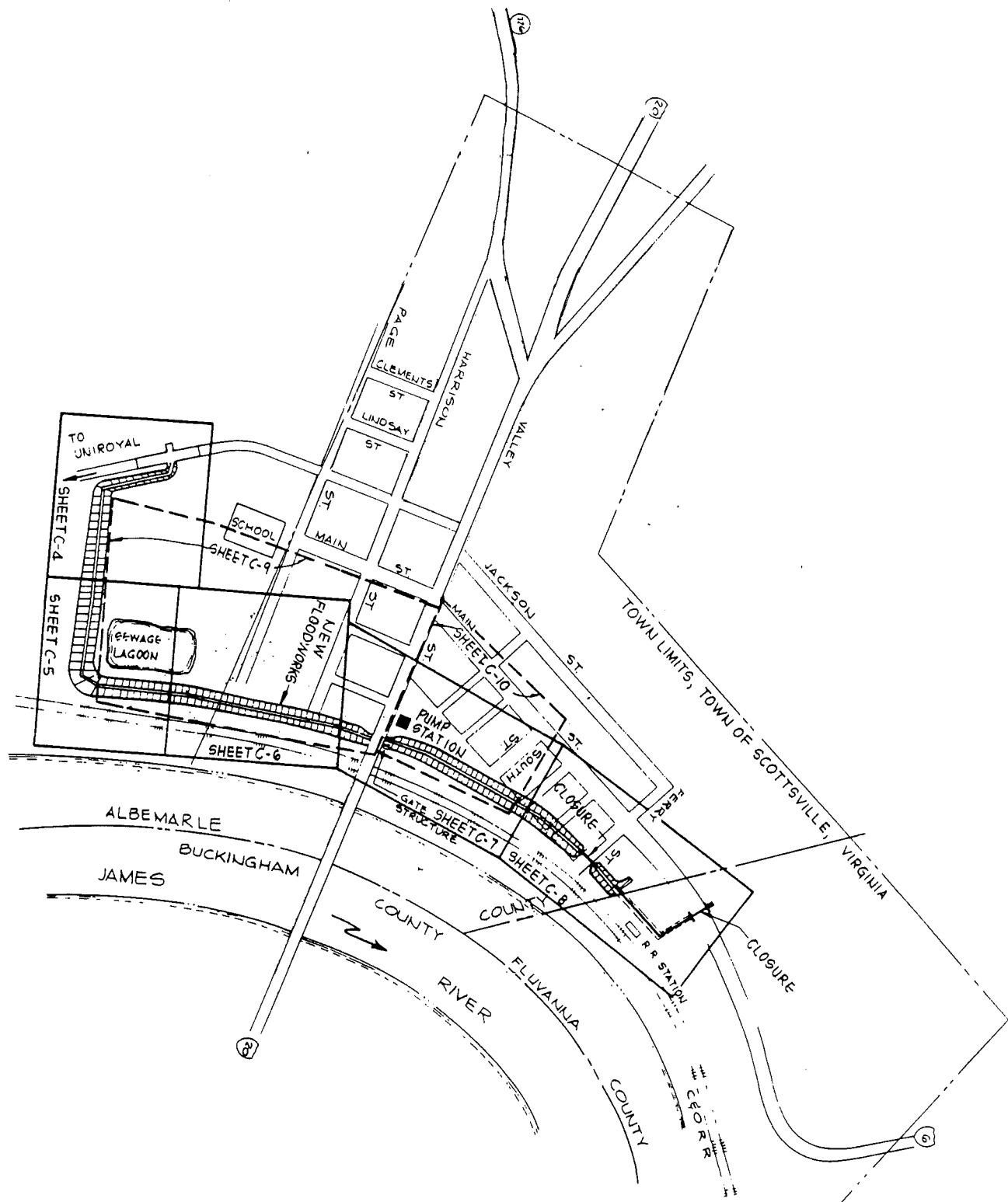


Figure 1.2--SCOTTSVILLE LOCAL FLOOD PROTECTION PROJECT

Table 1-1.

FLOOD RESPONSE PROCEDURES
(RISING WATER)

<u>Stage</u>	<u>Elevation</u>	<u>Action</u>	<u>Team or Individual</u>
9.0	262	Notification of impending flood threat received at some point prior to this stage or alarm at Discharge Structure "Sounds."	
10.0	263	FLOOD ALERT. Flood Superintendent notifies Flood Teams of impending flood threat.	Flood Superintendent
11.0	264	Flood teams assemble at Emergency Operations Center for briefing by Flood Superintendent.	All Flood teams
12.0	265	Notify Flood Plain residents and business owners of the potential flood threat.	Flood Superintendent
12.0	265	Flood teams check readiness of pump station, street closure materials, flap gate/slucice gate, Mink Creek sluice gate, and emergency generator.	Teams 1, 2, 3, 4, and 5
13.0	266	Move street closure barriers, cones, lights, detour signs to Ferry Street.	Team 3
13.0	266	Move street closure barriers, cones, lights, detour signs to Main Streets.	Team 4
13.0	266	Close sanitary sewer gate valves.	Team 5
15.0	268	Start all three pumps at pump station and set at idle.	Team 1
16.0	269	Check levee discharge structure flap gate and close sluice gate if flap gate is blocked by debris.	Team 1
16.0	269	Engage pumps if heavy rainfall is observed or reported in the Mink Creek watershed. (Immediately open sluice gate if capacity of pumps is exceeded to allow for pressure flow to equilibize interior and river elevations)	Team 1

Table 1-1.

FLOOD RESPONSE PROCEDURES
(RISING WATER) CONTINUED

<u>Stage</u>	<u>Elevation</u>	<u>Action</u>	<u>Team or Individual</u>
16.0	269	VDOT, State Police, and Fluvanna Sheriff notified of impending closure of Ferry Street Closure.	Flood Superintendent
16.0	269	Monitor water level at Mink Creek Dam and keep sluice gate open as long as Team 1 reports that pumps are operating properly and that no runoff is collecting at Pump Station.	Team 2
16.0	269	Close sluice gate if Team 1 reports that runoff has begun to collect at Pump Station.	Team 2
<u>16.0</u>	269	Immediately open sluice gate if emergency bypass channel at Mink Creek Dam should fill with water. IMMEDIATELY NOTIFY FLOOD SUPERINTENDENT OF NEED TO EVACUATE DOWNTOWN AREA.	Team 2
16.0	269	Begin semi-hourly inspection of entire project and notify Flood Superintendent of any potential problem areas.	Team 5
16.5	269.5	Place street closure barriers, cones, lights, and detour signs at Ferry Street.	Team 3
17.0	270	Install Ferry Street Closure.	Team 3
19.0	272	VDOT, State Police, and Fluvanna Sheriff notified of impending closure of Main Street Closure.	Flood Superintendent
19.5	272.5	Place street closure barriers, cones, lights, and detour signs at Main Street.	Team 4
20.0	273	Install Main Street Closure.	Team 4
27.0	280	Implement the Town's Evacuation Plan.	Flood Superintendent and Team 6

Table 1-2. Town Roster of Key Personnel

Town Office (434) 286-9267
Scottsville Police..... (434) 286-2511
Scottsville Volunteer Rescue Squad..... (434) 286-3979
Scottsville Volunteer Fire Department (434) 286-2841

Town Mayor

Name **Mr. Jesse B. Grove III**
Business Address 401 Valley Street
Scottsville, VA 24590
Business Phone (434) 286-9267
Home Address 270 Jackson Street
Scottsville, VA 24590
Home Phone (434) 286-4840
Mobile Phone (434) 960-6790

Flood Protection Superintendent

Name **Mr. Tim Karr**
Business Address Charlottesville Fire Department
203 Ridge Street
Charlottesville, VA 22902
Business Phone (434) 970-3324
Home Address 591 Irish Road
Scottsville, VA 24590
Home Phone (434) 286-2623
Mobile Phone (434) 531-6030

Table 1-2. Town Roster of Key Personnel

(Cont'd)

Police Chief

Name	Robert H. Layman
Business Address	Scottsville Police Department 105 Main Street Scottsville, VA 24590
Business Phone	(434) 286-2511
Home Address	6938 Plank Road Charlottesville, VA 22903
Home Phone	(540) 456-6214
Mobile Phone	(434) 566-3555

Fire Chief

Name	Mike Grandstaff
Home Address	320 Hardware Road Scottsville, VA 24590
Home Phone	(434) 286-3147
Mobile Phone	(434) 566-2827
Contact through Emergency Dispatch	(434) 977-9041

Rescue Squad Chief

Name	Bryan Cropp
Home Address	882 Jefferson Drive East Palmyra, VA 22963
Mobile Phone	(434) 326-6234
Contact through Emergency Dispatch	(434) 977-9041

Town Administrator

Name	George T. Goodwin III
Business Address	Town Municipal Building 401 Valley Street Scottsville, VA 24590
Business Phone	(434) 286-9267
Home Address	263 Belle Meade Lane Scottsville, VA 24590
Home Phone	(434) 286-2665
Mobile	(434) 906-2561

Table 1-2. Town Roster of Key Personnel

(Cont'd)

Flood Response Team Personnel

Name	Scottsville Volunteer Fire Department
Business Address	P.O. Box 381
	Scottsville, VA 24590
Business Phone	(434) 286-2841
Contact through Emergency Dispatch	(434) 977-9041

Table 1-3. Pertinent Contacts

Federal

National Weather Service

Blacksburg, VA..... (800) 221-2856

Contact: Mike Gillen

Web Page: <http://www.erh.noaa.gov/rnk/>

(Blacksburg Office covers James River Watershed to Bremo Bluff)

Wakefield, VA..... (757) 899-4200

(James River downstream of Bremo)

Sterling, VA (703) 260-0107

(Albemarle County is in the Sterling District)

Corps of Engineers

Boris O. "Bo" Taran

Civil Engineering Section (757) 201-7612

(Designed Scottsville System)

State

Virginia Department of Transportation

(Charlottesville) (434) 293-0011

(Keene) (434) 286-3201

Virginia State Police

(Charlottesville) (434) 293-3223

(Headquarters) (800) 552-0962

County

Albemarle County Sheriff (434) 972-4001

Albemarle County Police (434) 296-5807

Fluvanna County Sheriff

(Scottsville) (434) 286-3642

(Palmyra) (434) 589-8211

Albemarle County Executive (434) 296-5841

Fluvanna County Administrator (434) 591-1910

Table 1-3 Pertinent Contacts

(Continued)

County -- Continued

Charlottesville/Albemarle Emergency Communications Center	
(Emergency)	911
(Non-emergency)	(434) 977-9041
(Administration)	(434) 970-3560
(Alternative Administration #)	(434) 970-3505
Albemarle County Service Authority	(434) 977-4511
(Nights & Weekends – Call Alb. Co. Police)	(434) 296-5807
Charlottesville/Albemarle Airport	
(Airport Administration)	(434) 973-8342
(FAA Tower)	(434) 973-4458
(Off-hours Beeper number – William Pahuta)	(434) 972-4950
(Off-hours Beeper number – Barbara Hutchinson) ..	(434) 963-1495

Service, Supply, & Other Facilities

Rivanna Water & Sewer Authority	(434) 977-2970
Appalachian Power.....	(800) 956-4237
Columbia Gas of Virginia.....	(800) 544-5606
CSX Railway (Charlottesville).....	(434) 296-7442
(Scottsville)	(434) 286-3638
Drew Caldwell, Scottsville Chief, Mobile.....	(434) 242-0635
Fuel Oil Supplier	
(Tiger Fuel)	(434) 293-6157
Liquid Propane Gas Supplier	
(AmeriGas).....	(434) 295-4194

TABLE 1-3. PERTINENT CONTACTS
(Cont'd)

OTHERS

_____	_____
_____	_____
_____	_____

**Table 1-4. LIST OF RESIDENCES IN THE
FLOOD PLAIN (IN ALPHABETICAL ORDER)**

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

**Table 1-4. LIST OF RESIDENCES IN THE
FLOOD PLAIN (IN ALPHABETICAL ORDER)**
(Cont'd)

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

**Table 1-4. LIST OF RESIDENCES IN THE
FLOOD PLAIN (IN ALPHABETICAL ORDER)**
(Cont'd)

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

Resident Name _____
Address _____

Phone No. _____

**Table 1-5. LIST OF BUSINESSES IN THE
FLOOD PLAIN (IN ALPHABETICAL ORDER)**

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

**Table 1-5. LIST OF BUSINESSES IN THE
FLOOD PLAIN (IN ALPHABETICAL ORDER)**
(Cont'd)

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

**Table 1-5. LIST OF BUSINESSES IN THE
FLOOD PLAIN (IN ALPHABETICAL ORDER)
(Cont'd)**

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

Phone No._____

Business Name_____

Address_____

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2 GENERAL INFORMATION - REGULATIONS, PROVISIONS, AND PRECAUTIONS

2-1 GENERAL

This section of the manual provides general information on the Scottsville Local Flood Protection project, including general regulations and requirements and general procedures, precautions, and provisions, important to its operation, inspection, and maintenance.

2-2 AUTHORIZATION

The flood protection plan for the town of Scottsville, Virginia, was authorized by the Flood Control Act of 1948, approved June 30, 1948, Public Law 858, 80th Congress, Second Session.

2-3 GENERAL PROJECT DESCRIPTION

The Local Flood Protection project at Scottsville consists of a partially riprapped earthen levee, a concrete floodwall, two roadway closures, a gated outlet (sluice/flap gate) structure, a pumping station, two designated ponding areas, and utility modifications. The levee is approximately 3,635 feet long, with a height varying from 0 to 21 feet, a top width of 10 feet, a bottom width varying from 0 to 100 feet, and side slopes of 2 horizontal to 1 vertical. The line of protection extends from the Albemarle-Fluvanna County line westward paralleling the James River, just inward of the railroad tracks to a point upstream of the town's former elementary school. The new levee is a reinforcement and augmentation of the existing levee with an extension on the eastern end. The project also encompasses an existing previously constructed flood control project on Mink Creek, referred to as Mink Creek Dam. Mink Creek Dam and associated facilities are utilized in conjunction with the pump station

and associated facilities to control interior drainage. The flood protection project provides 100-year protection to those areas of the town of Scottsville located behind the line of protection.

2-4 PROJECT CONSTRUCTION DATES

The contract for this project, including the Storm Water Pumping Station, Floodwall with Street Closures and Raising of Levee Elevation, and Modification of the Utility Systems, was awarded in November 1985. The contractor for this project was WATTS Contractors, Inc. of Farmville, Virginia, and the Subcontractor was English Construction Co. of Altavista, Virginia. The construction was substantially completed in April 1989 and was dedicated on April 30, 1989.

The Mink Creek Dam was constructed by Moore Golf, Incorporated, of Culpepper, Virginia. The dam was completed in November 1977.

2-5 PURPOSE OF MANUAL

The purpose of this manual is to present detailed information to be used as a guide in complying with the regulations governing the operation, inspection, and maintenance of the Local Flood Protection project. In executing assurances of local cooperation for the project, the town of Scottsville has agreed to maintain and operate the completed works in accordance with these regulations. The regulations are intended to cover all local protection projects constructed by the Corps of Engineers throughout the United States, are general in nature, and obviously cannot give detailed instructions for the maintenance and operation of a specific project. The details set forth in this manual for maintenance and operation of this project are intended to supplement the regulations to permit obtaining all the benefits and protection against floods for which the project was designed. Failure to maintain and operate the project as required by the regulations, and as detailed herein, can cause severe property losses and loss of life and can result in an irreparable loss of confidence in the flood protection system by citizens who have invested their funds on the basis of the protection which it provides.

2-6 APPENDICES TO THIS MANUAL

The following appendices to this manual contain pertinent information related to the operation, inspection, and maintenance of the Scottsville Local Flood Protection project.

- a. **Appendix A - Code of Federal Regulations, Title 33, Chapter II, Section 208.10.**
- b. **Appendix B - Inspection Forms and Checklists.**
- c. **Appendix C - Project Construction As-Built Drawings.**
- d. **Appendix D - Evaluation of flood Warnings, Response, and Action Times.**

2-7 REGULATIONS GOVERNING OPERATION AND MAINTENANCE OF THE PROJECT

2-7.1 REGULATIONS - APPROVAL AND AUTHORITY

The Secretary of the Army has approved regulations for operation and maintenance of local flood protection projects in accordance with the authority contained in Section 3 of the Flood Control Act of 22 June 1936, Public Law No. 738, 74th Congress, as amended and supplemented. The actual requirements are presented in Section 208.10 of the **CODE OF FEDERAL REGULATIONS, TITLE 33 - NAVIGATION AND NAVIGABLE WATERS, CHAPTER II, (REVISED AS OF JANUARY 1, 1968)**. Section 208.10, hereafter referred to as the "Regulations," is included as **appendix A**.

2-7.2 GENERAL REQUIREMENTS

The general operation and maintenance requirements are presented in paragraph (a) of the Regulations and listed verbatim as follows:

"(1) The structures and facilities constructed by the United States for local flood protection shall be continuously maintained in such a manner and operated at such times and for such periods as may be necessary to obtain the maximum benefits.

"(2) The State, political subdivision thereof, or other responsible local agency, which furnished assurance that it will maintain and operate flood-control works in accordance with regulations prescribed by the Secretary of the Army, as required by law, shall appoint a permanent committee consisting of or headed by an official hereinafter called the 'Superintendent,' who shall be responsible for the development and maintenance of, and directly in charge of, an organization responsible for the efficient operation and maintenance of all of the structures and facilities during flood periods and for continuous inspection and maintenance of the project works during periods of low water, all without cost to the United States.

"(3) A reserve supply of materials needed during a flood emergency shall be kept on hand at all times.

"(4) No encroachment or trespass which will adversely affect the efficient operation or maintenance of the project works shall be permitted upon the rights-of-way for the protective facilities.

"(5) No improvement shall be passed over, under, or through the walls, levees, improved channels or floodways, nor shall any excavation or construction be permitted within the limits of the project right-of-way, nor shall any change be made in any feature of the works without prior determination by the District

Engineer of the Department of the Army or his authorized representative that such improvement, excavation, construction, or alteration will not adversely affect the functioning of the protective facilities. Such improvements or alterations as may be found to be desirable and permissible under the above determination shall be constructed in accordance with standard engineering practice. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction acceptable under standard engineering practice shall be obtained from the District Engineer or, if otherwise obtained, shall be submitted for his approval. Drawings or prints showing such improvements or alterations as finally constructed shall be furnished the District Engineer after completion of the work.

"(6) It shall be the duty of the Superintendent to submit a semiannual report to the District Engineer covering inspection, maintenance, and operation of the protective works.

"(7) The District Engineer or his authorized representatives shall have access at all times to all portions of the protective works.

"(8) Maintenance measures or repairs which the District Engineer deems necessary shall be promptly taken or made.

"(9) Appropriate measures shall be taken by local authorities to insure that the activities of all local organizations operating public or private facilities connected with the protective works are coordinated

with those of the Superintendent's organization during flood periods.

"(10) The Department of the Army will furnish local interests with an Operation and Maintenance Manual for each completed project, or separate useful part thereof, to assist them in carrying out their obligations under this part."

Most of the general rules outlined above are self-explanatory and need no further discussion. The remainder of this section provides further guidance for complying with those features where clarification is required.

2-8 PROJECT ORGANIZATION AND OPERATING RESPONSIBILITIES

2-8.1 OPERATING RESPONSIBILITIES

The town of Scottsville is fully responsible for the complete operation, inspection, and maintenance of the Local Flood Protection project in accordance with the regulations prescribed by the Secretary of the Army. As directed in item (2) of paragraph (a) of the Regulations, the town executes this responsibility through the establishment of a permanent project organization, headed by a designated "Superintendent." The District Engineer, Norfolk District, Corps of Engineers, Norfolk, Virginia and the National Weather Service Office, Roanoke, Virginia, shall be kept advised of the names of the Superintendent and the organization members at all times.

2-8.2 PROJECT ORGANIZATION

The permanent project organization established by the town, in accordance with item (2) of paragraph (a) of the Regulations, shall be comprised of a number of individuals, all thoroughly trained in the operation of the various features of the project, who are available to assist the Superintendent in (1) the operation of the project during flood events and (2) the ordinary inspection, maintenance, and repair of the project throughout the year. The key personnel essential to the operation of the project during the

threat of flooding and their respective flood duties are presented in Section 7-2.1 of this manual. The assignment of duties regarding ordinary inspection, maintenance, and repair of the project is left to the discretion of the Superintendent.

2-8.3 DUTIES OF SUPERINTENDENT

As indicated in item (2) of paragraph (a) of the Regulations, the Superintendent is responsible for the development and maintenance of, and directly in charge of, the project organization. In general, the Superintendent is responsible for leading the project organization in accomplishing the operation, inspection, and maintenance of the project. The duties of the Superintendent during a threat of flooding are presented in Section 7-2.1 of this manual. Some of the specific duties of the Superintendent during low water conditions include:

- a. Submission of semiannual reports to the Norfolk District Engineer (see paragraph 2-10).

- b. Assurance that all key personnel have read the portions of the operation and maintenance manual pertaining to their duties and are properly trained to carryout those duties.

- c. Assurance that a copy of this manual is kept at the pump station and that closure installation charts are posted at the storage buildings adjacent to the Ferry Street closure and the Main Street closure, respectively.

- d. Accomplishment of periodic inspections of the project as required by the regulations and as outlined in this manual (see paragraph 2-11).

- e. Assurance that proper maintenance is being provided for all features of the project.

- f. Assurance that all closure parts and equipment are on hand, properly stored, and in good condition.

- g. Maintenance of complete records of all inspections, maintenance, and repairs of the project (see paragraph 2-12).

h. Maintenance of a sufficient supply of spare parts and supplies necessary for the continuous operation of the project.

i. Accomplish arrangements with **the Weather Service Office, Roanoke**, and other official agencies, to be notified of flood warnings and forecasts of river stages and expected precipitation, prior to and during flood periods, in sufficient time to enable the project to be operated before critical flood stages are reached.

j. Accomplishment of updates and revisions to this manual (see paragraph 2-16).

2-9 ALTERATIONS OR IMPROVEMENTS TO THE PROJECT

Item (5) of paragraph (a) of the Regulations, establishes the general requirements regarding alterations to and improvements of the Scottsville Local Flood Protection project. Drawings or prints of proposed improvements or alterations to the floodwall or appurtenant structures shall be submitted, in triplicate, to the District Engineer, Norfolk District, Corps of Engineers, Norfolk, Virginia, sufficiently in advance of the proposed construction period to permit adequate study and consideration of the work. In general, a minimum of 3 months in advance of the proposed construction is needed for relatively minor proposed alterations or improvements, while a minimum of 6 months is required for major proposed alterations or improvements. Drawings or prints, in duplicate, showing any improvements or alterations as finally constructed shall be furnished to the District Engineer after completion of the work.

2-10 SEMIANNUAL REPORT

The semiannual report required by item (6) of paragraph (a) of the Regulations, shall include dated copies of all inspection checklists made during the period of report. The nature, date of construction, and date of removal of all temporary repairs and the dates of construction of permanent repairs, shall also be included in this report. Other items and suggestions relative to public

cooperation with the maintenance and operation of this facility, public sentiment on the protection obtained, and other allied subjects, are considered pertinent and desirable data for inclusion in the report, but are not required. The report shall be submitted to the District Engineer, Norfolk District, Corps of Engineers, Norfolk, Virginia, on the first day of May and November of each year. Copies of all reports shall be maintained by the Town Clerk and at the pump station.

2-11 PERIODIC INSPECTIONS

2-11.1 INSPECTIONS BY THE TOWN

Periodic inspections as required by the regulations or as detailed in this manual for each respective feature of the protective works shall be made by the Superintendent at the following times:

a. At the beginning of each month during the flooding season, generally considered to include the months of March, April, May, June, July, August, September, October, and November. However, records reveal that flood stages are apt to occur during any month of the year.

b. Immediately following each major high-water period. For purposes of inspection, a major high-water period is defined as any event where the James River reaches an elevation of 265 feet, NGVD (river stage 12) or greater.

c. As specifically indicated for each respective piece of equipment or procedure.

2-11.2 INSPECTIONS BY THE FEDERAL GOVERNMENT

A representative of the Norfolk District will make periodic detailed inspections of all features of the project and all items of equipment. Inspections will generally be made twice a year or as otherwise directed by the District Engineer. It is suggested that the Superintendent be present during the inspections, and, in order to make this possible, local authorities will be advised, in advance, of the date of each inspection so that a mutually agreeable date may be set for the inspection.

2-12 STAFF GAGES

A 35-foot concrete gage station is located at Scottsville on the left bank of the James River, 1,200 feet downstream of the bridge on State Highway Route 20. The gage station houses a wire weight gage (with an automatic data recorder) and a staff gage, both owned and maintained by the U. S. Geodetic Survey. Overall operations of the various features of the Local Flood Protection project are to be based on river stages at the staff gage which is anchored to the downstream, shoreward corner of the gage station. The staff gage is numbered from 11.0 to 32.0 feet and gage zero is at elevation 253.18 feet, NGVD. The staff gage is commonly referred to as the Ferry Street gage because of its location adjacent to Ferry Street. Operation of the interior drainage system at Mink Creek, including the levee discharge structure, pump station, and Mink Creek, will soon be based on two staff gages to be placed in Mink Creek by the town of Scottsville at the suggestion of the Norfolk District. One gage is to be located on the James River side of the project and the other is to be located immediately upstream of the point where Mink Creek enters the levee discharge structure.

2-13 RECORDS

The town of Scottsville shall maintain complete records of all activities related to the operation, inspection, and maintenance of the Local Flood Protection project. These records include, but are not limited to, log sheets, inspection forms and checklists, semi-annual reports, work orders, and contracts. Copies of log sheets and inspection forms are furnished in appendix B for reproduction and use by the town of Scottsville for this project. It shall be the responsibility of the town to obtain a supply of the log sheets and checklists.

a. **Checklists**, as listed below, shall be used in each inspection to insure that no features of the protection system are overlooked. Items requiring maintenance shall be noted thereon; if items are satisfactory, they may be so indicated by a check.

(1) Inspection Report Form (exhibit A)

(2) Check List--Pump Station (exhibit B)

(3) Check List--Mink Creek Dam (exhibit C)

(4) Check List--Floodwall and Levee (exhibit D)

b. **Log Sheets** are provided for the Pump Start-up (exhibit E) and the Pump Station and Appurtenances (exhibit F) and shall be filled in by operating and maintenance personnel each time an item of equipment is operated or maintained. This shall apply to either an actual "wet" operation or a "dry" simulated operation.

2-14 TELEPHONE AND RADIO PROVISIONS

2-14.1 TELEPHONE SERVICE

The pumping station building includes provisions for a telephone, wall-mounted inside the building on the right side of the entrance door and conduit for the telephone cables. Item (1) of paragraph 208.10(f) of the Regulations requires that telephone service shall be maintained at all pumping plants. All costs for the installation and maintenance of the telephone service shall be borne by the town.

2-14.2 RADIO RECEIVERS

It is suggested that the Superintendent and Assistant Superintendent be supplied with radio receivers made specifically to receive National Oceanic and Atmospheric Administration (NOAA) weather transmissions. The receivers should be of the type which can sound an alarm or come on automatically for emergency storm or high water broadcasts. Prior to purchase of the suggested radio receivers, it should be determined if the Richmond and/or Lynchburg NOAA stations can be received in Scottsville. The Lynchburg, SW Virginia, information would seem to be more significant to Scottsville.

2-15 SIMULATED FLOOD OCCURRENCE

Flood Superintendent shall schedule semiannual flood alert drills to assist in training and to help identify problem areas. It is suggested that one drill be announced and one drill be unannounced.

2-16 REVISIONS TO AND UPDATES OF THIS MANUAL

Revisions to or updates of this manual shall be accomplished as necessary to insure that it contains the latest available information related to the Local Flood Protection project. All revised or updated pages to this manual shall be provided to the District Engineer. The dates of revisions or updates shall be clearly indicated on all pages.

2-17 SAFETY PRECAUTIONS

Operation, inspection, and maintenance of the Local Flood Protection project shall be accomplished in accordance with Occupational Safety and Health Administration requirements and General Industry Standards. Certain safety precautions and warnings are presented throughout this manual to alert operation, inspection, and maintenance personnel to potentially dangerous and hazardous conditions or areas. All personnel shall become familiar with these precautions and warnings and should follow them very carefully to avoid personal injury. First aid kits shall be stored at the pump station and the storage buildings at the Ferry Street and Main Street closures.

2-18 SECURITY PROVISIONS

Only authorized personnel shall be given access to the pumping station and to the buildings for the street closure gates. All entrance doors shall be locked while station and closure buildings are unattended.

2-19 FIRE PROTECTION PROVISIONS

Two portable dry chemical fire extinguishers are provided in the pumping station. They are effective for Class "B" fires (flammable petroleum products, etc.), for Class "C" fires (energized electrical equipment), and for Class "A" fires (wood, cloth, paper, etc.). The fire extinguishers shall be kept full at all times. Extinguishers have a 20-pound capacity. They shall be refilled immediately after use even though only partly discharged. The extinguishers shall be checked semiannually whether or not they are used and shall be recharged as necessary.

2-20 FREEZE PROTECTION PROVISIONS

2-20.1 BUILDING PLUMBING SYSTEM

The only plumbing in the pump station is a section of water service piping to the control room. A self-draining ball valve is located outside the building, below grade, which can be cut off should a freeze problem occur. It can be found in a cast iron valve box at the toe of the fill at the northwest corner of the storm water pump station.

2-20.2 STREET CLOSURE FACILITIES

Stop log post holes in the street closure sills shall be filled with antifreeze upon the approach of cold weather. Antifreeze shall be maintained in the holes until mid-March or until the danger of freezing is past.

2-21 PROVISIONS FOR TRAFFIC CONTROL EQUIPMENT

Required traffic control equipment, such as portable type street barricades, traffic signs, safety lanterns, etc., shall be made available to the operating personnel during a flooding condition. The barricades shall be used on the protected side of each street closure gate, both while it is being closed or opened, and while they remain in the fully closed position. The barricades shall serve to divert vehicular traffic away from the gates and their appurtenances, and to discourage pedestrians from tampering with the gates. Barricades shall be placed on the water side of the Main Street (Route 6) closure to warn motorists that the closure is in place. Barricades shall be secured with sandbags to insure that they will remain in place following the receding of the flood waters.

2-22 RODENTS, INSECTS, ETC. PRECAUTIONS

The building construction, including the various openings for access and the installation of equipment, was designed to minimize the entrance of rodents, insects, etc. Operating and maintenance personnel shall be alert for these pests and, if present, necessary steps shall be taken for their extermination.

2-23 PROVISIONS FOR NOTIFICATION OF FIRMS AND ORGANIZATIONS LOCATED ON RIVER SIDE OF THE PROJECT

The town shall compile a list of all firms and organizations located on the river side of the project that will be affected by flooding stages of the James River. When it appears that river flooding is imminent, the town shall alert these firms before any street closure gate is closed in order that automobiles, trucks, and other vehicles may be moved through the gate opening to the protected area.

3 EARTHEN LEVEE - DESCRIPTION, OPERATION, AND INSPECTION AND MAINTENANCE

3-1 GENERAL

This section of the manual presents a description of the levee portion of the Local Flood Protection project and the procedures that should be followed for its operation, inspection, and maintenance.

3-2 DRAWINGS

Drawings related to the earthen levee features of the Local Flood Protection Project are found in appendix C (PROFILES--plates C-4 through C-8 and CROSS SECTIONS--plates C-12 through C-20).

3-3 DESCRIPTION

The levee portion of the Local Flood Protection project extends from the Uniroyal access road on the west end of the project, south to a point just north of the Chessie System Railroad road bed and proceeds to the east north of and parallel to the railroad to a point just west of Ferry Street. The levee is approximately 3,500 feet long and has a height that varies from 0 to 21 feet. The levee side slopes are 2 horizontal to 1 vertical and the crest width is 10 feet. The landward side of the levee and approximately 1,000 feet of the river side of the levee are grassed. The remaining river side of the levee is covered by slope protection consisting of a plastic filter fabric overlain by a 6-inch layer of bedding stone covered by a 2-foot layer of armor stone.



Earthen levee



Riprapped levee

3-4 OPERATION

The levee portion of the flood protection project is a fixed, complete structure which requires no specific actions to affect operation in response to a potential flood threat. However, during flood periods, the levee must be patrolled continuously to locate possible sand boils or unusual wetness of the landward slope.

----- NOTE -----

FLOOD PROTECTION PROCEDURES	THE APPROPRIATE PROCEDURES AND SEQUENCE OF ACTIONS THAT MUST BE TAKEN DURING THE THREAT OF A MAJOR FLOOD EVENT, INCLUDING THE APPROPRIATE TIME TO BEGIN PATROL OF THE LEVEE, ARE PRESENTED IN SECTION 7, FLOOD PROTECTION PROCEDURES.
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Patrolling of the levee during periods of flooding is also necessary to be certain that:

- a. There are no indications of slides or sloughs developing;
- b. Wave wash or scouring action is not occurring;
- c. No low reaches of levee exist which may be overtopped;
- d. No other conditions exist which might endanger the structure.

Appropriate advance measures shall be taken to insure the availability of adequate labor and materials to meet all contingencies. Immediate steps shall be taken to control any condition which endangers the levee and to repair the damaged section.

3-5 INSPECTION AND MAINTENANCE

The Superintendent shall provide at all times such maintenance as may be required to insure serviceability of the structures in time of flood. Measures shall be taken to promote the growth of sod, exterminate burrowing animals, and to provide for routine mowing of the grass and weeds, removal of wild growth and drift deposits, and repair of damage caused by erosion or other forces. When practicable, measures shall be taken to retard bank erosion by planting willows or other suitable growth on areas riverward of the levees. Periodic inspections shall be made by the Superintendent to insure that the above maintenance measures are being effectively carried out and, further, to be certain that:

- a. No unusual settlement, sloughing, or material loss of grade or levee cross section has taken place;
- b. No caving has occurred on either the land side or the river side of the levee which might affect the stability of the levee section;
- c. No seepage, saturated areas, or sand boils are occurring;
- d. Toe drainage systems and pressure relief wells are in good working condition, and that such facilities are not becoming clogged;
- e. Drains through the levees and gates on said drains are in good working condition;
- f. No revetment work or riprap has been displaced, washed out or removed;
- g. No action is being taken, such as burning grass and weeds during inappropriate seasons, which will retard or destroy the growth of sod;
- h. Access roads to and on the levee are being properly maintained;
- i. Cattle guards and gates are in good condition;

j. Crown of levee is shaped so as to drain readily, and roadway thereon, if any, is well shaped and maintained;

k. There is no unauthorized grazing or vehicular traffic on the levees;

l. Encroachments are not being made on the levee right-of-way which might endanger the structure or hinder its proper and efficient functioning during times of emergency.

Such inspections shall be made immediately prior to the beginning of the flood season; immediately following each high water period, and otherwise at intervals not exceeding 90 days, and such intermediate times as may be necessary to insure the best possible care of the levee. Immediate steps will be taken to correct dangerous conditions disclosed by such inspections. Regular maintenance repair measures shall be accomplished during the appropriate season as scheduled by the Superintendent.

3-5.1 REPAIRS

Minor repairs required to correct conditions disclosed by the inspections should receive immediate attention, especially during non-flood season, in anticipation that high water may retard or prevent their later accomplishment. **In the event of severe damage, necessitating major repairs, a report should be made to the District Engineer, Norfolk District, describing the damage and identifying the proposed method of repair. Approval of the proposed method of repair by the District Engineer is necessary before any permanent remedial work is undertaken.**

3-5.2 DRIFT

Drift is to be removed from the levee and other sodded areas on the right-of-way at the end of each flood or high water occurring during the growing season. Drift shall be disposed of in such a way as to prevent damage to the sod.

3-5.3 RODENTS AND BURROWING ANIMALS

Rodent dens and burrowing areas can lead to levee failure during flood events. Areas identified during inspections should be destroyed and backfilled as necessary. Routine mowing of the levee and the control of weeds and woody growth will discourage the establishment of rodent dens and burrowing areas.

3-5.4 GULLIES

Gullies, holes and washes in the riverside levee slope and berm should be filled with silt, clay, sandy silt, or sandy clay, and tamped or compacted into place. Any suitable earthen material may be used to fill in areas along the landward slope of the levee.

3-5.5 SEEDING AND FERTILIZING

Seeding and fertilizing shall be accomplished as necessary to maintain the established sod and to fill in damaged and bare areas. Local experience shall indicate the best time to seed and fertilize.

3-5.6 RIPRAP SLOPE PROTECTION

Immediately following the subsidence of flood water, the entire riprap area shall be carefully inspected for stone displacement. Affected areas shall be returned to the original cross section by the addition of appropriately sized stone. The entire riprapped area shall be kept free of brush and woody growth in order to prevent stone displacement.

3-5.7 GRASS MOWING

The grass should be mowed as required to maintain good sod. A minimum of three mowings a season is suggested. Grass should not be allowed to attain a height of more than 14 inches as higher growth would encourage weed and woody plant growth.

3-5.8 INSPECTION FORMS

Forms for use in the inspection of the earthen levee portion of the Local Flood Protection project are contained in appendix C.

4

FLOODWALL - DESCRIPTION, OPERATION, AND INSPECTION AND MAINTENANCE

4-1 GENERAL

- This section of the manual presents a description of the floodwall portion of the Local Flood Protection project and the procedures that should be followed in its operation, inspection, and maintenance.



Photo 4-1. Typical section of floodwall

4-2 DRAWINGS

Drawings related to the floodwall features of the Local Flood Protection project are found in appendix C (FLOODWALL AND RETAINING WALL SECTIONS—plate C-25).

4-3 DESCRIPTION

The floodwall portion of the Local Flood Protection project extends to the east from just east of the Ferry Street Closure and levee section, passing the old train station and turning to the northeast and crossing Main Street. On the north side of Main Street, the wall extends into an embankment and terminates. The wall is of the inverted "T" type and is of reinforced concrete.

4-4 OPERATION

The floodwall portion of the flood protection project is a fixed, complete structure which requires no specific actions to affect operation in response to a potential flood threat. However, during periods of actual flooding, the floodwall must be patrolled continuously to locate possible leakage at monolith joints or seepage underneath the wall.

----- NOTE -----

FLOOD PROTECTION PROCEDURES	THE APPROPRIATE PROCEDURES AND SEQUENCE OF ACTIONS THAT MUST BE TAKEN DURING THE THREAT OF A MAJOR FLOOD EVENT, INCLUDING THE APPROPRIATE TIME TO BEGIN THE PATROL OF THE FLOODWALL, ARE PRESENTED IN SECTION 7, FLOOD PROTECTION PROCEDURES.
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In addition, during periods of flooding:

- a. Floating plant or boats will not be allowed to lie against or tie up to the wall.
- b. Adequate measures shall be taken to protect the floodwall's concrete and construction joints should it become necessary during a flood event to pass anchor cables over the wall.
- c. Appropriate advance measures will be taken to insure the availability of adequate labor and materials to meet all contingencies. Immediate action will be taken to control any condition which endangers the stability of the wall.

4-5 INSPECTION AND MAINTENANCE

The Superintendent shall provide at all times such maintenance as may be required to insure serviceability of the floodwall in time of flooding. Periodic inspections shall be made by the Superintendent to be certain that:

a. No undue settlement has taken place which affects the stability of the wall or its water tightness.

b. No bank caving conditions exist riverward of the wall which might endanger its stability.

c. No seepage, saturated areas, or sand boils are occurring.

d. Toe drainage systems and pressure relief wells are in good working condition, and that such facilities do not become clogged.

e. No trees exist in close proximity to the wall, the roots of which might extend under the wall and offer accelerated seepage paths.

f. The concrete has not undergone cracking, chipping, or breaking to an extent which might affect the stability of the wall or its watertightness.

g. Care is being exercised to prevent accumulation of debris adjacent to the wall, and to insure that no fires are being built near it.

h. There are no encroachments upon the rights-of-way which might endanger the structure or hinder its functioning in time of flood.

Such inspections shall be made immediately prior to the beginning of the flood season, immediately following each high water period, and otherwise at intervals not exceeding 90 days.

4-5.1 REPAIRS

Measures to eliminate encroachments and effect repairs found necessary by such inspections shall be undertaken immediately. **All repairs shall be ac-**

complished by methods acceptable in standard engineering practice. In the event of severe damage, necessitating major repairs, a report should be made to the District Engineer, Norfolk District, describing the damage and identifying the proposed method of repair. Approval of the proposed method of repair by the District Engineer is necessary before any permanent remedial work is undertaken.

4-5.2 INSPECTION FORMS

Forms for use in the inspection of the floodwall portion of the Local Flood Protection project are contained in appendix C.

5 STREET CLOSURES - DESCRIPTION, OPERATION, INSPECTION AND MAINTENANCE

5-1 DESCRIPTION

The Local Flood Protection project utilizes two street closures to prevent the flow of James River flood waters from entering the town at the points where the project crosses roadways. One closure, referred to as the Ferry Street closure, is a concrete/aluminum stop log structure constructed in the levee portion of the project near Ferry Street. The other closure, referred to as the Main Street (Route 6) closure, is a concrete/aluminum stop log structure with removable posts constructed in the floodwall portion of the project near Main Street. The stop logs were fabricated by Currier Steel, Inc., Lynchburg, Virginia, of galvanized steel and extruded aluminum.

5-2 DRAWINGS

Drawings related to the closure features of the Local Flood Protection project are found in appendix C (FERRY STREET CLOSURE—plates C-21 and C-22, MAIN STREET CLOSURE—plates C-23 and C-24, and CLOSURE BUILDING—plate C-26).

5-3 CLOSURE AND ASSOCIATED EQUIPMENT

The following equipment and supplies shall be available for use in connection with the closures:

A. Ferry Street Closure

1. Equipment is to be stored in building adjacent to Ferry Street closure.

2. Equipment and Supplies:

- Stop logs (51), aluminum, L10'-3" each
- Posts (2), aluminum, L11'-4" each
- Clamp rods (12), corrosion resistant steel, L9'-9" each
- lock nuts (24), corrosion resistant steel, 1-3/8" each
- Washers (24), corrosion resistant steel, 1-3/8" each
- Clamps (6), corrosion resistant steel, L1'-5-1/2" each
- Plastic buckets
- Lubricant
- Antifreeze
- Moisture barrier (1 roll), 6 mil x 20' x 100'
- Plastic bailing cups
- Sandbags
- Flashlights () and batteries ()
- Work gloves, heavy duty (1 dozen pairs)
- Rags
- Assorted tools
 - Sledge hammer (1)
 - Broom (2)
 - Open-end wrench (1)
 - Pipe wrench (1)
 - Pry bar (1)
 - Ratchet set (1)
- First aid kit (1)

B. Main Street Closure

1. Equipment is to be stored in building adjacent to Main Street Closure.

2. Equipment and Supplies:

- Stop logs (44), aluminum, L10'-3" each
- Posts (3), aluminum, L8'-4" each
- Clamp rods (16), corrosion resistant steel, L7'-0" each

- Lock nuts (32), corrosion resistant steel, 1-3/8" each
- Washers (32), corrosion resistant steel, 1-3/8" each
- Clamps (8), corrosion resistant steel, L1'-5-1/2" each
- Plastic buckets
- Lubricant
- Antifreeze
- Moisture barrier (1 roll), 6 mil x 20' x 100'
- Plastic bailing cups
- Sandbags
- Flashlights and batteries
- Work gloves, heavy duty (1 dozen pairs)
- Rags
- Assorted tools
 - Sledge hammer (1)
 - Broom (2)
 - Open-end wrench (1)
 - Pipe wrench (1)
 - Pry bar (1)
 - Ratchet set (1)
- First aid kit (1)

C. Traffic Barriers

1. Barriers to be stored at Virginia Department of Highways Building, Keene Area Office, located at the intersection of State Routes 20 and 712.
2. Ten barriers with lights to be used to close roadways when required (4 for Ferry Street and 6 for Main Street)

D. Sand Stockpile

1. Sand for filling sandbags is stockpiled at _____.
(location)

(To be completed by the city of Scottsville)

2. Approximately 30 cubic yards of material are available.

5-4 OPERATION

The installation of each movable closure shall be started in sufficient time to permit completion before flood waters reach the top of the sill structure. As discussed in appendix D, Evaluation of Flood Warning, Response, and Action Times, the minimum installation time is 45 minutes.

----- NOTE -----

FLOOD PROTECTION PROCEDURES	THE APPROPRIATE PROCEDURES AND SEQUENCE OF ACTIONS THAT MUST BE TAKEN DURING THE THREAT OF A MAJOR FLOOD EVENT, INCLUDING THE TIMING AND APPROPRIATE INSTALLATION OF THE CLOSURES, ARE PRESENTED IN SECTION 7, FLOOD PROTECTION PROCEDURES.
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5-4.1 CLOSURE INSTALLATION

The following procedure should be followed to install the Ferry Street and Main Street closures. Reader should refer to figure 5-1 and plates C-21, C-22, C-23, C-24, and C-26 , as needed.

----- CAUTION -----

POTENTIAL FOR INJURY	IN ORDER TO AVOID HAND INJURIES, WORKERS MUST WEAR GLOVES WHEN INSTALLING STOP LOGS.
-----------------------------	--

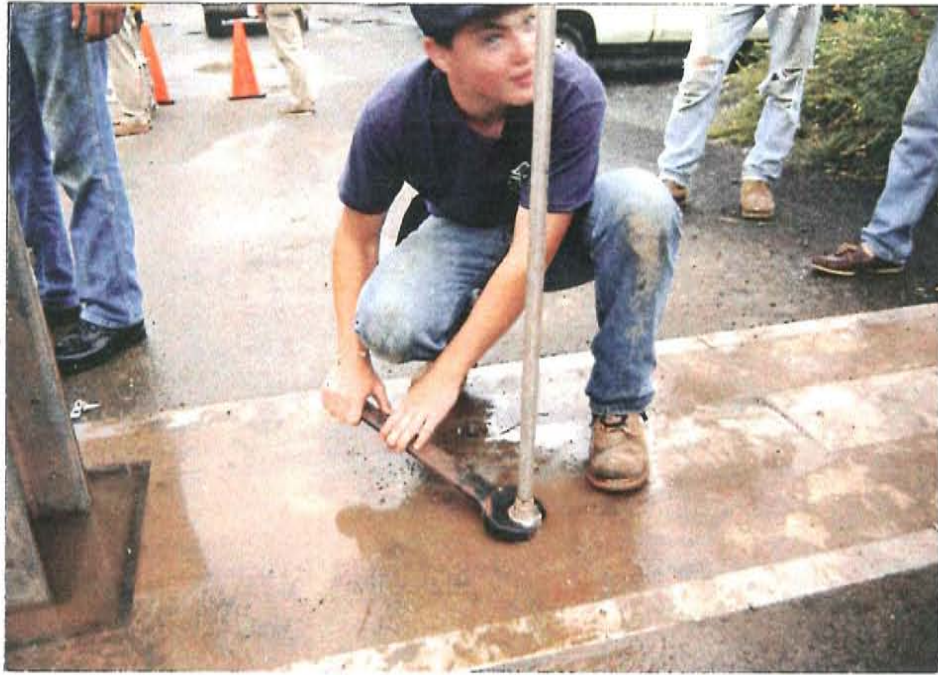
1. Start filling sandbags for use with plastic moisture barrier (Recommend 4 people at sand stockpile area and 1 person (truck driver) to transport filled bags to closure site).

2. Remove post hole plates and anchor bolt plugs (Store bolts and plugs in plastic bucket and put bucket and plates in storage buildings).



3. Clean grit out of post hole.
4. Install river side anchor rod into sill plate.
5. Screw anchor rod into sill plate.

6. Screw lock nut down tight.



7. Install H post. Post should be positioned such that the wide flange portion is inside the closure, the narrow flange portion is on the river side of the closure, and the hole in the web is at the top of the post.

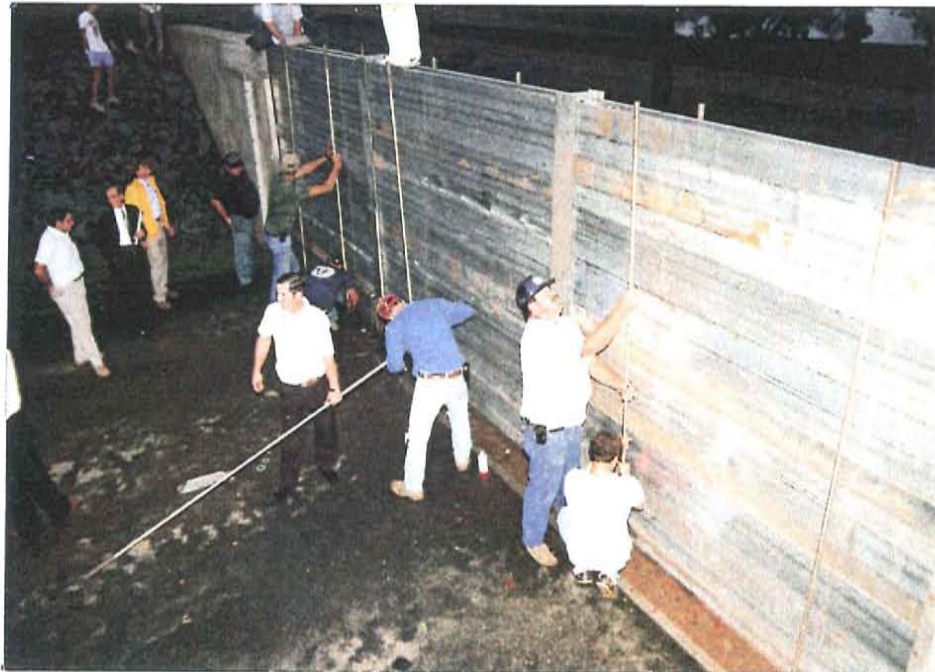


8. Put rags around the base of H post.

9. Install stop logs evenly across closure to the full height of the closure. Make certain that stop log handles are on the top of each stop log.



10. Install remainder of anchor rods inside stop logs.



11. Install bracket on top of stop logs, to anchor rods.



12. Put washer on rod and tighten lock nuts on top.



13. Install plastic moisture barrier and sandbags on river side of closure.
14. Put all tools and accessories back into storage building and close/lock door.

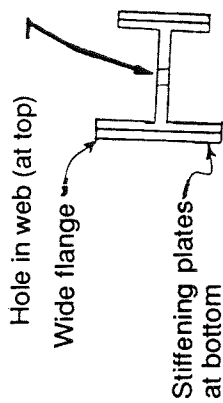
View of completed closure



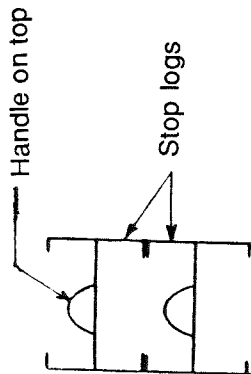
5-4.2 CLOSURE REMOVAL

The following procedure should be followed to remove the Ferry Street and Main Street closures. Reader should refer to figure 5-1, as needed.

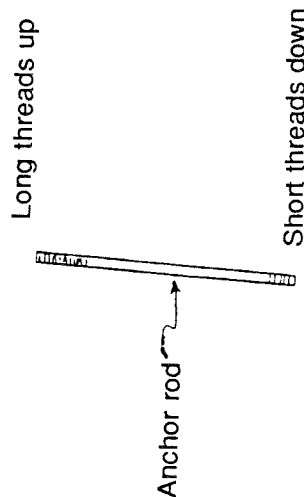
1. Remove top brackets, nuts, and washers.
2. Remove anchor rods.



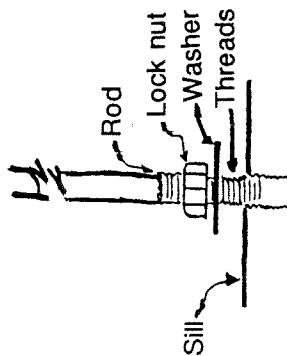
**"H-BEAM" POST
(TOP VIEW)**



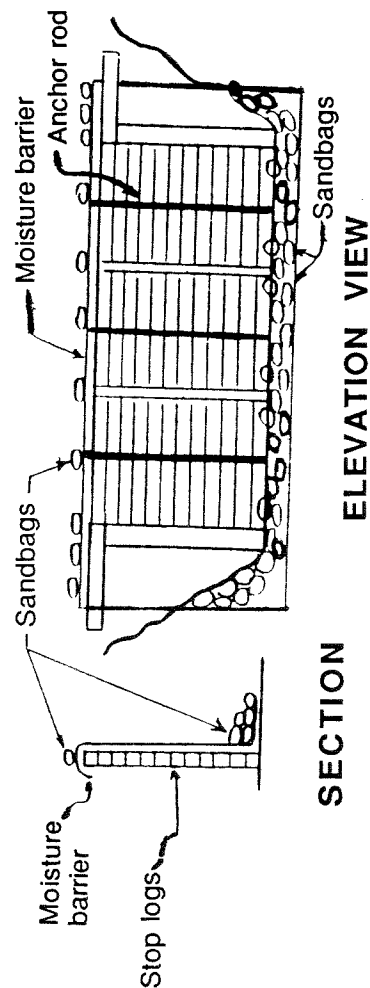
**STOP LOGS
(SIDE VIEW)**



ANCHOR ROD



**ANCHOR ROD
INSTALLATION**



SECTION

ELEVATION VIEW

INSTRUCTIONS FOR INSTALLATION

1. Start filling sandbags for plastic moisture barrier.
2. Remove post hole plates and anchor bolt plugs (Store bolts and plugs in plastic bucket and put bucket and plates in storage buildings).
3. Clean grit out of post hole.
4. Install river side anchor rod into sill plate. The short threaded end should go into the sill plate.
5. Screw anchor rod into sill plate.
6. Screw lock nut down tight.
7. Install "H-beam" post. Post should be positioned such that the wide flange portion is inside the closure, the narrow flange portion is on the river side of the closure, and the hole in the web is at the top of the post.
8. Put rags around the base of "H-beam" post.
9. Install stop logs evenly across closure to the full height of the closure. Make certain that stop log handles are on the top of each stop log.
10. Install remainder of anchor rods on the town side of the stop logs.
11. Install bracket on top of stop logs, to anchor rods.
12. Put washer on rod and tighten lock nuts on top.
13. Install plastic moisture barrier and sandbags on river side of closure.
14. Put all tools and accessories back into storage building and close/lock door.

FIGURE 5-1. INSTRUCTIONS FOR CLOSURE INSTALLATION

3. Remove stop logs. Wash and dry logs and stack in storage room with handles facing up.
4. Store anchor rods. Wash and dry rods, lubricate threads, and store on top of stop logs.
5. Store nuts/washers in plastic buckets. Wash and dry nuts and washers and lubricate threads.
6. Remove wedge and H posts. Wash and dry and store in storage building.
(NOTE: THESE WILL BE THE FIRST ITEMS REMOVED FROM BUILDING WHEN CLOSURES ARE ERECTED AGAIN!!)



Appropriate placement of closure components in storage building

7. Clean out post holes and anchor rod holes. Fill holes with antifreeze.
8. Lubricate and install H post cover plate, bolts, and plugs.

5-5 INSPECTION AND MAINTENANCE

Closure structures for traffic openings shall be inspected by the superintendent every 90 days to be certain that:

- (1) No parts are missing;
- (2) Metal parts are adequately covered with paint;
- (3) All movable parts are in satisfactory working order;
- (4) Proper closure can be made promptly when necessary;
- (5) Sufficient materials are on hand for the installation of sand bag closures and that the location of such materials will be readily accessible in times of emergency.

Tools and parts shall not be removed for other use. Trial erections of one or more closure structures shall be made once each year, alternating the structures chosen so that each gate will be erected at least once in each 3-year period. Trial installation of all closure structures shall be made whenever a change is made in key operating personnel. Where railroad operation makes trial installation of a closure infeasible, rigorous inspection and drill of operating personnel may be substituted therefor. Trial installation of sand bag closures is not required. Closure materials will be carefully checked prior to and following flood periods, and damaged or missing parts shall be repaired or replaced immediately.

6 INTERIOR DRAINAGE FACILITIES- DESCRIPTION, OPERATION, AND INSPECTION AND MAINTENANCE

6-1 GENERAL

This section of the manual presents the description of the interior drainage facilities of the Local Flood Protection project and the procedures that should be followed for their operation, inspection, and maintenance.

6-2 DESCRIPTION OF INTERIOR DRAINAGE FACILITIES

The Local Flood Protection project utilizes an interior drainage system to aid in the control of runoff from Mink Creek. This system consists of a pumping station, a levee discharge structure, modified utility systems, Mink Creek Dam, outlet works and appurtenances on Mink Creek, and a designated ponding area. A brief description of each facility follows.

6-2.1 PUMPING STATION

The station is located in the downtown portion of Scottsville between the Chessie System Railroad road bed, Main Street (Route 6), and Valley Street (Route 20). Access to the station is off Main Street just east of Valley Street. The building consists of block walls with reinforced concrete for the foundation and roof slab. The building houses three diesel engines, three mixed flow pumps, and related control equipment. See photograph 6-1.

6-2.2 LEVEE DISCHARGE STRUCTURE

The existing sluice gate structure on Mink Creek was expanded to include the construction of a reinforced concrete chamber to receive the discharge from the pump station and to house a flap gate. The overall structure, referred to as the levee discharge structure, is located in the section of levee

crossing over Mink Creek. The structure prevents the James River from backing up into Mink Creek.

6-2.3 MINK CREEK DAM

Mink Creek runs through the town of Scottsville and empties into the James River at the edge of town near the point where Valley Street crosses the James. Mink Creek Dam is a flood control project which is located on Mink Creek immediately upstream of Scottsville. Completed in 1977, the purpose of the dam has been to control runoff from the Mink Creek watershed in order to prevent or reduce flooding of the portion of the town adjacent to Mink Creek. Although the facility was constructed and is operated by the town of Scottsville, it is an important feature of the present levee-floodwall project. The dam is presently utilized in conjunction with the pump station and the levee discharge structure to prevent flood waters from ponding behind the levee-floodwall project. The dam consists of an earthen embankment approximately 35 feet high and 320 feet long. The embankment is about 205 feet wide at its bottom and about 15 feet wide at its top. The major components of the dam are a water outlet structure (see photograph 6-2), a primary spillway, an impact basin, and an emergency spillway.

6-2.4 OUTLET WORKS AND APPURTENANCES

The project also includes associated outlet works and appurtenances in the natural Mink Creek channel. These include: (1) an existing 10-foot by 10-foot stone arch box culvert leading to the levee discharge structure; (2) an existing concrete and stone culvert leading from the levee discharge structure; and (3) an improved channel leading from the concrete and stone culvert to the James River.

6-2.5 UTILITY SYSTEMS

Scottsville's sanitary sewer system and a storm drain system were modified and/or adjusted in the vicinity of the levee and the floodwall to isolate the "inside" system from the "outside" system. This was accomplished to prevent flood waters from entering the protected sections of town through the existing utility pipes.

Addendum to **Section 6-2.5: Utility Systems**
[All new text, add after existing paragraph]

There are two sewer shut-off valves that must be closed during a flood emergency.



1) The Main Street sanitary sewer valve.

Location: twelve feet north of the concrete flood wall, in the driveway leading to 475 Main Street.

Tools: A) valve key: kept in the cinderblock building at the Main Street Closure. The valve is shut after approx. 23 revolutions (clockwise, looking down).

B) large screw driver to pry off the valve cover.

Operation: Turn in clockwise direction, approximately 23 revolutions, until valve key will not turn any more.

Picture taken in October, 2002 (Note the green paint applied to the concrete flood wall.)

2) Uniroyal sanitary sewer valve

Location: east face of the Levee behind the softball field backstop; marked by four metal posts.

Tools: valve key kept in the Pump House (different in shape and size from the Main Street sewer valve key).

Operation: Turn clockwise approximately 26 revolutions until valve key will not turn anymore.

Picture taken from the top of the levee, looking back to the Old Scottsville School. (October, 2002)



6-2.6 DESIGNATED PONDING AREA

An area designated for ponding of interior runoff is located adjacent to and surrounding Mink Creek on the intake side of the Mink Creek culvert. The area provides approximately 14,000 acre-feet of temporary storage at elevation 275.4 feet, National Geodetic Vertical Datum (NGVD).

6-3 DRAWINGS

Drawings related to the interior drainage features of the Local Flood Protection project are found in appendix C. Pumping station drawings are found on plates C-27, C-28, C-29, C-30, E-1, E-2, M-1, S-1, and S-2. Levee discharge structure drawings are found on plates C-31 and C-32. Utility systems drawings are found on plate C-13. Ponding area drawings are found on plates C-9 and C-10.

6-4 MECHANICAL AND ELECTRICAL EQUIPMENT

The manufacturer and model number of the various mechanical and electrical items of equipment which have been provided in the pumping station and in connection with the flood protection project are presented in table 6-1, where available. A directory of manufacturers and suppliers is provided in table 6-2.

Table 6-1. MECHANICAL AND ELECTRICAL EQUIPMENT

Item	No. of units	Model and manufacturer
<u>PUMPING STATION</u>		
1. DIESEL ENGINES (see photo 6-3):	Three	Caterpillar Model 3306 Industrial Diesel Engine, rated 168 H.P. @ 1800 RPM, Continuous Duty with S.A.E. #1 Flywheel Housing.
2. RIGHT ANGLE GEAR DRIVES:	Three	De'Ran Gear, Inc. model M-20-A with a 3:1 ratio, rated for 250 H.P., Input RPM of 1755 and output RPM of 585, thrust capacity of 11,200lbs.
3. PUMPS:	Three	Couch Pump Company Mixed Flow Pump, Model MF 25.3 x 30, 30" in size, rated for 16,667 GPM, HD. FT. of 27.7, Impeller Diameter of 25.3" and RPM of 585.
4. LUBRICATION SYSTEM:	Three	Farval Division, Cleveland Gear Company, model CS2225 with 24 lb. steel grease reservoir, dual piston pump with a 1/3 H.P. motor with low level warning switch for the grease reservoir.
5. FLOAT LEVEL CONTROL:	One	Autocon Industries, Inc. model Selectrol Class 3500 with a 10" level indicator and 7" stainless steel float.

Table 6-1. MECHANICAL AND ELECTRICAL EQUIPMENT
(Cont'd)

Item	No. of units	Model and manufacturer
6. ENGINE CONTROLLER (see photo 6-4):	Three	Frank W. Murphy Mfr., Inc., Murphymatic Automatic Engine Controller, Model A77 with a dual setpoint speed/switch and Murphy Tattleale resets.
7. STARTING BATTERY RECHARGE SYSTEM:	Three	LaMarche Manufacturing Company, Model A-46-10-24V, with 120AC Input volts, 6 DC Amp output.
8. WATER CONTROL GATES - SLUICE GATES - PUMP STATION:	Three	Rodney Hunt Company, Series 240, 72" x 60" cast iron sluice gates with bronze seat facings and wedges.
9. LIGHTING AND APPLIANCE PANELS: PANELBOARD "A":	One	Westinghouse Electric Corporation, type WIOB with S.C. Rating of 10,000 AIC, 120/240 V, 100 Amp Rtg. Box is 36" x 20" x 5 3/4", surface mounted, with 25 - single pole 20 AMP Breakers; 2 double pole 30 AMP Breakers; 1 double pole 50 AMP Breaker; 1 double pole 20 AMP Breaker and 9 single pole spaces.
10. LIGHTING AND APPLIANCE PANELS: PANELBOARD "E" (see photo 6-5):	One	Westinghouse Electric Corporation, type WIOB with S.C. Rating of 10,000 AIC, 120/240 V, 100 Amp Rtg. Box is 24" x 20" x 5 3/4", surface mounted, with 12 single pole 20 AMP Breakers and 5 single pole spaces.

Table 6-1. MECHANICAL AND ELECTRICAL EQUIPMENT
(Cont'd)

Item	No. of units	Model and manufacturer
11. TRASH RACK AND RAKES:	One, With Rakes	Fabricated by Currier Steel, Inc., of Lynchburg, Virginia, of A36 steel and hot dip galvanized.
12. BRIDGE CRANE (see photo 6-6):	One	Reliable Cranes by Stanspec Corp., Cleveland, Ohio, Model TSG with a 2 ton capacity and 15' of lift. Hoist is by Chester Hoist of Lisbon, Ohio, Army type trolley hoist, geared for a hand chain effort of 73 lbs.
13. VENTILATION AND EXHAUST SYSTEM:	Three (Designated Fan No. 1, Fan No. 2, and Fan No. 3).	(1) American Coolair, Jacksonville, Florida, Model UDU12HI with motor side guard, wall sleeve, automatic wall shutter, 12" blade diameter, rated for 195 CFM @ 1050 RPM. (2) American Coolair, Jacksonville, Florida, Model CABL24J with Type S wall sleeve, motorized safety guard, wall housing, belt drive, 24" blade diameter, rated for 5400 CFM @ 780 RPM. (3) Loren Cook Company, Berea, Ohio, Model 12CV straight through centrifuged blower with 12" diameter, belt guard, hanging support rubber isolator, backdraft damper, rated for 1370 CFM at 1138 RPM.

Table 6-1. MECHANICAL AND ELECTRICAL EQUIPMENT
(Cont'd)

Item	No. of units	Model and manufacturer
14. HEATING SYSTEMS:	Three	
	(1) One 3.3 KW Heater	(1) Markel Products Company, Tonawanda, New York, Model HFIB5103C3, 3.3 KW, 240 volts, single phase, rated at 400 CFM @ 1550 RPM with 26° F temperature rise.
	(2) Two 5.0 KW Heaters	(2) Markel Products Company, Tonawanda, New York, Model HFIB5105C3, 5.0 KW, 240 volts, single phase, rated at 400 CFM @ 1550 RPM with 40° F temperature rise.
15. FUEL OIL TANKS (see photo 6-7):	Three	Manufacturer's information not available at this time
<u>LEVEE DISCHARGE STRUCTURE</u>		
1. SLUICE GATES - LEVEE DISCHARGE STRUCTURE:	One	Rodney Hunt Company, 120" X 96" cast iron sluice gate with stainless steel seat facings and bronze wedges, floor mounted, electrically operated by an EIM model EB03 electric actuator.
2. FLAP GATE - LEVEE DISCHARGE STRUCTURE:	One	Rodney Hunt Company, Series FV-AR, 120" x 120" with flange frame, cast iron body and cover with bronze seats.
3. TRASH RACK AND RAKES (see photo 6-8):	One, With Rakes	Fabricated by Currier Steel, Inc., of Lynchburg, Virginia, of A36 steel and hot dip galvanized.

Table 6-1. MECHANICAL AND ELECTRICAL EQUIPMENT
(Cont'd)

Item	No. of units	Model and manufacturer
4. FUEL OIL TANKS:	One	Manufacturer's information not available at this time.
5. EMERGENCY GENERATOR (see photo 6-9):	One	Kohler Co., R Series Model 15RMY62 with a Wisconsin four cylinder engine to provide for continuous standby of 15 KW, 15 KVA, 62 Amps; 120/240 volts, single phase.
6. ROTARY PHASE CONVERTER (see photo 6-9):	One	Steelman Industries, Inc., H-A-S Rotary Phase Conversion System, Model R-5, 230 V.
7. AUDIBLE ALARM "HORN" (see photo 6-10):	One	Manufacturer's information not available at this time.
<u>UTILITY SYSTEMS</u>		
1. SANITARY SEWER VALVES:	Two	Mueller Co., Decatur, Ill., Resilient seat gate valve, model No. A-2370-___, ___-inch valve diameter.
2. WATER SUPPLY LINE SELF DRAINING BALL VALVE:	One	Manufacturer's information not available at this time.
3. TRASH RACK AND RAKES:	One, With Rakes	Fabricated by Currier Steel, Inc., of Lynchburg, Virginia, of A36 steel and hot dip galvanized.

Table 6-1. MECHANICAL AND ELECTRICAL EQUIPMENT
(Cont'd)

Item	No. of units	Model and manufacturer
<u>MINK CREEK AND MINK CREEK DAM</u>		
1. OUTLET STRUCTURE SLUICE GATES:	Two	Manufacturer's information not available at this time.
2. TRASH RACKS:	Three	Manufacturer's information not available at this time.

Table 6-2. DIRECTORY OF MANUFACTURERS AND SUPPLIERS

AUTOCON INDUSTRIES, INC.
995 University Avenue
St. Paul, MN 55104
(612) 642-1784

KOHLER CO.
44 High Street
Kohler, WI 53044
(414) 456-4441

CATEPILLAR CO.
100 N. E. Adams Street
Peoria, IL 61629-0001
(309) 578-6200

LAMARCHE MFR CO.
106 Bradrock Drive
Des Paines, IL 60018
(708) 299-1188

COUCH MFR. CO
U. S. Highway No. 1
Grant, FL 32949
(305) 723-0897

MUELLER CO.
500 Eldorado Street
Decatur, IL 62525
(217) 423-4471

CURRIER STEEL, INC
2915 Macke Street
P. O. Box 11438
Lynchburg, VA 24501-4651
(804) 845-6056

RODNEY HUNT CO.
46 Mill Street
Orange, MA 01364
(508) 544-2511

DERAN GEAR, INC.
9405 N. Quaker Road
Rural Route 2
Lubbock, TX 79415
(806) 746-6926

STEELMAN INDUSTRIES, INC
P. O. Box 1461
2706 Highway 135
Kilgore, TX 75663
(903) 984-3061

FRANK W. MURPHY MFR, INC.
P.O. Box 470248
3131 S. Sheridan
Tulsa, OK 74147
(918) 627-3550

STANSPEC CORP.
13612 Deise Avenue
Cleveland, OH 44110
(216) 451-9800

GEAR COMPANY OF AMERICA, INC.
14301 Loraine Avenue
Cleveland, OH 44111
(216) 671-5403

WESTINGHOUSE ELECTRIC CORP.
35 N. Snowdrift Road
Allentown, PA 18106
(215) 395-7333

6-5 OPERATION OF THE INTERIOR DRAINAGE FACILITIES

6-5.1 OPERATION OVERVIEW

The purpose of the interior drainage system is (1) to allow for the day-to-day drainage of Mink Creek through the line of flood protection; (2) to prevent, during a flood event, the waters of the James River from entering the line of protection; and (3) to minimize the ponding of runoff from the Mink Creek watershed during periods of high James River stages. The operation of the interior drainage system is briefly described as follows based on the various water level conditions on the James River and Mink Creek (See plate C-7 of appendix B).

----- NOTE -----

FLOOD PROTECTION PROCEDURES	THE APPROPRIATE PROCEDURES AND SEQUENCE OF ACTIONS THAT MUST BE TAKEN DURING THE THREAT OF A MAJOR FLOOD EVENT, INCLUDING THE TIMING AND APPROPRIATE OPERATION OF THE INTERIOR DRAINAGE FACILITIES, ARE PRESENTED IN SECTION 7, FLOOD PROTECTION PROCEDURES.
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a. Normal conditions on the James River and Mink Creek.

During normal water conditions on the James River and Mink Creek, runoff from the Mink Creek watershed flows by gravity to the James River by way of the Mink Creek channel, the 10-foot by 10-foot box culvert, the levee discharge structure, the concrete and stone culvert, and the improved Mink Creek channel. Both the Mink Creek Dam sluice gate and the levee discharge structure sluice gate are open. The flap gate in the levee discharge structure opens with the flow of the runoff.

b. Condition of normal water levels on the James and heavy rainfall in the Mink Creek watershed. The system operates as indicated in paragraph 6-5.1a with the flap gate opening as needed in the levee discharge structure to allow the runoff to flow to the James River.

c. **Condition of high water on the James and little or no rainfall in the Mink Creek watershed.** The system operates as indicated in paragraph 6-5.1a with the exception that the flap gate in the levee discharge structure is held closed by the waters of the James River which prevents the waters from entering the line of flood protection. In the event that the flap gate is blocked open by debris, the levee discharge structure sluice gate is closed. The runoff is allowed to collect in Mink Creek and the designated ponding area as no significant volume of runoff is anticipated under these water conditions.

d. **Condition of high water on the James and heavy rainfall in the Mink Creek watershed.** The system operates as indicated in paragraph 6.5-1a until such time that the level of the James prevents the levee discharge structure flap gate from opening and thus preventing further drainage into the river by gravity flow. Once this occurs, runoff diverts into the pump station for forced discharge to the James River by way of the levee discharge structure, the concrete and stone culvert, and the improved Mink Creek channel. This process continues unless one of the following occurs:

(1) the situation develops where the inflow into Mink Creek is greater than the capacity of the pumps and the interior pond level becomes significantly higher than the level of the James. In this situation, the pumps should be shut off to allow pressure flow to equalize the interior and river elevations. **(NOTE: The levee discharge structure sluice gate must not be closed in this situation).**

(2) the situation develops where the inflow into Mink Creek becomes greater than the capacity of the pumps and the interior pond level is not significantly higher than the level of the James. In this situation, the Mink Creek Dam sluice gate should be closed and the pumps should continue to be operated as needed. At this point, the dam would begin to contain the runoff in the Mink Creek watershed.

6-5.2 GENERAL OPERATION PROCEDURES

Individuals with specific training in the operation of the interior drainage facilities and competent pumping station operators shall be on duty at the

facilities whenever it appears that the necessity for the operation of the facilities is imminent.

The operator shall thoroughly inspect, trial operate, and place in readiness all plant equipment. The operator shall be familiar with the equipment manufacturers' instructions and drawings and with the "Operating Instructions" for each facility. The equipment shall be operated in accordance with the "Operating Instructions" and care shall be exercised that proper lubrication is being supplied to all equipment and that no overheating, undue vibration or noise is occurring. Immediately upon final recession of flood waters, the pumping station shall be thoroughly cleaned; the pump house flushed; and equipment thoroughly inspected, oiled, and greased.

Since the main pumps, the water control gates, and the pumping station are not operated in their normal "wet" environment at regular intervals, these items and other items described in this manual shall be operated, or their automatic operation shall be observed, under a "dry" condition, at the prescribed intervals noted in this section. Included in appendix B of this manual is a blank log sheet (**exhibit F**) of the type that must be filled in by the operator for either the "wet" or the "dry" operating conditions.

6-5.3 PREPARING FOR THE OPERATION OF THE INTERIOR DRAINAGE FACILITIES

The following preparations shall be made prior to placing the interior drainage facilities in operation. The preparatory work shall be initiated at the specified time so that all preparatory work is completed before the operation of the facilities is required. **Note: In some cases, as indicated below, it is recommended that certain features be left in their "normal" position at all times so that visual inspection is all that is necessary prior to the operation of these features.**

a. **General.** Make a visual inspection of all mechanical and electrical equipment to be certain that each item is in order.

b. Visually inspect the **Water Control Gates** to insure that they are in the following positions (**Note: During normal conditions when the**

facility is unattended and the river stage is not expected to increase due to upstream storm activity, each of the water control gates shall be kept in this specified "normal" position).

(1) **Three Main Sump Intake Gates:** Gates fully open.

(2) **Levee Discharge Structure Sluice Gate:** Gate fully open.

(3) **Mink Creek Dam Sluice Gates:** Gates fully open.

(4) **Levee Discharge Structure Flap Gate:** Gate operating automatically.

c. Visually inspect the **Sanitary Sewer Control Valves** to insure that they are in the following "normal" positions:

(1) **Sewer Valve A - Located near the Uniroyal access road near the west end of the levee:** Normally fully open. Valve operating wrench stored in pump station.

(2) **Sewer Valve B - Located near the floodwall just west of the Route 6 (Main Street) street closure building downtown:** Normally fully open. Valve operating wrench stored in Route 6 closure storage building.

d. Visually inspect the **Electrical Disconnects and Transfer Switch Settings** to insure that they are in the following positions:

(1) **Pump Station Control Room:** Normal conditions shall be considered to be when Appalachian Power Company (APCO) has power available to the flood protection facilities.

(a) Main Disconnect - To be in the position necessary to supply power to the station.

(b) "Panel E Feed" Transfer Switch - To be in the "APCO-ON" position.

(c) "APCO Feed to Transfer Switch at Sluice Gate" Disconnect - To be in the "OFF" position (i.e., to not supply power to the "Sluice Gate Feed" transfer switch on the levee).

(2) Levee Flap/Sluice Gate Structure:

(a) "Sluice Gate Feed" Transfer Switch - Normally to be in the "OFF" position.

(b) "APCO and Generator" Disconnect - To be in the "OPEN" position (i.e., to not supply power through the switch).

(3) **Pump Station Pump Room:** Disconnects to the station heaters and pump lubrication systems to remain in the "ON" position except for maintenance reasons.

e. Inspect the Pump Room Equipment to insure that the following settings have been made:

(1) Pump Failure Panel Gauge and Timer Settings:

- Pump Bearing Temperature - 170 ° F.

- Gear Drive Oil Pressure - 10 psi.

- Gear Drive Oil Temperature - 220 ° F.

- Failure Lock-out Relay - 1 minute.

(2) Lubrication System Panel and Valve Settings:

- Failure Signal Timer - 15 minutes.

- Lubrication Frequency Timer - 5 minutes.

- Measuring Valves - full capacity.

f. Inspect the pump chamber and trash rack for debris and remove any that is found.

g. Check the fuel supply at the pump station and emergency generator.

h. Check the readiness of the emergency generator.

6-5.4 PUMP STATION OPERATION

The pump station utilizes three pumps to discharge runoff from the Mink Creek watershed into the James River when the river level is such that discharge is no longer possible by gravity flow through the levee discharge structure. The following describes the operation of the various features of the pump station.

a. Pumps and Engines

-----CAUTION-----

VENTILATION PRECAUTIONS	WHEN DIESEL ENGINES ARE OPERATING, VERIFY THAT THE AIR SUPPLY DAMPERS HAVE OPENED AND ARE ALLOWING SUFFICIENT AIR FOR ENGINE COOLING TO ENTER THE PUMP STATION. BEFORE GOING INTO THE WET WELL, TURN ON THE LIGHTS/EXHAUST FAN SWITCH AND WAIT FIVE MINUTES FOR FRESH AIR TO BE EXCHANGED IN THE WELL.
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(1) **General:** Pumps were manufactured to handle storm water with some small trash. Due to their lubrication system, they may be operated dry for short periods.

(2) **Operating Procedure (Wet Sump Condition):** Refer to posted instructions in the pump station (included herein) and Section V - Flood Protection Procedure. See pump manual and engine controller manual.

(3) Operating Procedure (Dry Sump Condition): Refer to posted instructions in the pump station. Pumps are to be operated every two weeks, 15 minutes for each pump or until engine operating temperature is reached. Once units have logged over 100 hours of operation, the operating interval can be monthly. See Couch Pump Company pump manual and Murphymatic engine controller manual.

(4) Manual Operation of Units 1, 2, and 3:

To start the system:

- (a) Check to see that the sump is free of debris.
- (b) Set the Lubrication System selector switch to "auto."
- (c) Check to see that the clutch is disengaged.
- (d) Start the engine by turning the Auto-Start Panel selector switch to "start."
- (e) Throttle the engine up to 1000 revolutions per minute (rpm).
- (f) Engage the clutch (if the clutch is not engaged within one minute after the engine starts, the pump failure panel will shut the system down)
- (g) Throttle the engine up to the design speed of 1755 rpm.

(5) Automatic Operation of Unit 3:

- (a) Set the Lubrication System selector switch to "auto."
- (b) Set the throttle to give the design speed of 1755 rpm.

(c) Set the Auto-Start Panel selector switch to "auto."

(d) Engage the clutch.

(e) The pumping system will now start and stop automatically as directed by the Level Control System.

(6) To Stop the System:

(a) Throttle the engine down to 1000 rpm.

(b) Disengage the clutch .

(c) Stop the engine by turning the Auto-Start Panel selector switch to "stop", and then to "off."

(7) To Stop the System in an Emergency:

(a) Turn the Auto-Start Panel selector switch to "off."

b. Float Level Control

General: Normal operation will be "automatic" during a "wet sump" condition which will automatically start engine and pump No. 3 when the float level reaches a depth of 8 feet to 9 feet in the wet well. See Autocon manual.

c. Lubrication System

General: Lubrication system must be turned on at control panels on the front wall of the pump station but will function automatically during pumping operation. See Farval lubrication system manual.

d. **Ventilation - Exhaust System**

General: Ventilation systems are thermostatically controlled to ventilate the pump station during periods of operation. Wet well should be ventilated prior to entry.

e. **Heaters**

General: Heaters are thermostatically controlled to heat the pump station during occupancy and to automatically maintain a winter temperature of 50 ° F +/-.

f. **Sluice Gates**

The three gates are used to facilitate maintenance on individual pumps. Each gate is operated by its own hand crank located directly above each gate on the concrete pad on the outside, north end of the pump station.

g. **Bridge Crane**

General: The bridge crane is utilized to remove pumps, motors, etc. for repair and maintenance. The bridge crane drive, hoist unit, and trolley drive are all manually operated and, as operation is evident, require no instructions.

h. **Trash Racks**

General: Trash racks are stationary and their only function is to prevent large debris from entering the pump wet wells and other conveyance system sections. Monitoring and debris removal as needed are the only operations required.

6-5.5 LEVEE DISCHARGE STRUCTURE

The levee discharge structure controls the flow of runoff from the Mink Creek watershed through the flood protection project and into the James River. During normal water levels on the James River, the levee discharge structure

flap gate allows gravity flow through the structure to the river. During high river levels, the flap gate or sluice gate is used to divert the runoff to the pump station. The following describes the operation of the various features of the levee discharge structure.

a. Flap Gate

The gate operates automatically to reduce or prevent flooding on the James River from entering the line of protection. Monitoring for continued free movement and the removal of debris, as needed, are the only operational procedures to be followed.

b. Sluice Gate

(1) General: The sluice gate is utilized in conjunction with the flap gate to close the stone arch culvert under the railroad through which runoff flows from Mink Creek to the river. Primary operation of the gate is electrical with manual backup capability. The hand crank and electrical controls are located on top of the levee discharge structure (see photograph 6-9). The Phase Converter must be utilized to allow for the electrical operation of the sluice gate. See the Operation and Maintenance Manual supplied by a previous contract (Rodney Hunt Company, Shop Order 32392-2, dated September 15, 1983).

(2) Procedure for Electrical Operation:

(a) Shift the phase converter disconnect switch, located on top of the discharge structure on the south side of the unistrut rack, to the "on" position. This will energize the converter which will begin to rotate. Allow the unit to come to operating speed.

(b) Operate the sluice gate in the desired direction. Upon completion of the desired movement, stop the phase converter by placing the disconnect in the "off" position. The converter should stop operation. **NOTE: DO NOT LEAVE THE CONVERTER OPERATING WHEN NOT REQUIRED.**

(c) Repeat procedure (2), above, whenever power is required to operate the discharge structure sluice gate.

(d) Note that the movement of the sluice gate is controlled by limit switches.

-----CAUTION-----

POTENTIAL FOR EQUIPMENT DAMAGE	ON EMERGENCY POWER, THE DISCONNECT SWITCH ON THE LEVEE LABELED "APCO AND GENERATOR" <u>MUST</u> BE IN THE "OFF" POSITION PRIOR TO OPERATING THE SLUICE GATE. THE GENERATOR CANNOT SUPPORT THE DEMANDS OF THE PUMP STATION AND THE SLUICE GATE AS THE POWER FOR THE SLUICE GATE HAS TO BE ROUTED THROUGH A SINGLE TO THREE PHASE CONVERTOR. WHEN THE SLUICE GATE HAS BEEN CLOSED THE DISCONNECT CAN BE SWITCHED ON, RESTORING EMERGENCY POWER TO THE PUMP STATION. CONVERSELY, THE SLUICE GATE CANNOT BE OPENED BY EMERGENCY POWER UNLESS THE DISCONNECT IS IN THE "OFF" POSITION. THE PHASE CONVERTER MUST BE OPERATIONAL TO OPERATE THE DISCHARGE STRUCTURE SLUICE GATE.
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c. Trash Racks

General: Trash racks are stationary and their only function is to prevent large debris from entering the pump wet wells and other conveyance system sections. Monitoring of debris removal from the rack are the only operations required.

d. Emergency Generator

(1) General: Generator is to supply electrical power when regular power has been interrupted. Emergency power is available to the levee sluice gate, generator battery charger, high water alarm horn, and Panel "E" in the pump station. Panel "E" in turn feeds the pump station interior lights, engine

immersion heaters and crank case heaters, the pump lubrication system and the engine startup battery chargers.

(2) Operating Procedure: The following actions will supply emergency generator power to those systems necessary to operate the pump station engines and pumps without damage. The interior lights will be on, but the only exterior light on the emergency system is the building exterior light over the supply dock door on the east end of the station. **(Refer to SECTION 6-5.2, paragraph d, for normal position of the various transfer switches and disconnects).**

----- D A N G E R -----

ELECTRICAL HAZARD	CAUTION SHOULD BE EXERCISED WHEN WORKING ON THE "PANEL E FEED" TRANSFER SWITCH IN THE PUMP STATION CONTROL ROOM. "GENERATOR" SIDE OF THE SWITCH COULD BE "HOT" WHEN THE GENERATOR IS NOT RUNNING. TO ASSUME OTHERWISE COULD RESULT IN ELECTRIC SHOCK.
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(a) Place the following switches in the pump station in the "off" position:

- Main Disconnect
- APCO Feed to Transfer Switch at Sluice Gate
- Panel "E" Feed

(b) Place the "Sluice Gate Feed" transfer switch on the levee in the "off" position.

(c) Start the generator per the instructions in the generator manual.

(d) Place the "Sluice Gate Feed" transfer switch on the levee in the "Generator" position.

(e) Place the "Panel E Feed" transfer switch in the pump station control room in the "Generator" position.

(3) Termination of Emergency Generator Power. To terminate the emergency generator power and restore APCO power, reverse the instructions in paragraph (2) above.

(4) Power to Panel E. With the following switches in the indicated positions, APCO power is being fed to Panel E in two directions at the same time. This combination of switch settings allows Panel E to be fed APCO power if there is some problem in getting power out of Panel A.

(a) "Sluice Gate Feed" transfer switch on levee in "APCO" position.

(b) "APCO and Generator" disconnect on the levee in "on" position.

(c) "Panel E Feed" transfer switch in the pump station control room is in either the "APCO" or the "GENERATOR" position.

(d) Panel A feed to the "Panel E Feed" transfer switch is "on".

(e) "APCO Feed to Transfer Switch at Sluice Gate" is "on".

(f) Main Disconnect is "on".

(5) Termination of Power to the "Generator" side of "Panel E Feed." If any one of the following switches is thrown to "off" the APCO power being supplied to the "Generator" side of the "Panel E Feed" transfer switch can be terminated.

(a) Main Disconnect (No power to Panel E from anywhere).

(b) "APCO Feed to Transfer Switch at Sluice Gate" disconnect in pump station control room in "off" position.

(c) "Sluice Gate Feed" transfer switch on the levee in either the "off" or "Generator" positions.

(d) "APCO and Generator" disconnect on the levee in the "off" position.

(6) Rotary Phase Converter Operation. Check the rotary phase converter for proper operation during pump station operation and/or maintenance-operation checks. (Necessary to operate the sluice gate in the discharge structure on Mink Creek.)

6-5.6 UTILITY SYSTEM

Two sewer valves are located in the sanitary sewer system to prevent flood waters from entering the protected sections of town through the existing sewer system. Also a water supply valve has been placed in the water supply line to the pump station to control the supply of water to the station. The following describes the operation of these features of the utility system.

a. Sanitary Sewer Valves

(a) Sewer Valve A (Located near the Uniroyal access road near the west end of the levee)

The valve is closed with the operating wrench stored in the pump station.

(b) Sewer Valve B (Located near the floodwall just west of the Main Street Closure Building)

The valve is closed with the operating wrench stored in the Main Street Closure Building.

b. Water Supply

(a) General: The supply of water to the pump station is controlled by an in-line control valve, approximately 3/4 to 1 inch in size. The valve is operated by a control key with "T-shaped" handle which is stored in the control room of the pump station.

(b) The control mechanism of the valve is similar to a corporation stop. The water supply is "on" at the pump station when the control nut is aligned with the direction of the service line. The water is "off" when the control nut is turned 90° to the service line.

(c) During cold weather, the water supply valve should be in the "off" position to allow the supply line to drain itself from the north wall of the pump station to the valve location. Care must be taken to insure that the line does not freeze during these periods and to redrain the line once the need for water is terminated.

6-5.7 MINK CREEK

The dam controls a drainage area of 0.92 square mile and has a top elevation of 321.0 feet, mean sea level (m.s.l.). The emergency spillway crest is at elevation 313.0 feet, m.s.l. and the principal spillway crest is at elevation 301.0 feet, m.s.l. Under normal operations, the main slide gate on the 42-inch diameter outlet pipe is completely open and water flows into the riser over the weir openings at elevation 301.0 feet, m.s.l. The water then flows by gravity down Mink Creek, through the levee discharge structure, and into the James River. During high river conditions on the James, the pump station is utilized as necessary to discharge the flow in Mink Creek into the James River and the operation of the dam is dependent upon the volume of inflow of water into Mink Creek and the capacity of the pumps in the pumping station. The main slide gate of the dam is left completely open as long as the capacity of the pumps is greater than the volume of inflow into Mink Creek. However, when the volume of inflow becomes greater than the capacity of the pumps, Mink Creek can no longer drain into the James River and water rises within the creek. At this point the main slide gate is closed allowing no additional discharge from the dam. The dam then stores excessive flows from the Mink Creek watershed until the

James River subsides or the pump capacity again becomes greater than the volume of inflow into Mink Creek. At this point, the main slide gate is partially or completely opened as required and the pumps are operated again as needed. The following describes the operation of these features of Mink Creek Dam.

a. **Sluice Gates**

(a) Drain Gate (36-inch diameter) - This gate, which is located in the dam outlet structure, is used only for the emptying of the impoundment lake and has no bearing on the operation of the dam during a flood event. The gate is closed manually with the use of a gate crank which is stored at the town Fire Department. A rowboat is needed to cross the lake to the outlet structure. The rowboat is also stored at the Fire Department.

(b) Spillway Gate (42-inch diameter) - This gate, which is also located on the dam outlet structure, is normally used to close the primary spillway for maintenance and inspection. Unusual circumstances during a major flood event may require that the gate be closed. The gate is closed manually with the use of a gate crank which is stored at the town Fire Department. A rowboat is needed to cross the lake to the outlet structure. The rowboat is also stored at the Fire Department.

6-6 INSPECTION AND MAINTENANCE

In the interest of minimizing deterioration, the various mechanical and electrical items of equipment installed at the pumping station, at Mink Creek Dam, and at or in connection with the floodwall, shall be operated, or observed, at regular intervals as noted hereinafter. The maintenance, unless otherwise noted, shall be confined to minor adjusting, cleaning, and lubricating the various items of equipment. Should major adjustments or repairs be required, refer to the detailed service instructions which were prepared by the various manufacturers for each item of equipment. Where instructions are incomplete, contact the manufacturer involved for additional service information. Specialized maintenance beyond the scope of normal lubrication and cleaning shall be accomplished by journeymen mechanics in the trades involved. It is recommended that an authorized service representative of the particular

manufacturer be present to perform or supervise major repairs. Included at the end of this manual are checklists, and a sample blank log sheet which, in regard to maintenance, are self-explanatory.

6-6.1 PHYSICAL PLANT, PUMP DISCHARGE CHAMBER, AND OUTLET WORKS

The following procedures should be followed in the inspection and maintenance of the physical plant, pump discharge chamber, and outlet works:

a. During the monthly visits to the pumping station building, normal housekeeping shall be accomplished, lamps (light bulbs) shall be replaced as required, doors and other access openings shall be checked for proper latching and sealing, and rain leaks shall be corrected.

b. During the annual inspection of the pumping station building, pump discharge chamber, and outlet works, observe the condition of all painted, and other type of protective-coated, ferrous metal surfaces. Remove all oxidation and touch up with prime and finish coats of the type and color described in the contract specifications for the pumping station, and for each element of the pump discharge chamber and outlet works.

c. During the annual inspection, observe the condition of the concrete surfaces of the pumping station, of the outlet works, and of the pump discharge chamber. Make certain that the concrete has not undergone cracking, chipping and breaking to an extent which might affect the stability or the watertightness of the structure. **NOTE: Major repairs shall be subject to the approval of the District Engineer, Norfolk District, Corps of Engineers.**

----- D A N G E R -----

PERSONAL INJURY HAZARD	CARE MUST BE EXERCISED WHEN WORKING WITH THE FLAP GATE DUE TO ITS SIZE AND WEIGHT. IT WILL HAVE TO BE PRIED OPEN AND BLOCKED FOR THE INSPECTION AND CLEANING. UPON REMOVING THE BLOCK, THE GATE WILL "FALL" BACK INTO PLACE AND WILL CAUSE SEVERE INJURY TO ANYONE WITH A FOOT OR HAND IN THE WAY.
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d. Check entire conveyance system (main sump, influent channel, stormwater conduit, and appurtenances) following each pump station operation, after each occurrence of river high water (even if pump station is not operated) and after each storm event in the Mink Creek watershed. Inspect levee flap gate/sluice gate structure monthly, (even with no pump station operation) after each high water stage in the river and after each storm event. Flush grit and sand out of sluice gate inverts. Check flap gate for blockages and remove any sediment or grit which may interfere with its operation.

e. Adequate measures shall be taken to insure that inlet and outlet channels are kept open and that trash, drift, or debris is not allowed to accumulate near drainage structures.

6-6.2 MECHANICAL AND ELECTRICAL EQUIPMENT

The following procedures should be followed in the inspection and maintenance of the physical plant, pump discharge chamber, and outlet works. Complete maintenance requirements should be reviewed in each manufacturer's manual.

a. Pump Station

(1) Pumps:

(a) General: Immediately prior to operating, in either a "wet" or "dry" condition, turn on the automatic lubrication system, set the cycle selector switch to the "hand" position and press-and-release the manual pushbutton.

(b) Lubricate monthly or every 40 hours of operation, the tube tension nut/seal housing with one application from a grease gun of Amoco Super Permalube or equal, general purpose bearing grease. Do not over-lubricate.

(2) Lubrication System:

Maintain reservoir at no less than one quarter full with Amoco Super Permalube or equal, general purpose bearing grease.

(3) Float Level Control and Float:

(a) Monthly Inspection: During the routine monthly visits to the pumping station, the operator shall exert a slight upward pull on the float tape to verify that float is moving freely in its floatwell. If float appears to bind, unbolt screened cover at bottom of floatwell to determine cause, and correct as required.

(b) Annual Inspection: Maintenance shall be confined to inspection of unit for evidence of loose connections at electrical terminals, deterioration from corrosion, and the presence of insects, dust, etc. **Disconnect unit from electrical supply before checking electrical terminals, and before cleaning.** No lubrication will be required for this unit since bearings are of the sealed type.

(4) Heaters:

General: Verify operation of system and clean all units of foreign material.

(5) Ventilating and Exhaust Systems:

General: Check for operation of all units of the system; i.e., verify that backdampers are open as required when fans are on and operating. Clean all screens.

(6) Sluice Gate:

(a) General: Operate gates every 3 months.

(b) Lubricate, adjust and check per manufacturer's recommendations in product manual.

(7) Trash Racks:

(a) General: Trash racks are located at the wet well entrances to the pump station pump chambers.

(b) Remove any accumulated debris from the trash racks monthly and after each storm event.

(8) Bridge Crane:

Annual Inspection: The crane truck wheels and line shaft pillow blocks shall be lubricated at their pressure-type grease fittings. The mating surfaces of the truck wheel gears and drive pinions shall be coated with lubricant. The chain hoist unit was lubricated for life at the factory. Since actual use of the crane is infrequent, all drives should be operated for a few minutes semiannually to prevent deterioration of the machine elements.

b. Levee Discharge Structure

(1) Levee Flap Gate:

(a) General: Check installation for obstructions and clearance monthly.

(b) Lubricate hinges with heavy-duty waterproof lubricant every 3 months.

(2) Levee Sluice Gate:

(a) General: Operate gate every 3 months. Check invert area and remove any debris which may hinder the closing of the gate.

(b) Lubricate, adjust and check per the manufacturer's recommendations and data contained in the Operation and Maintenance Manual for this facility supplied by a previous contract.

(3) Fuel Oil Tanks and Fuel:

(a) General: Every 6 months inspect tanks and supply lines to the engines for leaking or damage. Fuel, if not used and replenished in normal high water operation, shall be drained and replaced every twelve (12) months. An anti-deterioration additive shall be added to each fuel oil tank to insure that fuel has the combustibility necessary for operation at all times.

(b) Fuel Levels: Review fuel quantities and replenish as required. Review pressure gauge on LP gas tank and order fuel as necessary.

(4) Rotary Phase Converter:

(a) General: Check unit for dirt accumulation and free flow of air for cooling. Check operation every 6 months. Lubricate annually with No. 2 lithium base grease while rotary is at standstill. On H-A-S Rotarys having drain plugs, remove grease drain plug and operate motor for 20 minutes before replacing drain plug. If motor is equipped with an Alemite fitting, clean the tip of the fitting and apply grease gun, using two full strokes to apply grease.

(b) Trouble shooting shall only be performed after review of the trouble shooting guide supplied by the manufacturer.

(5) Emergency Generator:

(a) General: Check oil in generator prior to every use or test. Run for test every 6 months.

(b) Run test on start up:

- Put start switch into test position; this will start the unit. If unit fails to start, put switch into reset and repeat this step.

- To stop unit push emergency stop button.

(6) Trash Rack:

(a) Remove any accumulated debris from the trash rack monthly and after each storm event. The trash rack is located at the entrance to the 10-foot by 10-foot box culvert leading to the levee discharge structure.

(c) Utility Systems

(1) Sanitary Sewer Valves:

(a) General: Every 3 months, inspect each valve location (2 valves) to assure the valves are free from obstruction and ready for operation. Operate each valve (2 valves) at each 3-month inspection.

(b) One valve key is to be stored in the pump station control room and one valve key is to be stored in the Main Street (Route 6) closure building.

(2) Water Supply Line Self Draining Ball Valve:

(a) General: Operate the valve every 3 months to confirm that the supply line drains properly. Also operate prior to the winter season's first cold wave to empty the line to prevent the line from freezing. Keep line drained during freezing weather unless service is required at the pump station.

----- WARNING -----

POTENTIAL FOR EQUIPMENT DAMAGE	IF WATER SUPPLY LINE IS PLACED "IN SERVICE" DURING COLD WEATHER, THEN SPECIAL ATTENTION SHALL BE GIVEN TO PERIODIC DRAINING OR USE TO ASSURE THAT IT DOES NOT FREEZE OR BURST.
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(3) Trash Racks:

(a) General: Trash racks are located at the existing 60" pipe entrance on the west side of Route 20.

(b) Remove any accumulated debris from the trash rack monthly and after each storm event.

d. Mink Creek Dam

(1) Sluice Gates:

(a) General: Operate gates every 3 months as a maintenance check.

(b) Lubricate, adjust and check per the manufacturer's recommendations and data in the Mink Creek Dam manual.

(2) Trash Racks:

(a) Three racks are located on the outlet structure.

(b) Remove any accumulated debris from the trash racks monthly and after each storm event.

e. Ponding Area

Areas used for ponding in connection with the pumping plant or for temporary storage of interior runoff during flood periods shall not be allowed to become filled with silt, debris, or dumped material.

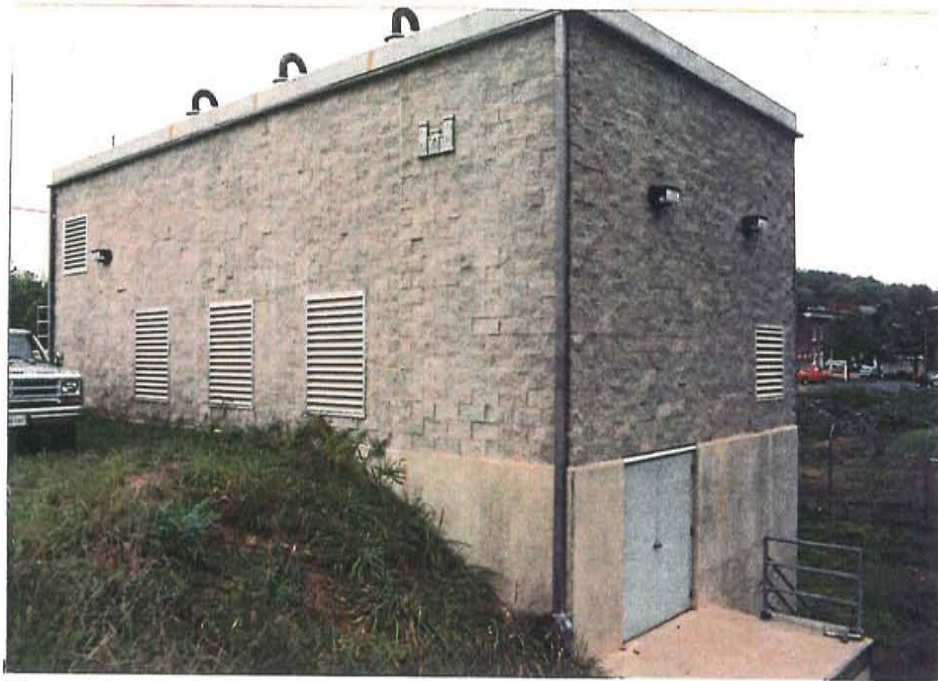


Photo 6-1. Pumping station



Photo 6-2. Water outlet structure at Mink Creek Dam

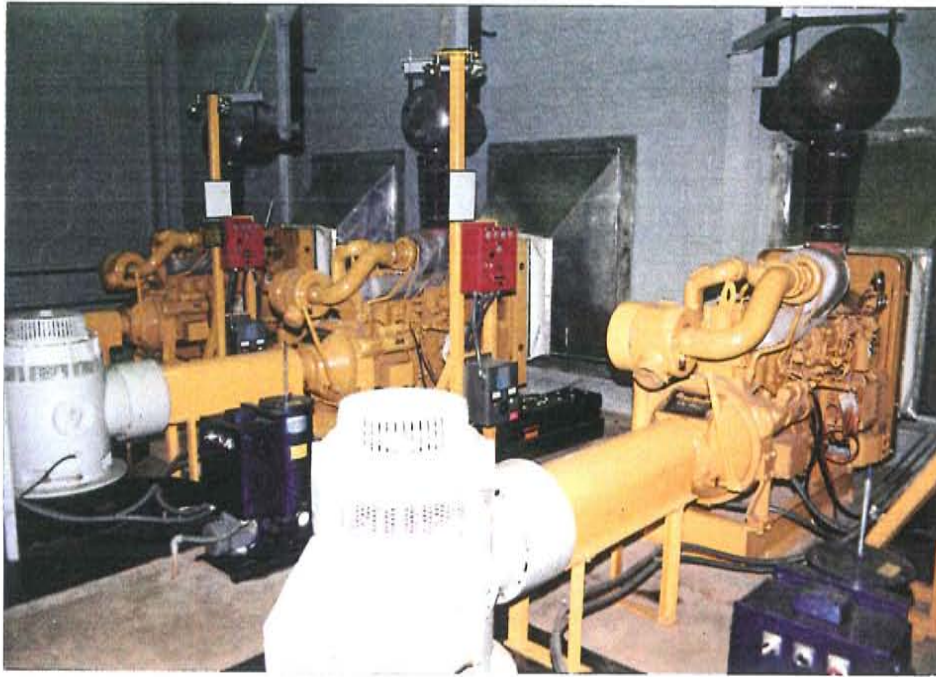


Photo 6-3. Diesel engines in pumping station

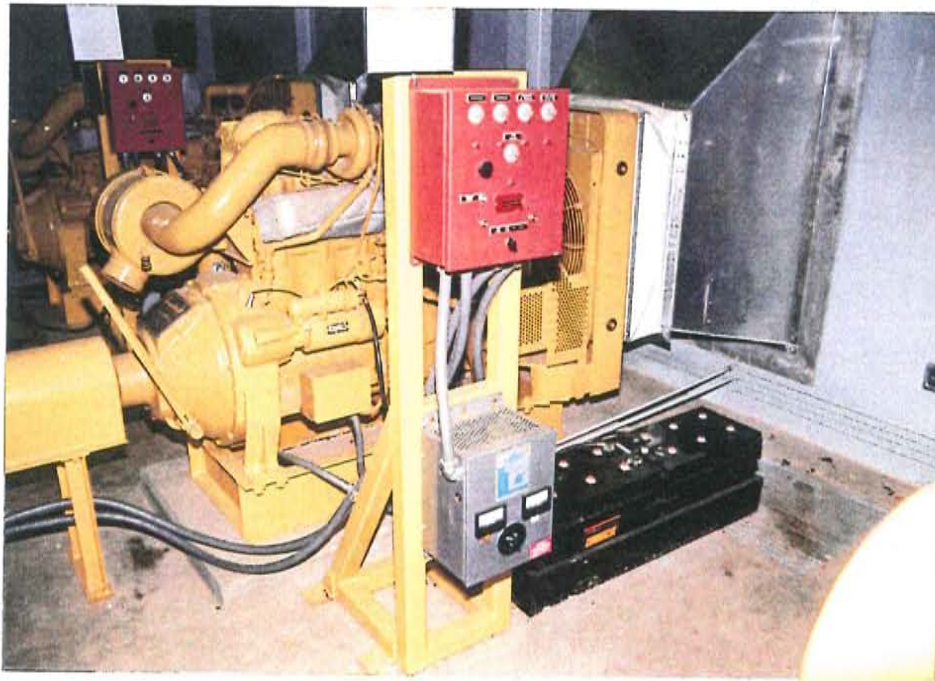
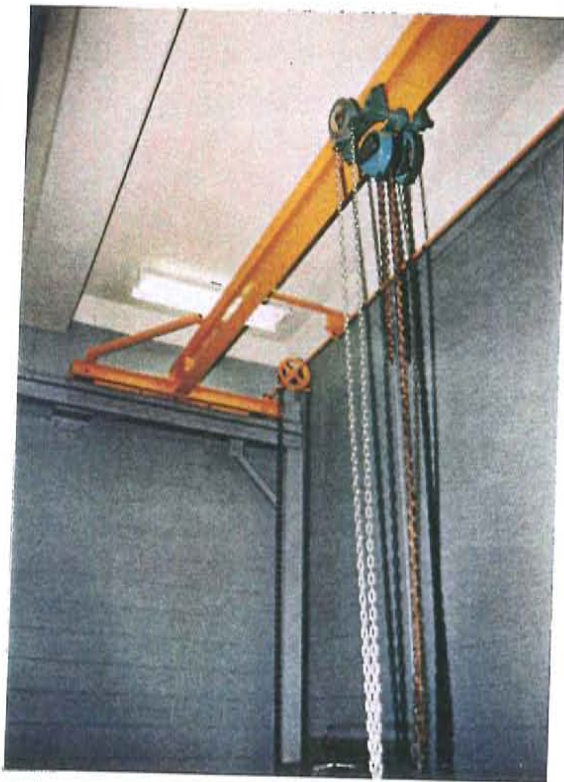


Photo 6-4. Engine controller in pumping station

*Photo 6-5. Lighting and appliance
panelboard E in pumping station*



*Photo 6-6. Bridge crane in
pumping station*

Photo 6-7. Fuel oil tanks for diesel engines in pumping station



Photo 6-8. Trash rack to levee discharge structure



Photo 6-9. On top of levee discharge structure: Emergency generator (background), phase converter (left foreground), sluice gate hand crank (right foreground)



Photo 6-10. Audible alarm

7 FLOOD PROTECTION PROCEDURES- NOTIFICATION/WARNING AND RESPONSE

7-1 GENERAL

This section of the manual covers the specific notification and response procedures that must be followed during the threat of a major flood event to prevent the loss of life and to ensure maximum flood protection to the protected area of Scottsville. These procedures include:

- a. Flood threat recognition.
- b. Issuance of the flood warning to the public.
- c. Flood response and effective operation of the Local Flood Protection project.
- d. Arrangements for the temporary evacuation of people in the event that breaching or overtopping of the protective works is imminent.
- e. Post-flood followup procedures.

7-2 PROJECT OPERATION AND FLOOD RESPONSE ORGANIZATION

7-2.1 KEY INDIVIDUALS AND RESPONSIBILITIES

The following individuals are essential to the accomplishment of the flood protection procedures outlined in this section.

Table 7-1. RESPONSE TEAM - CREW SIZE AND RESPONSIBILITIES

Team no.	Responsibility area or activity	Crew size
1	Pump Station and Levee Discharge Structure	4 (a)
2	Mink Creek Dam	2 (a)
3	Ferry Street Closure	6 (a)
4	Main Street Closure	6 (a)
5	Project Inspection, Maintenance, and Sewer Valve Closures	2 (b)
6	Evacuation of residents in response to threat of project overtopping	(c)

- (a) The town has designated these responsibilities to Police and Fire Department personnel.
- (b) It is considered appropriate to assign these tasks to the Flood Foreman and the Deputy Flood Foreman.
- (c) The town has designated this responsibility to the Rescue Squad personnel. Thirty-nine people are available, as needed.

7-2.2 THE SCOTTSVILLE EMERGENCY OPERATIONS CENTER

During the threat of major flooding, the emergency command post at the Rescue Squad Building on 805 Irish Road is to be established as the Scottsville Emergency Operations Center. The center will serve as the command center for all of the town's flood operations.

NWS office then follows up with telephone contact directly with the mayor of Scottsville. This action serves as an important secondary notification to the town.

7-3.4 BACKUP NOTIFICATIONS TO THE TOWN OF SCOTTSVILLE

Under the very unlikely situation that the town does not receive notification from the Virginia Department of Emergency Services or the National Weather Service, the following backup procedures are in effect to ensure that the town is made aware of an impending flood threat:

a. **Audible Alarm at the Discharge Structure.** The levee discharge structure is presently equipped with an alarm which automatically "sounds" when the James River water level reaches a specified elevation. **As will be discussed later in paragraph 7-4 of this section, the alarm should be set to sound at ELEVATION 262 (STAGE 9).** This alarm is of particular importance in the event that rapidly rising water occurs overnight.

b. **Local Observations.** In the event that the Flood Superintendent or other town official notices that the river is rising rapidly and beyond normal levels and notification has not been received through the Virginia Department of Emergency Services or from the National Weather Service, the Flood Superintendent or his designated deputy shall call the **WEATHER SERVICE OFFICE, ROANOKE**, to be apprised of the projected weather situation for the Scottsville area. **The office to contact is the Hydrology Section and the phone number is (703) 366-4263. This phone is monitored 24 hours per day.**

7-4 FLOOD RESPONSE AND OPERATION OF LOCAL FLOOD PROTECTION PROJECT

The flood protection project in Scottsville has been designed to protect the town from high water in the James River and to eliminate flooding of the town by local runoff water being trapped behind the line of protection. This subsection outlines those specific tasks which must be performed in a certain sequence and at specific times during flood events to accomplish these objectives. **It should be noted that there exists an elevation difference between the levee outlet and pump station at Mink Creek, and the USGS gauge at Ferry Street. The differential has been taken into consideration in preparing this manual.**

Table 7-2. FLOOD RESPONSE PROCEDURES WITH RISING WATER

Elevation/Stage	Action
<u>FLOOD NOTIFICATION</u>	
	1. After receiving notification of an impending flood threat, the POLICE/FIRE DISPATCHER immediately contacts the FLOOD SUPERINTENDENT and continues to monitor the flood warning updates and keep the FLOOD SUPERINTENDENT advised.
<u>FLOOD ALERT</u>	
Elevation 263 (Stage 10)	2. The FLOOD SUPERINTENDENT alerts the FLOOD RESPONSE TEAMS of the impending flood threat.
Elevation 264 (Stage 11)	3. FLOOD RESPONSE TEAMS assemble at Emergency Operations Center for briefing by FLOOD SUPERINTENDENT .
Elevation 265 (Stage 12)	4. FLOOD SUPERINTENDENT implements the notification of Flood Plain businesses and residents of the impending flood (See Section 1, page 1-11)
Elevation 265 (Stage 12)	5. FLOOD TEAMS check readiness of project features (See Table 7-3 for the normal positions of gates, closures, and valves; Table 7-4 for pump room equipment settings; and Table 7-5 for electrical disconnects, and transfer switch settings): a. TEAM 1 - Pump Station and Levee Discharge Structure (Flap gate, Generator, Fuel Level, etc.) b. TEAM 2 - Mink Creek Sluice Gate c. TEAM 3 - Ferry Street Closure Materials d. TEAM 4 - Main Street Closure Materials e. TEAM 5 - Sewer Valve Gates and Project Inspection

Table 7-2. FLOOD RESPONSE PROCEDURES WITH RISING WATER
(Cont'd)

<u>Elevation/Stage</u>	<u>Action</u>
Elevation 266 (Stage 13)	6. TEAMS 3 AND 4 move street closure barriers, cones, lights, detour signs to Ferry Street and Main Street
Elevation 266 (Stage 13)	7. TEAM 5 closes the two sanitary sewer valves
Elevation 268 (Stage 15)	8. TEAM 1 starts all three pump engines and sets at idle (See Table 7-6 for pump operation instructions)

LEVEE DISCHARGE STRUCTURE

Elevation 269 (Stage 16)	9. TEAM 1 continuously monitors operation of flap gate on the Levee Discharge Structure: a. If gate is operating properly, TEAM 1 does nothing. The flap gate will open and close automatically in response to the water levels on both the James River and Mink Creek sides of the gate. b. If gate is blocked open by debris, TEAM 1 closes levee discharge structure sluice gate to prevent the river from entering the line of protection (See Table 7-7 for operating instructions).
Elevation 269 (Stage 16)	

Operation and Maintenance Manual
A. Raymon Thacker Flood Control System
Addenda dated October 28, 2002

Addendum to **Table 7-2: Flood Response Procedures** (Underlined text is new)

Action 7. **Flood Stage 20.** Team 5 closes the two sanitary sewer valves. Prior to closing the valve, the Levee Superintendent informs the Albemarle County Service Authority of this action.
See Section 6-2.5 for a fuller description of the actions required to close the valves.

Table 7-2. FLOOD RESPONSE PROCEDURES WITH RISING WATER
(Cont'd)

Elevation/Stage	Action
<u>MINK CREEK DAM</u>	
Elevation 269 (Stage 16)	10. TEAM 1 continuously monitors water level at Mink Creek upstream of the Levee Discharge Structure. a. If there is no observed or reported heavy rainfall in the Mink Creek watershed and there is little or no collection of runoff at the Pump Station and in Mink Creek, there is no need to engage the pumps at this time. b. If heavy rainfall is observed or has been reported in the Mink Creek watershed, TEAM 1 shall engage the pumps to keep ponding in Mink Creek and the designated ponding area to a minimum (This practice will keep storage available for later use, if needed). c. In the event that inflow into Mink Creek is greater than the capacity of the pumps and the interior ponding area is significantly higher than the river, TEAM 1 shall shut off the pumps and open the sluice gate to allow pressure flow to equalize the interior and river elevations.

Table 7-2. FLOOD RESPONSE PROCEDURES WITH RISING WATER
(Cont'd)

<u>Elevation/Stage</u>	<u>Action</u>
<u>FERRY ST. CLOSURE</u>	
Elevation 269 (Stage 16)	13. THE FLOOD SUPERINTENDENT or his designee notifies Virginia Department of Transportation, State Police, and the Fluvanna Sheriff of the impending closure of the Ferry Street closure.
Elevation 269.5 (Stage 16.5)	14. TEAM 3 places street closure barriers, cones, lights, and detour signs at Ferry Street.
Elevation 270 (Stage 17)	15. TEAM 3 installs Ferry Street closure (<u>See Figure 7-2 for closure installation instructions</u>).
<u>MAIN ST. CLOSURE</u>	
Elevation 272 (Stage 19)	16. THE FLOOD SUPERINTENDENT or his designee notifies Virginia Department of Transportation, State Police, and the Fluvanna Sheriff of the impending closure of the Main Street closure.
Elevation 272.5 (Stage 19.5)	17. TEAM 4 places street closure barriers, cones, and detour signs at Main Street.
Elevation 273 (Stage 20)	18. TEAM 4 installs Main Street Closure (<u>See Figure 7-2 for closure installation instructions</u>).
	19. Continue to monitor water level and rate of rise at Ferry Street gage.
<u>EVACUATION</u>	
Elevation 280 (Stage 27)	20. Evacuation team implements the town's EVACUATION PLAN (<u>See Section 7-4.4</u>).

Table 7-4. PUMP ROOM EQUIPMENT SETTINGS

Inspect the PUMP ROOM EQUIPMENT to insure that the following settings have been made:

(1) Pump Failure Panel Gauge and Timer Settings:

(a) Pump Bearing Temperature	170 ° F
(b) Gear Drive Oil Pressure	10 psi
(c) Gear Drive Oil Temperature	220 ° F
(d) Failure Lock-out Relay	1 minute

(2) Lubrication System Panel and Valve Settings:

(a) Failure Signal Timer	15 minutes
(b) Lubrication Frequency Timer	5 minutes
(c) Measuring Valves	full capacity

Table 7-6. OPERATION INSTRUCTIONS FOR PUMPS AND ENGINES

-----CAUTION-----

VENTILATION PRECAUTION	WHEN DIESEL ENGINES ARE OPERATING, VERIFY THAT THE AIR SUPPLY DAMPERS HAVE OPENED AND ARE ALLOWING SUFFICIENT AIR FOR ENGINE COOLING TO ENTER THE PUMP STATION. BEFORE GOING INTO THE WET WELL, TURN ON THE LIGHTS/EXHAUST FAN SWITCH AND WAIT FIVE MINUTES FOR FRESH AIR TO BE EXCHANGED IN THE WELL.
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-----CAUTION-----

AUTOMATIC EQUIPMENT (STARTS WITH- OUT WARNING)	CAUTION SHOULD BE EXERCISED AROUND PUMP NO. 3 DURING A RISING WATER SITUATION. THE AUTOMATIC SETTING IS AN EMERGENCY MEASURE FOR OCCASIONS WHEN RISING WATER IS NOT ANTICIPATED. PUMP NO. 3 SHALL BE RESET TO MANUAL MODE UPON ARRIVAL OF THE FLOOD RESPONSE TEAM AT THE STATION SO THAT IT WILL NOT ALWAYS BE THE FIRST PUMP TURNED ON. PUMP NO. 3 WILL START WHEN WATER IN THE WET WELL REACHES AN ELEVATION OF 269 TO 270 IF SET FOR AUTOMATIC START-UP.
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TO OPERATE UNITS 1, 2, AND 3

Manual Operation

1. Check to see that the sump is free of debris.
2. Set the Lubrication System selector switch to "AUTO."
3. Check to see that the clutch is disengaged.
4. Start the engine by turning the Auto-Start Panel selector switch to "START."
5. Throttle the engine up to 1000 rpm.

Table 7-7. OPERATION INSTRUCTIONS FOR THE
LEVEE DISCHARGE STRUCTURE SLUICE GATE

-----CAUTION-----

POTENTIAL FOR EQUIPMENT DAMAGE	ON EMERGENCY POWER, THE DISCONNECT SWITCH ON THE LEVEE LABELED "APCO AND GENERATOR" MUST BE IN THE "OFF" POSITION PRIOR TO OPERATING THE SLUICE GATE. THE GENERATOR CANNOT SUPPORT THE DEMANDS OF THE PUMP STATION AND THE SLUICE GATE AS THE POWER FOR THE SLUICE GATE HAS TO BE ROUTED THROUGH A SINGLE TO THREE PHASE CONVERTOR. WHEN THE SLUICE GATE HAS BEEN CLOSED, THE DISCONNECT CAN BE SWITCHED ON, RESTORING EMERGENCY POWER TO THE PUMP STATION. CONVERSELY, THE SLUICE GATE CANNOT BE OPENED BY EMERGENCY POWER UNLESS THE DISCONNECT IS IN THE OFF POSITION. THE PHASE CONVERTER MUST BE OPERATIONAL TO OPERATE THE DISCHARGE STRUCTURE SLUICE GATE.
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The sluice gate is located in the stone arch culvert of the levee discharge structure and is a backup gate to the flap gate also located in the discharge structure. The sluice gate is utilized to close the culvert in situations where the flap gate is not operating properly and it is necessary to stop the gravity flow of interior drainage in Mink Creek to the James River. The following steps should be followed for operation:

1. The Phase Converter must be utilized to allow the electrical operation of the previously existing sluice gate.
2. Locate the Phase Converter Disconnect Switch on the top of the Levee Discharge Structure on the south side of the unistrut rack.
3. Shift Phase Converter Disconnect Switch to the "ON" position. This will energize the converter which will begin to rotate.
4. Allow the unit to reach operating speed.
5. Operate the sluice gate in the desired direction (Note that the movement of the sluice gate is controlled by limit switches).
6. Upon completion of the desired sluice gate movement, stop the Phase Converter by placing the disconnect in the "OFF" position. The converter should stop operation. **Note: Do not leave the converter operating when not required.**
7. Repeat procedure 3, above, whenever power is required to operate the discharge structure sluice gate.

7-4.3 ONGOING ACTIVITIES DURING OPERATION OF FLOOD PROTECTION PROJECT

The following activities must be accomplished routinely and periodically during the operation of the project to ensure continued and effective operation.

a. **Control Panels and Gauge.** The following panels and gauge must be monitored:

- (1) Engine Controls and Gauge
- (2) Pump Failure Panel
- (3) Lubrication Panel

-----CAUTION-----

VENTILATION PRECAUTIONS	ENTRY TO THE PUMP WET WELL CATWALK SHOULD NOT BE MADE DURING PERIODS OF PUMPING OPERATION, EXCEPT IN AN EMERGENCY. IF AN EMERGENCY SHOULD EXIST, GREAT CAUTION SHOULD BE EXERCISED. PRIOR TO ENTRY, TURN ON LIGHTS (WITH EXHAUST FAN INTERCONNECT) AND WAIT FIVE (5) MINUTES FOR ANY FOUL AIR TO BE REMOVED FROM THE SUMP AREA BEFORE ATTEMPTING ENTRY.
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b. **Pump Discharge Gauges and Force Main Vent Stacks.** Monitor pump discharge gauges and force main vent stacks on top of the levee so as not to run the pumps at such a pressure to force water out of the vents. If designated running rpm of 1755 forces water out of the vents, reduce the rpm to compensate for excessive pressure.

c. **Fuel Supplies.** Extended periods of operation of the pump engines could require that fuel be replenished prior to shutdown. If fuel should run low for a particular engine which is pumping and another, which is not engaged and not pumping, has sufficient fuel, then consider shutting down the engine with low fuel and pump with the engine with more fuel.

7-4.4 RESPONSE IN THE EVENT OF OVERTOPPING OR BREACHING OF PROJECT OR OVERTOPPING OF MINK CREEK DAM

-----WARNING-----

PUBLIC SAFETY HAZARD	PEOPLE MUST NOT BE ALLOWED TO BECOME COMPLACENT TO THE DANGERS OF FLOODING BECAUSE THEY ARE LOCATED BEHIND A FLOOD PROTECTION PROJECT. THEY MUST BE MADE TO UNDERSTAND THAT, IN THE EVENT OF PROJECT OVERTOPPING OR BREACHING, THE WATER LEVEL BEHIND THE LEVEE WILL EQUALIZE WITH THE LEVEL IN THE RIVER IN A MATTER OF MINUTES, NOT HOURS, AND THAT NO TIME WILL BE AVAILABLE TO PACK UP AND MOVE. WHEN THE ORDER TO EVACUATE IS GIVEN, EVERYONE MUST LEAVE IMMEDIATELY.
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a. **General.** There is a 40 percent chance that a flood equal to or greater than a 100-year flood will occur on the James River at Scottsville one or more times during a 50-year period and a 63 percent chance of a flood occurring one or more times during a 100-year period. There is also the potential during any flood event that the earthen levee portion of the project could be breached by the flood waters. Additionally, heavy rainfall over the Mink Creek watershed over an extended period of time could lead to overtopping of the Mink Creek Dam whether or not there is flooding on the James River. In this regard, it is imperative that the town of Scottsville have established an appropriate plan to respond to such situations.

b. **Project Breaching and Overtopping.** The Scottsville Flood Protection project was designed such that overtopping, should it occur, would first occur in an area that would, at least theoretically, result in the least amount of damages to the protected area of the town. This area is identified as the downstream portion of the project or that segment of the levee-floodwall immediately east of Ferry Street. Levee breaching would not be confined to any particular segment of the project and could only be detected by periodic monitoring along the project during major flood events. The area of potential danger from project overtopping or levee breaching is that area having an elevation equal to or less than the top of the line of protection at a point perpendicular to the flow of the river. This area basically encompasses the entire downtown central business district and surrounding residences in Scottsville. In

(2) The implementation of appropriate actions in response to levee breaching would be triggered by periodic monitoring of the project during a flood event which reveals that a seepage or a weakness exists that could develop into a breach of protection. Table 7-9 presents the actions that must be taken in the event that project breaching is imminent.

(3) The implementation of appropriate actions in response to the impending overtopping of the Mink Creek Dam would be triggered by continuous monitoring of the dam during a major flood event, with major rainfall in the Mink Creek watershed, and an indication that the emergency bypass channel is filling with water flowing out of the impoundment, thereby creating the possibility that the dam could be overtopped. Table 7-9 presents the actions that must be taken in the event of impending overtopping of the Mink Creek Dam.

Table 7-9. EVACUATION PROCEDURES LEVEE
BREACHING AND MINKCREEK DAM OVERTOPPING

<u>Levee Action</u>	<u>Mink Creek Dam Action</u>
1. During periodic monitoring of the project, the Flood Response Team identifies a weakness or area of seepage in the levee that might lead to a breach of the project.	1. During monitoring of the dam, the Flood Response Team identifies the flow of water into the emergency bypass channel indicating the potential for overtopping.
2. The Flood Superintendent is immediately notified of the affected portion of the project and makes a decision regarding the need to implement evacuation procedures.	2. The Flood Superintendent is immediately notified of the situation at the dam and makes a decision regarding the need to implement evacuation procedures.
3. The Police and Rescue Squad personnel notify residents and business merchants of potential for project breaching and the need to be prepared to evacuate, if needed.	3. The Police and Rescue Squad personnel notify residents and business merchants of potential for overtopping of the dam and the need to be prepared to evacuate, if needed.
4. Albemarle County and Fluvanna County Police, Town Sheriff Department, and State Police assist in traffic and crowd control as requested by Flood Superintendent.	4. Albemarle County and Fluvanna County Police, Town Sheriff Department, and State Police assist in traffic and crowd control as requested by Flood Superintendent.
5. If the Flood Superintendent determines that the seepage in the project could lead to a breach, the Rescue Squad is immediately notified to initiate the Town Evacuation Plan. Town Mayor authorizes sounding of the emergency siren designating that evacuation procedures are in effect. Evacuation starts with all lower streets and the Senior Citizen Facility (old school building). Evacuees taken to designated emergency shelter (New Elementary School).	5. If the Flood Superintendent determines that flow into the emergency bypass channel could lead to overtopping, the Rescue Squad is immediately notified to initiate the Town Evacuation Plan. Town Mayor authorizes sounding of the emergency siren designating that evacuation procedures are in effect. Evacuation starts with all buildings directly on Mink Creek. Evacuees taken to designated emergency shelter (New Elementary School).
6. Evacuees await direction from town officials regarding the recession of flood waters and when it is safe to return to the evacuated area.	6. Evacuees await direction from town officials regarding the recession of flood waters and when it is safe to return to the evacuated area.

Table 7-10. FLOOD RESPONSE PROCEDURES WITH RECEDING WATER

<u>Elevation/Stage</u>	<u>Action</u>
Elevation 269.5 (Stage 16.5)	1. Disengage first pump turned on, leaving engine at idle to react to possible rise in water or failure of another pump. 2. Open Mink Creek Dam sluice gate.
Elevation 267 (Stage 14)	3. Disengage second pump turned on, leaving engine at idle.
Elevation 265 (Stage 12)	4. Disengage third pump turned on. 5. Turn off all pump engines, but continue to monitor levels in case of water build up behind the levee until sluice gate is opened. 6. Open two sanitary sewer gate valves. 7. Observe water level at old train station. When water drops below the railroad tracks, open Main Street (Route 6) closure, then Ferry Street closure. 8. Observe flood stage gage in river. When water level drops below 10-foot stage, open levee sluice gate. 9. The following instructions are to be utilized when the water level at the pump station inside the levee appears to stabilize with two pumps running to maintain a stabilized elevation: a. Open Mink Creek Dam sluice gate. b. Run pumps intermittently to: (1) Stabilize water level. (2) Equalize pump engagement. 10. Reclose Mink Creek Dam Sluice Gate under same conditions as in Section 7-4.2 of these instructions if the water inside the levee begins to rise.

CODE OF FEDERAL REGULATIONS
TITLE 33 - NAVIGATION AND NAVIGABLE WATERS

CHAPTER II

PART 200 TO END

(REVISED AS OF JANUARY 1, 1968)

AUTHORITY: The provisions of this Part 208 issued under sec. 7, 58 Stat. 800; 33 U.S.C. 700, unless otherwise noted.

§ 208.10 Local flood protection works; maintenance and operation of structures and facilities.

(a) *General.* (1) The structures and facilities constructed by the United States for local flood protection shall be continuously maintained in such a manner and operated at such times and for such periods as may be necessary to obtain the maximum benefits.

(2) The State, political subdivision thereof, or other responsible local agency, which furnished assurance that it will maintain and operate flood control works in accordance with regulations prescribed by the Secretary of the Army, as required by law, shall appoint a permanent committee consisting of or headed by an official hereinafter called the "Superintendent," who shall be responsible for the development and maintenance of, and directly in charge of, an organization responsible for the efficient operation and maintenance of all of the structures and facilities during flood periods and for continuous inspection and maintenance of the project works during periods of low water, all without cost to the United States.

(3) A reserve supply of materials needed during a flood emergency shall be kept on hand at all times.

(4) No encroachment or trespass which will adversely affect the efficient operation or maintenance of the project works shall be permitted upon the right-of-way for the protective facilities.

(5) No improvement shall be passed over, under, or through the walls, levees, improved channels or floodways, nor shall any excavation or construction be permitted within the limits of the project right-of-way, nor shall any change be made in any feature of the works without prior determination by the District Engineer of the Department of the Army or his authorized representative that such improvement, excavation, construction, or alteration will not adversely affect the functioning of the protective facilities. Such improvements or alterations as may be found to be desirable and permissible under the above determination shall be constructed in accordance with standard engineering practice. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of con-

struction acceptable under standard engineering practice shall be obtained from the District Engineer or, if otherwise obtained, shall be submitted for his approval. Drawings or prints showing such improvements or alterations as finally constructed shall be furnished the District Engineer after completion of the work.

(6) It shall be the duty of the superintendent to submit a semiannual report to the District Engineer covering inspection, maintenance, and operation of the protective works.

(7) The District Engineer or his authorized representatives shall have access at all times to all portions of the protective works.

(8) Maintenance measures or repairs which the District Engineer deems necessary shall be promptly taken or made.

(9) Appropriate measures shall be taken by local authorities to insure that the activities of all local organizations operating public or private facilities connected with the protective works are coordinated with those of the Superintendent's organization during flood periods.

(10) The Department of the Army will furnish local interests with an Operation and Maintenance Manual for each completed project, or separate useful part thereof, to assist them in carrying out their obligations under this part.

(b) *Levees—(1) Maintenance.* The Superintendent shall provide at all times such maintenance as may be required to insure serviceability of the structures in time of flood. Measures shall be taken to promote the growth of sod, exterminate burrowing animals, and to provide for routine mowing of the grass and weeds, removal of wild growth and drift deposits, and repair of damage caused by erosion or other forces. Where practicable, measures shall be taken to retard bank erosion by planting of willows or other suitable growth on areas riverward of the levees. Periodic inspections shall be made by the Superintendent to insure that the above maintenance measures are being effectively carried out and, further, to be certain that:

(i) No unusual settlement, sloughing, or material loss of grade or levee cross section has taken place;

(ii) No caving has occurred on either the land side or the river side of the levee which might affect the stability of the levee section;

(iii) No seepage, saturated areas, or sand boils are occurring;

(iv) Toe drainage systems and pressure relief wells are in good working condition, and that such facilities are not becoming clogged;

(v) Drains through the levees and gates on said drains are in good working condition;

(vi) No revetment work or riprap has been displaced, washed out, or removed;

(vii) No action is being taken, such as burning grass and weeds during inappropriate seasons, which will retard or destroy the growth of sod;

(viii) Access roads to and on the levee are being properly maintained;

(ix) Cattle guards and gates are in good condition;

(x) Crown of levee is shaped so as to drain readily, and roadway thereon, if any, is well shaped and maintained;

(xi) There is no unauthorized grazing or vehicular traffic on the levees;

(xii) Encroachments are not being made on the levee right-of-way which might endanger the structure or hinder its proper and efficient functioning during times of emergency.

Such inspections shall be made immediately prior to the beginning of the flood season; immediately following each major high water period, and otherwise at intervals not exceeding 90 days, and such intermediate times as may be necessary to insure the best possible care of the levee. Immediate steps will be taken to correct dangerous conditions disclosed by such inspections. Regular maintenance repair measures shall be accomplished during the appropriate season as scheduled by the Superintendent.

(2) *Operation.* During flood periods the levee shall be patrolled continuously to locate possible sand boils or unusual wetness of the landward slope and to be certain that:

(i) There are no indications of slides or sloughs developing;

(ii) Wave wash or scouring action is not occurring;

(iii) No low reaches of levee exist which may be overtopped;

(iv) No other conditions exist which might endanger the structure.

Appropriate advance measures will be taken to insure the availability of adequate labor and materials to meet all contingencies. Immediate steps will be taken to control any condition which endangers the levee and to repair the damaged section.

(c) *Flood walls*—(1) *Maintenance.* Periodic inspections shall be made by the Superintendent to be certain that:

(i) No seepage, saturated areas, or sand boils are occurring;

(ii) No undue settlement has occurred which affects the stability of the wall or its water tightness;

(iii) No trees exist, the roots of which might extend under the wall and offer accelerated seepage paths;

(iv) The concrete has not undergone cracking, chipping, or breaking to an extent which might affect the stability of the wall or its water tightness;

(v) There are no encroachments upon the right-of-way which might endanger the structure or hinder its functioning in time of flood;

(vi) Care is being exercised to prevent accumulation of ~~grass~~ and debris adjacent to walls, and to insure that no fires are being built near them;

(vii) No bank caving conditions exist riverward of the wall which might endanger its stability;

(viii) Toe drainage systems and pressure relief wells are in good working condition, and that such facilities are not becoming clogged.

Such inspections shall be made immediately prior to the beginning of the flood season; immediately following each major high water period, and otherwise at intervals not exceeding 90 days. Measures to eliminate encroachments and effect repairs found necessary by such inspections shall be undertaken immediately. All repairs shall be accomplished by methods acceptable in standard engineering practice.

(2) *Operation.* Continuous patrol of the wall shall be maintained during flood periods to locate possible leakage at monolith joints or seepage underneath the wall. Floating plant or boats will not be allowed to lie against or tie up to the wall. Should it become necessary during a flood emergency to pass anchor cables over the wall, adequate measures shall be taken to protect the concrete and construction joints. Immediate steps shall be taken to correct any condition which endangers the stability of the wall.

(d) *Drainage structures*—(1) *Maintenance.* Adequate measures shall be taken to insure that inlet and outlet channels are kept open and that trash, drift, or debris is not allowed to accumulate near drainage structures. Flap gates and manually operated gates and valves on drainage structures shall be examined, oiled, and trial operated at least once every 90 days. Where drainage structures are provided with stop log or other

emergency closures, the condition of the equipment and its housing shall be inspected regularly and a trial installation of the emergency closure shall be made at least once each year. Periodic inspections shall be made by the Superintendent to be certain that:

(i) Pipes, gates, operating mechanism, riprap, and headwalls are in good condition;

(ii) Inlet and outlet channels are open;

(iii) Care is being exercised to prevent the accumulation of trash and debris near the structures and that no fires are being built near bituminous coated pipes;

(iv) Erosion is not occurring adjacent to the structure which might endanger its watertightness or stability.

Immediate steps will be taken to repair damage, replace missing or broken parts, or remedy adverse conditions disclosed by such inspections.

(2) *Operation.* Whenever high water conditions impend, all gates will be inspected a short time before water reaches the invert of the pipe and any object which might prevent closure of the gate shall be removed. Automatic gates shall be closely observed until it has been ascertained that they are securely closed. Manually operated gates and valves shall be closed as necessary to prevent inflow of flood water. All drainage structures in levees shall be inspected frequently during floods to ascertain whether seepage is taking place along the lines of their contact with the embankment. Immediate steps shall be taken to correct any adverse condition.

(c) *Closure structures—(1) Maintenance.* Closure structures for traffic openings shall be inspected by the superintendent every 90 days to be certain that:

(i) No parts are missing;

(ii) Metal parts are adequately covered with paint;

(iii) All movable parts are in satisfactory working order;

(iv) Proper closure can be made promptly when necessary;

(v) Sufficient materials are on hand for the erection of sand bag closures and that the location of such materials will be readily accessible in times of emergency.

Tools and parts shall not be removed for other use. Trial erections of one or more closure structures shall be made once each year, alternating the structures chosen so that each gate will be erected at least once in each 3-year period. Trial erection of all closure structures shall be made whenever a change is made in key operating personnel. Where railroad operation makes trial erection of a closure structure infeasible, rigorous inspection and drill of operating personnel may be substituted therefor.

Trial erection of sand bag closures is not required. Closure materials will be carefully checked prior to and following flood periods, and damaged or missing parts shall be repaired or replaced immediately.

(2) *Operation.* Erection of each movable closure shall be started in sufficient time to permit completion before flood waters reach the top of the structure sill. Information regarding the proper method of erecting each individual closure structure, together with an estimate of the time required by an experienced crew to complete its erection will be given in the Operation and Maintenance Manual which will be furnished local interests upon completion of the project. Closure structures will be inspected frequently during flood periods to ascertain that no undue leakage is occurring and that drains provided to care for ordinary leakage are functioning properly. Boats or floating plant shall not be allowed to tie up to closure structures or to discharge passengers or cargo over them.

(f) *Pumping plants—(1) Maintenance.* Pumping plants shall be inspected by the Superintendent at intervals not to exceed 30 days during flood seasons and 90 days during off-flood seasons to insure that all equipment is in order for instant use. At regular intervals, proper measures shall be taken to provide for cleaning plant, buildings, and equipment, repainting as necessary, and lubricating all machinery. Adequate supplies of lubricants for all types of machines, fuel for gasoline or diesel powered equipment, and flash lights or lanterns for emergency lighting shall be kept on hand at all times. Telephone service shall be maintained at pumping plants. All equipment, including switch gear, transformers, motors, pumps, valves, and gates shall be trial operated and checked at least once every 90 days. Megger tests of all insulation shall be made whenever wiring has been subjected to undue dampness and otherwise at intervals not to exceed one year. A record shall be kept showing the results of such tests. Wiring disclosed to be in an unsatisfactory condition by such tests shall be brought to a satisfactory condition or shall be promptly replaced. Diesel and gasoline engines shall be started at such intervals and allowed to run for such length of time as may be necessary to insure their serviceability in times of emergency. Only skilled electricians and mechanics shall be employed on tests and repairs. Operating personnel for the plant shall be present during tests. Any equipment removed from the station for repair or replacement shall be returned or replaced as soon as practicable and shall be trial operated after reinstallation.

lation. Repairs requiring removal of equipment from the plant shall be made during off-flood seasons insofar as practicable.

(2) *Operation.* Competent operators shall be on duty at pumping plants whenever it appears that necessity for pump operation is imminent. The operator shall thoroughly inspect, trial operate, and place in readiness all plant equipment. The operator shall be familiar with the equipment manufacturers' instructions and drawings and with the "Operating Instructions" for each station. The equipment shall be operated in accordance with the above-mentioned "Operating Instructions" and care shall be exercised that proper lubrication is being supplied all equipment, and that no overheating, undue vibration or noise is occurring. Immediately upon final recession of flood waters, the pumping station shall be thoroughly cleaned, pump house sumps flushed, and equipment thoroughly inspected, oiled and greased. A record or log of pumping plant operation shall be kept for each station, a copy of which shall be furnished the District Engineer following each flood.

(g) *Channels and floodways* — (1) *Maintenance.* Periodic inspections of improved channels and floodways shall be made by the Superintendent to be certain that:

(i) The channel or floodway is clear of debris, weeds, and wild growth;

(ii) The channel or floodway is not being restricted by the depositing of waste materials, building of unauthorized structures or other encroachments;

(iii) The capacity of the channel or floodway is not being reduced by the formation of shoals;

(iv) Banks are not being damaged by rain or wave wash, and that no sloughing of banks has occurred;

(v) Riprap sections and deflection dikes and walls are in good condition;

(vi) Approach and egress channels adjacent to the improved channel or floodway are sufficiently clear of obstructions and debris to permit proper functioning of the project works.

Such inspections shall be made prior to the beginning of the flood season and otherwise at intervals not to exceed 90 days. Immediate steps will be taken to remedy any adverse conditions disclosed by such inspections. Measures will be taken by the Superintendent to promote the growth of grass on bank slopes and earth deflection dikes. The Superintendent shall provide for periodic repair and cleaning of debris basins, check dams, and related structures as may be necessary.

(2) *Operation.* Both banks of the channel shall be patrolled during periods of high water, and measures shall be taken to protect those reaches being attacked by the current or by wave wash. Appropriate measures shall be taken to prevent the formation of jams of ice or debris. Large objects which become lodged against the bank shall be removed. The improved channel or floodway shall be thoroughly inspected immediately following each major high water period. As soon as practicable thereafter, all snags and other debris shall be removed and all damage to banks, riprap, deflection dikes and walls, drainage outlets, or other flood control structures repaired.

(h) *Miscellaneous facilities* — (1) *Maintenance.* Miscellaneous structures and facilities constructed as a part of the protective works and other structures and facilities which function as a part of, or affect the efficient functioning of the protective works, shall be periodically inspected by the Superintendent and appropriate maintenance measures taken. Damaged or unserviceable parts shall be repaired or replaced without delay. Areas used for ponding in connection with pumping plants or for temporary storage of interior run-off during flood periods shall not be allowed to become filled with silt, debris, or dumped material. The Superintendent shall take proper steps to prevent restriction of bridge openings and, where practicable, shall provide for temporary raising during floods of bridges which restrict channel capacities during high flows.

(2) *Operation.* Miscellaneous facilities shall be operated to prevent or reduce flooding during periods of high water. Those facilities constructed as a part of the protective works shall not be used for purposes other than flood protection without approval of the District Engineer unless designed therefor.

(Sec. 3, 49 Stat. 1671, as amended; 33 U.S.C. 701c) [9 F.R. 9090, Aug. 17, 1944; 9 F.R. 10203, Aug. 22, 1944]

EXHIBIT A--INSPECTION REPORT FORM (1)
SCOTTSVILLE, VIRGINIA, LOCAL FLOOD PROTECTION PROJECT

Date of inspection _____ Date of last inspection _____

Inspection Item	Comment/Action Required/Action Taken
1. Has any unusual or excessive deterioration, damage, breakdown, act of vandalism, etc., occurred to any feature of the project or item of equipment since the last inspection?	
2. Has this inspection disclosed the need for any repairs to the protection works or equipment, other than required for normal maintenance?	
3. Are any gate closure parts or equipment, as listed in Section 5, damaged or missing from the gate storage buildings?	
4. Are any tools or spare parts for pump station equipment missing from the pump station?	
5. Is there any apparent damage to the pump station or equipment therein from humidity or condensation?	
6. Did any pump, engine, engine control, or item of switchboard equipment show any malfunctioning during test operation?	

EXHIBIT A--INSPECTION REPORT FORM (CONTINUED) (1)
SCOTTSDVILLE, VIRGINIA, LOCAL FLOOD PROTECTION PROJECT

Inspection Item	Comment/Action Required/Action Taken
7. Has any construction or filling occurred in the Mink Creek ponding area since the last inspection? If so, does the construction affect the capacity or purpose of the ponding area?	
8. Has there been any change in the key operating personnel of the Flood Protection Project since the last inspection report? Has Table 1-1, "Town Roster of Key Personnel", of Section 1 been revised to reflect these changes?	

If the answer to any of the above questions is "yes", an explanation should be provided concerning the conditions and circumstances pertaining to the matter. A statement should be provided concerning the measures that are being taken to correct all unsatisfactory conditions. Also, an outline should be provided of all measures, other than routine maintenance, that have been taken since the last inspection report or that will be taken to repair or recondition any feature of the project or any item of equipment.

(1) This form to be used in conjunction with Exhibits B, C, D, E, and F.

(Signed) _____
Flood Protection Superintendent
Scottsville, Virginia

EXHIBIT B--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

CHECK LIST--PUMP STATION

Inspected by _____	Title _____	Date _____					
Item	Condition	Recommended Maintenance	Accomplished Date/By				
A. GROUNDS, BUILDING, AND OUTLET WORKS							
1. Silt, Trash, etc., in Levee Flap Gate/Sluice Gate Structure:							
a. Main Pump Discharges							
b. Concrete and Stone Culvert							
2. Settlement, Cracks, etc.:							
a. Pump Station Building, Including Main Pump Sumps							
b. Storm Water Influent Channel and Wet Well							
3. Paint:							
a. Exposed Ferrous Metal							
b. Concrete (Inside Bldg)							
4. Control Room:							
a. General							
b. Disconnect - transfer switch settings							

EXHIBIT B--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

CHECK LIST--PUMP STATION

Inspected by _____	Title _____	Date _____				
Item	Condition	Recommended Maintenance	Accomplished Date/By			
A. GROUNDS, BUILDING, AND OUTLET WORKS (CONT'D)						
5. Gratings, Stairs, Guard Rails and Chains, Catwalks, etc.						
6. Doors, Hatchways, Roof Scuttles, etc.						
7. Fire Extinguishers						
8. Adequate Supply of Lubricants						
9. Emergency Lights (Flashlights or Electric Lanterns)						
10. Operation and Maintenance Log Sheets on Hand						
11. Operation and Maintenance Manual on Hand						
12. Basic Tools for Normal Maintenance on Hand						
13. Cleanliness:						
a. Grounds						
b. Storm Water Culvert and Bar Screen						
c. Pump Room						

EXHIBIT B--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

CHECK LIST--PUMPING STATION

Inspected by _____ Title _____ Date _____

Item	Condition	Recommended Maintenance	Accomplished Date/By
A. GROUNDS, BUILDING, AND OUTLET WORKS (CONT'D)			
13. Cleanliness: (Cont'd)			
d. Main Sump			
e. Levee Flap/Sluice Gate Structure			
f. Control Room			
14. Ventilating System:			
a. Main Fan Units and Associated Back Dampers			
b. Louvers, Birdscreens, Dampers, and Controls, and Duct Works			
15. Heating Units			
16. Fuel Oil Tank and Fuel Lines to Engines:			
a. General			
b. Leaking			
c. Fuel Quantities			

EXHIBIT B--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

CHECK LIST--PUMPING STATION

Inspected by _____ Title _____ Date _____

Item	Condition	Recommended Maintenance	Accomplished Date/By
A. GROUNDS, BUILDING, AND OUTLET WORKS (CONTD)			
17. Force Main Suction Vents on Top of Levee:			
a. General			
b. Clear of Debris			
18. Bridge Crane:			
a. General			
b. Lubricated			
19. Emergency Generator			
a. General			
b. Battery Charger			
c. Batteries (Full Charge)			
d. LP Gas Tank			
1) Condition			
2) Fuel Quantity			

EXHIBIT B--LOCAL FLOOD PROTECTION PROJECT, SCOTTSDALE, VIRGINIA

CHECK LIST--PUMPING STATION

Inspected by _____ Title _____ Date _____

Item	Condition	Recommended Maintenance	Accomplished Date/By
A. GROUNDS, BUILDING, AND OUTLET WORKS (CONT'D)			
e. Disconnect - Transfer Switch Settings			
f. Check Oil in Generator			
g. Perform Start Up Test			
20. Sanitary Sewer Valves:			
a. General			
1) Accessible			
2) Damage			
b. Operation			
c. Valve Key(s) Available			
1) Pumping Station			
2) Main Street Storage Building			

EXHIBIT B--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

CHECK LIST--PUMPING STATION

Inspected by _____ Title _____ Date _____

Item	Condition	Recommended Maintenance	Accomplished Date/By
A. GROUNDS, BUILDING, AND OUTLET WORKS (CONT'D)			
21. Water Supply Line Self Draining Ball Valve:			
a. General			
1) Accessible			
2) Damage			
b. Operation			
c. Control Handle/Valve Key located in pump station control room			
B. WATER CONTROL GATES, TRASH RACK, ETC.			
1. Sluice Gate at Levee:			
a. General			
b. Electric Operator			
c. Stem			
d. Greased (Date _____)			
e. Trial Operated (Date _____)			

EXHIBIT B--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

CHECK LIST--PUMPING STATION

Inspected by _____ Title _____ Date _____

Item	Condition	Recommended Maintenance	Accomplished Date/By
B. WATER CONTROL GATES, TRASH RACKS, ETC. (CONTD)			
2. Phase Converter for Sluice Gate:			
a. General			
b. Oil accumulations around and in vent openings			
c. Lubricated			
d. Trial Operated			
3. Flap Gate at Levee:			
a. General			
b. Greased (Date _____)			
c. Movement and clearance checked (Date _____)			
4. Main Sump Intake Gates--Three (3) Gates:			
a. General			
b. Manual Floor Stand			
c. Stem			

EXHIBIT B--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

CHECK LIST--PUMPING STATION

Inspected by _____ Title _____ Date _____

Item	Condition	Recommended Maintenance	Accomplished Date/By
B. WATER CONTROL GATES, TRASH RACKS, ETC. (CONT'D)			
d. Greased (Date _____)			
e. Trial Operated (Date _____)			
5. Bar Screen and Rakes:			
a. General			
b. Rakes Available			
6. Bridge Crane:			
a. Greased (Date _____)			
b. Trial Operated (Date _____)			

EXHIBIT B--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

CHECK LIST--PUMPING STATION

Inspected by _____ Title _____ Date _____

Item	Condition	Recommended Maintenance	Accomplished Date/By
B. WATER CONTROL GATES, TRASH RACKS, ETC. (CONT'D)			
7. Emergency Generator:			
a. Battery Checked Full Charge (Date _____)			
b. Trial Operated (Date _____)			
c. Fuel Checked (Date _____)			
8. Sanitary Sewer Gate Valves			
a. Set to be normally "OPEN"			
b. Trial Operated (Date _____)			
C. PUMPS			
1. Main Pump No. 1			
a. General			
b. Greased (Date _____)			
c. Grease Reservoir Filled (Date _____)			

EXHIBIT B--LOCAL FLOOD PROTECTION PROJECT, SCOTTSDALE, VIRGINIA

CHECK LIST--PUMPING STATION

Inspected by _____ Title _____ Date _____

Item	Condition	Recommended Maintenance	Accomplished Date/By
C. PUMPS (CONT'D)			
d. Propeller Running Clearance Checked (Annual) (Date _____)			
e. Test Run (Submit Log of Operation) (Date _____)			
2. Main Pump No. 2			
a. General			
b. Greased (Date _____)			
c. Grease Reservoir Filled (Date _____)			
d. Propeller Running Clearance Checked (Annual) (Date _____)			
e. Test Run (Submit Log of Operation) (Date _____)			

EXHIBIT B--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

CHECK LIST--PUMPING STATION

Inspected by _____ Title _____ Date _____

Item	Condition	Recommended Maintenance	Accomplished Date/By
C. PUMPS (CONT'D)			
3. Main Pump No. 1			
a. General			
b. Greased (Date _____)			
c. Greased Reservoir Filled (Date _____)			
d. Propeller Running Clearance Checked (Annual) (Date _____)			
e. Test Run (Submit Log of Operation) (Date _____)			
4. Main Pump Discharge Piping Three (3) Pumps			
a. General			
b. Supports			
c. Couplings and Tie Rods			
d. Vents (Top of Levee)			

EXHIBIT C--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

CHECK LIST--MINK CREEK DAM

Inspected by _____ Title _____ Date _____

Item	Condition	Recommended Maintenance	Accomplished Date/By
A. MINK CREEK DAM SLUICE GATES			
a. 42 inch Primary Spillway Gate:			
a. General			
b. Manual Floor Stand			
c. Stem			
d. Greased Date _____			
e. Trial Operated Date _____			
b. 36 inch Drain Gate (To empty lake):			
a. General			
b. Manual Floor Stand			
c. Stem			
d. Greased Date _____			
e. Trial Operated Date _____			

EXHIBIT C--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

CHECK LIST--MINK CREEK DAM

Inspected by _____ Title _____ Date _____

Item	Condition	Recommended Maintenance	Accomplished Date/By
B. MINK CREEK DAM SPILLWAY AND OVERFLOW CHANNEL			
a. General			
b. Riprap			
C. WATER OUTLET STRUCTURE (TOWER)			
a. General			
b. Trash Racks			
1. Condition			
2. Clear of Debris			
D. PRIMARY SPILLWAY 42 inch DISCHARGE PIPE			
a. General			
E. DISCHARGE IMPACT BASIN			
a. General			
b. Concrete			
c. Clear of Debris			

APPENDIX B

EXHIBIT C
SHEET 2 OF 3

EXHIBIT C--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

CHECK LIST--MINK CREEK DAM

Inspected by _____ Title _____ Date _____

Item	Condition	Recommended Maintenance	Accomplished Date/By
F. DAM EMBANKMENT			
a. General			
b. Ground Cover			
c. Settlement			
d. Erosion			
e. Seepage			
1. Location			
2. Severity			
3. Erosion			

EXHIBIT D--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

CHECK LIST--FLOODWALL AND LEVEE

Inspected by _____ Title _____ Date _____

Item	Condition	Recommended Maintenance	Accomplished Date/By
A. FLOODWALL			
1. Concrete:			
a. General			
b. Settlement			
c. Cracking			
d. Spalling			
e. Horizontal Movement			
f. Structure Rotation			
2. Seepage (After a flood condition)			
a.. Construction Joints (Water Stops):			
(i) General			
b. Bottom of Floodwall			
(i) Erosion			

EXHIBIT D--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

CHECK LIST--FLOODWALL AND LEVEE

Inspected by _____ Title _____ Date _____

Item	Condition	Recommended Maintenance	Accomplished Date/By
B. STREET CLOSURE GATES			
1. Ferry Street Closure a. General b. Closure Items (i) Stop logs (14L1)-- 51 each (ii) Rods (14R1), with 2 washers and 2 nuts per rod--12 each (iii) Rod plates (14C1)--6 each (iv) Wedges (14W1)--2 each (v) Post Hole Covers (14P1)--2 each (vi) Posts (15P1)--2 each c. Protective coating d. Removable Post Pocket and Cover e. Embedded Metal Sill Beam f. Cleanliness: (i) Closure Building (ii) Stop Log Slots g. Tools (Confirm Tool List Complete) h. Leakage Location and Extent (after a flooding condition)			

EXHIBIT D--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

CHECK LIST--FLOODWALL AND LEVEE

Inspected by _____ Title _____ Date _____

Item	Condition	Recommended Maintenance	Accomplished Date/By
B. STREET CLOSURE GATES			
2. Main Street Closure a. General b. Closure Items (i) Stop logs (14L1)-- 44 each (ii) Rods (14R1), with 2 washers and 2 nuts per rod--16 each (iii) Rod plates (14C1)--8 each (iv) Wedges (14W1)--3 each (v) Post Hole Covers (14P1)--3 each (vi) Posts (15P1)--3 each c. Protective coating d. Removable Post Pocket and Cover e. Embedded Metal Sill Beam f. Cleanliness: (i) Closure Building (ii) Stop Log Slots g. Tools (Confirm Tool List Complete) h. Leakage Location and Extent (after a flooding condition)			

EXHIBIT D--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

CHECK LIST--FLOODWALL AND LEVEE

Inspected by _____ Title _____ Date _____

Item	Condition	Recommended Maintenance	Accomplished Date/By
C. LEVEE			
1. Earth: a. Ground Cover b. Settlement c. Erosion			
2. Riprap a. Placement b. Settlement			
3. Seepage (After a flooding condition) a. Location b. Severity c. Erosion			

EXHIBIT E--LOCAL FLOOD PROTECTION PROJECT, SCOTTSVILLE, VIRGINIA

PUMP START-UP LOG

DATE OF OPERATION_____

OPERATOR_____

OPERATOR TITLE_____

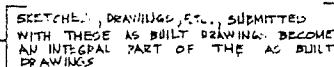
Pump No.	Time Engaged	Time Disengaged	Operation Time

Date _____
Time _____ PM _____ AM
Time _____ AM _____ PM

[illegible]

Operator's Name _____ Period _____ to _____

Date _____



CONTRACT NO: DACW-65-85-C-0075

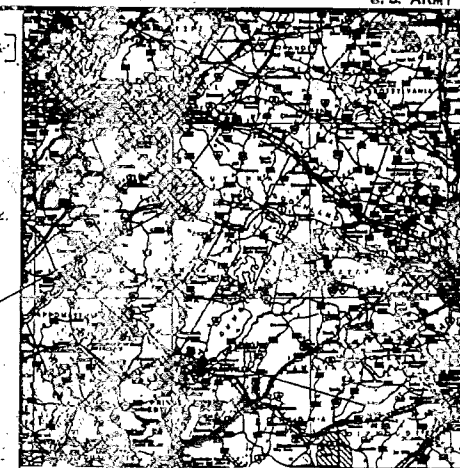
AS BUILT

(b) RECAPED AS BUILT DRAWING
AUG / SEPT / 01

(b) NOTE: INFORMATION SHOWN HAS BEEN RECREATED AND POSTED TO REFLECT APPROXIMATE 'AS BUILT' CONDITIONS. INFORMATION SHOWN MAY OR MAY NOT BE EXACTLY ACCURATE. FIELD VERIFICATION, PHYSICAL SURVEY, AND/OR OTHER MEANS WOULD BE REQUIRED TO DETERMINE EXACT PRECISE CONDITIONS. INFORMATION SHOWN IS DESIGN ONLY (THERMINESE NOTES OR CHANGED BY 'AS BUILT' NOTES).

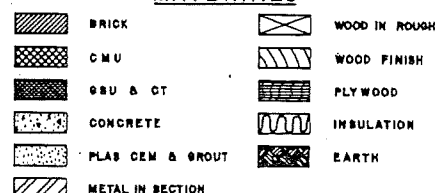
INDEX OF DRAWINGS

SHEET NO.	TITLE	NORFOLK DISTRICT FILE NO.	SHEET NO.	TITLE	NORFOLK DISTRICT FILE NO.
C-1	COVER SHEET - ABBREVIATIONS AND LEGEND	H-29-21-68 (1)	C-31	PLAN - FLAP GATE STRUCTURE	H-29-21-68 (34)
C-2	OMITTED		C-32	SECTIONS - FLAP GATE STRUCTURE	H-29-21-68 (35)
C-3	INDEX SHEET	H-29-21-68 (2)	C-33	BORROW AREA	H-29-21-68 (36)
C-4	PLAN AND PROFILE STA. 0+00 TO STA. 7+00	H-29-21-68 (3)	C-34	TELCE DETAILS	H-29-21-68 (37)
C-5	PLAN AND PROFILE STA. 7+00 TO STA. 16+00	H-29-21-68 (4)	E-1	PUMP STATION - LIGHTING PLAN	H-29-21-68 (38)
C-6	PLAN AND PROFILE STA. 16+00 TO STA. 21+00	H-29-21-68 (5)	E-2	PUMP STATION - POWER PLAN	H-29-21-68 (39)
C-7	PLAN AND PROFILE STA. 21+00 TO STA. 28+00	H-29-21-68 (6)	M-1	PUMP STATION - MECHANICAL PLAN	H-29-21-68 (40)
C-8	PLAN AND PROFILE STA. 28+00 TO STA. 35+49.81	H-29-21-68 (7)	G-1	PUMP STATION - STRUCTURAL PLAN	H-29-21-68 (41)
C-9	POUNDING AREA NO. 1	H-29-21-68 (8)	G-2	PUMP STATION - STRUCTURAL SECTIONS	H-29-21-68 (42)
C-10	POUNDING AREA NO. 2	H-29-21-68 (9)	C-2.5A	CONTROL JOINT DETAILS	H-29-21-68 (43)
C-11	PLAN AND PROFILE ROAD TO UNIROVAL	H-29-21-68 (10)			
C-12	LEVEE SECTIONS AND PROFILES	H-29-21-68 (11)		ADDED SHEETS BELOW (AS BUILT INFO.)	
C-13	SAUITYARY AND STORM DRAIN PROFILES	H-29-21-68 (12)	C-25 B	PROFILE - TOP OF FLOODWALL FOOTER	H-29-21-68 (25 B)
C-14	PAVEMENT DETAILS	H-29-21-68 (13)	38 A	ADDITIONAL FLOODWALL DATA - SHEET 1	H-29-21-68 (38 A)
C-15	CROSS SECTIONS STA. 0+43 TO STA. 6+00	H-29-21-68 (14)	38 B		
C-16	CROSS SECTIONS STA. 7+00 TO STA. 14+50	H-29-21-68 (15)	38 C		2
C-17	CROSS SECTIONS STA. 16+00 TO STA. 21+80	H-29-21-68 (16)	38 D		3
C-18	CROSS SECTIONS STA. 21+75 TO STA. 27+80	H-29-21-68 (17)	38 E		4
C-19	CROSS SECTIONS STA. 27+75 TO STA. 28+00	H-29-21-68 (18)	38 F		5
C-20	CROSS SECTIONS STA. 27+00 TO STA. 35+00	H-29-21-68 (19)	38 G	ADDITIONAL FLOODWALL DATA - SHEET 7	H-29-21-68 (38 G)
C-21	PLAN AND DETAILS FERRY STREET CLOSURE	H-29-21-68 (20)			
C-22	CLOSURE DETAILS	H-29-21-68 (21)			
C-23	PLAN MAIN STREET CLOSURE	H-29-21-68 (22)			
C-24	CLOSURE DETAILS	H-29-21-68 (23)			
C-25	FLOOD WALL AND RETAINING WALL SECTIONS	H-29-21-68 (24)			
C-26	PLAN-CLOSURE BUILDINGS AT MAIN STREET AND FERRY STREET	H-29-21-68 (25)			
C-27	PUMP STATION PLANS	H-29-21-68 (26)			
C-28	PUMP STATION SECTIONS	H-29-21-68 (27)			
C-29	PUMP STATION ELEVATIONS	H-29-21-68 (28)			
C-30	DETAILS	H-29-21-68 (29)			

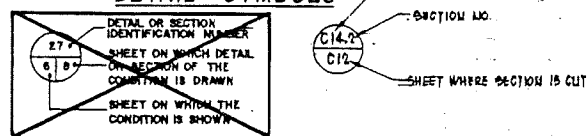


LOCATION MAP

MATERIALS



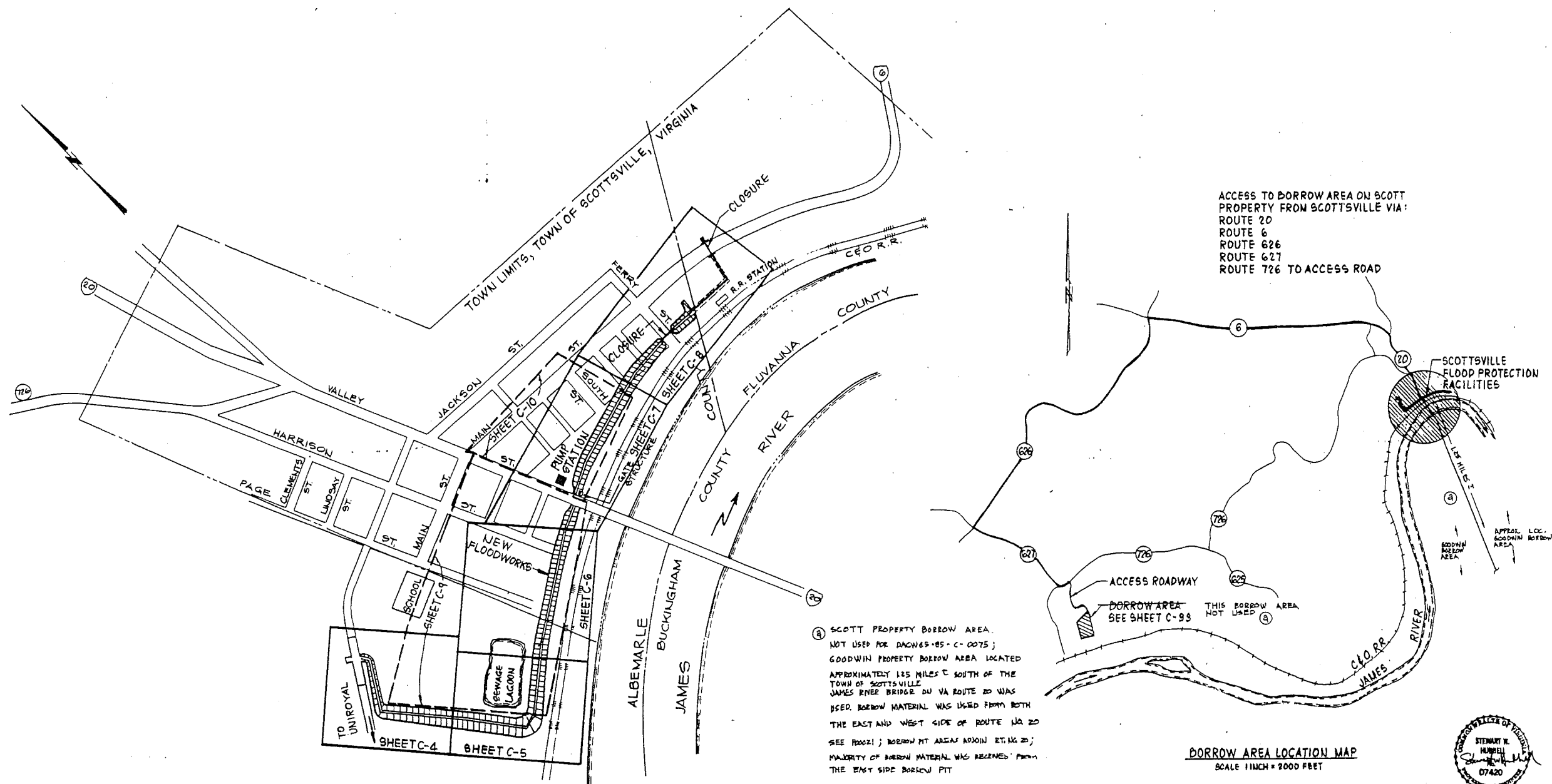
DETAIL SYMBOLS



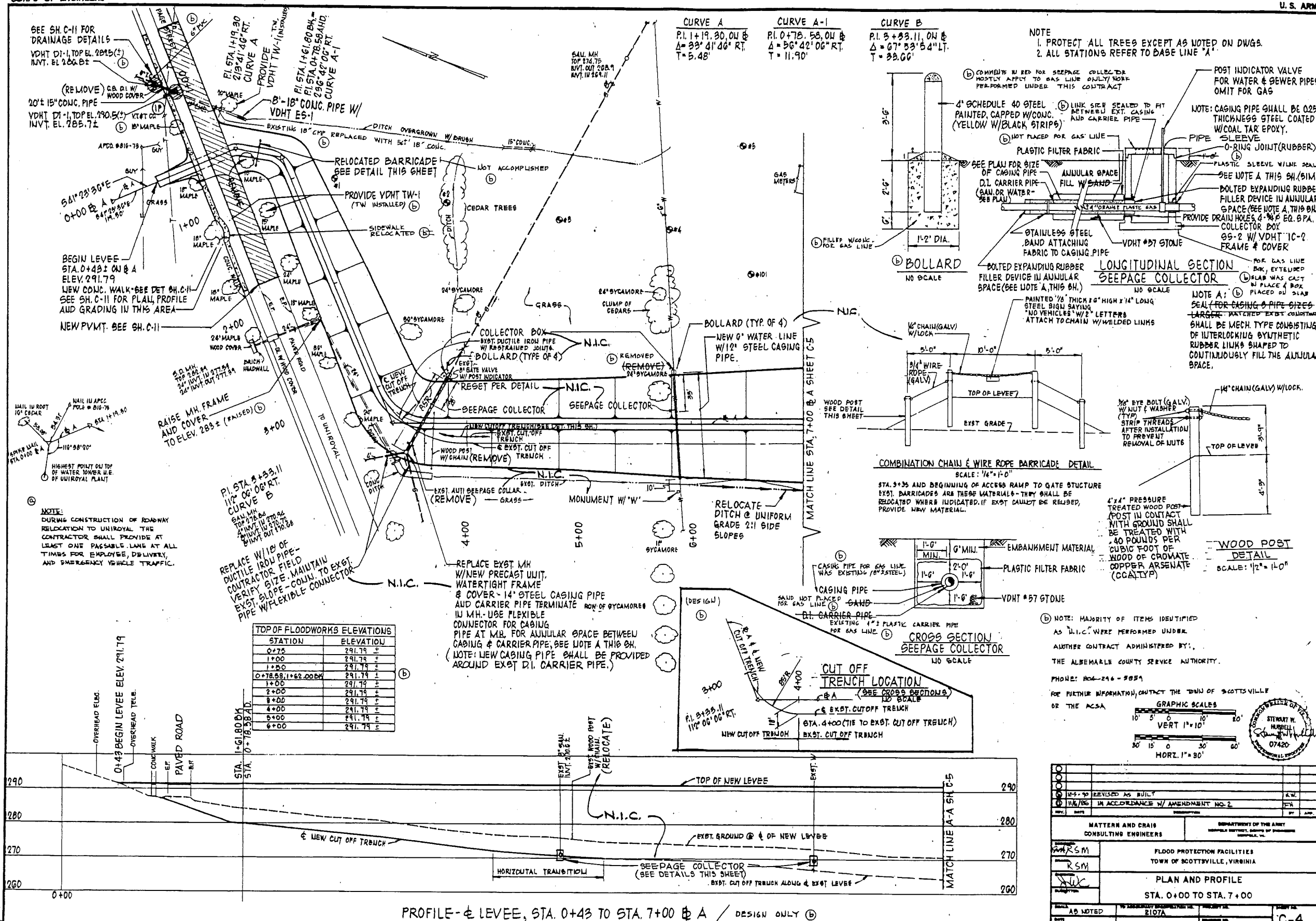
ABBREVIATIONS

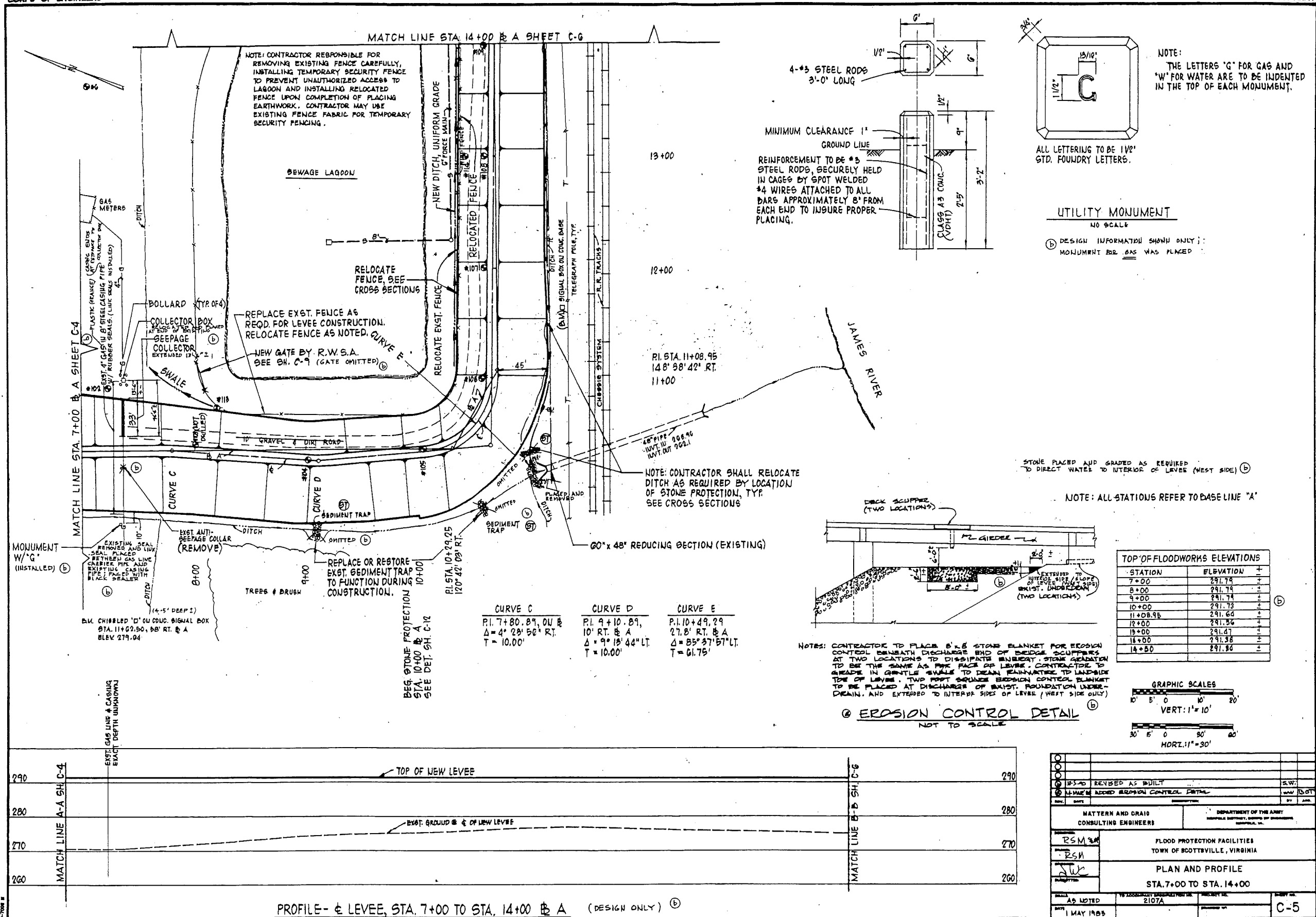
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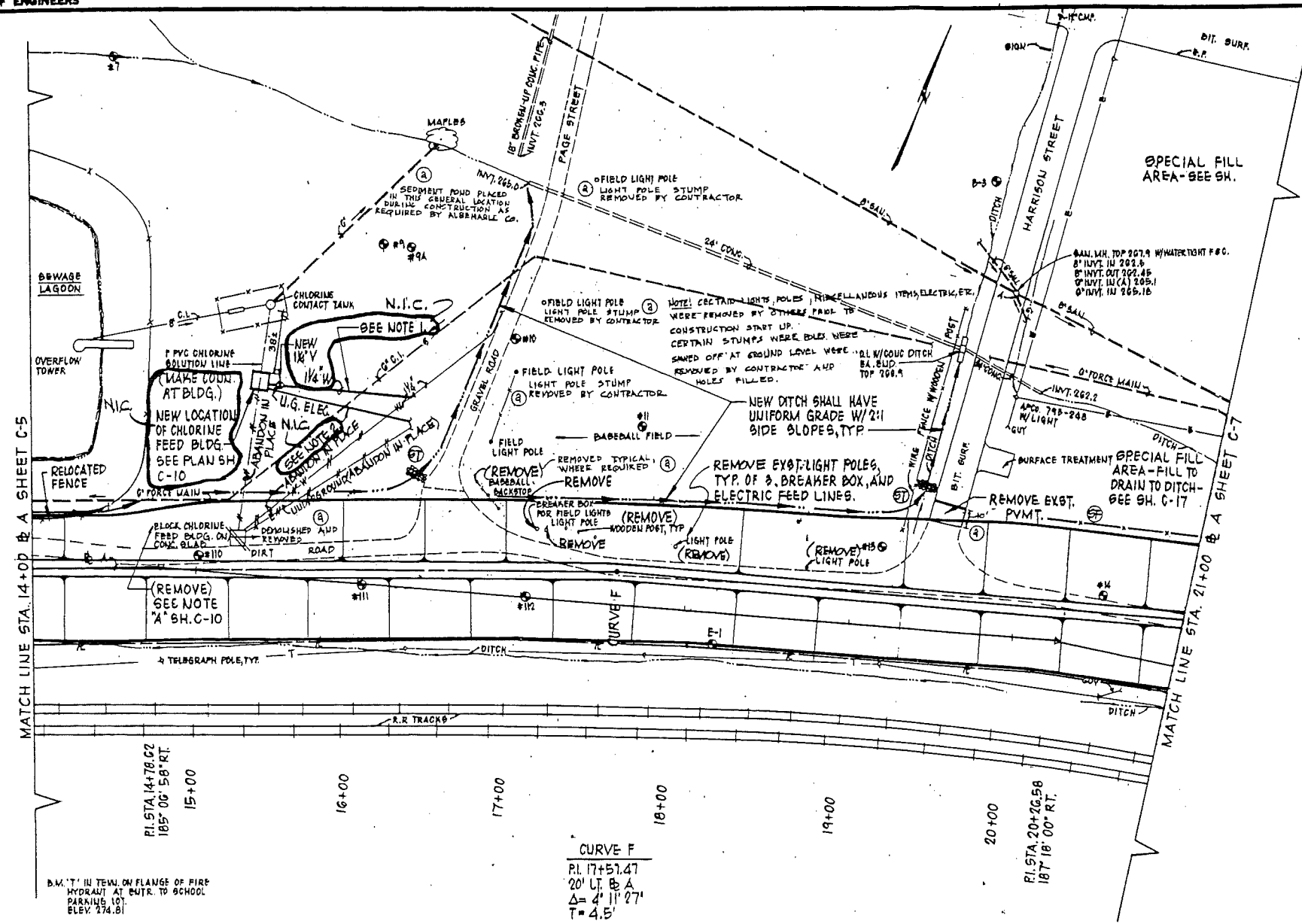


REVISIONS		DATE		BY	
1	AS NOTED	2107A	1 MAY 1985		
MATTEN AND CRAIG CONSULTING ENGINEERS		DEPARTMENT OF THE ARMY ENGINEERING CENTER, WASHINGTON, D.C.			
PROJECT NO. 2107A		FLOOD PROTECTION FACILITIES TOWN OF SCOTTSVILLE, VIRGINIA			
SHEET NO. C-3		INDEX SHEET			

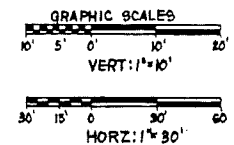




- NOTE:
1. NEW 14" WATER LINE SHALL HAVE 3' MIN. COVER. LINE SHALL SLOPE UP FROM CONN. POINT ON EXST. LINE TO RELOCATED CHLORINE FEED BLDG.
 2. EXACT LOCATION OF U.G. ELECTRIC UNKNOWN-CONTRACTOR PROVIDE WIRING AND CONDUIT TO MATCH EXST. AND CONNECT AT SUITABLE POINT NORTH OF LEVEE
 3. FOR SPECIAL FILL AREA GRADING, SEE SH. C-9
 4. ALL STATIONS REFER TO BASE LINE "A"
- N.I.C.



TOP OF FLOODWORKS ELEVATIONS	
STATION	ELEVATION
15+00	291.30
16+00	291.21
17+00	291.12
18+00	291.02
19+00	290.92
20+00	290.83
21+00	290.74



MATTEN AND CRAIG CONSULTING ENGINEERS		DEPARTMENT OF THE ARMY	
FLOOD PROTECTION FACILITIES		TOWN OF SCOTTSVILLE, VIRGINIA	
PLAN AND PROFILE		STA. 14+00 TO STA. 21+00	
AS NOTED	2107A	DATE	1 MAY 1965
C-6			

PROFILE - E LEVEE, STA. 14+00 TO STA. 21+00 @ A (DESIGN ONLY) (B)

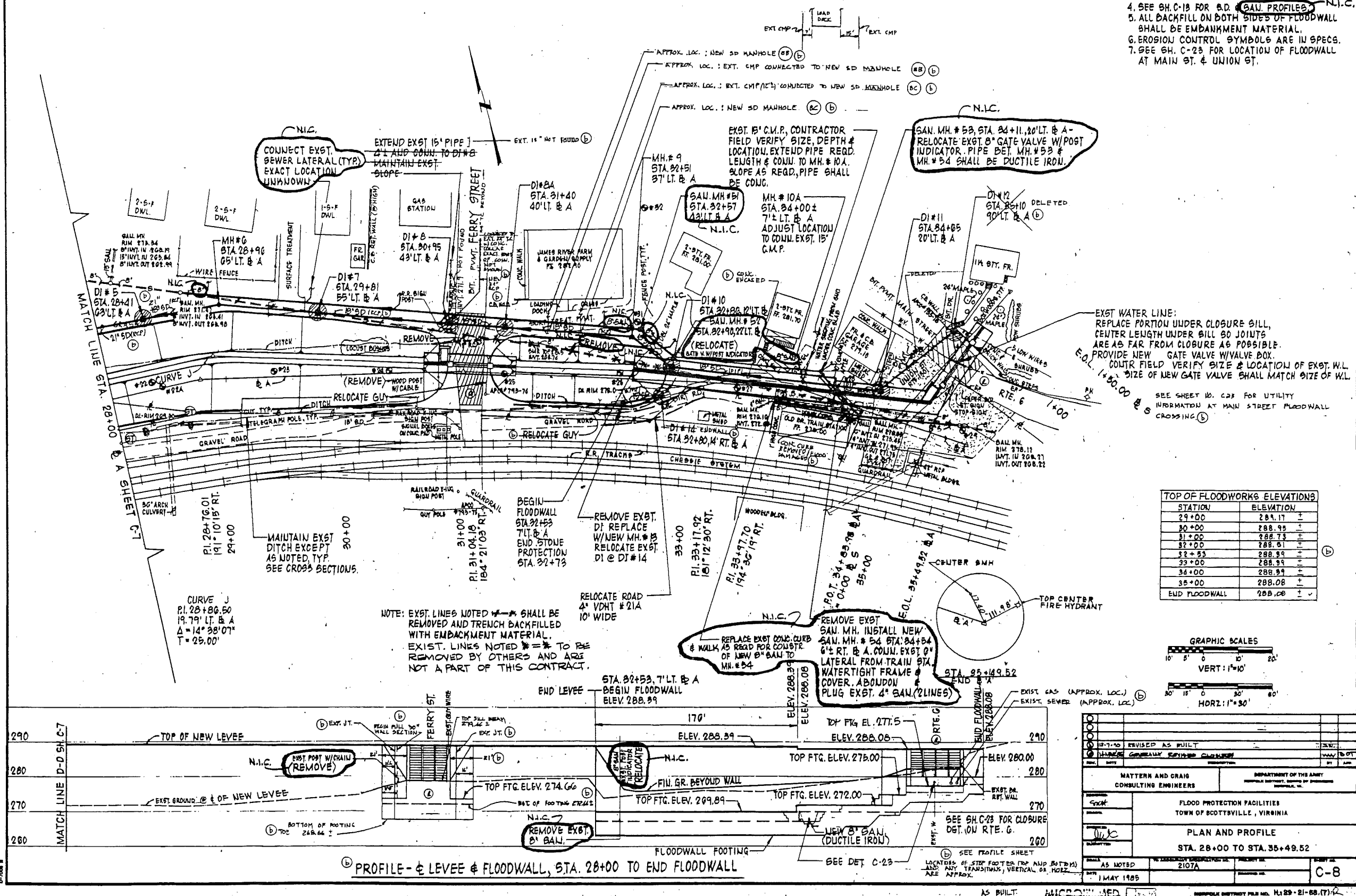
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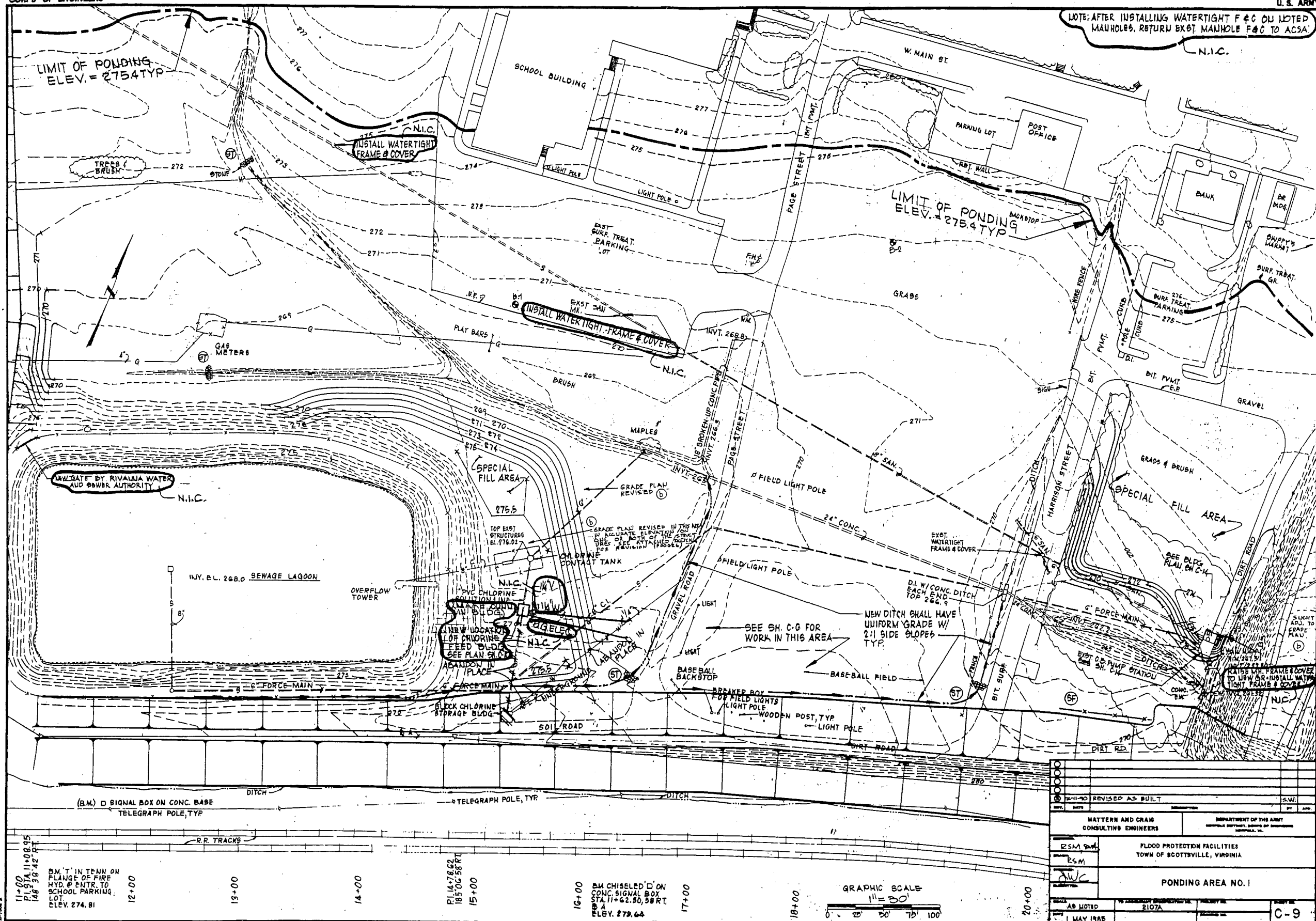
ENGINEERING PLAN NO. H-25-21-66 (5) R

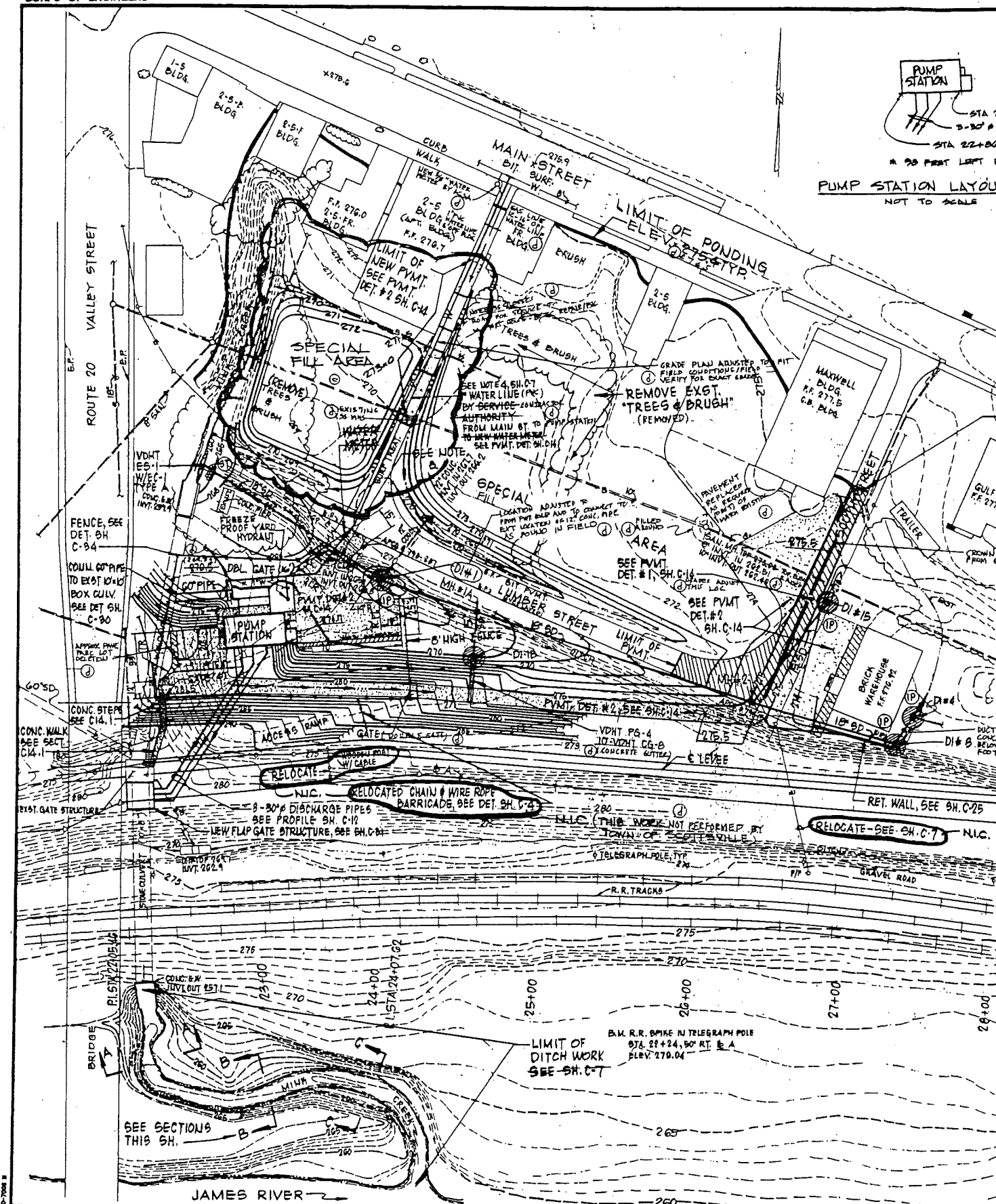


NOTES:

1. SEE SH. C-21 FOR FERRY ST. CLOSURE.
2. SEE SH. C-23 FOR MAIN ST. (RTE. 6) CLOSURE.
3. SEE SH. C-23 FOR FLOODWALL DETAILS.
4. SEE SH. C-13 FOR S.D. & SAN. PROFILES. N.I.C.
5. ALL BACKFILL ON BOTH SIDES OF FLOODWALL SHALL BE EMBANKMENT MATERIAL.
6. EROSION CONTROL SYMBOLS ARE IN SPECS.
7. SEE SH. C-23 FOR LOCATION OF FLOODWALL AT MAIN ST. & UNION ST.







NOTES CONT.

6. SEE SH. C-34 FOR FENCE DETAILS
7. SWITCH FOR FAN & LIGHTS SHALL BE AUTOMATIC WHEN DOOR OPENS & MANUALLY OPERATED OUTSIDE.

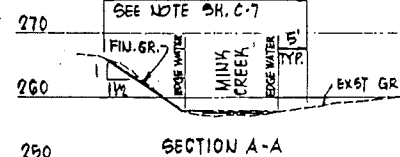
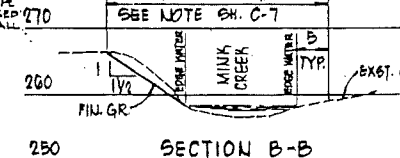
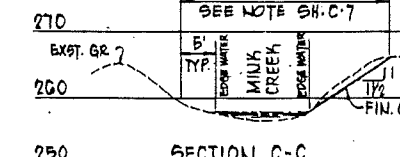


STA 22+31.17 A
3-30" DISCHARGE PIPES
STA 22+36.30 A
A 30 FEET LEFT BASELINE A CORNER OF CMU.

PUMP STATION LAYOUT DATA
NOT TO SCALE

1. SEE SHEET C-7 FOR FURTHER INFORMATION

LIMIT OF BIT, P.V.M.T.
(SEE DETAIL #1, SH. C-14)
ELEV. OF NEW P.V.M.T. ON
SOUTH ST. SHALL BE 275.5

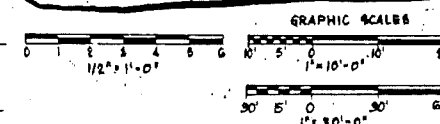
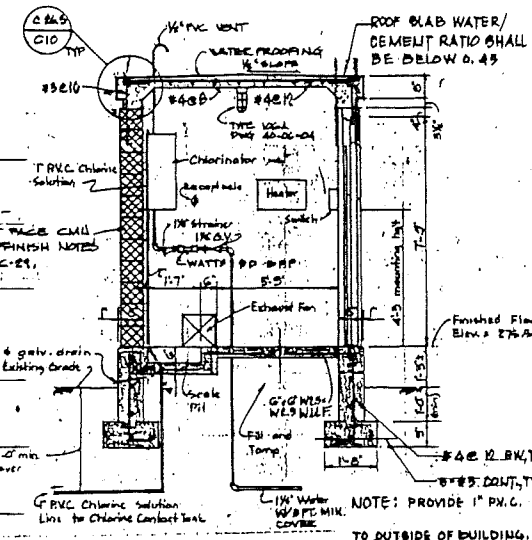
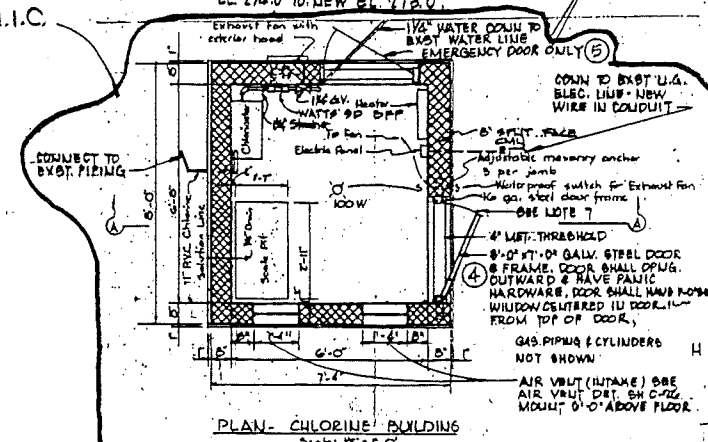
CLEAR & GRUB THIS AREA
SEE NOTE SH. C-7CLEAR & GRUB THIS AREA
SEE NOTE SH. C-7CLEAR & GRUB THIS AREA
SEE NOTE SH. C-7

SCALE: HORIZ. 1" = 10'
VERT. 1" = 10'

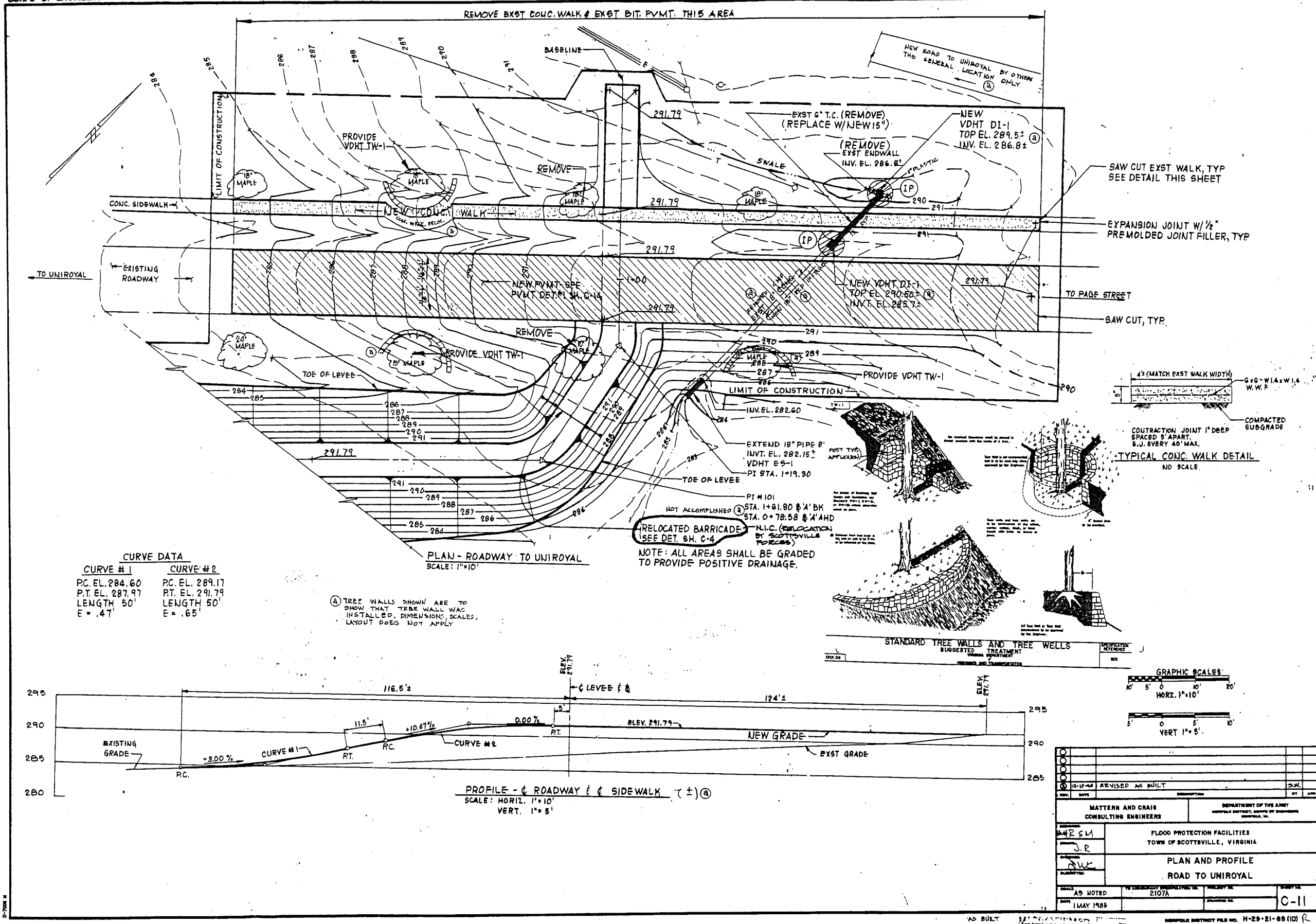
NOTE A: EXISTING CHLORINE BUILDING SHALL BE DEMOLISHED AND REMOVED. NEW CHLORINE BUILDING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PLANS SHOWN. EXISTING EQUIPMENT SHALL BE REMOVED & REINSTALLED IN THE NEW BUILDING. ALL PIPING AND EQUIPMENT SHALL BE TESTED AFTER INSTALLATION FOR PROPER FUNCTION, IN THE PRESENCE OF THE CONTRACTING OFFICER. THE NEW BUILDING SHALL BE COMPLETED PRIOR TO DEMOLITION OF EXISTING BUILDING TO MINIMIZE DOWNTIME OF EQUIPMENT. IF DOWNTIME IS MORE THAN HALF HOUR, PROVISION SHALL BE MADE FOR TEMP. CHLORINE FEED.

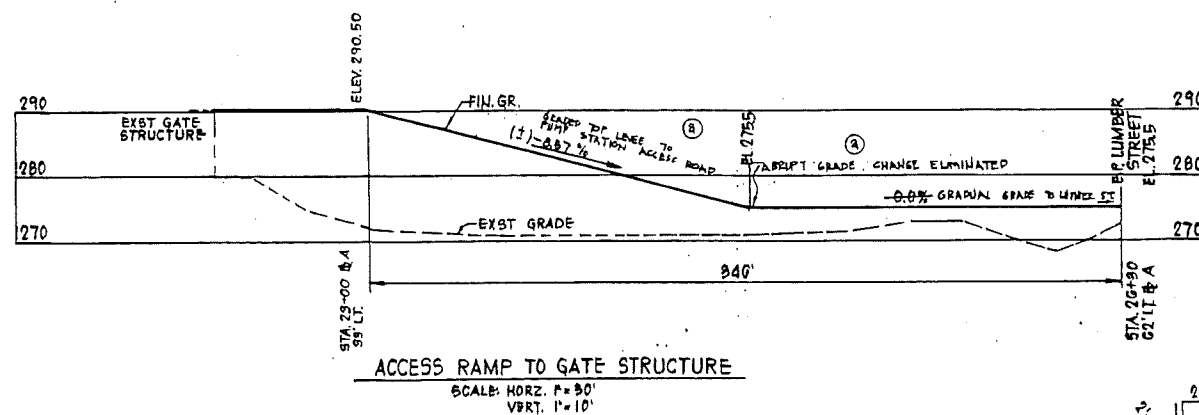
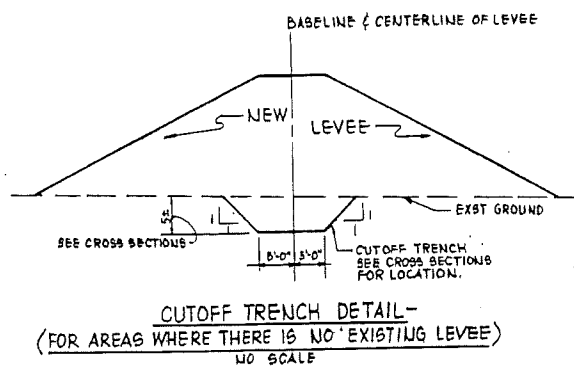
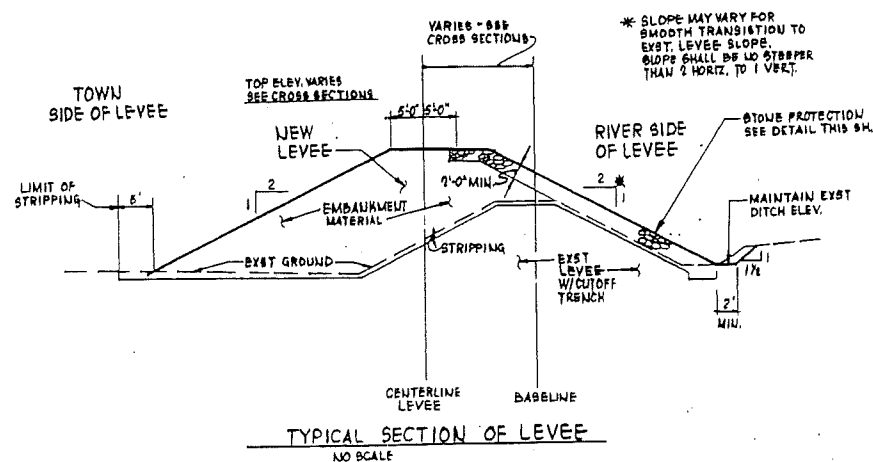
NOTES:

1. SEE SH. 13 FOR S.D. PROFILES
2. SEE SH. 14 FOR PUMP STATION PLANS
3. REMOVE EXST. 12" CMP
4. SEE SH. C-7 FOR ELEC. SITE PLAN
5. IN SPECIAL FILL AREAS, CONTRACTOR SHALL NOT FILL ABOVE EL. 274.0. THE FINAL GR. SHALL SLOPE UNIFORMLY FROM EXST. EL. 274.0 TO NEW EL. 273.0.

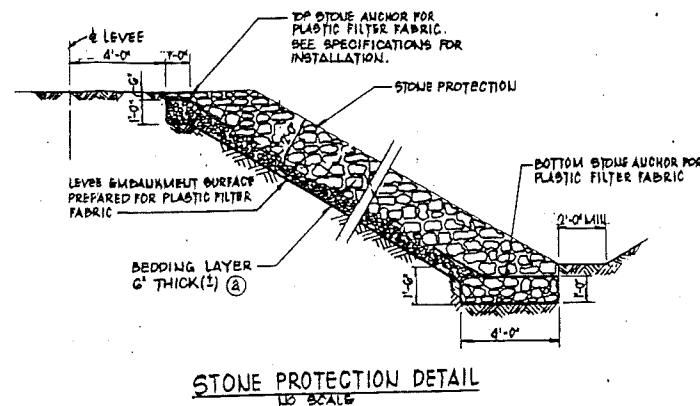


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0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

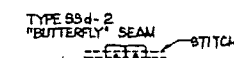




STANDARD LEVEE SECTIONS

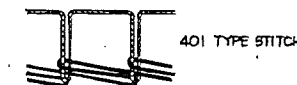


STONE PROTECTION DETAIL
NO SCALE



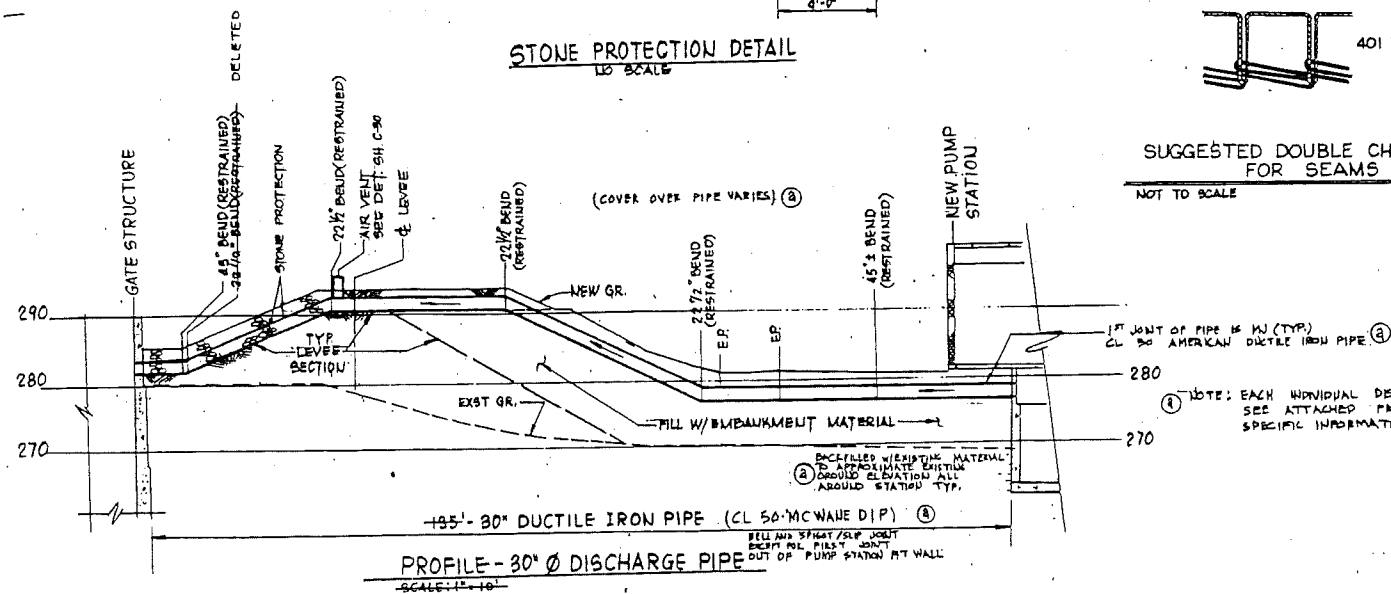
TYPE SSn-2
"J" SEAM

SPECIFIED SEAMS FOR FABRIC



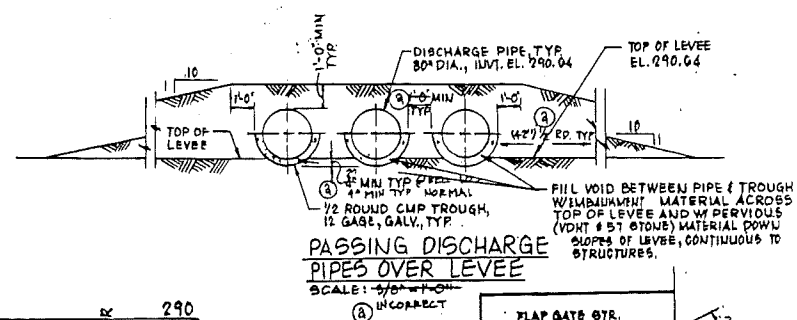
SUGGESTED DOUBLE CHAIN STITCH FOR SEAMS

NOT TO SCALE



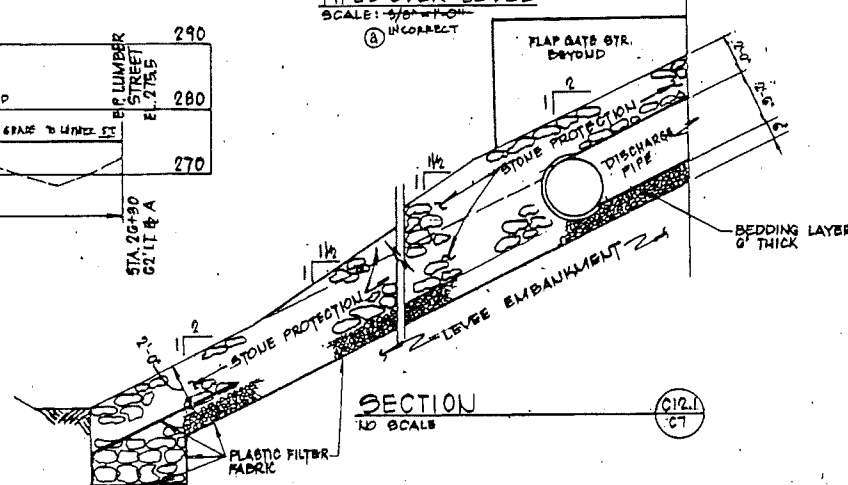
PROFILE - 30" Ø DISCHARGE PIPE

~~SCALE: 1" = 10'~~



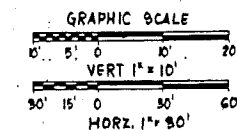
PASSING DISCHARGE PIPES OVER LEVEE

SCALE: ~~5/8" = 1'-0"~~
(2) INCORRECT



SECTION
NO SCALE

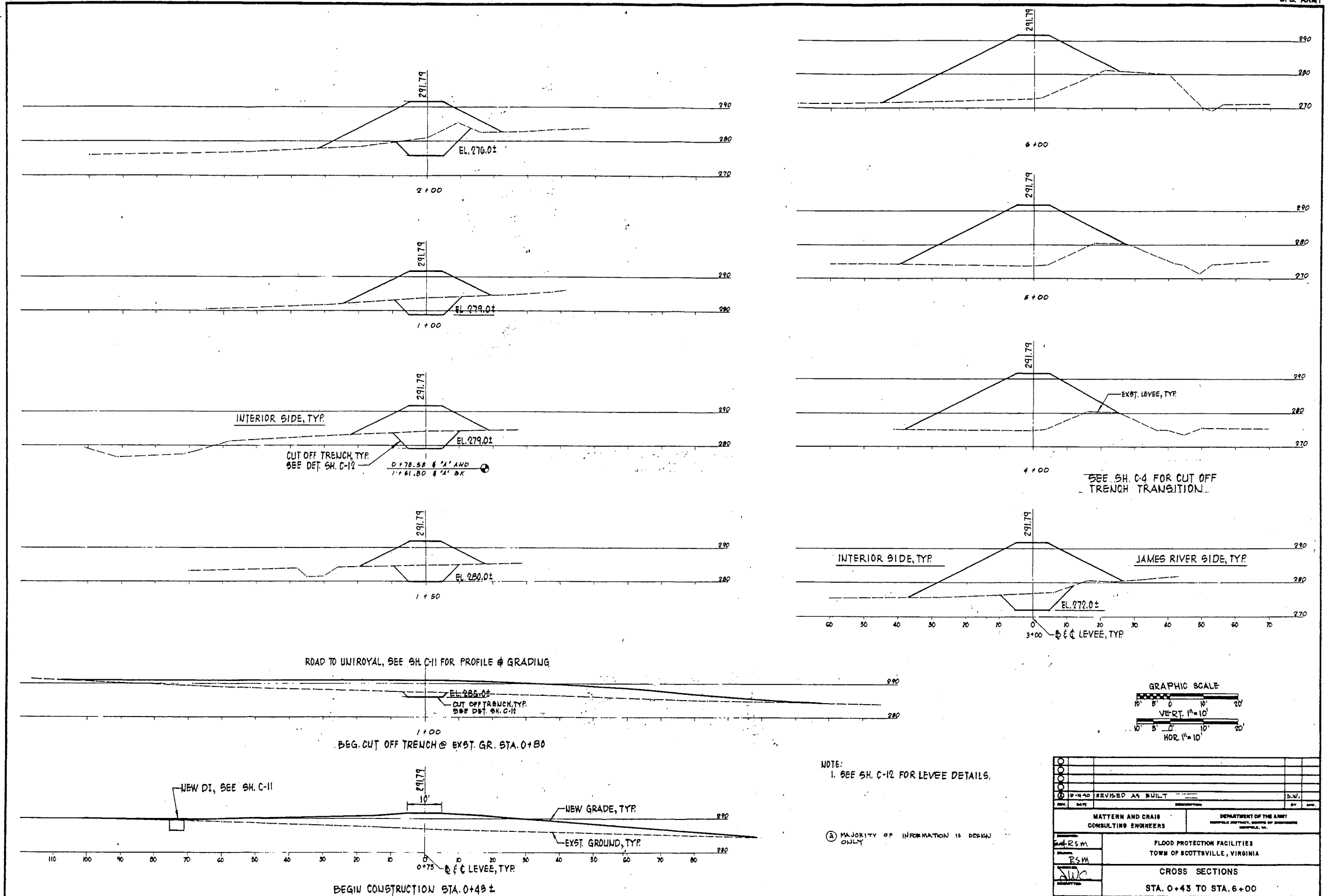
(C12
-C7



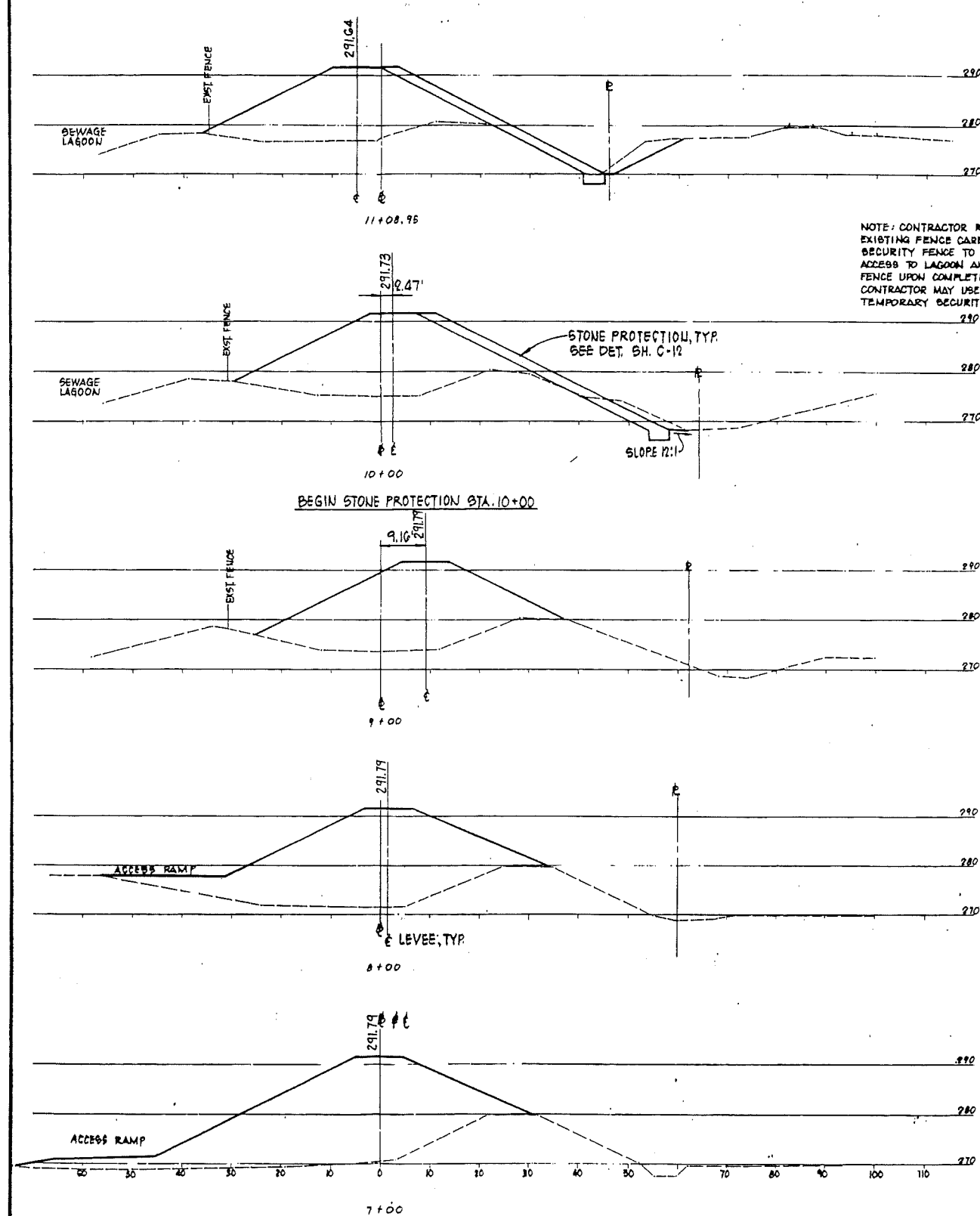
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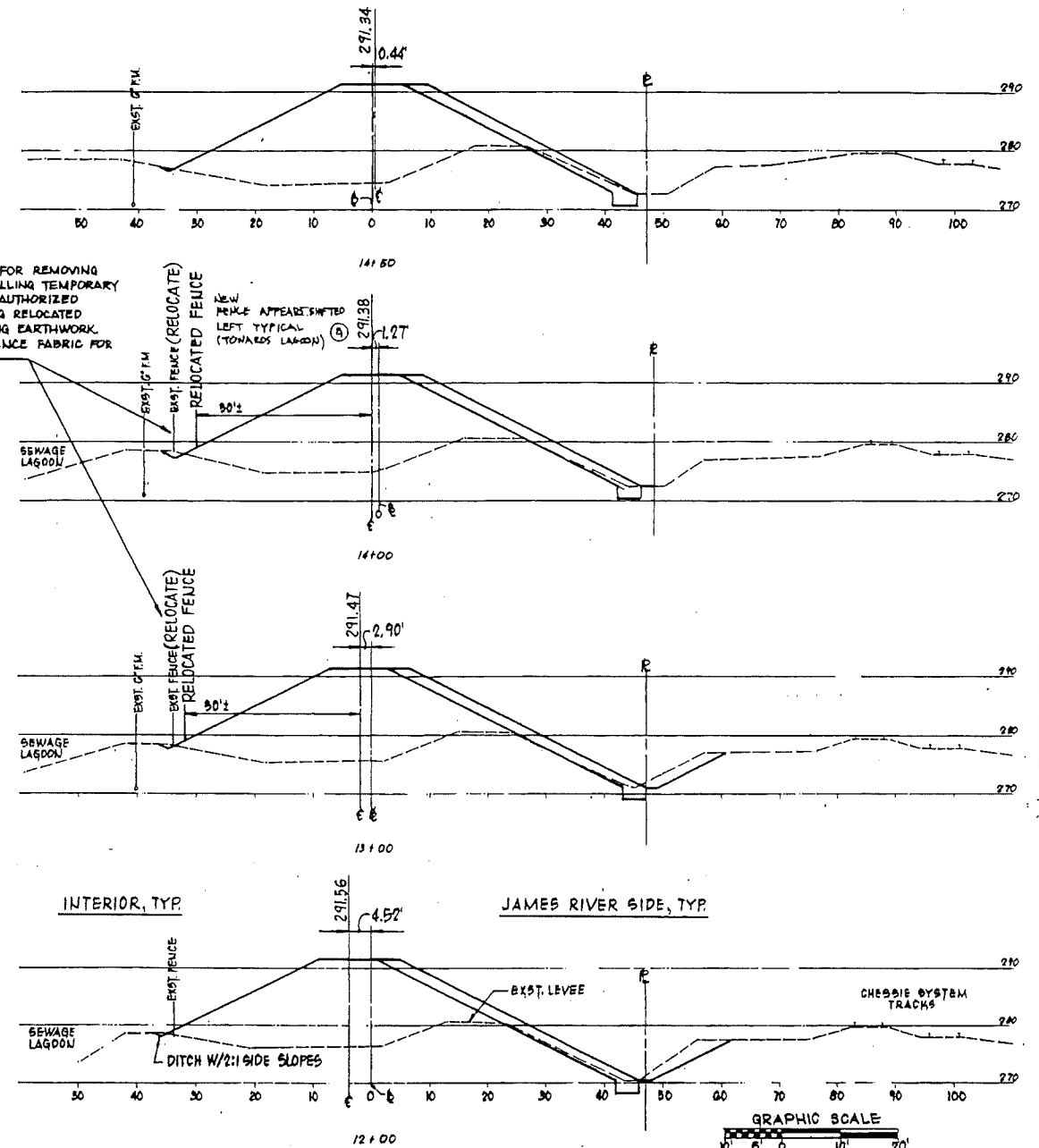




MATTEN AND CRAIG CONSULTING ENGINEERS		DEPARTMENT OF THE ARMY ENGINEERING DISTRICT, SCOTTSDALE, ARIZONA	
FLOOD PROTECTION FACILITIES TOWN OF SCOTTSDALE, VIRGINIA		CROSS SECTIONS STA. 0+43 TO STA. 6+00	
SCALE AS NOTED	NO. 2107A	DATE 1 MAY 1955	PROJECT NO. C-15



NOTE: CONTRACTOR RESPONSIBLE FOR REMOVING EXISTING FENCE CAREFULLY, INSTALLING TEMPORARY SECURITY FENCE TO PREVENT UNAUTHORIZED ACCESS TO LAGOON AND INSTALLING RELOCATED FENCE UPON COMPLETION OF PLACING EARTHWORK. CONTRACTOR MAY USE EXISTING FENCE FABRIC FOR TEMPORARY SECURITY FENCING.



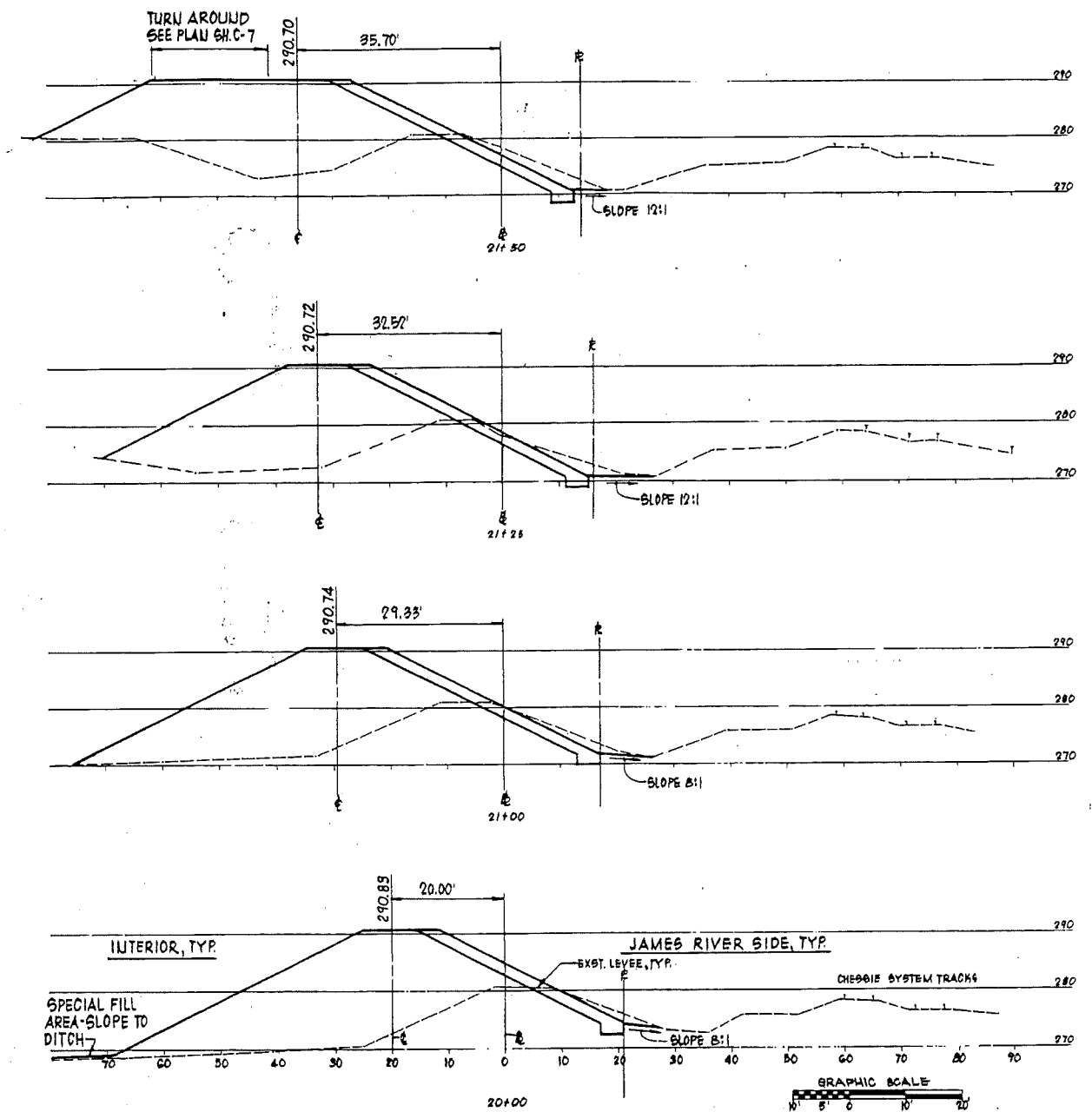
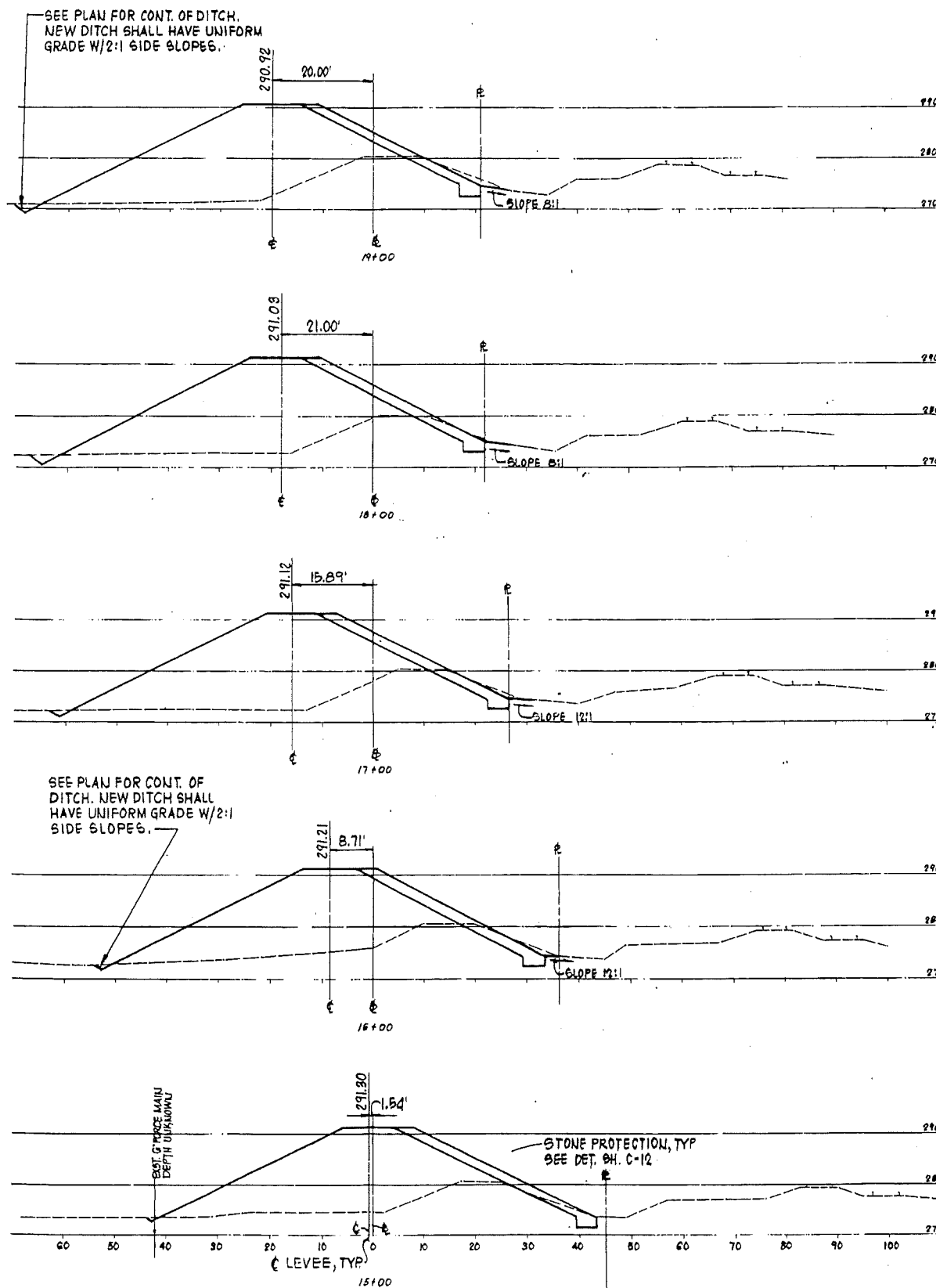
NOTE: SEE SH. C-12 FOR LEVEE DETAILS.

③ DESIGN INFORMATION ONLY

REV.	DATE	REVISIONS	BY	APP.
1	12-1-50	REVISED AS BUILT		
MATTEN AND CRAIG		DEPARTMENT OF THE ARMY		
CONSULTING ENGINEERS		ENGINEER DISTRICT, CORPS OF ENGINEERS		
R.M. SMITH		FLOOD PROTECTION FACILITIES		
R.M.		TOWN OF SCOTTSVILLE, VIRGINIA		
J.W.		CROSS SECTIONS		
		STA. 7+00 TO STA. 14+50		
AS NOTED		2107A		2107A
1 MAY 1965				
				C-16

AS BUILT

MORRIS DISTRICT FILE NO. H-29-21-68 (15) 2



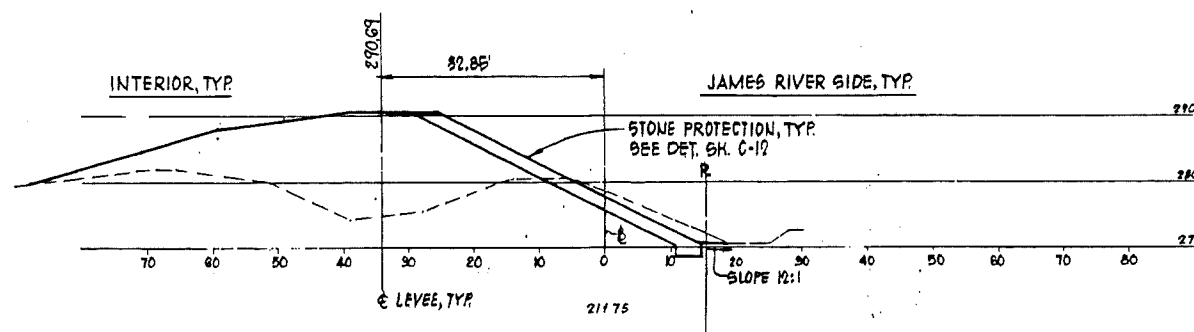
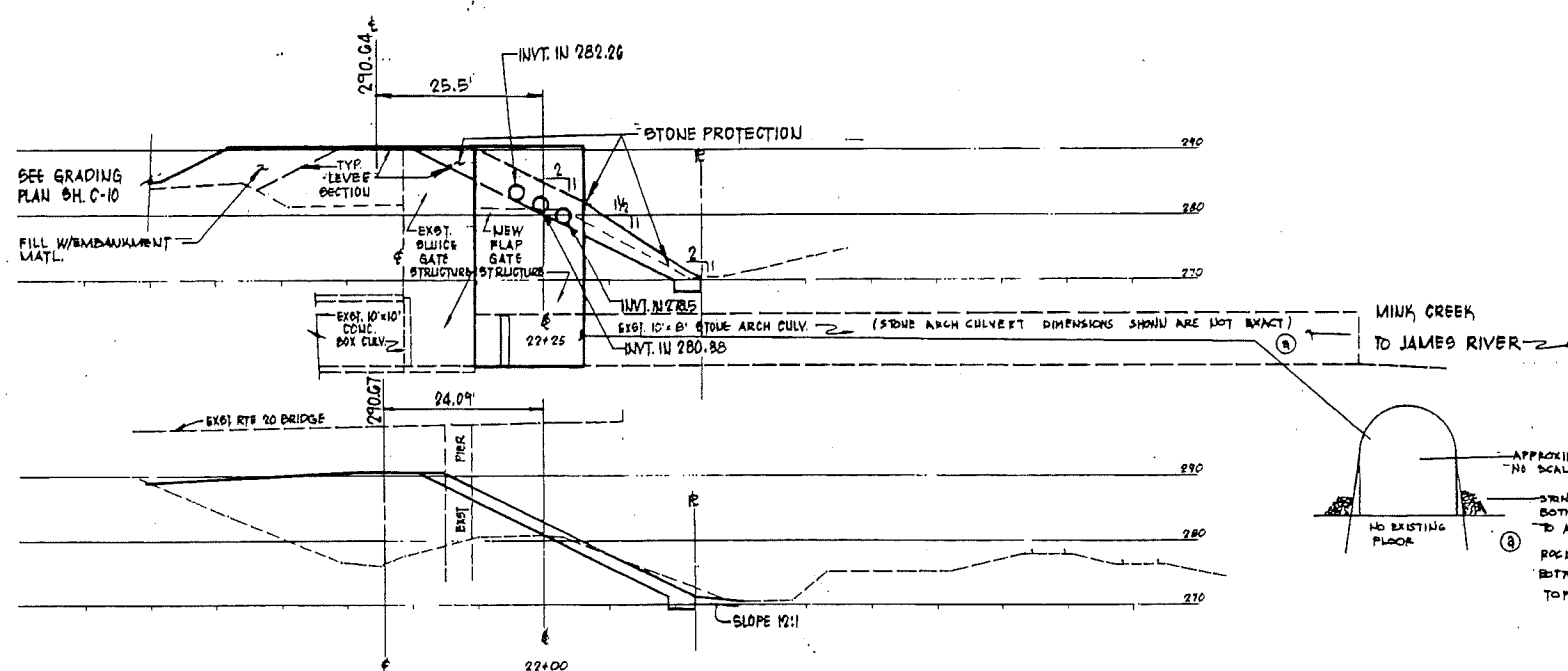
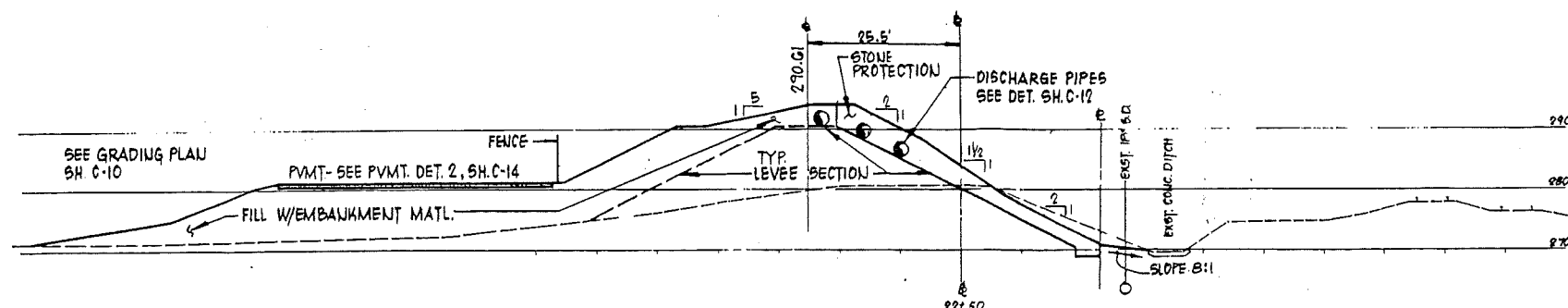
NOTE: SEE SH. C-12 FOR LEVEE DETAILS.

(A) DESIGN INFORMATION ONLY

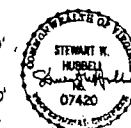
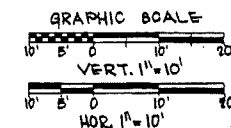
REVISIONS		DATE		BY		APP	
12-8-80		REVISED AS BUILT		AN:			
MATTEN AND CRAIG CONSULTING ENGINEERS				DEPARTMENT OF THE ARMY MORRIS DISTRICT, BUREAU OF ENGINEERING MORRIS, VA.			
FLOOD PROTECTION FACILITIES TOWN OF SCOTTSVILLE, VIRGINIA							
CROSS SECTIONS STA. 15+00 TO STA. 21+50							
AS NOTED		2107A		DESIGNED BY		C-17	
1 MAY 1985				DRAWN BY			

AS BUILT

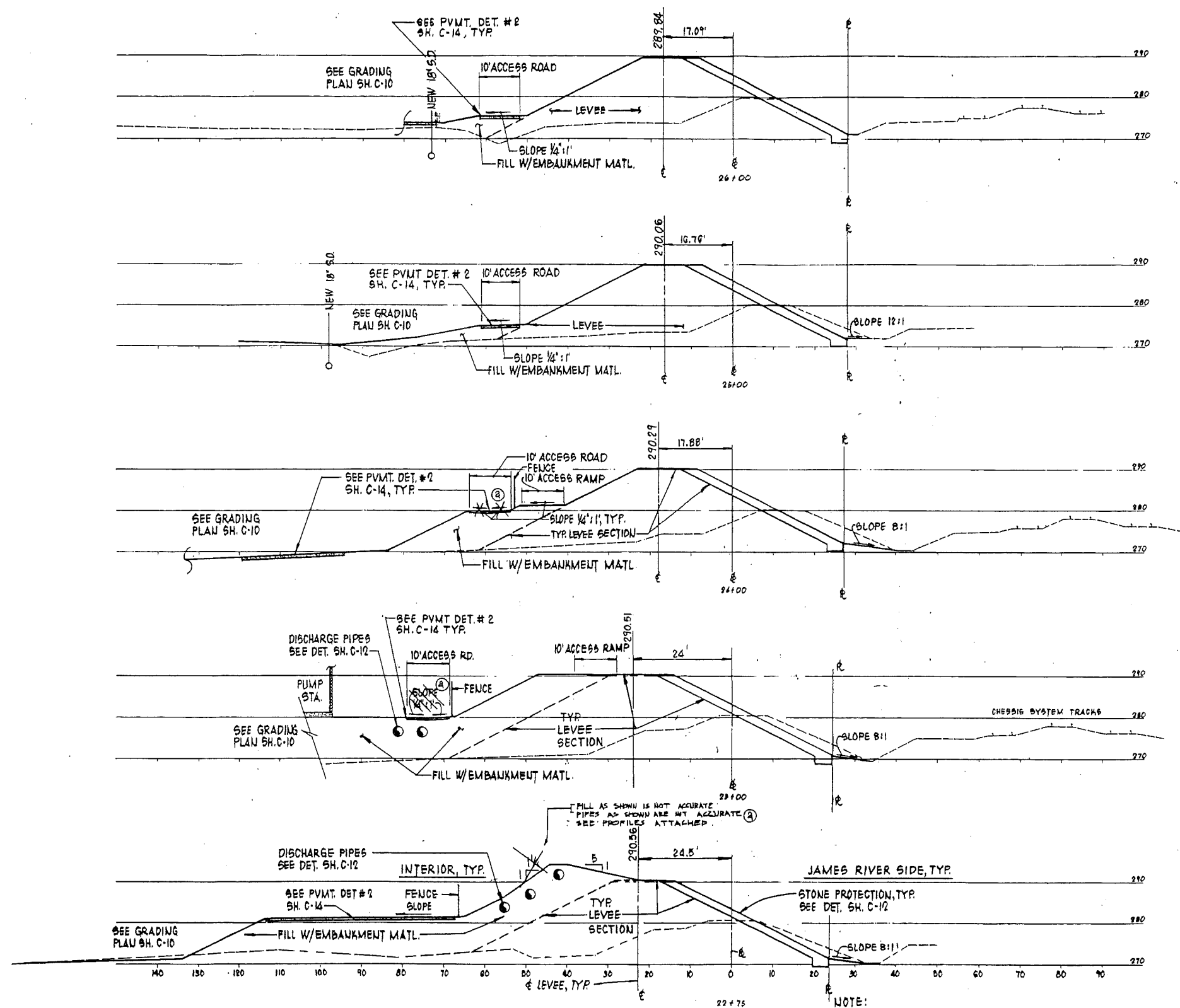
MORRIS DISTRICT FILE NO. H-23-21-85 06) R



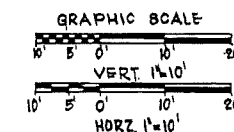
NOTE:
 1. SEE SH. C-12 FOR LEVEE DETAILS.
 2. DISTANCES BETWEEN B AND C ARE PERPENDICULAR TO B AT STATION INDICATED (TYP.)



REV.	DATE	DESCRIPTION	BY	APP.
1	12-14-60	REVISED AS BUILT		
MATTEN AND CRAIG CONSULTING ENGINEERS			DEPARTMENT OF THE ARMY HARRISBURG DISTRICT, CORPS OF ENGINEERS HARRISBURG, PA.	
DESIGNED BY RSM, RWH CHECKED BY ESW DRAWN BY JWC			FLOOD PROTECTION FACILITIES TOWN OF SCOTTSVILLE, VIRGINIA	
CROSS SECTIONS STA. 21+75 TO STA. 22+50				
AS NOTED			2107A	
DATE: MAY 1966				C-18



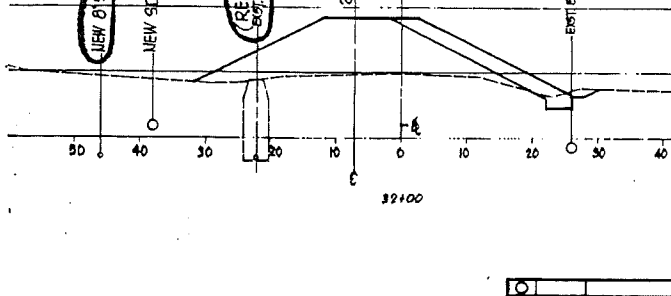
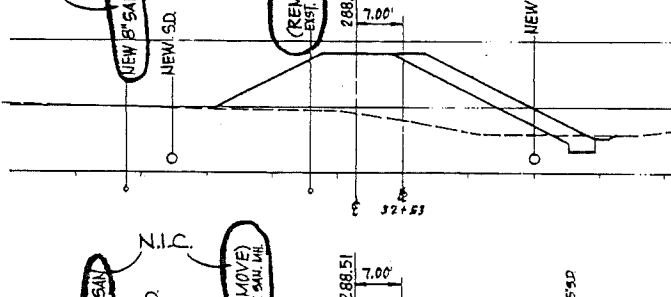
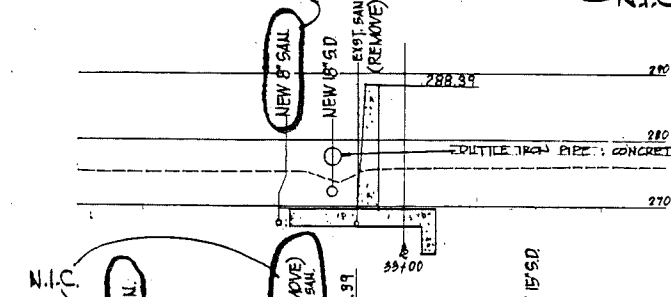
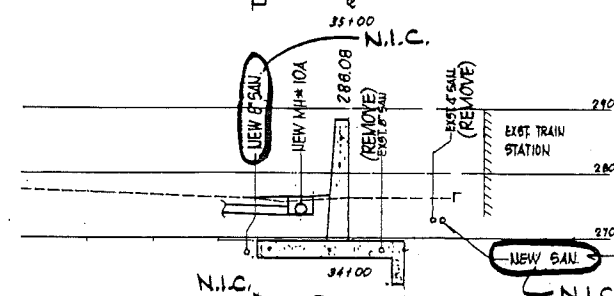
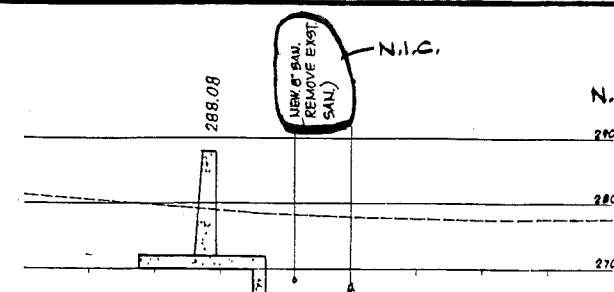
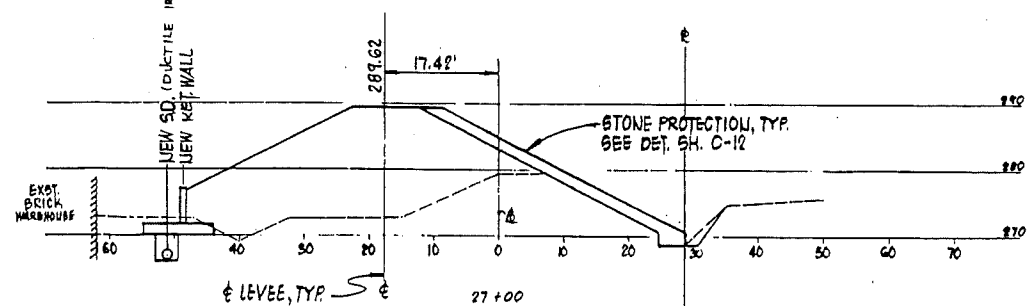
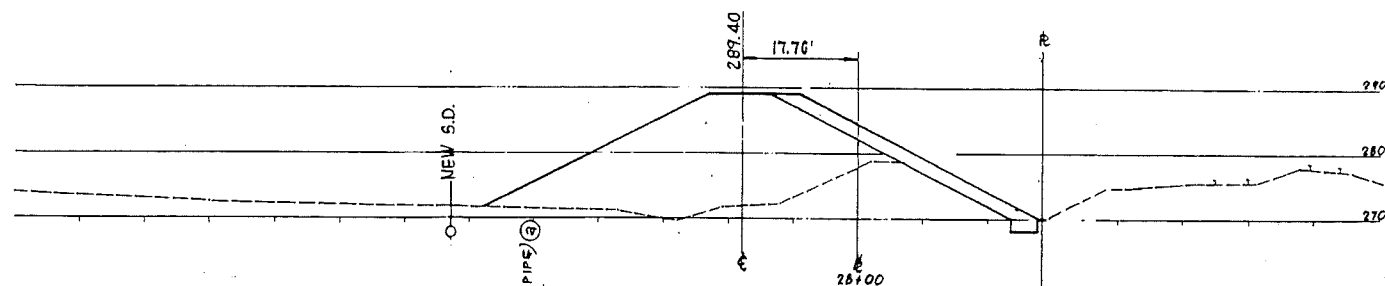
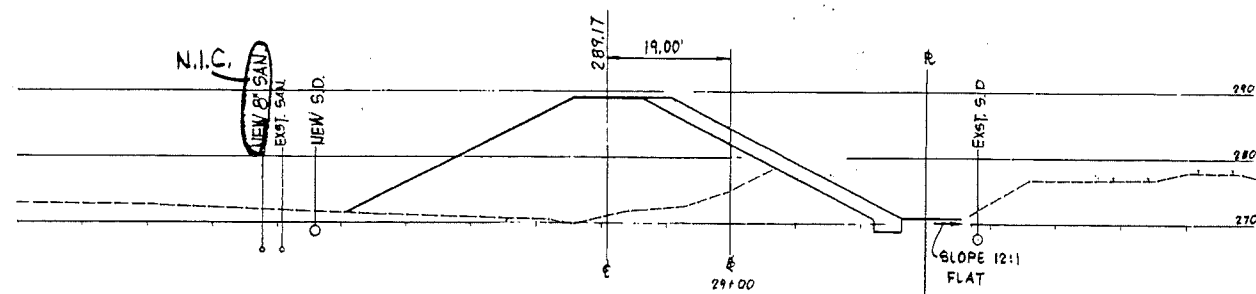
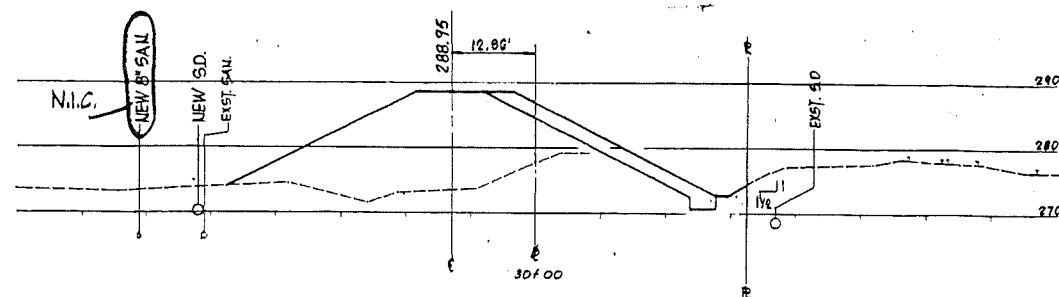
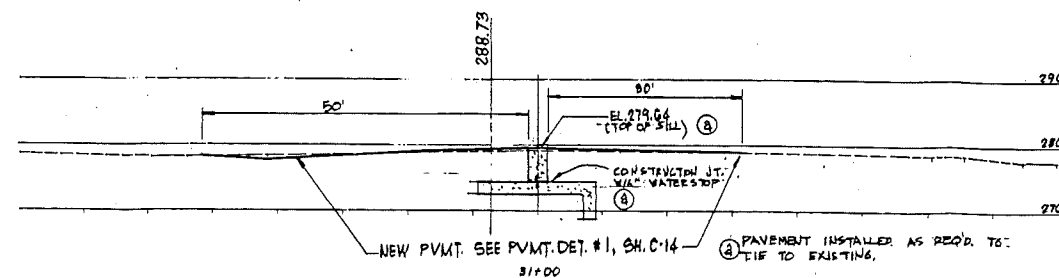
④ MOSTLY DESIGN
INFORMATION SHOWN



DESIGNED BY	REVIEWED BY	DATE	APPROVED BY
REVISIONS	REVISIONS	REVISIONS	REVISIONS
MATTEN AND CHAIR CONSULTING ENGINEERS		DEPARTMENT OF THE ARMY ENGINEERING DISTRICT, OFFICE OF ENGINEERING SCOTTSDALE, ARIZ.	
FLOOD PROTECTION FACILITIES TOWN OF SCOTTSDALE, VIRGINIA			
CROSS SECTIONS STA. 22+75 TO STA. 26+00			
SCALE	AS NOTED	PROJECT NO.	2107A
DATE	1 MAY 1985	DESIGNED BY	C-19

AS BUILT - UNCORRECTED

ENGINEERING DISTRICT FILE NO. H-29-21-68 (18) K



NOTES:

N.I.C.

1. SAN. SEWER REMOVED UNDER LEVEE AND FLOODWALL SHALL HAVE ITS TRENCH BACKFILLED W/ COMPACTED EMBANKMENT MATERIAL.
2. ALL BACKFILL ON BOTH SIDES OF FLOODWALL SHALL BE EMBANKMENT MATERIAL.

MAIN S.S. COLLECTOR LINE NOT INSTALLED ALONG FRONT (S) SIDE OF TRAIN STATION

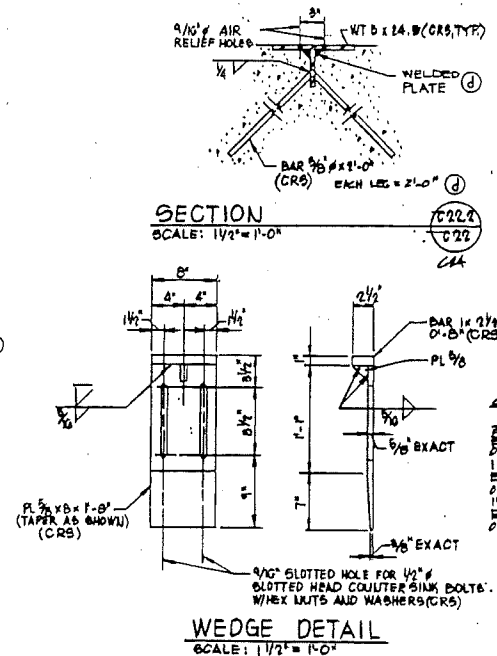
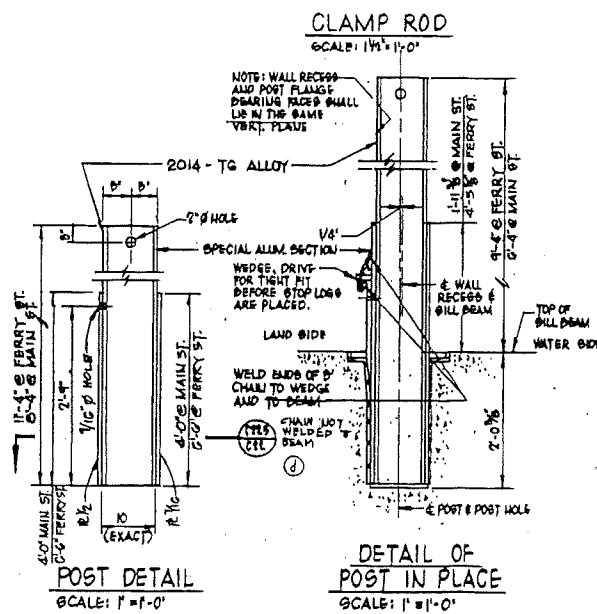
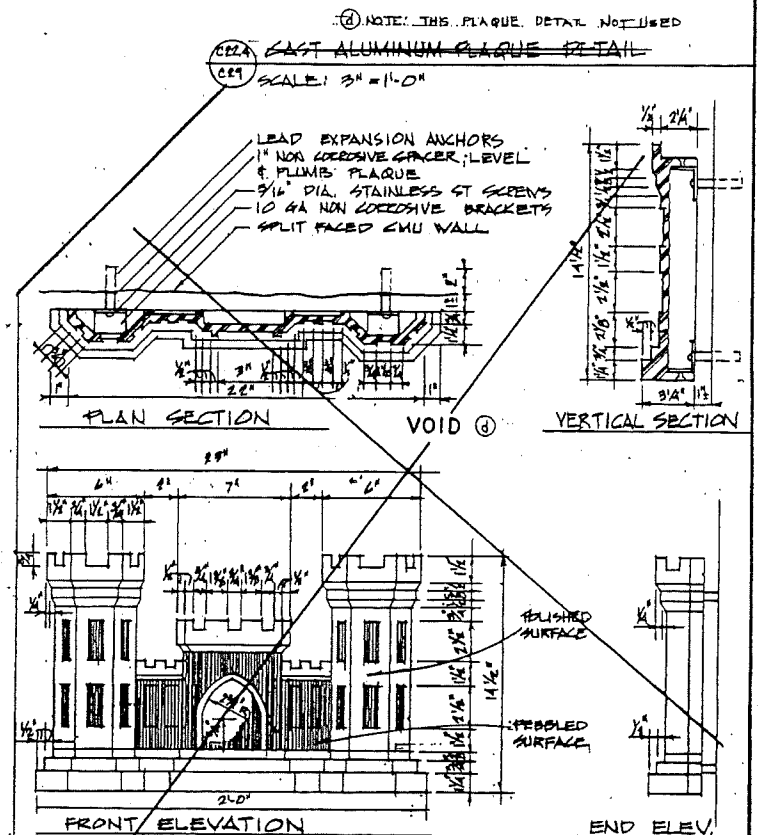
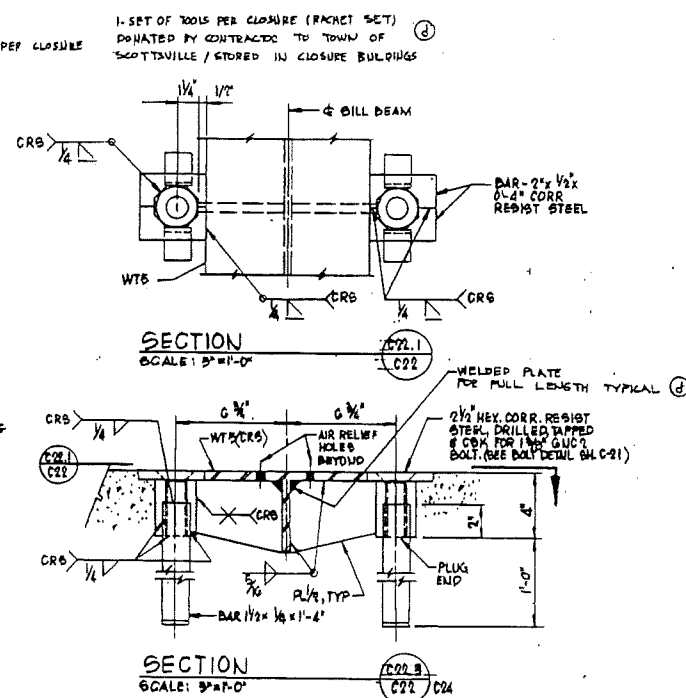
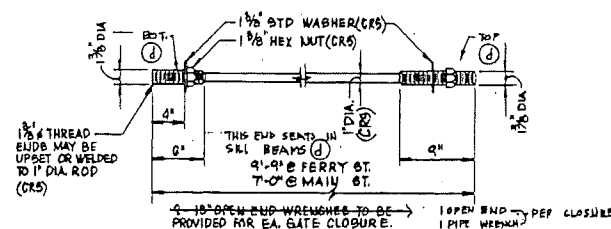
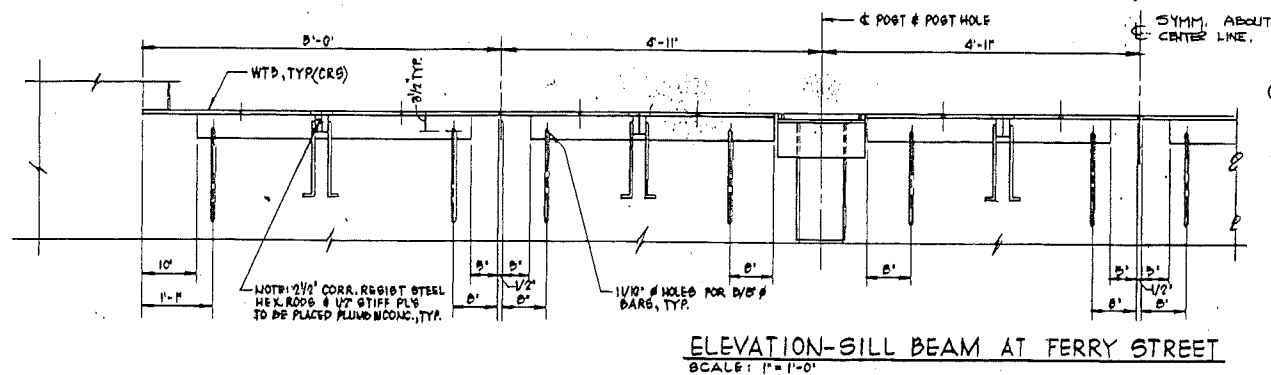
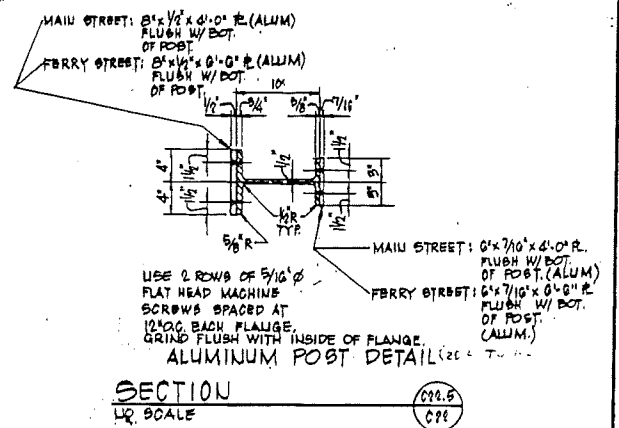
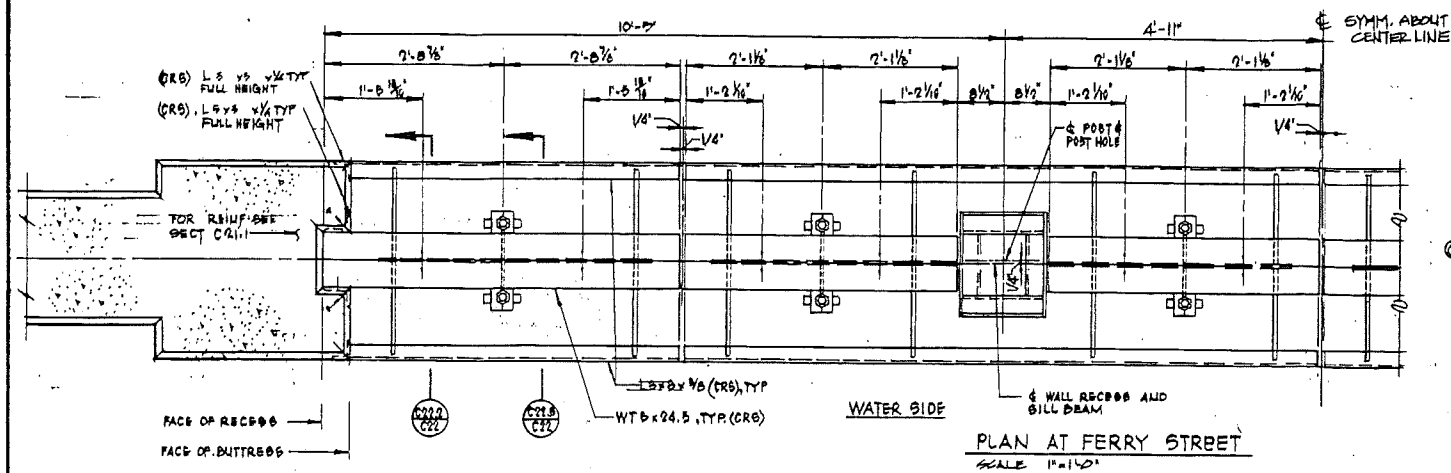
② MOSTLY DESIGN INFORMATION SHOWN

MATTEN AND CRAIG CONSULTING ENGINEERS		DEPARTMENT OF THE ARMY ENGINEERING DISTRICT, SCOTTSDALE, ARIZONA	
FLOOD PROTECTION FACILITIES TOWN OF SCOTTSDALE, VIRGINIA			
CROSS SECTIONS STA. 27+00 TO STA. 35+00			
SCALE AS NOTED	NO. OF SHEETS 2107A	DESIGNER C-20	DATE 1 MAY 1988

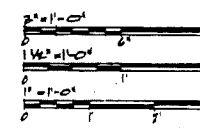
AS BUILT

MICROFILMED

ENGINEERING DISTRICT FILE NO. H-29-21-68 (D)

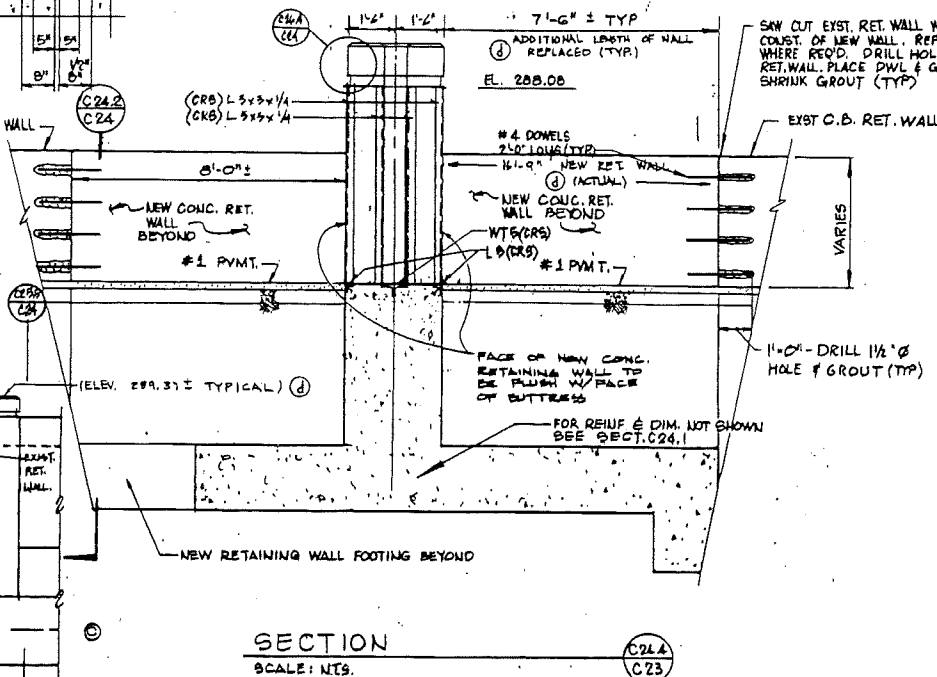
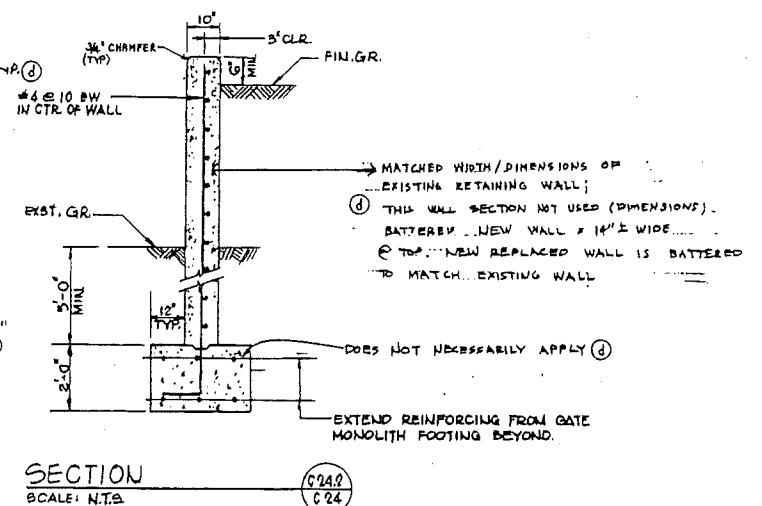
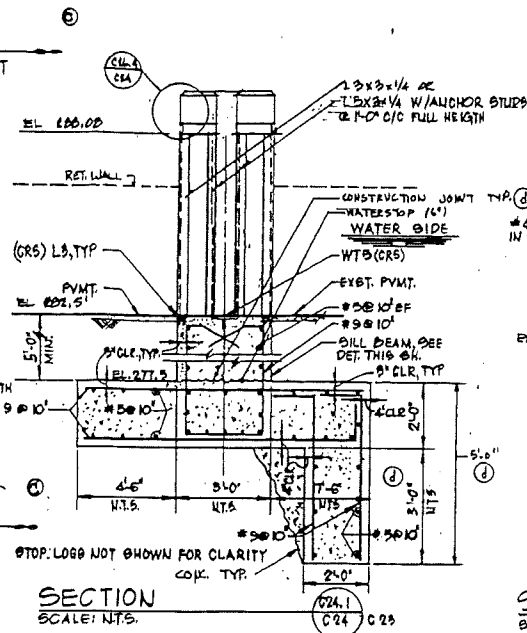
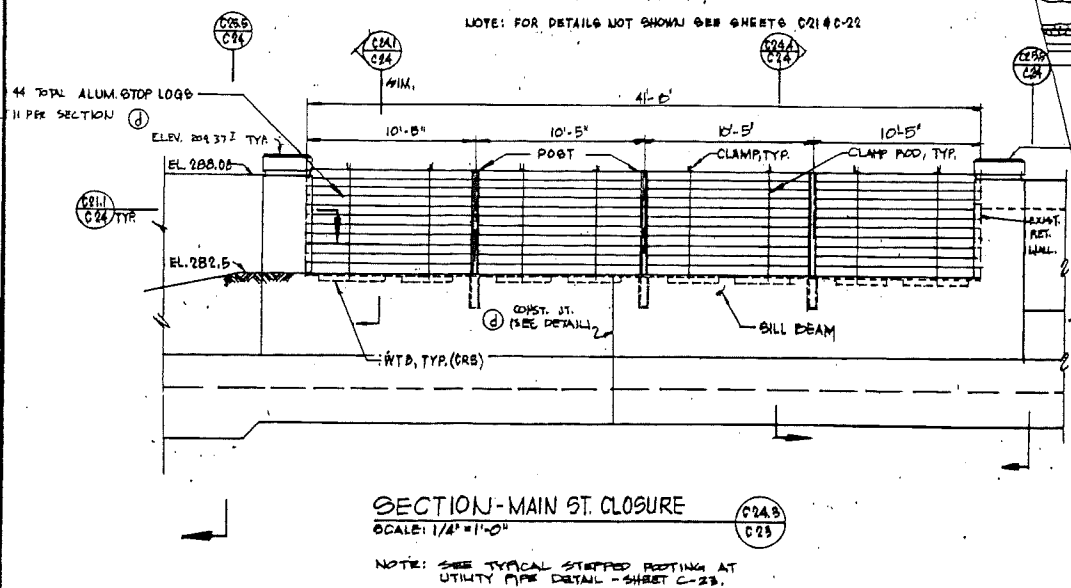
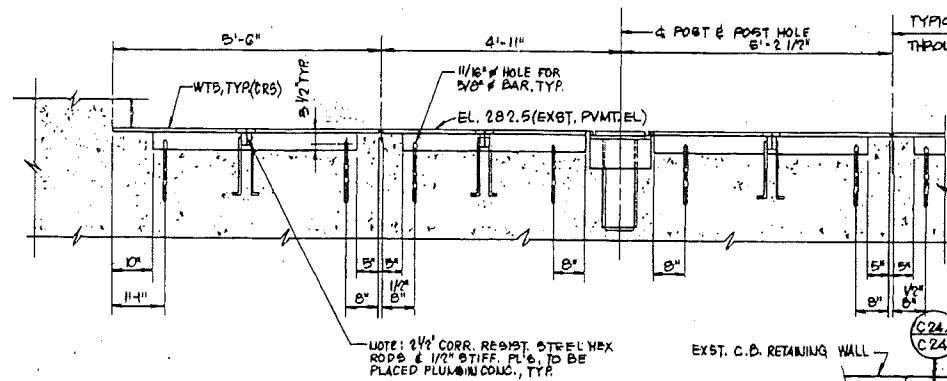
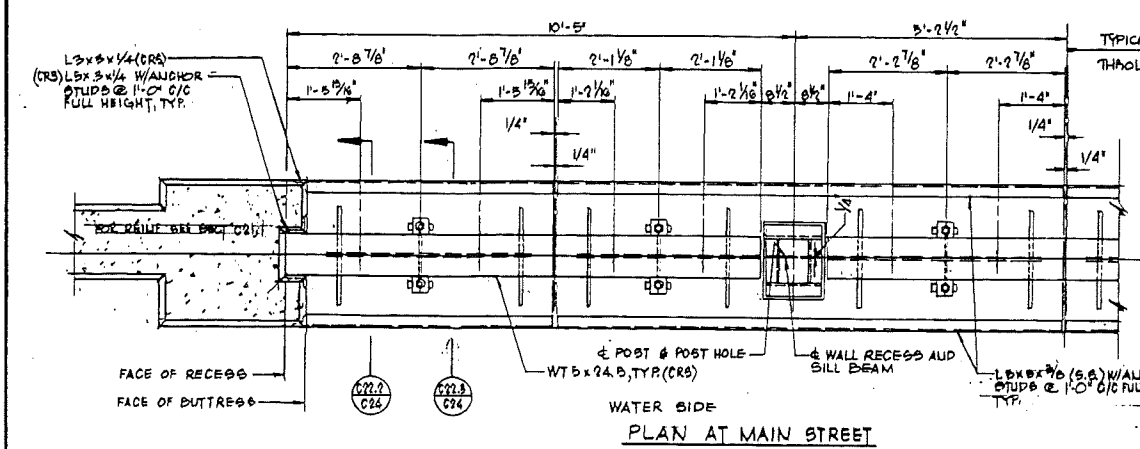


GRAPHIC SCALES



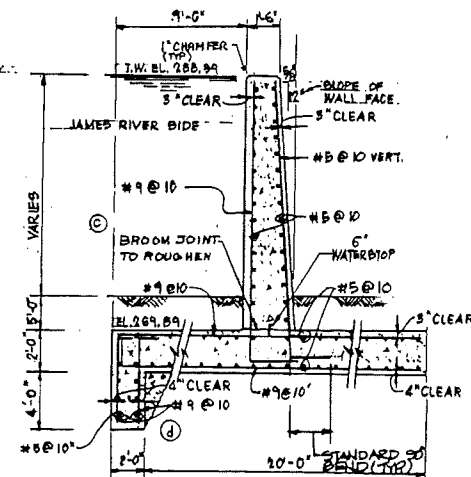
0	REVISED AS BUILT	S.W.
1	1-1-80 REV. GENERAL GEOMETRY	ARR
2	1-1-80 REV. POST DETAIL	ESM
3	1-1-80 REV. PLAQUE & BUTTRESS	BY ADM
MATTEN AND CRAIG CONSULTING ENGINEERS		
DEPARTMENT OF THE ARMY ENGINEER DISTRICT, BARRACKS OF PROGRESS SCOTTSDALE, ARIZ.		
FLOOD PROTECTION FACILITIES TOWN OF SCOTTSDALE, VIRGINIA		
CLOSURE DETAILS		
AS NOTED	2107A	1-1-80
1 MAY 1985		C-22





NOTE: CONCRETE WK. MAT. WAS UTILIZED BELOW BOTTOM OF FOOTER ON NUMEROUS OCCASIONS FOR FLOODWALL AREAS

11-4-40	REVISED AS BUILT	J.V.
3-11-44	REV. CLARIFY GEOMETRY	J.V.
1-20-46	REV. FOOTING	J.V.
11-11-47	BUTTERFLY DETAILS	J.V.
MATTEN AND CRAIG CONSULTING ENGINEERS		DEPARTMENT OF THE ARMY
FLOOD PROTECTION FACILITIES		TOWN OF SCOTTSVILLE, VIRGINIA
CLOSURE DETAILS		
AS NOTED	NO. 2107A	2107A
MAY 1965		C-24

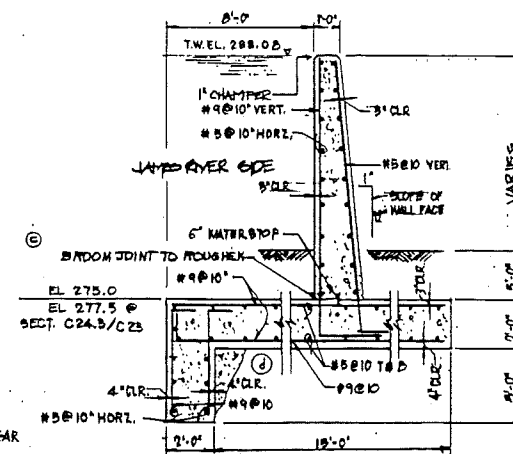


SECTION

NO SCALE:
STA. 34+29 TO STA. 35+11

SECTION

NO SCALE
STA. 32+59 TO STA. 34+29



SECTION
NO SCALE

25.5
C23 C24

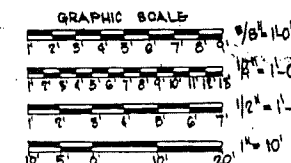
TYPICAL FOOTING STEP DETAIL
NO. 8 SCALE

- FOR PUMP STATION FOOTERS ONLY
- (d) FOR FLOODWALL FOOTER STEP DETAIL
DESIGN CHANGE IS ATTACHED

SECTION

SCALE: 1/2" = 1'-0"

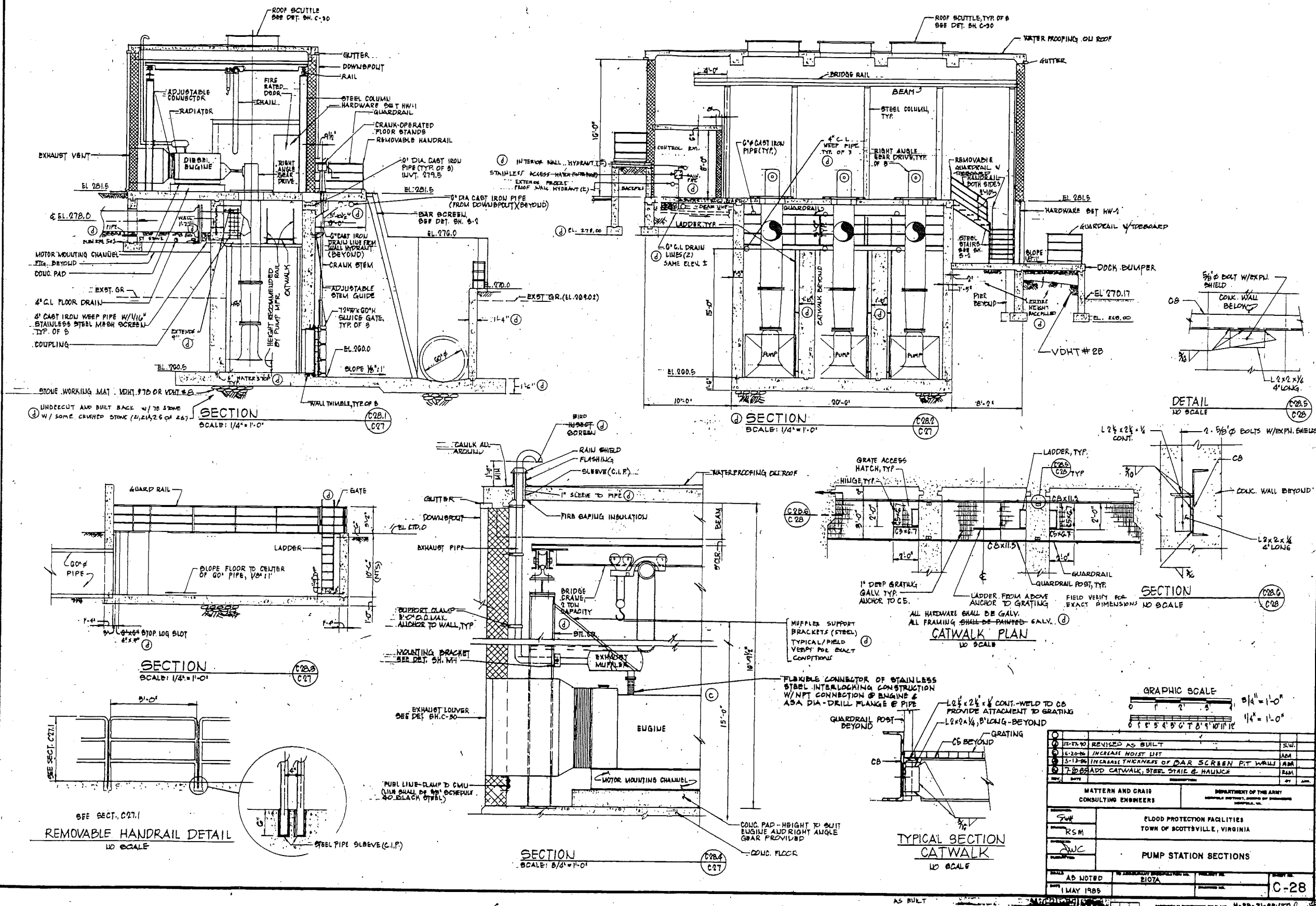
- FASTER EXTENDED REQUIRED
(d) LENGTH TO EXPOSE
SPECIAL DESIGN D.I.
(M.G./NOS. REBAR)
WIDTH / LENGTH OF EXTENSION
VARIES

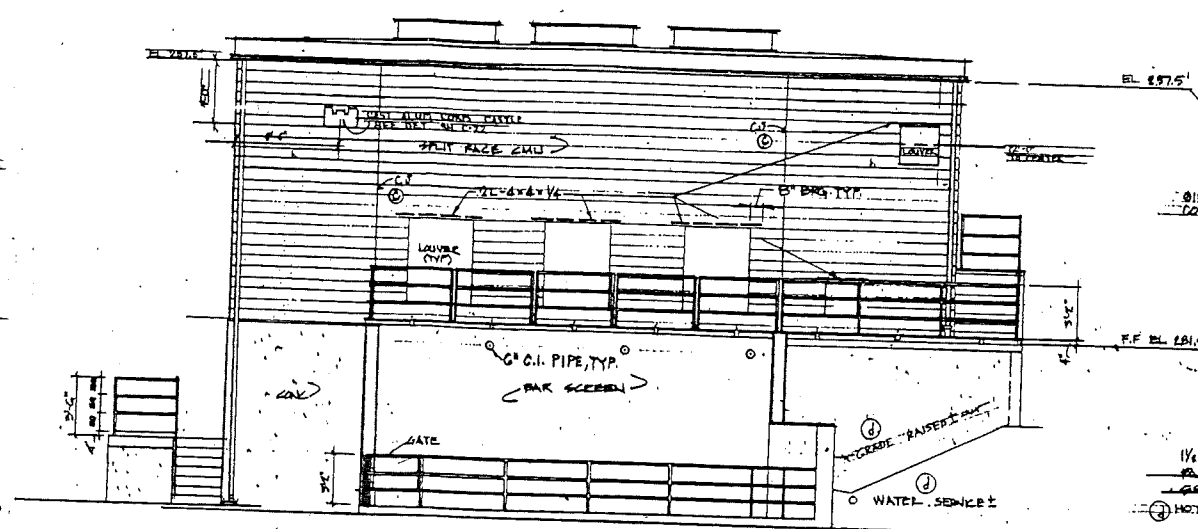


Q									
Q	10-10-90	REVISED AS BUILT							SW
Q	6/10/98	CONSTRUCTION JOINT REV.							ABA
Q	10/10/98	IN ACCORDANCE W/ AMENDMENT NO. 2							FM
Q	7-12-95	REV. SUT CES. 1, C23.2, C25.5, C25.3							SM
Rev.	Date	Description							DT
MATTEN AND CRAW CONSULTING ENGINEERS			DEPARTMENT OF THE ARMY WATTSVILLE DISTRICT, OFFICE OF DISTRICT ENGINEER WATTSVILLE, VA.						
Signature <i>Scott</i>	FLOOD PROTECTION FACILITIES TOWN OF SCOTTSVILLE, VIRGINIA								
Signature <i>RSM</i>									
Signature <i>WJC</i>									
Signature <i>WJC</i>	FLOOD WALL AND RETAINING WALL SECTIONS								
DATE	PROJECT NO.		PROJECT NO.		PROJECT NO.		PROJECT NO.		PROJECT NO.
DATE	1 MAY 1985		2107A						C-25









NORTH ELEVATION

SCALE 1/4" = 10'

SCALE 1/4" = 1'-0"

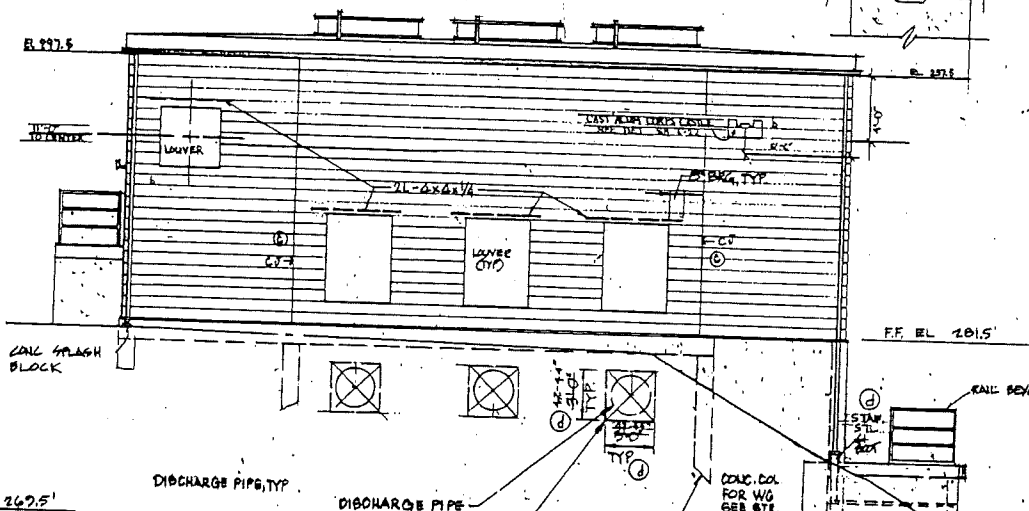
- ~~JOINT REINF. EVERY~~
~~OTHER BLOCK/COURSE TYPE~~

SCALE 1/4" = 1'-0"

-

TYPICAL CHAMFER DETAIL

16 SCAL

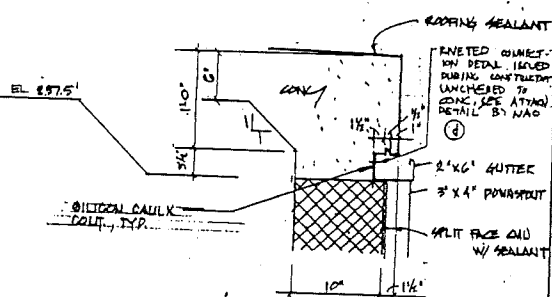


SOUTH ELEVATION

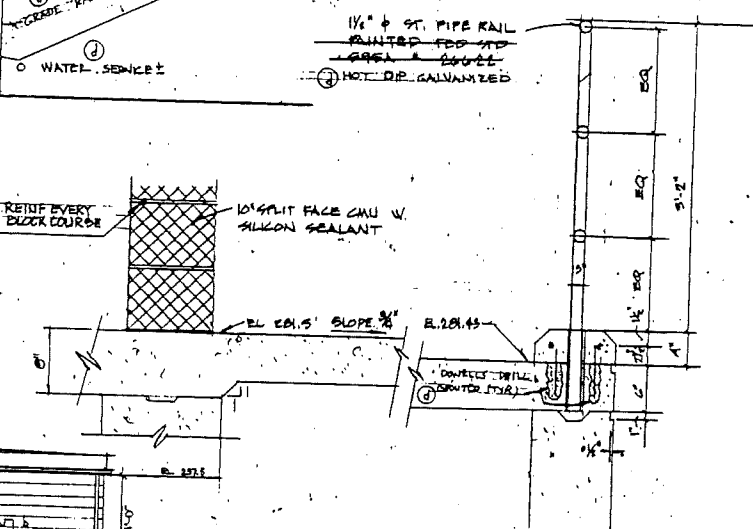
SCALE $1/4" = 1'-0"$

SCALE 1/4" = 1'-0"

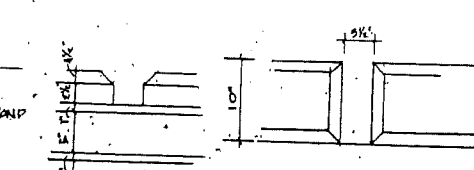
DOOR SCHEDULE						
SIZE	MATL	FRAME	RATING	HARDWARE	REMARKS	LOCATION
7'-0" x 3'-0"	GLW. STL	GLW. STL	---	HW-2	2-3'-0" x 7'-0" DOORS	① PUMP STATION
7'-0" x 3'-0"	"	"	FIRE RATED	HW-1	W/ CLOSER	② "
7'-0" x 3'-0"	"	"	---	HW-1		③ "
7'-0" x 3'-0"	"	"	---	PANIC	7'-0" x 3'-0" WINDOW	④ CHLORINE BLDG
7'-0" x 3'-0"	"	"	---	PANIC	BEE SH. C-10	⑤ "
7'-0" x 3'-0"	"	"	---	HW-1	2'-0" x 3'-0" LOUVER	⑥ STORAGE BLDG
7'-0" x 3'-0"	GLW. STL	GLW. STL	---	HW-1	BEE SH. C-26	⑦ "



SECTION _____ SCALE $1\frac{1}{2}'' = 10'$ (291)
(227)

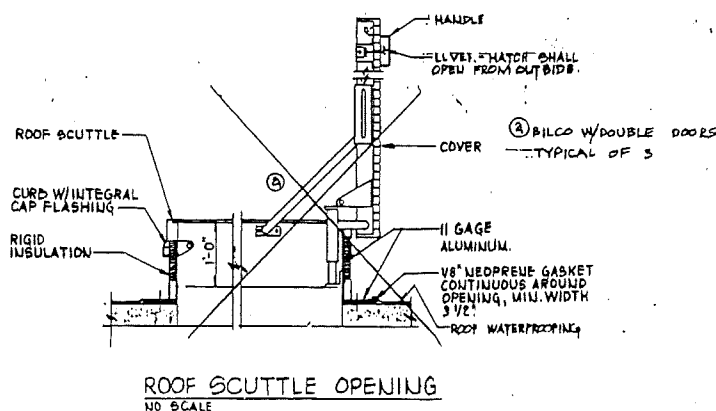
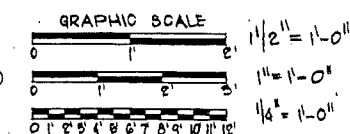
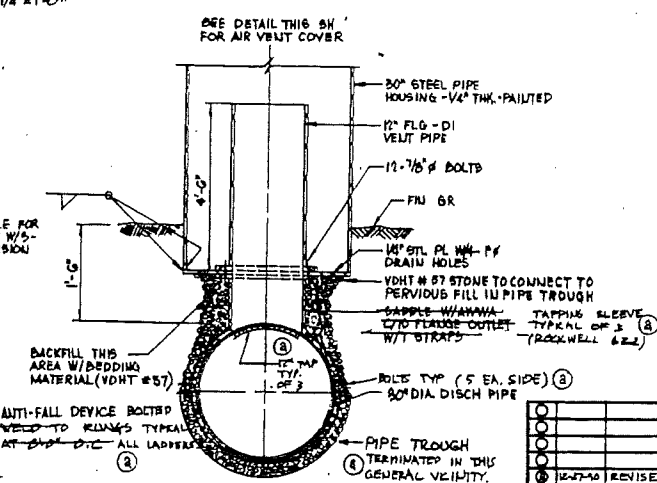
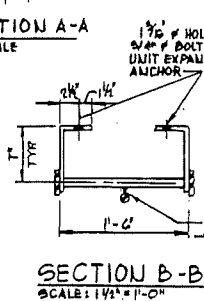
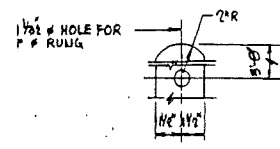
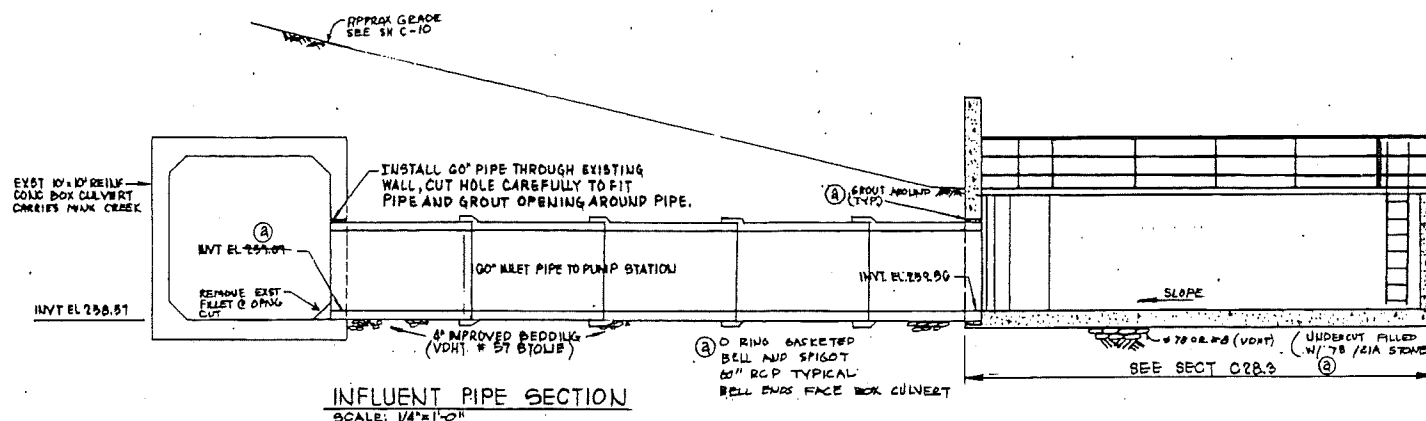
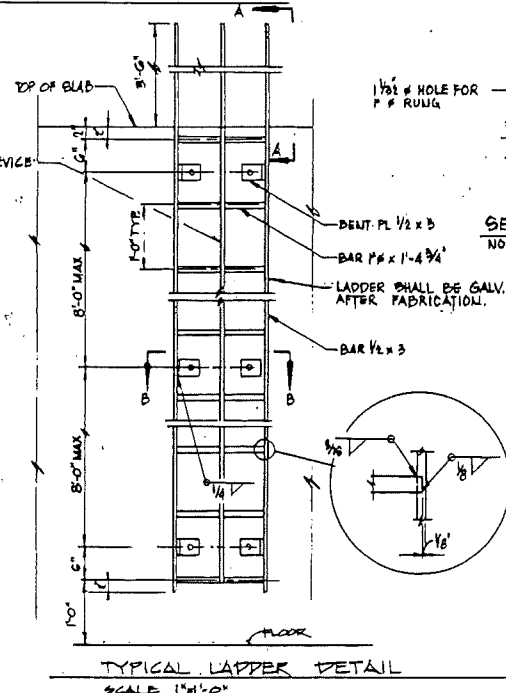
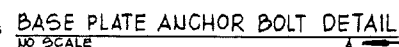
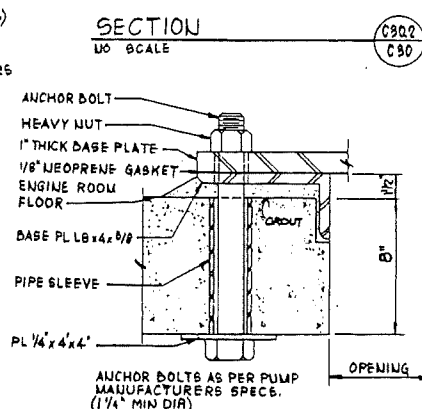
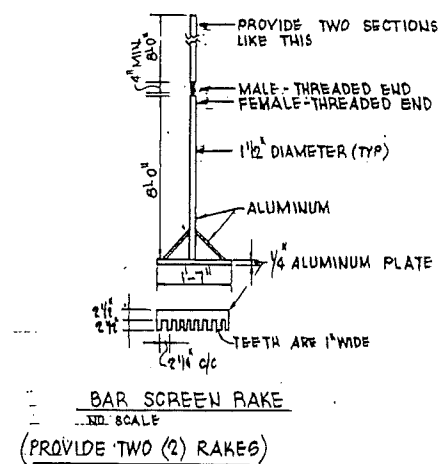


SECTION _____ SCALE $1\frac{1}{2}" = 1'-0"$

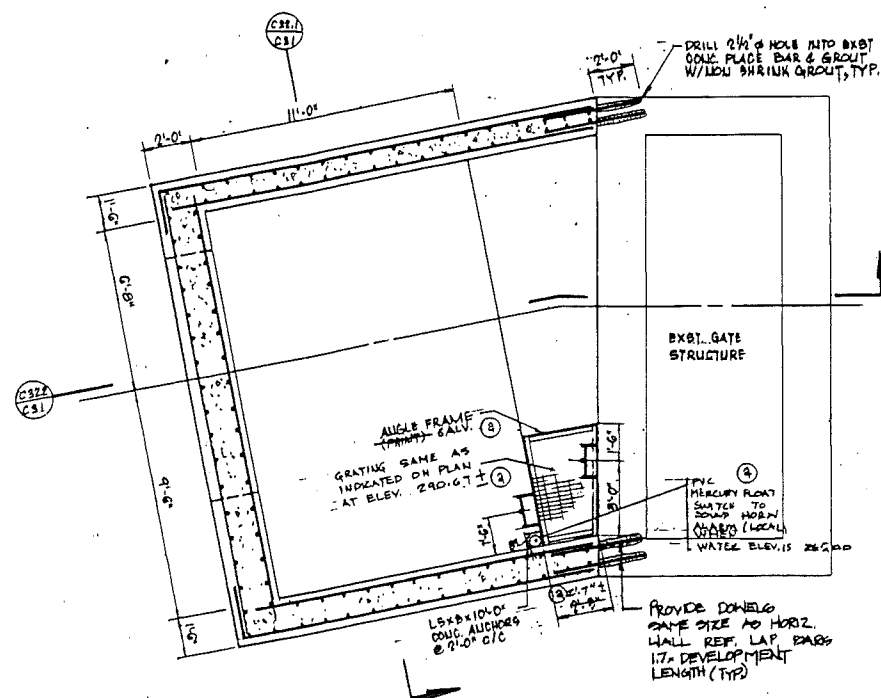


DETAIL SCALE 1/8" = 1'-0" (229)
(227)

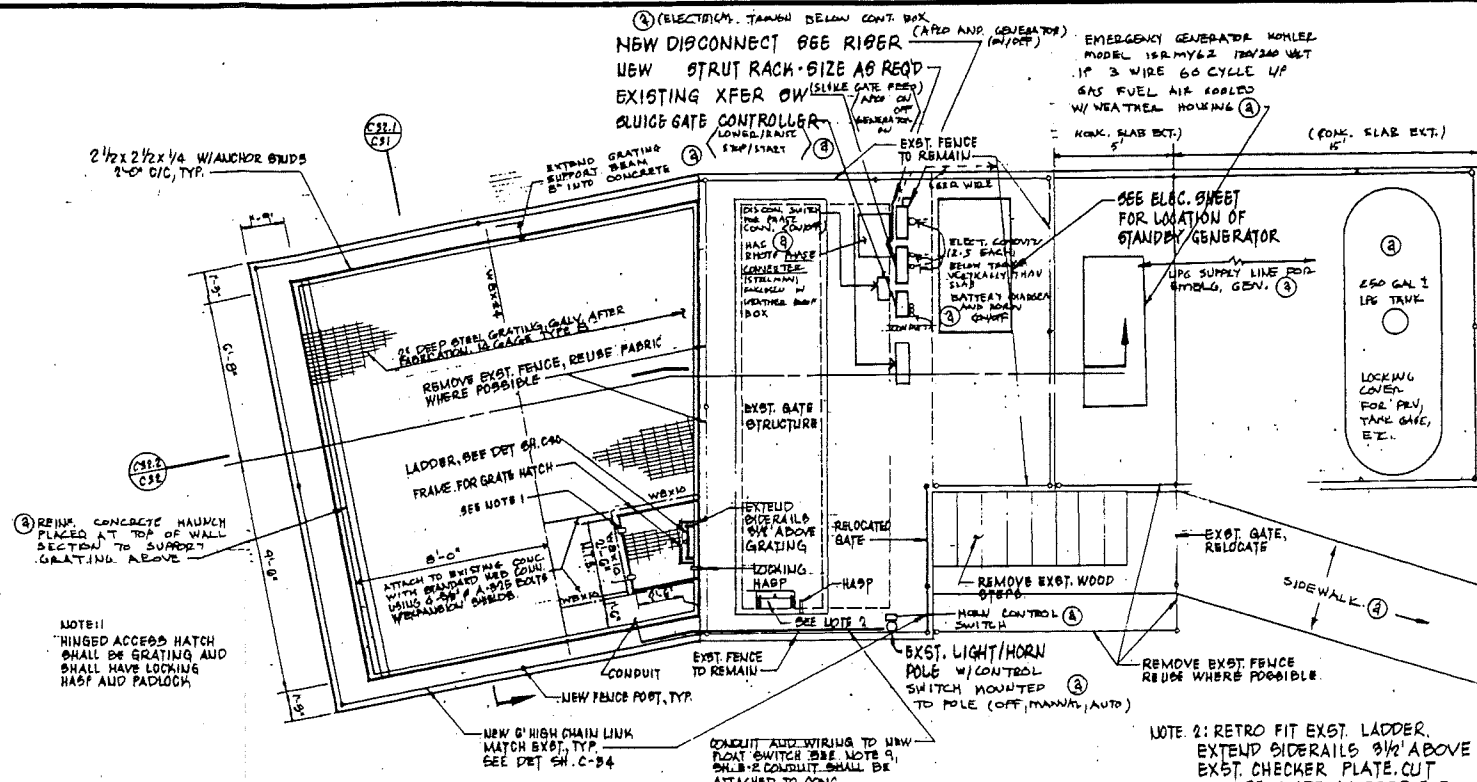
[illegible]



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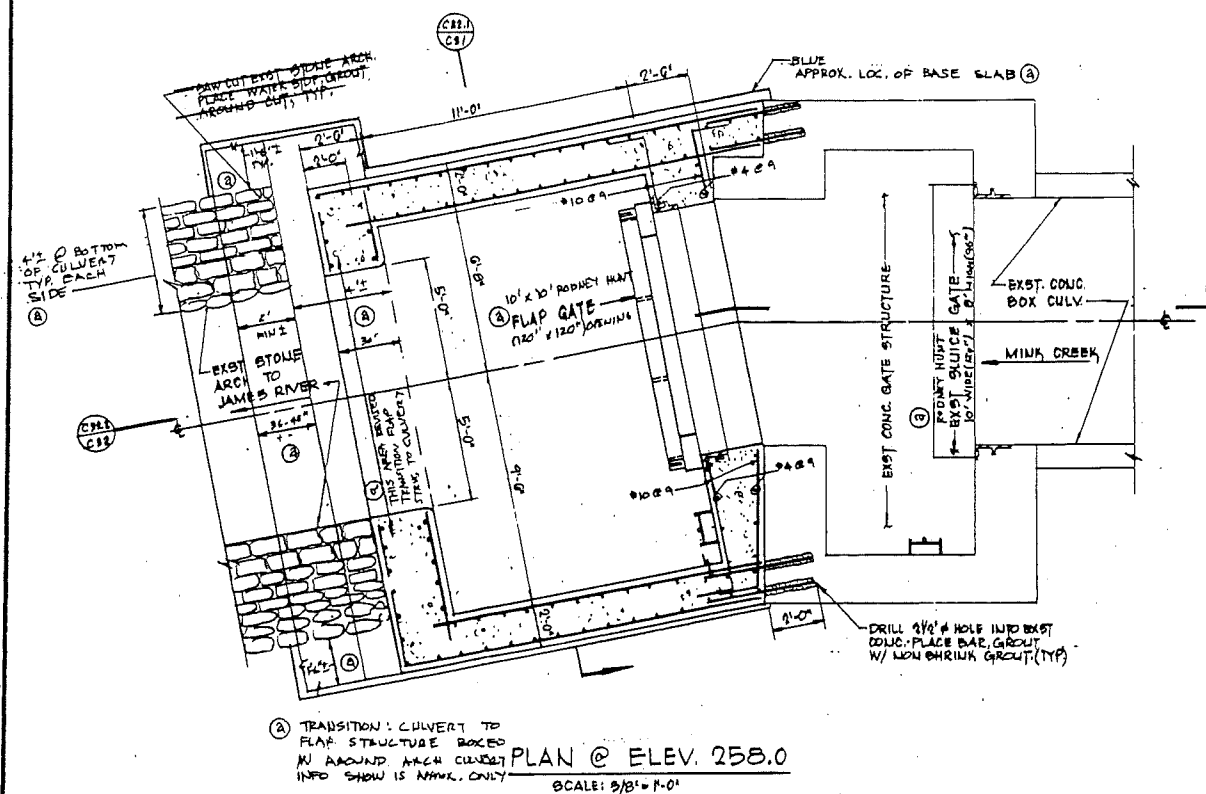


PLAN @ ELEV. 277.67
SCALE: 3/8" = 1'-0"

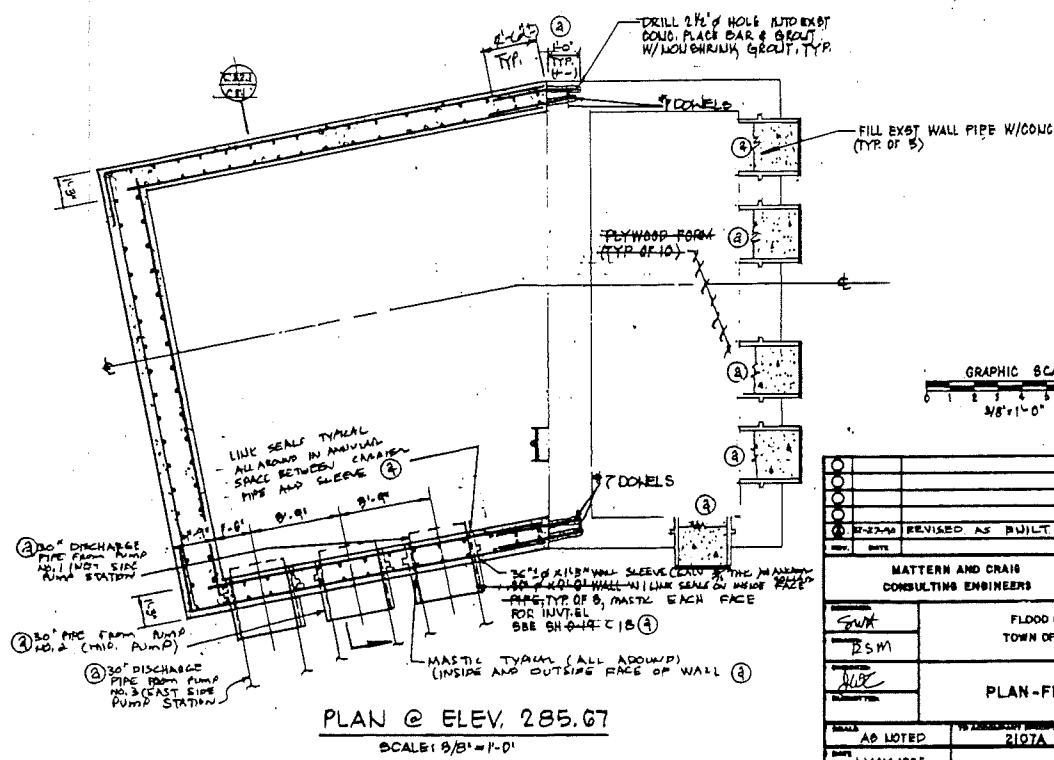


PLAN @ ELEV. 290.67
SCALE: 3/8" = 1'-0"

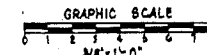
NOTE:
SEE SHEET NO. C-32
FOR REINFORCING
SIZE AND SPACING.



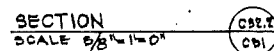
PLAN @ ELEV. 258.0
SCALE: 3/8" = 1'-0"



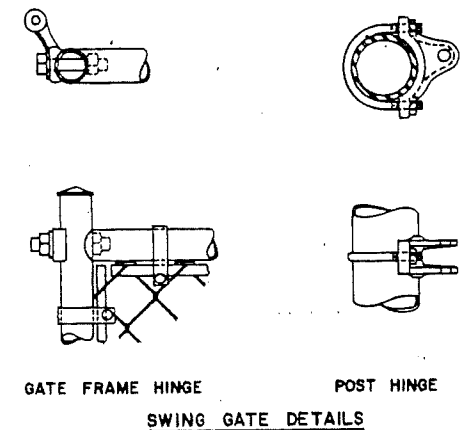
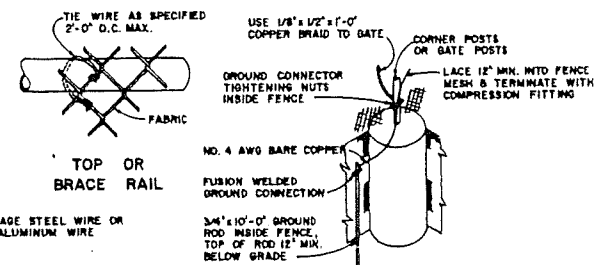
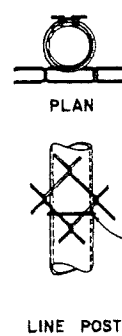
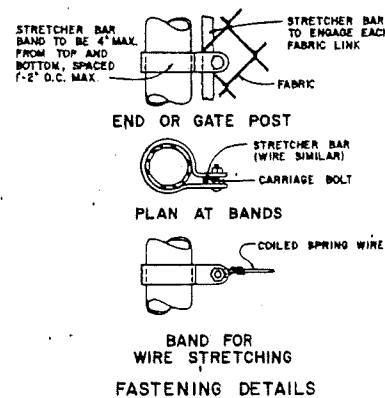
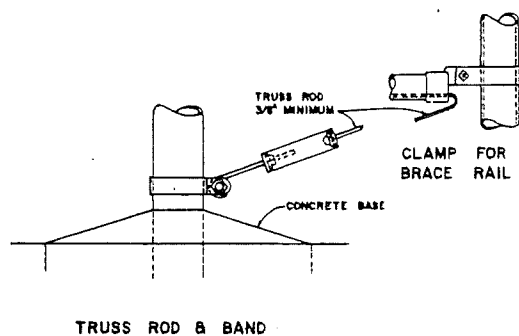
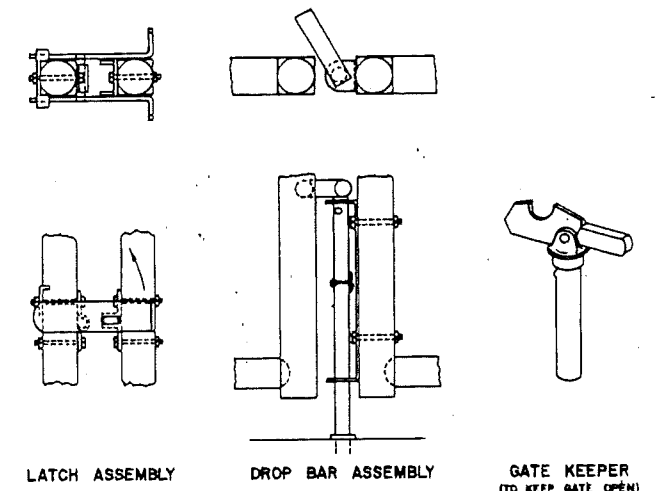
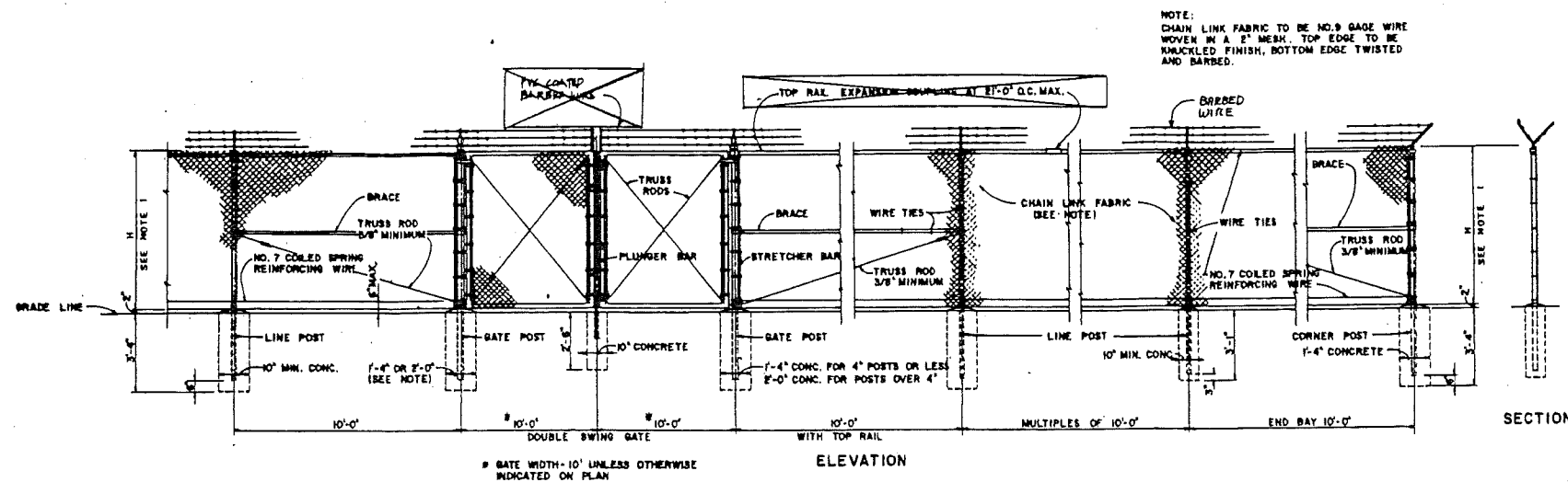
PLAN @ ELEV. 285.67
SCALE: 3/8" = 1'-0"



REVISION	DATE	BY	APP
1	10-22-60	REVISD AS BUILT	
MATTEN AND CRAIG CONSULTING ENGINEERS			
DEPARTMENT OF THE ARMY			
FLOOD PROTECTION FACILITIES			
TOWN OF SCOTTSVILLE, VIRGINIA			
PLAN-FLAP GATE STRUCTURE			
SCALE	AS NOTED	PROJECT NO.	2107A
DATE	MAY 1965	DESIGNED BY	
			C-31

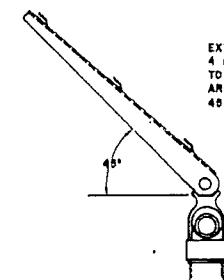
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FENCE DETAILS

NO SCALE



NOTES

1. 'H' INDICATES HEIGHT OF FENCE. SEE NOTES TO GUIDE SPECIFICATION CE-02711, (SPEC SECTION 2.01)
2. DETAILS ARE TO CLARIFY REQUIREMENTS BUT ARE NOT INTENDED TO LIMIT OTHER FENCE SECTIONS AND METHODS OF INSTALLATION SPECIFIED.

③ FENCE DETAILS SHOWN ARE DESIGN ONLY
THEY DO NOT NECESSARILY REPRESENT
AS-BUILT CONDITIONS / FENCE INSTALLED IS SIMILAR ONLY

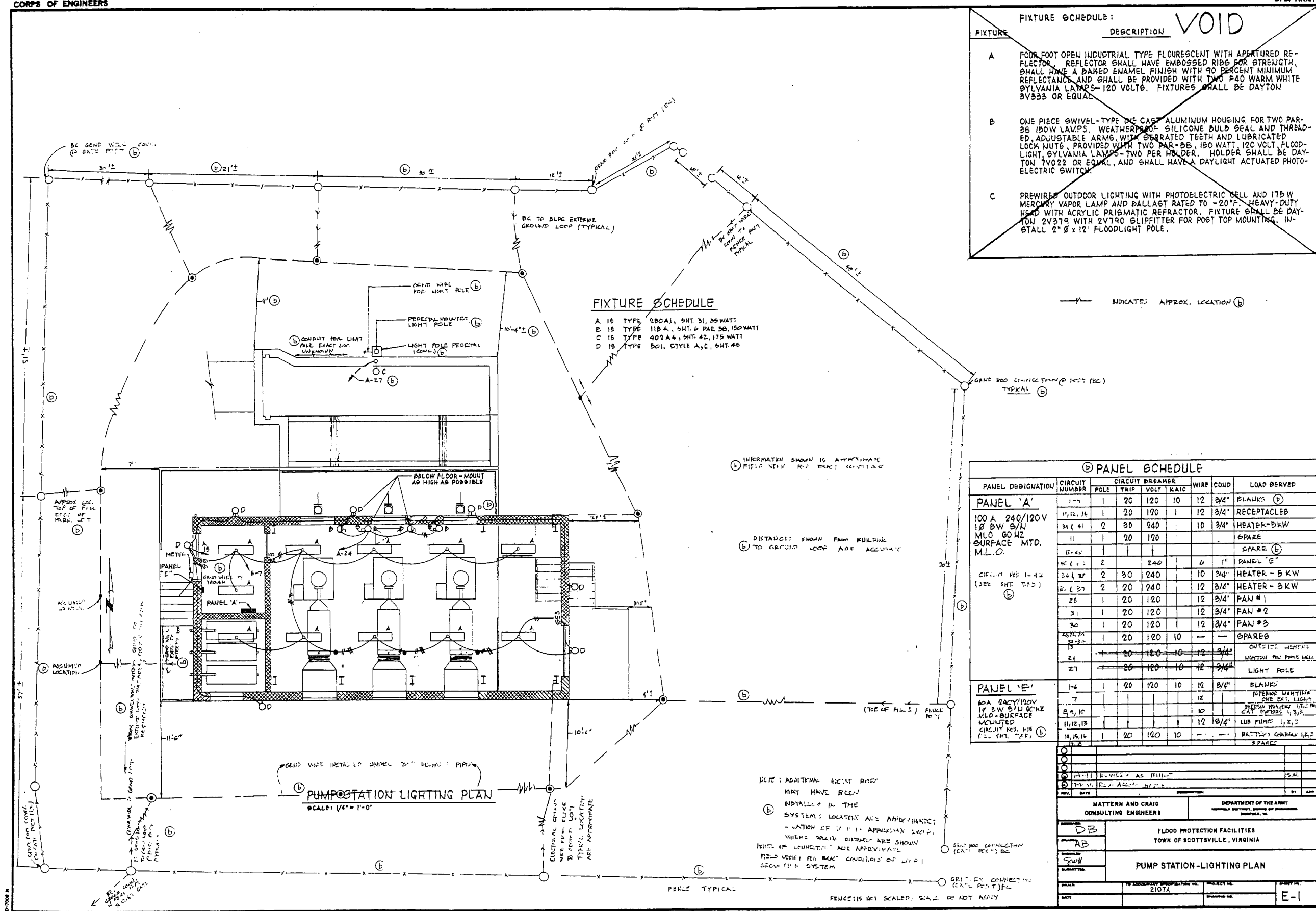


NO.	DATE	REVISION	BY
1	1 MAY 1988	REVISED AS BUILT	S.W.
MATTEN AND CRAIG CONSULTING ENGINEERS		DEPARTMENT OF THE ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS FORT MONROE, VA.	
FENCE DETAILS			
FLOOD PROTECTION FACILITIES TOWN OF SCOTTSVILLE, VIRGINIA			
NO. 0 SCALE	NO. 2107A	NO. 0 SCALE	NO. 0 SCALE
DATE 1 MAY 1988	NO. 2107A	NO. 0 SCALE	NO. 0 SCALE
			C-34

AS BUILT

MICROFILMED

NORFOLK DISTRICT FILE NO. H-29-21-68 (33)





1. ALL CONNECTIONS FOR GROUNDING SYSTEM SHALL BE BY EXOTHERMIC GROUNDING CONNECTION METHOD. NO SOLDER CONNECTIONS WILL BE ALLOWED.
2. GROUND LOOP SHALL BE CONTINUOUS BARE COPPER (BC) W/ NO SPLICES. SEE NOTE 4 FOR SIZE.
3. INSTALL $\frac{1}{2}$ " ϕ x 8'-0" L GROUND ROD. GROUND CONDUCTOR TO GROUND ROD. - $\frac{1}{4}$ " ϕ GROUND RODS USED (b)
4. *B.C. GROUND CONDUCTOR. MINIMUM DEPTH 2'-6" BELOW FIN. GRADE.
5. GROUND TO COLUMN. RUN *B.C. GROUND CONDUCTOR ^{#2 STRANDED/INSULATED AND #2 SOLID COPPER USED IN VARIOUS AREAS.} BELOW SLAB & CONNECT TO GROUND LOOP WITH (b)
6. EXOTHERMIC GROUNDING CONNECTION.
#2 STRANDED (HEATED)
7. *B.C. GROUND CONDUCTOR - CONNECT TO MOTOR FRAME. ROUTE TO COLUMN THRU BUILDING STRUCTURAL SYSTEM. (TYPICAL FOR 3 MOTORS).
8. GROUND BUILDING SERVICE AT METER AND ~~RUN *B.C. TO GROUND LOOP.~~ DISCONNECTED NOT AUTHORIZED BY PWR CO / ROUTED TO TROUGH INSIDE. (b) CONTROL ROOM
9. GROUND SERVICE GATE SERVICE. CONNECT & SERVICE WIRE WAY & RUN *B.C. TO GROUND LOOP. #2 STRANDED (b)
10. *B.C. TIE BETWEEN COLUMNS. #2 SOLID (b)
11. *B.C. GROUND CONDUCTOR FROM FENCE TO BLDG. GROUND LOOP.
12. TIE GATE TO FENCE W/ #4 AWG WELDING CABLE BETWEEN GATE POST & FENCE POST.

GENERAL NOTES

- A. THE CIRCUIT NUMBERS ARE FOR IDENTIFICATION PURPOSES AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECTLY PHASING THE CIRCUITS IN THE PANEL. HOME RUNS OF SIMILAR SINGLE-PHASE CIRCUITS MAY BE COMBINED IN ONE CONDUIT WITH A COMMON NEUTRAL, ON COMPLETION OF THE BUILDING, THE CONTRACTOR SHALL BALANCE THE PANEL LOAD UNDER NORMAL OPERATING CONDITIONS.
- B. HORSEPOWER RATINGS SHOWN ARE APPROXIMATE. CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND INSTALLING THE REQUIRED ACCESSORIES, INCLUDING PANELBOARD ELEMENTS, MOTOR CONTROLS AND WIRING FOR THE MOTOR SIZES INSTALLED.
- C. ALL EQUIPMENT, SUCH AS STARTERS, RELAYS, CONTACTORS, SWITCHES, PANELS, AND OTHER APPURTENANCES SHALL HAVE IDENTIFICATION PLATES OF LAMINATED PLASTIC WITH 1/2" WHITE LETTERS. PANELS IN FINISHED AREAS SHALL HAVE PLATES MOUNTED ON INSIDE OF DOOR OVER PANEL DIRECTORY; OTHERWISE, PLATES SHALL BE MOUNTED ON FRONT OF EQUIPMENT. FASTEN PLATES WITH FOUR SCREWS.
- D. THE NUMBER OF WIRES MAY NOT BE INDICATED FOR ALL CIRCUITS, ONLY THOSE WHERE CLARIFICATION IS NECESSARY. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL WIRES NECESSARY FOR THE PROPER FUNCTION OF THE SYSTEM, WHETHER INDICATED ON PLANS OR NOT.
- E. ALL TYPE "A" FIXTURES SHALL HAVE 120 VOLT BALLASTS.
- F. SEE SHEET C-7 FOR PUMP STATION SITE PLAN.

NOTE: INTERIOL GROUNDING SYSTEM WAS
ROUTED IN VARIOUS LOCATIONS - FIELD
VERIFY FOR EXACT CONDITIONS.

(INTERVIEW GROUPING) $\rightarrow$ NO. OF CONNECTIONS TO COLUMN SHOWN; FIELD VERIFICATION OF GRID SYSTEM WOULD BE REQUIRED

(b) ALL PANEL SCHEDULE FOR
CIRCUIT NUMBERS WHICH ARE CHANGED

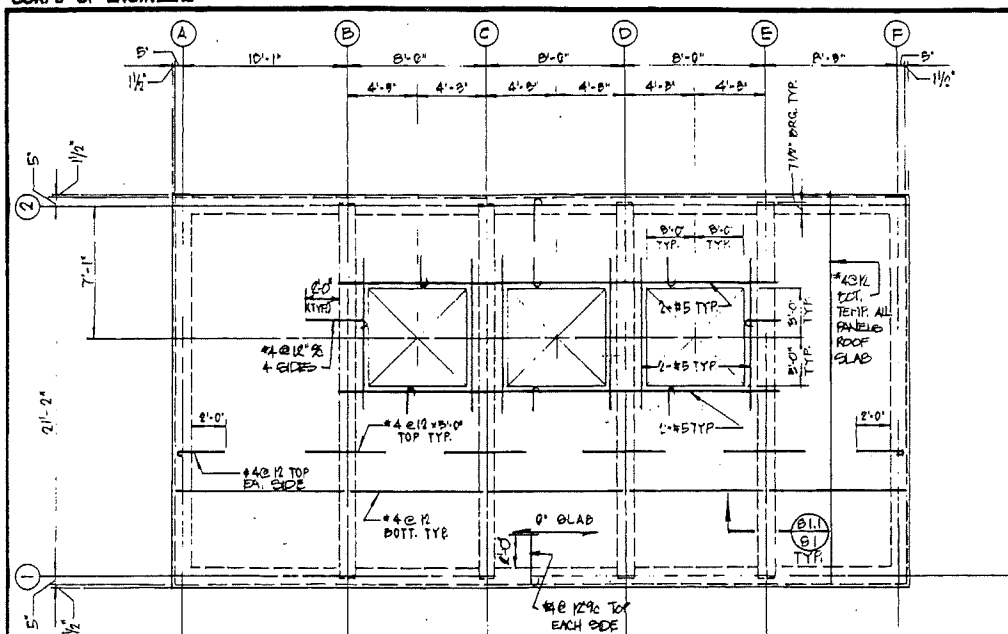
ELECTRICAL LEGEND		
SYMBOL	DESCRIPTION	NOT. HGT. ABOVE FIN. FL.
=====	CONDUIT IN WALL	---
-----	CONDUIT BELOW FLOOR OR IN FLOOR SLAB	---
-----	EXPOSED CONDUIT	---
→ ←	HOMERUN TO PANEL, ARROWS INDICATE NO. CKTS. HATCHMARKS INDICATE NO. OF CONDUCTORS	---
S	SINGLE-POLE SWITCH	4'-0"
⊕ WP	DUPLEX GROUNDING TYPE RECEPTACLE 'WP' INDICATES WEATHERPROOF COVER	1'-0"
⊕	MOTOR CONNECTION, NUMBER INDICATES APPROXIMATE HORSEPOWER, 'F' INDICATES FRACTIONAL HORSEPOWER	---
•	CONNECTION TO GROUND LOOP	---
⊙	GROUND ROD	---
Sm	MOTOR SWITCH WITH THERMAL OVERLOAD	---
□ A	1 x 4 FLUORESCENT FIXTURE (TYPE 'A')	14'-0"
⊕ B	BRACKET MID FIXTURE (TYPE 'B')	8'-0"
⊕ C	POLE: TYPE HIGH PRESSURE SODIUM (TYPE 'C')	---
⊕	DISCONNECT SWITCH-COMBINATION MOTOR STARTER- UNFUSED DISCONNECT SWITCH	---

ELECTRICAL NOTES:

1. CONDUIT TURNED UP IN THIS AREA (VERIFY EXACT LOCATION) FOR CONNECTION TO BATTERY CHARGER, IMMERSION HEATER, AND CRANKCASE HEATER ON CHGS. INDICATED. PROVIDE FLEXIBLE CONDUIT AS REQUIRED, FOR FINAL CONNECTIONS. TYPICAL FOR THREE (3). ALSO, LEVEL GAGE CONTROL WIRING
2. 2-PCLE ICC AMP 250 VOLT FUSIBLE DISCONNECT SWITCH IN NEMA-2R ENCLOSURE.
3. 2-PCLE 60 AMP 250 VOLT FUSIBLE DISCONNECT SWITCH.
4. 2-PCLE 30 AMP DISCONNECT SWITCH IN NEMA-3R ENCLOSURE (20A FUSE), FOR BATTERY CHARGER, CRANKCASE HEATER AND HCRN. TAP CNE PHASE AND NEUTRAL IN MANUAL TRANSFER SWITCH TO PROVIDE 120 V. CKT. OTHER PCLE OF DISCONNECT TO BE SPARE
5. THERMSTAT SUPPLIED BY MECHANICAL CONTRACTOR & INSTALLED BY ELECTRICAL CONTRACTOR.
6. COORDINATE ACTUAL LOCATIONS OF ALL FANS WITH MECHANICAL CONTRACTOR BEFORE CONNECTION.
7. INTERLOCK FAN WITH LIGHT SWITCHES @ ACCESS HATCHES, COORDINATE WITH MECHANICAL.
8. STUB 1" E.C. 5'-0" OUTSIDE CONC. SLAB. CAP CONDUIT & MARK LOCATION FOR FUTURE TELB. CONNECTION.
9. REPLACE EXST. HORN @ GATE STRUCTURE & BACK BOX. TIE INTO EXISTING FLOAT SWITCH CONTACTS.
10. SEE SPECS FOR LIGHTING FIXTURE SCHEDULE
11. NEW 60A 240V 2P 3W EMERGENCY TRANSFER SWITCH. MANUAL.

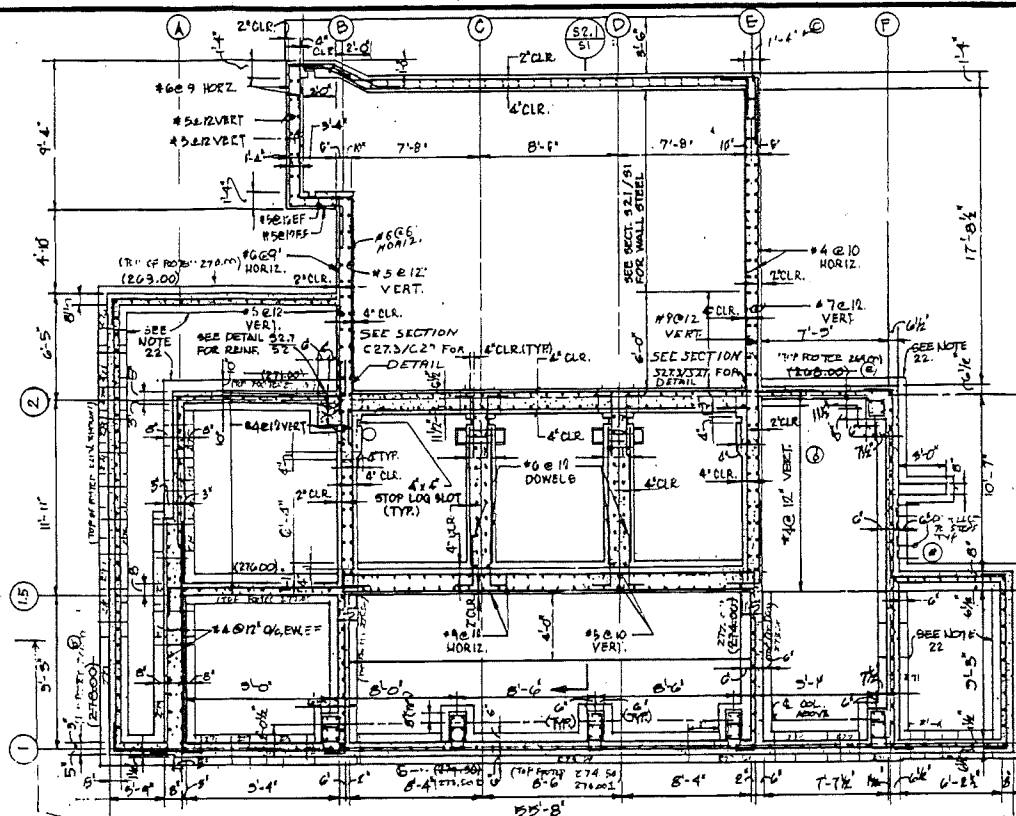
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NONPOLK DISTRICT FILE NO. H-29-21-68 (36)



ROOF FRAMING PLAN

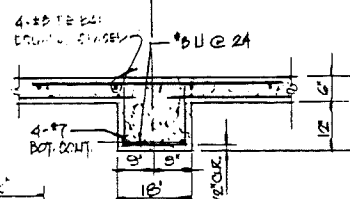
SCALE: 1/4" = 1'-0"



③ FOUNDATION PLAN

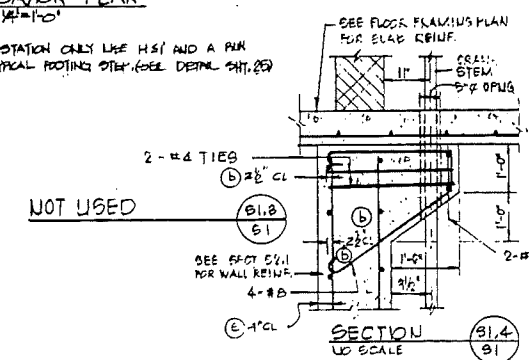
SCALE: 1" = 100'

NOTE : FOR PUMP STATION ONLY USE H.SI AND A RUN OF 2H (MIN) FOR TYPICAL FOOTING STEP. (SEE DETAIL SH. 25)



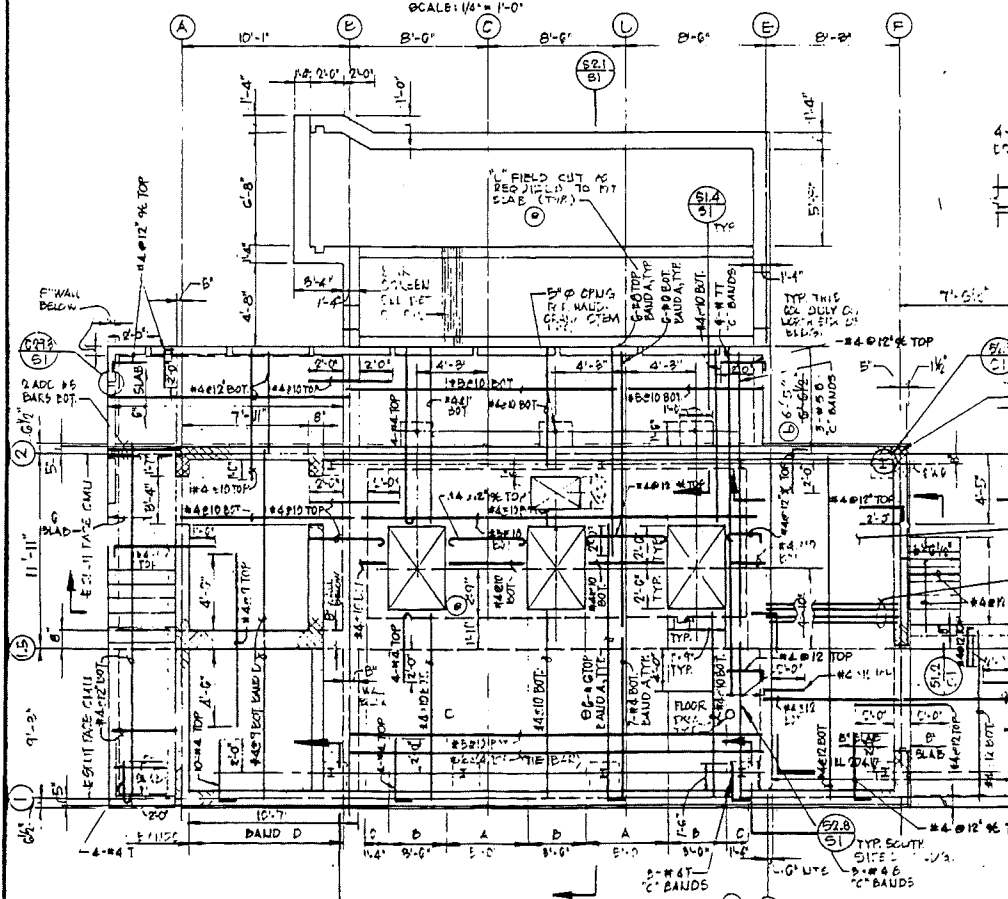
SECTION

SCALE: $3/4" = 1' - 0"$



SECTION
1000

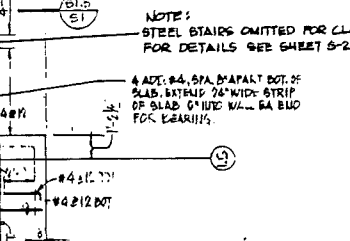
US SCALE



FLOOR FRAMING PLAN 281.5

SCALE: 1/4" = 1'-0"

NOTE: SEE SK C-27 & C-18 FOR DIM NOT SHOWN.
ALL EXTERIOR CORNERS SHALL BE FINISHED WITH SHAL.
ALL C-27 FOR TREADS & RISER DIM
ALL BLADE ARE 8" UNLESS OTHERWISE NOTED.



SECTION

SCALE: 1/2" = 1'-0"

ADDITIONAL KEYS: ABOVE C. & D. TYPE

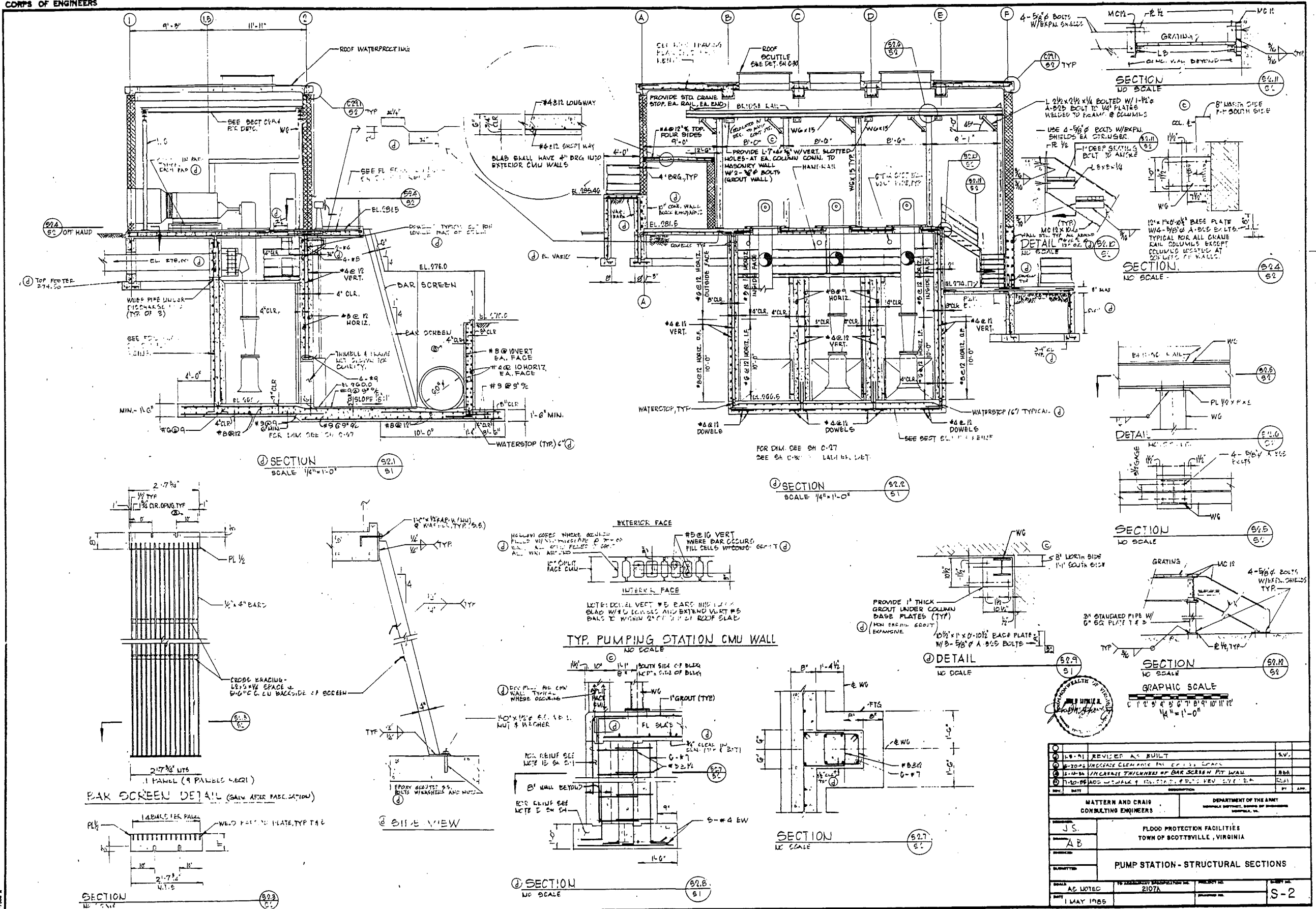
- GENERAL STRUCTURAL NOTES
1. FOOTINGS SHALL REST ON SOIL HAVING A BEARING CAPACITY OF 2000 LBS. PER SQ. FT. SEE TYPE NOTES FOR STEPPING OF FOOTING. SEE NOTE 22.
2. WHERE WALL FOOTINGS ENCOUNTER ROCK, EXCAVATE THE ROCK A MINIMUM OF 12" BELOW BOTTOM OF THE FOOTING AND FILL WITH SUITABLE FOUNDATION MATERIAL FROM THE SITE. THE FILL SHALL BE PLACED IN 6" LAYERS AND COMPACTED TO 95% DENSITY.
3. UNLESS OTHERWISE NOTED, ALL FLOOR SLABS OR GRADE SHALL BE 4" THICK AND SHALL BE REINFORCED WITH ONE LAYER OF #16/12, DWG.D. WELDED WIRE FABRIC.
4. SEE SPECIFICATIONS FOR CONCRETE USAGE.
5. UNLESS OTHERWISE NOTED ALL CONTINUOUS WALL FOOTINGS SHALL BE 12" DEEP WITH 4" PROJECTIONS ON EACH SIDE OF WALL AND BE REINFORCED WITH 2 - #6.
6. NO BACKFILLING ADJACENT TO FOUNDATION WALLS SHALL BE UNDERTAKEN UNTIL PILES BRACING THE WALLS ARE IN PLACE AND THEY HAVE REACHED THEIR DESIGN STRENGTH, OR THE CONTRACTOR ELECTS TO SHORE THE WALLS.
7. PROVIDE 2 - #5 @ ALL SIDES OF OPENINGS THROUGH CONCRETE WALLS AND SLABS, EXTEND BARS 1'-0" BEYOND EDGE OF OPENINGS.
8. PROVIDE 3/4" CHAMFER ON EXPOSED CONCRETE EDGES UNLESS OTHERWISE NOTED.
9. ALL LINTELS TO HAVE 6" MINIMUM BEARING ON ONE COURSE OF SOLID MASONRY UNITS UNLESS OTHERWISE NOTED.
10. UNLESS OTHERWISE NOTED PROVIDED ANGLE 3-1/2" X 3-1/2" X 5/16" FOR EACH 4" OF MASONRY WALL THICKNESS OVER BATTLES, LOUVERS, PANEL NOTES, DUCTS, DOOR AND OTHER MISCELLANEOUS OPENINGS.
11. SEE MECHANICAL DRAWINGS FOR LOCATION OF PIPE SLEEVES AND OPENINGS. PRIOR APPROVAL REQUIRED FOR CUTTING AND BENDING OF REINFORCING TO ACCOMMODATE SLEEVING AND IN NO CASE SHALL MAJOR REINFORCING BE CUT OR BENT.
12. CUTS, HOLES, COPIERS, ETC., IN STRUCTURAL STEEL MEMBERS REQUIRED BY WORK OF OTHER TRADES SHALL BE MADE IN THE SHOP AND SHALL BE SHOWN ON THE SHOP DRAWINGS. REMOVING OF HOLES OR CUTS IN STRUCTURAL STEEL MEMBERS IN THE FIELD WILL NOT BE PERMITTED WITHOUT SPECIFIED APPROVAL OF THE ENGINEER.
13. UNLESS OTHERWISE NOTED PROVIDE 2 COURSES OF SOLID CMU OR 6 COURSES OF BRICK UNDER ALL BEAM BEARINGS.
14. TEMPERATURE REINFORCING BAR BE PLACED IN TOP OR BOTTOM OF SLABS.
15. REINFORCE CONCRETE WALLS WITH REINFORCING LISTED BELOW UNLESS OTHERWISE NOTED.
- | THICKNESS | REIN. | LOCATION |
|-------------|-----------------------------------|--------------|
| 6" (C) | #4 @ 12" HORIZ.
#4 @ 12" VERT. | CTR. OF WALL |
| 8" & 9-1/2" | #4 @ 10" HORIZ.
#4 @ 10" VERT. | CTR. OF WALL |
| 10" | #5 @ 12" HORIZ.
#5 @ 12" VERT. | CTR. OF WALL |
| 12" | #4 @ 12" HORIZ.
#4 @ 12" VERT. | EACH FACE |
| 14" | #4 @ 10" HORIZ.
#4 @ 10" VERT. | EACH FACE |
| 16" | #4 @ 10" HORIZ.
#4 @ 10" VERT. | EACH FACE |
| 18" | #4 @ 8" HORIZ.
#4 @ 8" VERT. | EACH FACE |
16. DESIGN LIVE LOADS: ROOF = 30#/50. FT.
FLOOR = 100#/50. FT.
WIND = 20#/50. FT.
17. COLOR MATCHES TO BE MADE AT ALL JOINTS (E)
18. LAPS FOR REINFORCING BARS SHALL BE A MINIMUM OF 42 X BAR DIAMETER.
19. DESIGN STRENGTHS:
CONCRETE F_{CD} 3000 PSI
REINFORCING BARS F_y (GRADE 60 UTS-181) 60,000-60,000 PSI
STRUCTURAL STEEL F_y 36,000 PSI
20. CONCRETE COVER FOR REINFORCING IS INDICATED ON DRAWINGS.
21. BOTTOM OF FOOTING ELEVATION GIVEN ON PLAN THIS: (268.00)
22. ALL STRIP FOOTINGS WITH BOTTOM OF FOOTING ELEV. OF 271.0 OR LOWER SHALL BE OVER EXCAVATED 2 FEET AND BACKFILL WITH COMPACTED SATISFACTORY FILL.
23. GROUNDWATER AT APPROXIMATELY ELEVATION 262.2. SEE LOGS.

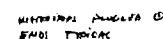


GRAPHIC SCALE

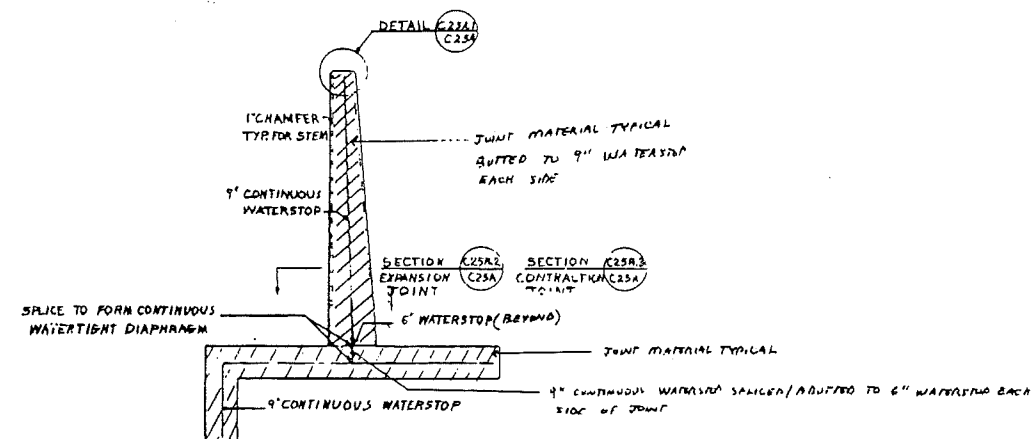
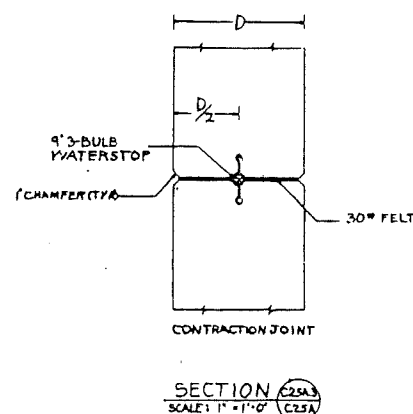
$3|4 = 1 \cdot 0^1$
 $4^2 = 1 \cdot 0^2$
 $1|4^3 = 1 \cdot 0^3$

1	18-91	REVISED AS BUILT	SW
2	6-20-94	INCREASE CLEARANCE FOR BRIDGE CRANE	
3	6-13-94	INCREASE THICKNESS OF BAR SCREEN P-T WALL	ADA
4	7-1-94	REV ELEV ON FOUNDATION PLAN	SW
5	7-2-94	REV IN FOUNDATION PLAN	SW
NOV.	DATE	DESCRIPTION	BY
MATTEN AND CRAIG CONSULTING ENGINEERS			DEPARTMENT OF THE ARMY NORFOLK DISTRICT, BUREAU OF ENGINEERING NORFOLK, VA.
DESIGNED J.S.	FLOOD PROTECTION FACILITIES TOWN OF SCOTTSVILLE, VIRGINIA		
DRAWN A.B.			
CHECKED			
SUBMITTED			
PUMP STATION - STRUCTURAL PLAN			
ISSUED AS NOTED	FOR APPROPRIATE REVISIONS USE 2107A	PROJECT NO.	SHEET NO. S-1
DATE 1 MAY 1995		PREPARED BY	





FOSTER AS SHOWN IS NOT
AS QUART - see
Additional sheet Added
for more built information
(profiles)



NOTE: RUBBER WATERSTOPS SHALL CONFORM TO CORPS OF ENGINEERS CRD-C 513. POLYVINYL CHLORIDE WATERSTOPS SHALL CONFORM TO CORPS OF ENGINEERS CRD-C 572.

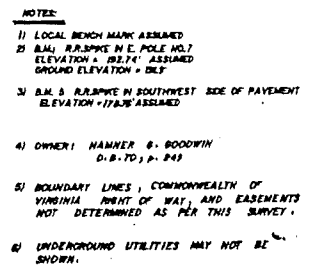
AS BUILT INFORMATION
TRFED LINE COMMENTS

1					
2					
3					
4	6104.0	NEW SHEET DETAILING CONTROL JOINTS			
REV.	DATE	DESCRIPTION			BY
DEPARTMENT OF THE ARMY DISTRICT OFFICE OF ENGINEERS NORFOLK, VA.					
DESIGNS	AB A	FLOOD PROTECTION FACILITIES TOWN OF SCOTTSVILLE, VIRGINIA			
DATE	ABA				
CHECKED	JCI				
SUBMITTED		CONTROL JOINT DETAILS			
SCALE	AS NOTED	TO ACCOMPANY SPECIFICATION NO.	PROJECT NO.	SHEET NO.	
DATE	10 JUNE 1986	210 TA		C-25A	

AS BUILT

NORFOLK DISTRICT FILE NO. H-29-21-68(25 A)

MICROFILMED



INCLUDE W/AS BUILT DRAWINGS
10/90
FOR SEATTLE FLOOD PROTECTION FACILITIES
DACW85-05-C-0075

- SEDIMENT AND EROSION CONTROL

NOTES:

- [illegible]

* REVISED: 31 OCT 86, NORFOLK DIST. CORPS OF ENGINEERS

REVISED: AUG. 7, 1946

AUG. 8, 1981

ADD SEDIMENT AND EROSION
CONTROL PLAN.

REVISED: AUG. 14, 1968

TO SHOW TEST BORE HOLE
LOCATIONS.

EDWARDS:

ENGINEERS

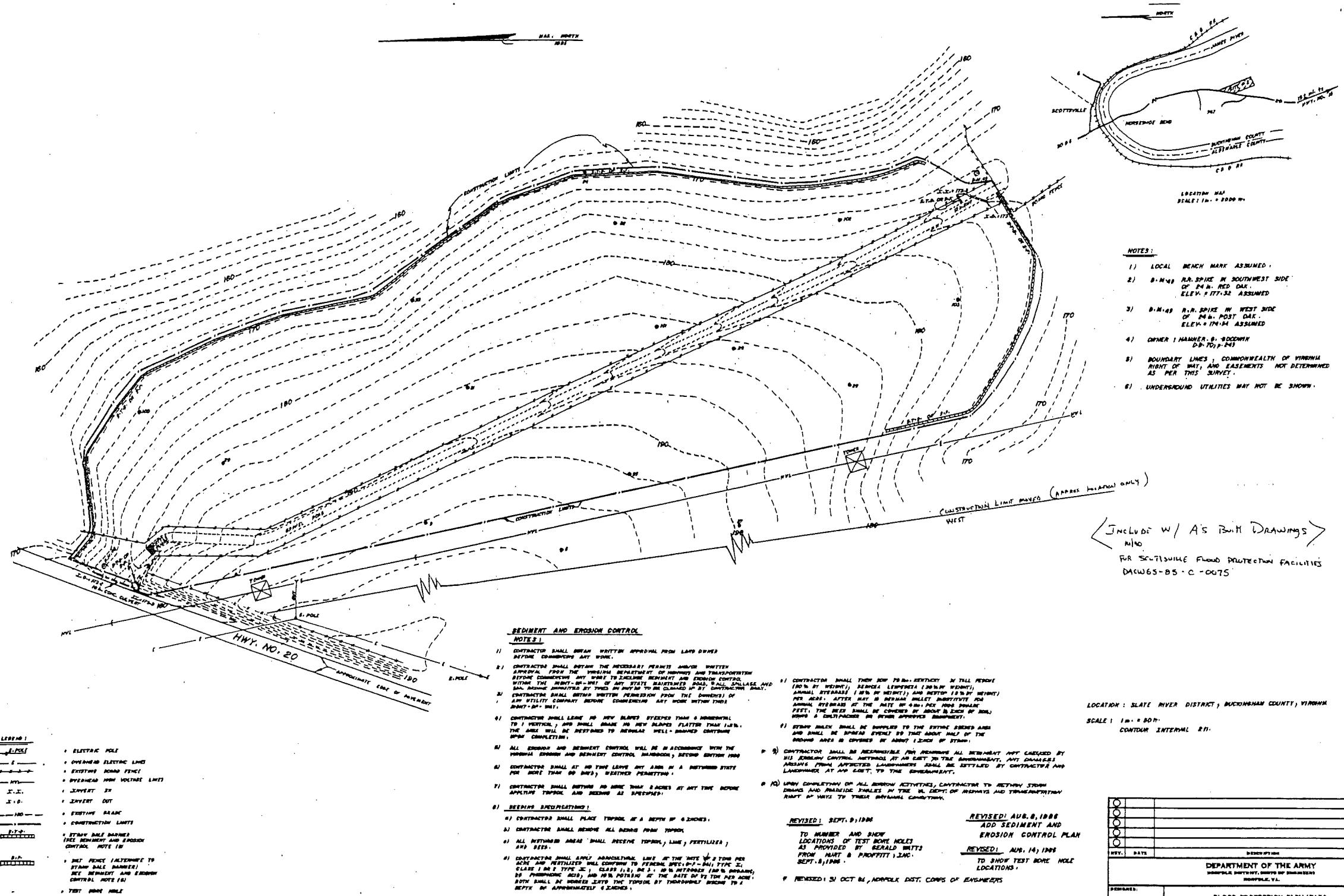
LOCATION: SLATE RIVER DISTRICT,
MCKINNAHAN COUNTY, VIRGINIA.

SCALE: 1 in. = 50 ft.
CONTOUR INTERVAL 2 ft.

[illegible]

AS BUILT

NORFOLK DISTRICT FILE NO. H-29-21-68 (38 A)



AS BUILT ^(10/21/90) INFORMATION
 For DACW 65-65-C-0075
 Flood Protection Facilities,
 Town of Scottsville -

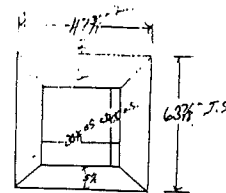
If further information
 is required, contact
 Steve Lantz @ Conner Branch (NAS)
 or Sam Pace at (CVAO)

Finalized
 11/6/90
 after revision
 last provided
 11/6/90

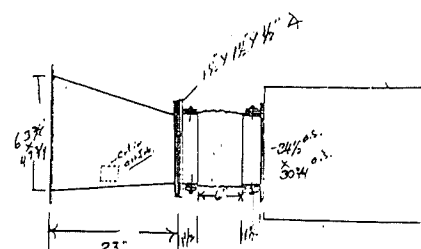
SAM PACE

AS BUILT

#1-5K
 #2-4K
 #3-4K



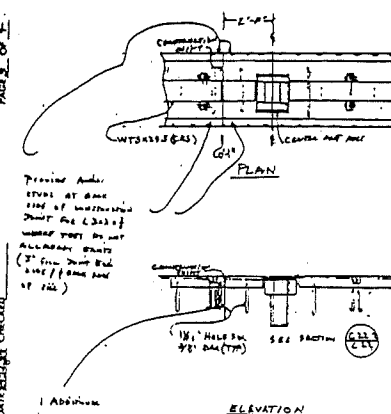
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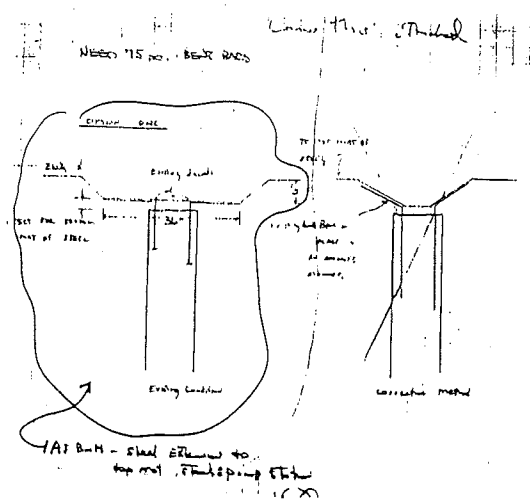
WHITE CONTRACTORS, INC.
 CONTRACTOR
 Certified to comply with contract drawings and specifications.
 B. Certified to comply with contract drawings and specifications
 noted on sheet 2 of 3 and attached sheets. (Performance
 required per 2 of 3 and attached sheets as noted.)
 Signature: AS BUILT
 Title: CGC
 Date: OCT 23 1990

FLOOD PROTECTION
 FACILITIES
 SCOTTSVILLE, VA
 DACW 65-65-C-0075
 PUMP ENGINE
 NOISE BARRELS
 @ WHITE LOWERS

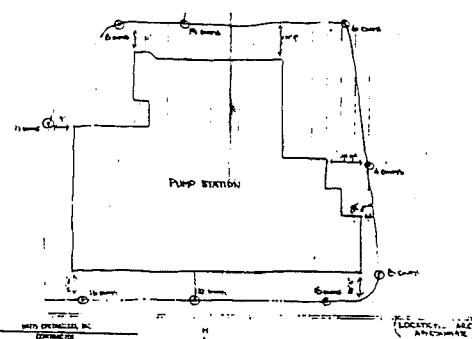
CORPS OF ENGINEERS, USARMC
 ENGINEERING DIV. DESIGN
 PROJECT: SCOTTSVILLE
 DRAWING NO. 38C
 DATE: 10/21/90



SILL BEAM AT CENTER POST
 SEE SHEET C-24



1st BUILT - steel structure to
 top of flood wall



AS BUILT
 9/1/90
 Lantz @
 Pump Station

WHITE CONTRACTORS, INC.
 CONTRACTOR
 Certified to comply with contract drawings and specifications.
 B. Certified to comply with contract drawings and specifications
 noted on sheet 2 of 3 and attached sheets. (Performance
 required per 2 of 3 and attached sheets as noted.)
 Signature: AS BUILT
 Title: CGC
 Date: OCT 23 1990

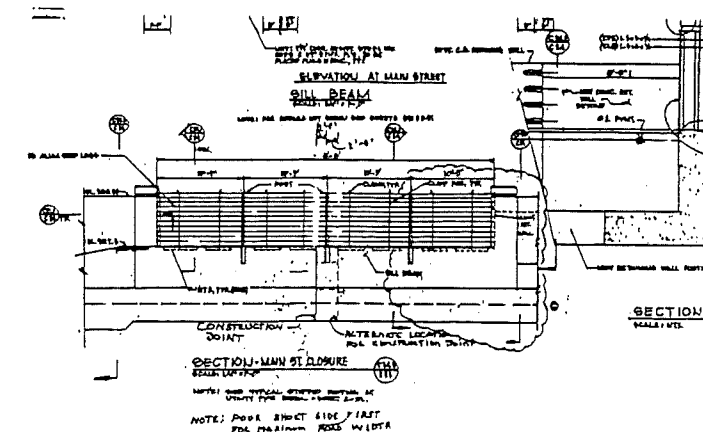
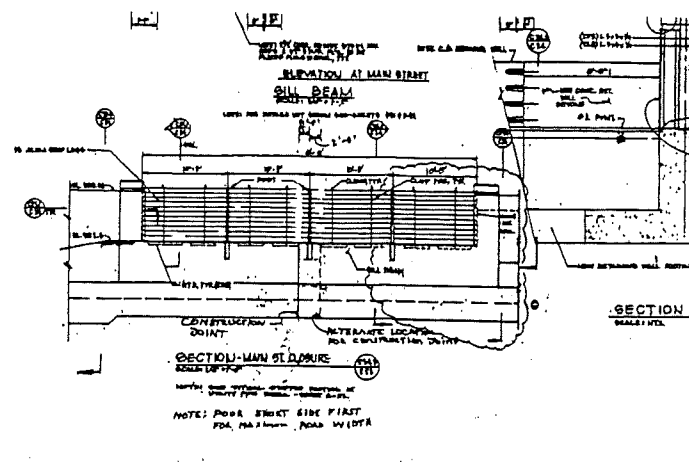
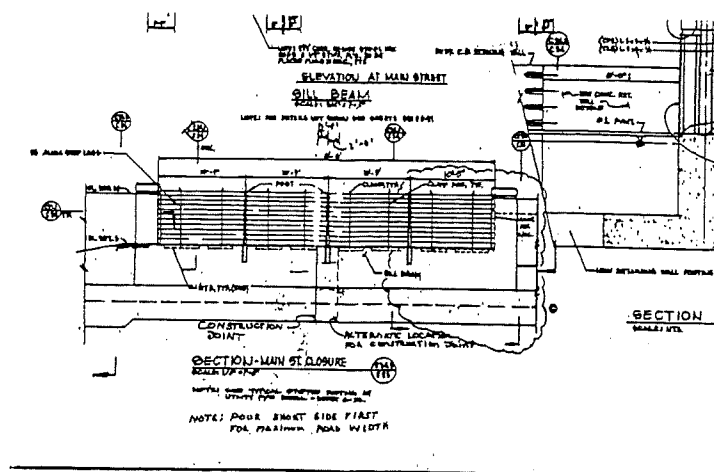
GROUND REMOVALS
 @ CENTER POST
 PUMP ENGINE
 NOISE BARRELS
 @ WHITE LOWERS

REV.	DATE	DESCRIPTION	BY	APP.
DEPARTMENT OF THE ARMY ENGINEERING DIVISION SCOTTSVILLE, VA				
FLOOD PROTECTION FACILITIES TOWN OF SCOTTSVILLE, VIRGINIA				
ADDITIONAL FLOODWALL DATA (SHEET 3)				
DRAWN BY:		TO ACCOMPANY SPECIFICATION NO. PROJECT NO.		
CHECKED BY:		SHEET NO.		
SUBMITTED BY:		38C		
DATE:		DRAWING NO.		

AS BUILT

MEMPHIS DISTRICT FILE NO. H-29-21-68(38 C)

MICROFILMED



CONSTRUCTION POINT DETAIL FOR MAIN STREET CLOSURE

AS BUILT INFO

AS BUILT IN FO

CORPS OF ENGINEERS, US ARMY

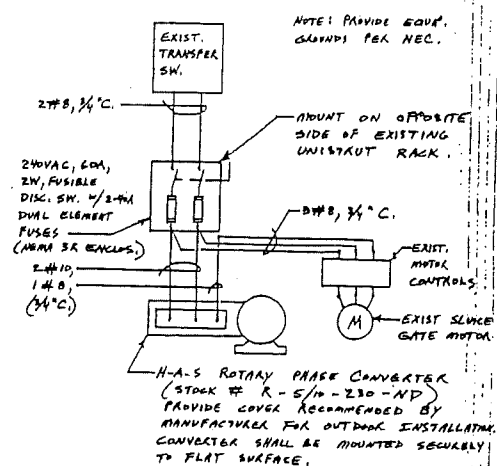
NORFOLK DISTRICT

ENGINEERING DIV. DESIGN BRANCH MECH/ELEC SECTION

PROJECT SCOTTSVILLE FLOOD FACT. SUBJECT PHASE CONVERTER

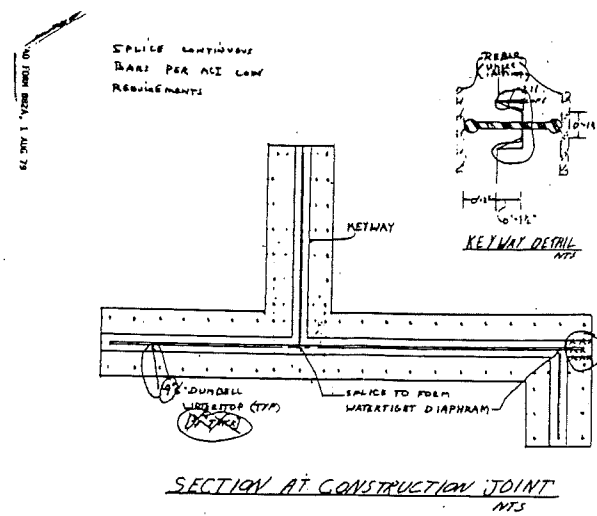
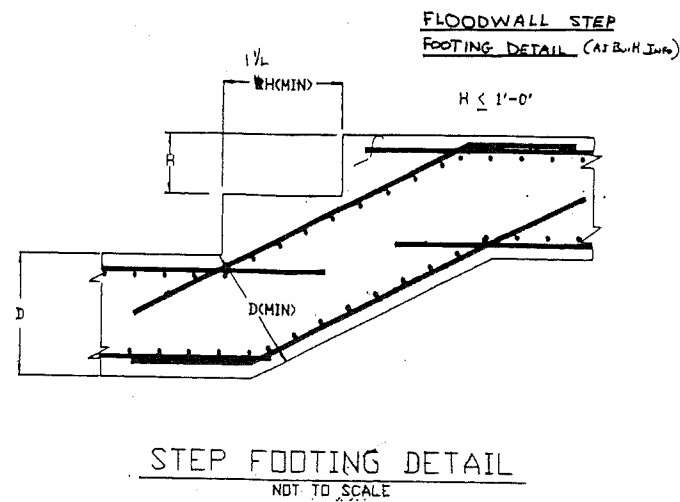
BY MEC DATE 12/1/88 CHECKED _____ PAGE 1 OF 01

CONNECTION DIAGRAM FOR SLUICE GATE MOTOR
PHASE CONVERTER

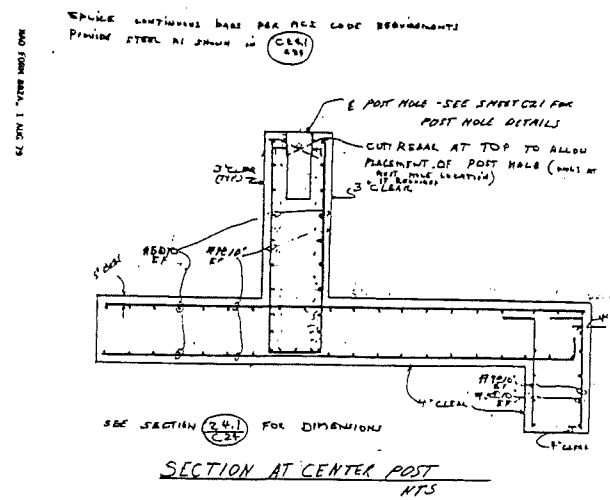
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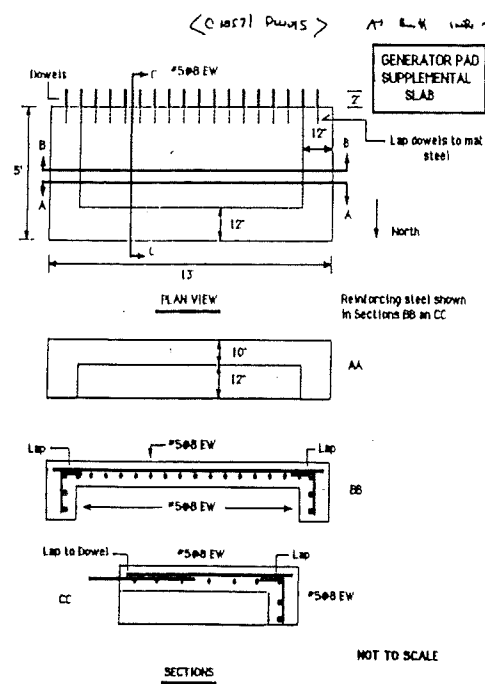
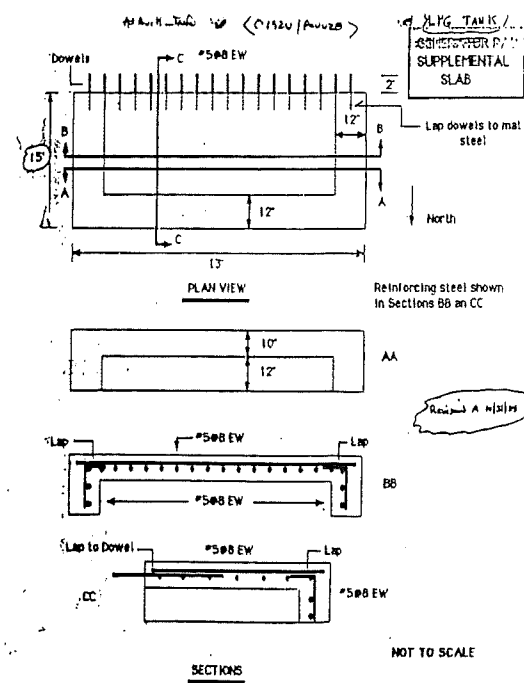
REV.	DATE	DESCRIPTION	BY	APP.
DEPARTMENT OF THE ARMY NOVALE DISTRICT, CORPS OF ENGINEERS NOVALE, VA.				
DESIGNED:	FLOOD PROTECTION FACILITIES TOWN OF SCOTTSVILLE, VIRGINIA			
DRAWN:				
CHECKED:				
SUBMITTED:				
ADDITIONAL FLOODWALL DATA (SHEET 4)				
SCALE	TO ACCOMPANY SPECIFICATION NO.	PROJECT NO.	SHEET NO.	
DATE		DRAWING NO.	380	



CORPS OF ENGINEERS, USAMV
ENGINEERING DIV. DESIGN BRANCH
PROJECT: SCOTTVILLE FLOODWALL
SUBJECT: FLOODWALL SECTION
AT B.W.H. JUNCTION
PAGE 1 OF 1



CORPS OF ENGINEERS, USAMV
ENGINEERING DIV. DESIGN BRANCH
PROJECT: SCOTTVILLE FLOODWALL
SUBJECT: FLOODWALL SECTION
AT B.W.H. JUNCTION
PAGE 1 OF 1



REV.	DATE	DESCRIPTION	BY	APP.
DEPARTMENT OF THE ARMY				
ENGINEERING DIVISION, CORPS OF ENGINEERS				
FLOOD PROTECTION FACILITIES				
TOWN OF SCOTTVILLE, VIRGINIA				
ADDITIONAL FLOODWALL DATA				
(SHEET 5)				
SCALE	TO APPROPRIATE SPECIFICATION NO.	PROJECT NO.	SHEET NO.	
DATE	DESIGNING NO.	38E		

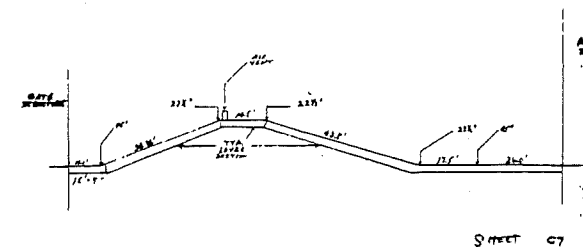
AS BUILT

NORFOLK DISTRICT FILE NO. H-29-21-68 (38 E)

MICROFILMED

(AS BWH INFO)

30" DISCHARGE LINE FOR PUMP #3

[illegible][illegible]

MICROFILMED

AS BUILT
INFORMATION

February 23, 1968

CENAG-37

SUBJECT: Flood Protection Facilities, Scottsville, Virginia,
Contract No. DACW 65-65-C-0075, Flap Gate

Watts Contractors, Incorporated
Post Office Box 222
Petersville, Virginia 22901

Gentlemen:

The attached flap gate/curtain transition design is approved. If you should have any further questions, please contact Major Raddy.

Sincerely,

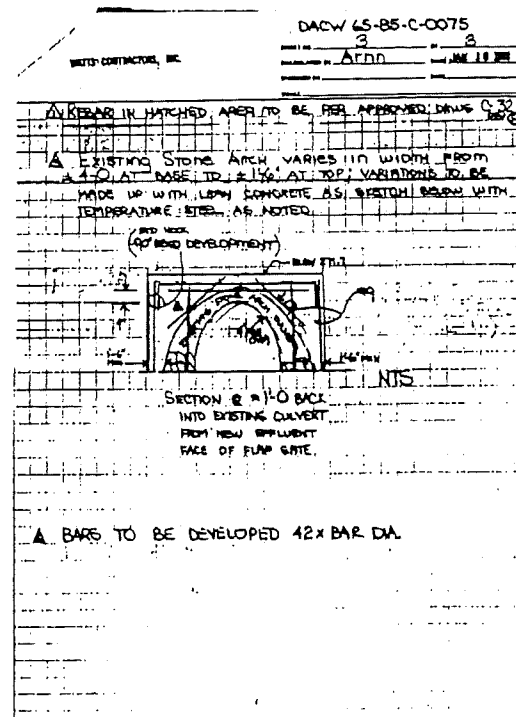
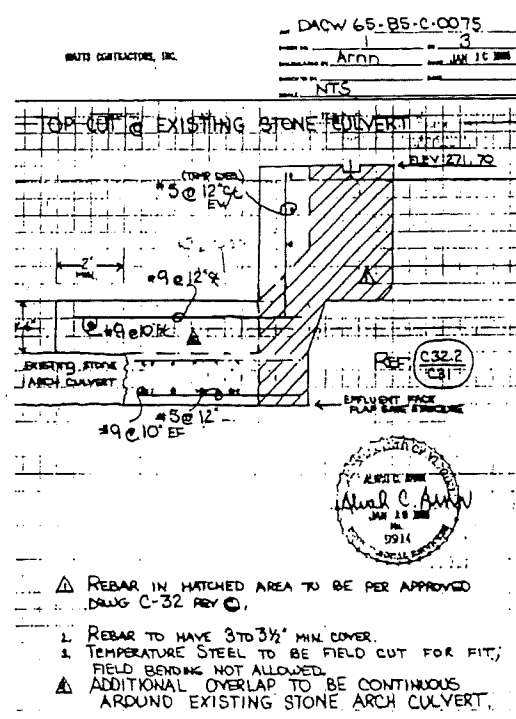
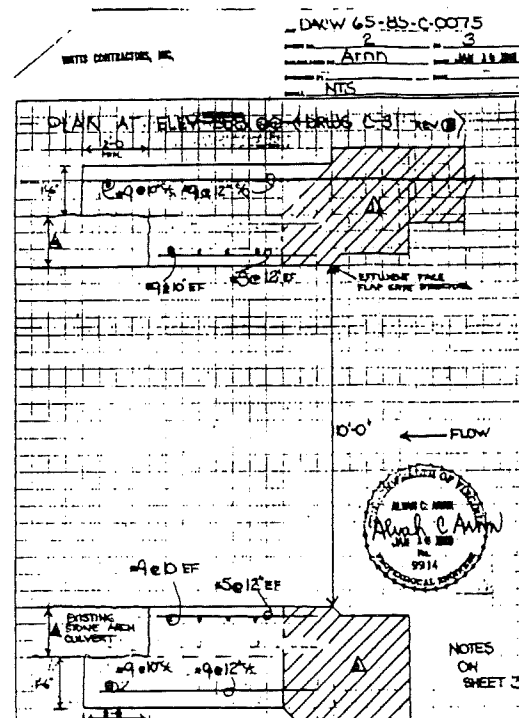
Donald W. Dow, Jr., P.E.
Authorized Representative
of the Contracting Officer

Enclosure

CR

CMS
Constructs
Team Leader
READING

FACTOR
REDDY
TANAKA
BLACKBURN
DOW
JUNE 11/68



REV.	DATE	DESCRIPTION	BY	APP.
DEPARTMENT OF THE ARMY ENGINEER DISTRICT, CORPS OF ENGINEERS NORFOLK, VA.				
FLOOD PROTECTION FACILITIES TOWN OF SCOTTSVILLE, VIRGINIA				
ADDITIONAL FLOODWALL DATA (SHEET 7)				
SCALE	TO ACCOMPANY SPECIFICATION NO.		DESIGN NO.	SHEET NO.
DATE	DRAWING NO.		38 G	

APPENDIX D

SCOTTSVILLE, VA.-OPERATIONS AND MAINTENANCE MANUAL EVALUATION OF FLOOD WARNING, RESPONSE, AND ACTION TIMES

Overall Study Purpose: The Scottsville Local Flood Protection project does not provide an ultimate level of protection to the town and can be overtopped by flood events exceeding the recommended level of protection. In addition, the town is required to coordinate and implement the timely operation of all closure structures and related facilities to insure that the overall flood protection project functions as intended. These required procedures are currently presented in a draft Operations and Maintenance (O&M) Manual dated May 1990. The purpose of this evaluation is to examine the functional performance and safety related aspects of the Scottsville Local Flood Protection project for use in the revision of the current O&M manual where necessary.

Purpose of the Evaluation of Flood Warnings and Action Times: All levels of the Corps have recently expressed greater interest in and concerns about the development of O&M manuals for Corps of Engineers constructed levee and floodwall projects. The purpose of this evaluation is to determine adequate warning times and safety factors for the operation of the local protection project that are within the capability of the local sponsor to implement. The very real need for the operation of the project in an efficient and timely manner to protect lives and property must be balanced against an unacceptable number of "false alarms." The information must be presented in such a way in the O&M manual that it is easily understood and readily implemented by the local sponsor.

Floods of Record: Table D-1 lists pertinent information on the nine largest Floods of Record at Scottsville.

TABLE D-1
FLOODS OF RECORD AT SCOTTSVILLE

Flood Event	Gage Height, Ft. (a)	Discharge cfs	Flood Event % (b)
June 1972	34.02	301,000	0.34
November 1985	31.77	243,000	0.77
August 1969	30.00	188,000	2.08
April 1987	26.17	133,000	5.41
September 1944	26.00	132,000	5.56
August 1940	25.84	115,000	7.69
March 1936	25.46	126,000	5.88
March 1975	24.63	115,000	7.69
September 1987	24.56	114,000	8.00

(a) Gage zero = 253.2 feet, NGVD.

(b) Based on flood discharge.

Flood Emergency Preparedness: The town of Scottsville has experienced major flooding in 1969, 1972, and 1985 and the threat of major flooding twice in 1987 and once in 1992. As a result of these events, the community has a heightened level of public awareness of the existing flood threat and officials are particularly attentive to forecasted and actual heavy rainfall in the area and to any rises in water level in the James River.

The Police-Fire Department dispatcher's office serves as the town's Emergency Operation's Center (EOC) and is responsible for alerting the Mayor, the Flood Superintendent, and other town officials of an impending flood threat.

Forty-nine police and fire department personnel are available to be called in as needed to assist in the monitoring of the river, the operation of the project, and the evacuation notification procedures. These individuals, living within a 6-mile radius of the town, can report to the flood protection project within 1/2 hour from the time that a standby alert is issued. Another 39 Rescue Squad people are also available as needed to implement evacuation procedures.

Appropriate Action/Operation Times: Table D-2 lists the critical actions/operations required during the threat of a major flood and the appropriate durations determined for the implementation of these actions/operations. These durations were based on semi-annual inspections conducted by the Norfolk District since project construction, the Hurricane ZELDA Exercise of 1992, and discussions with town officials.

TABLE D-2

APPROPRIATE ACTION/OPERATION TIMES

<u>Action/Operation</u>	<u>Time Needed in Minutes</u>	<u>Comments</u>	<u>No. of People</u>
a. The notification of the Response Teams of a Flood Alert, their arrival at the Emergency Operations Center, and readiness to initiate pre-designated actions.	45	Includes 30 minutes for response teams to be notified and to report to the EOC and 15 minutes for briefing by Flood Superintendent.	18 (a)
b. The installation of the street closure at Ferry Street.	45	Includes 45 minutes for actual installation of closure. Installation of traffic signs and cones (15 minutes) runs concurrently.	6 (b)
c. The installation of the street closure at Main Street.	45	Includes 45 minutes for actual installation of closure. Installation of traffic signs and cones (15 minutes) runs concurrently.	6 (b)
d. The evacuation of the businesses and residences in the downtown area in anticipation of project overtopping.	60	Includes final Police notification and actual evacuation time.	39 Rescue Squad personnel are available as needed.

(a) Total number of individuals for teams 1, 2, 3, and 4.

(b) Crew size for teams 3 and 4, respectively.

1972 Flood Hydrograph: The flood of record at Scottsville was the 1972 Flood which produced a gage height of 34.02 feet and a discharge of 301,000 cubic feet per second. The hydrograph of this flood is shown in figure D-1. As indicated in the figure, flood waters rose, peaked, and receded over a period of 5 days. The recurrence of this flood event would allow several multiples of the time needed to accomplish the operations of the Flood Protection project.

Composite Hydrograph: Realizing that a more critical rising hydrograph limb can reduce the available warning times that would be allowed by the recurrence of a 1972 flood, a composite hydrograph was developed to evaluate the workability of the various closures associated with the levee/floodwall project. Hydrographs for the nine largest floods in the systematic record shown in Table D-1 were reviewed to determine the critical rate of increase in stage for each rising limb. These nine events represent all flood events on record exceeding a flood stage of 24 feet (approximately a 9 percent flood event). Smaller flood events would not be expected to produce and maintain a more critical rate of increase in flood stage. It was determined from the review of the flood events that:

a. The August 1969 flood event produced the most critical initial rising limb. This event produced an increase in stage from 6.2 feet to 10.2 feet in approximately 2 hours resulting in a rate of increase of 2 feet per hour.

b. The September 1987 flood event produced the most critical rising limb above the 12-foot alert stage. This event produced an increase in stage from 10.2 feet to 17.5 feet over a 2-hour period or an increase in stage of 3.7 feet per hour. This event peaked at 24.56 feet.

c. Between flood stages 17.5 feet and 19.3 feet, the event producing the most critical rise is the September 1944 flood event. An increase of 1.8 feet was experienced in 40 minutes resulting in a rate of increase of 2.7 feet per hour. This event peaked at flood stage 26.0 feet.

d. The June 1972 flood event produced the most critical rising limb between river stage 19.3 feet and 25 feet. This event produced an increase in stage of 5.7 feet over a 2.7-hour period, an increase in stage of 2.1 feet per hour.

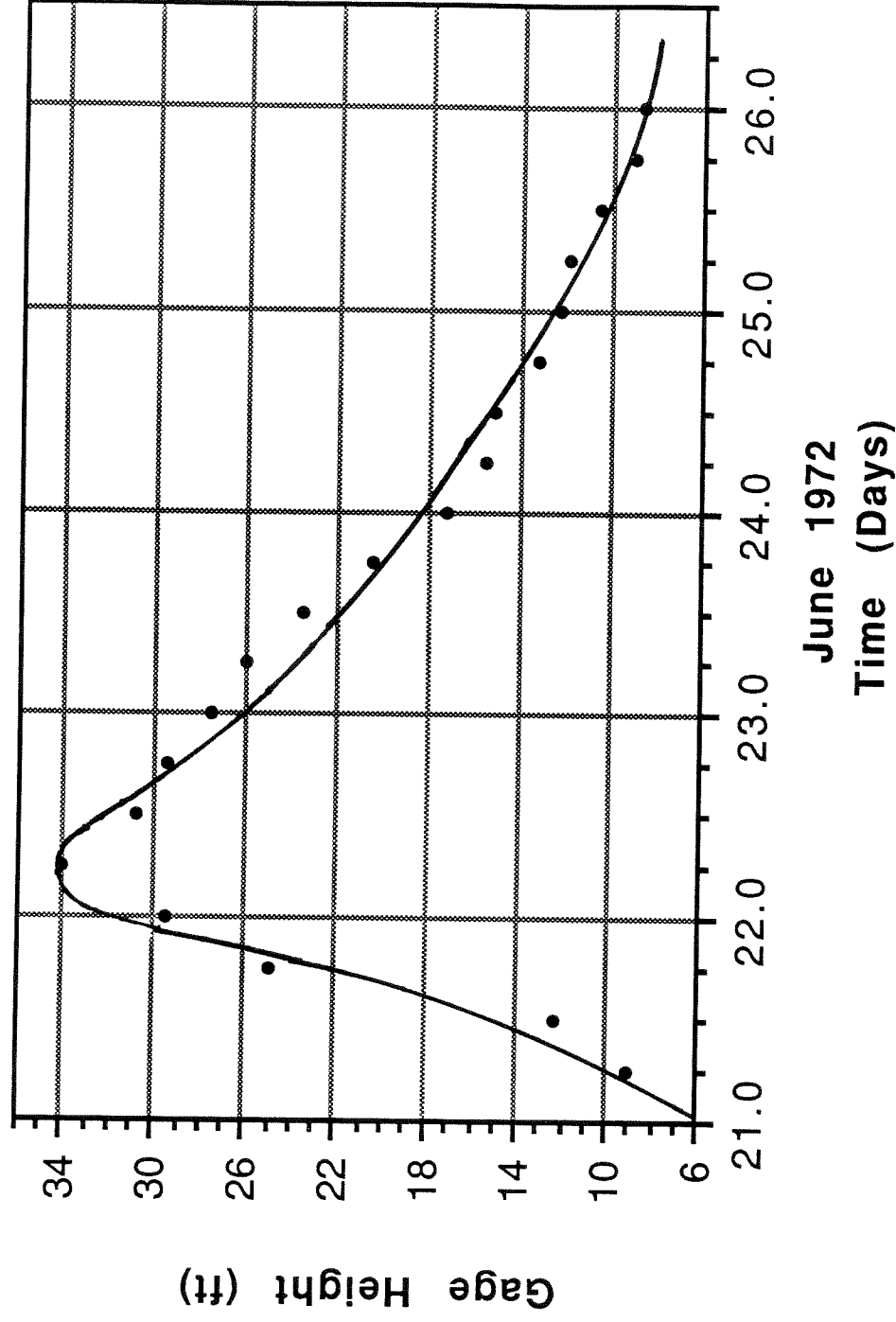


FIGURE D-1. 1972 HYDROGRAPH-SCOTTSVILLE, VA.

e. The August 1969 flood event produced the most critical rising limb between stage 25 feet and 29.4 feet. This event produced an increase in stage of approximately 4.4 feet in a 3.5-hour period, an increase in stage of 1.3 feet per hour.

f. The June 1972 flood event produced the most critical rising limb above a flood stage of 29 feet. The rate of increase for this event averaged 0.8 foot per hour between flood stage 29 feet and 34 feet. The June 1972 flood event peaked at 34.02 feet.

A composite hydrograph, as shown in figure D-2, was developed using the above flood events for the portions of the hydrograph where each produced the most critical rising limb.

Standard Project Storm Hydrograph: The most critical rate of rise of floodwaters at Scottsville would be realized with the occurrence of a Standard Project Storm. The Standard Project Storm (SPS) is a hypothetical storm intended to represent the most severe combination of storm parameters that is considered reasonably characteristic of a specified area. Figure D-3 presents the SPS hydrograph developed for Scottsville and vicinity. This hydrograph indicates that the James River could be expected to rise from about 6 feet to 36 feet in a period of 5 hours. This results in a rate of rise of 6 feet per hour.

Evaluation: The composite hydrograph provides the most critical rising limb based on actual flood events. The only hydrograph to produce a greater prolonged increase in stage is the SPS. The workability of the various flood actions/operations were evaluated with consideration to both the SPS and composite hydrographs and the adoption of several combinations of flood stages. The primary considerations in the evaluation were (1) the provision of factors of safety of at least 2.0 for the installation of the Ferry Street and Main Street Closures and the evacuation of the flood plain; and (2) the provision of factors of safety of 2.0 for the remaining flood actions, if possible.

The first combination of flood stages evaluated were those adopted by the consultant in the present O&M manual (May 1990) as shown in table D-3. Table D-4 shows the results of this evaluation for the composite hydrograph while table D-5 presents the results for the SPS hydrograph.

TABLE D-3

FLOOD STAGE-ACTION VALUES PRESENTED IN THE
MAY 1990 OPERATION AND MAINTENANCE MANUAL

Action	Gage Height (Ft.)
Flood Alert Stage	12.0
Initiation of Ferry St. Closure	17.0
Initiation of Main St. Closure	22.0
Completion of Ferry St. Closure	26.5
Completion of Main St. Closure	29.3

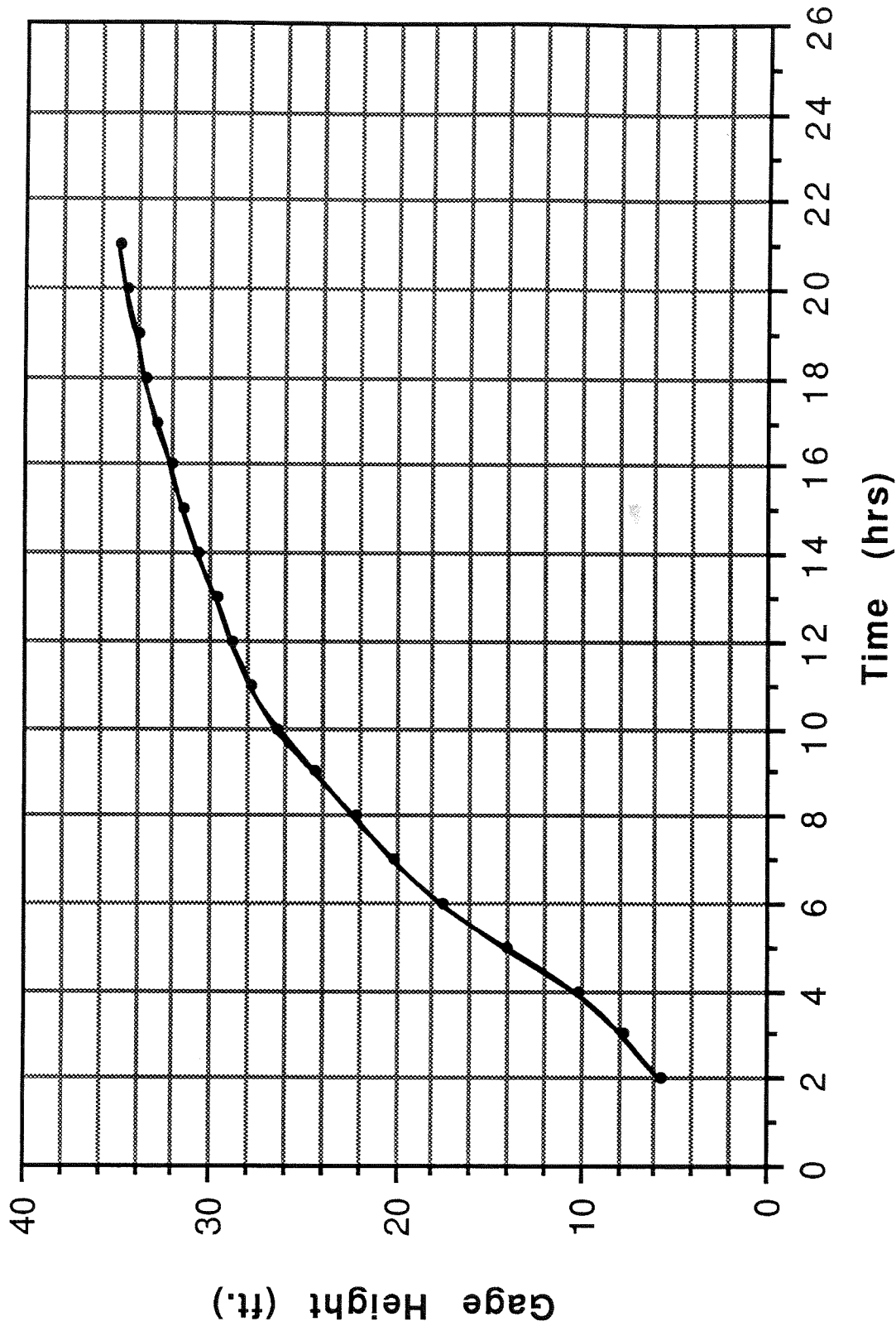


FIGURE D-2. COMPOSITE HYDROGRAPH-SCOTTSVILLE, VA

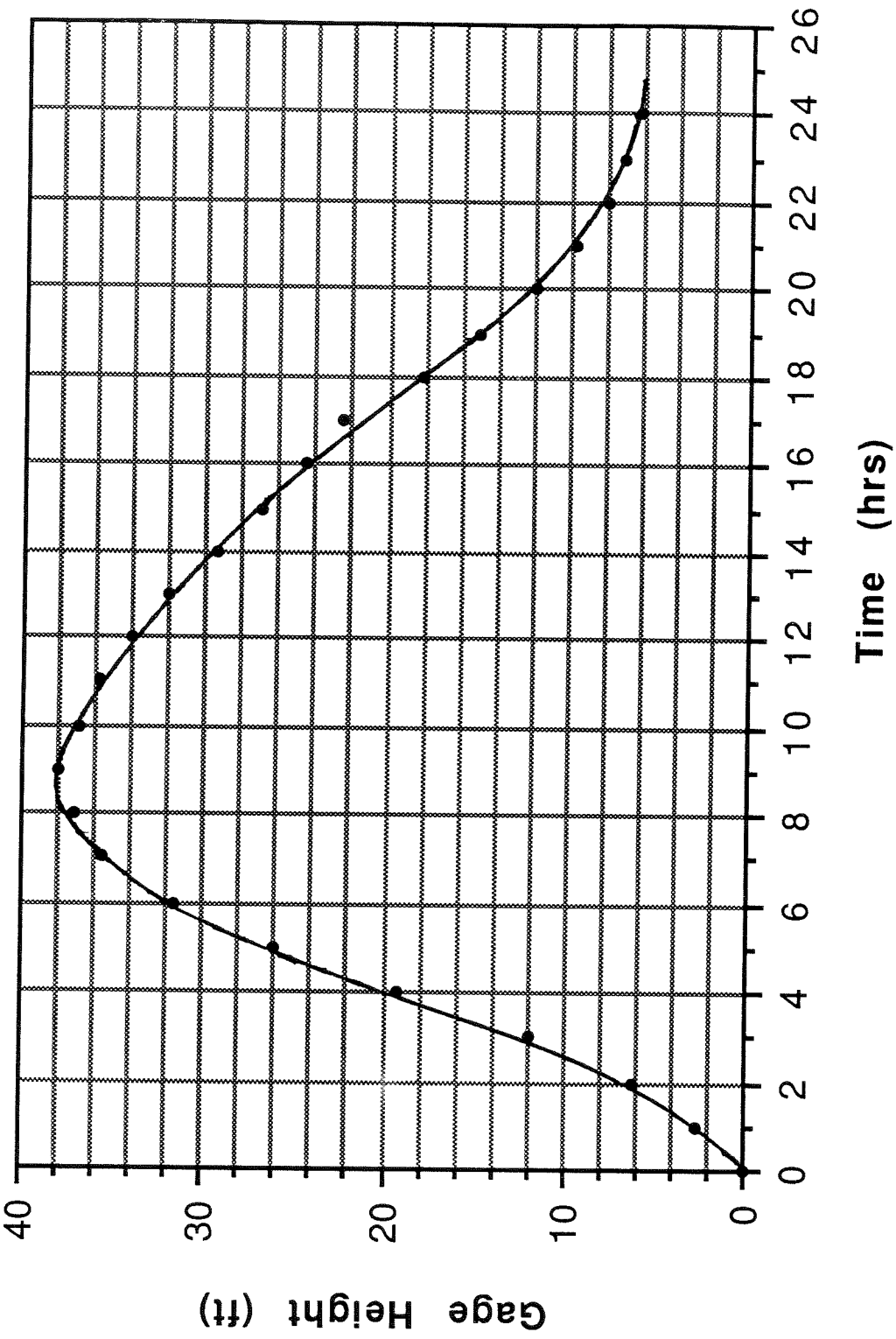


FIGURE D-3. SPS HYDROGRAPH, SCOTTSVILLE, VA.

A review of table D-4 shows that, based on the composite hydrograph, there is sufficient time for the accomplishment of all actions/operations presented in table D-2 with a factor of safety ranging from 2.0 to 7.0. The action indicating the lowest factor of safety, 2.0, is that overall effort consisting of the flood alert and the initiation of the Ferry Street closure.

A review of table D-5 shows that, based on the SPS hydrograph, there is also sufficient time for the accomplishment of all actions/operations presented in table D-2. However, the SPS hydrograph limits significantly the overall time available. All factors of safety are 2.0 or less, with the first critical effort, the flood alert and the initiation of the Ferry Street closure, exhibiting a factor of safety of only 1.1. In addition, the factor of safety for the entire process of evacuating the flood plain is only 1.2.

Tables D-6, D-7, D-8, and D-9 present the results of attempts to alter the gage heights presented in table D-5 to meet the primary evaluation considerations presented in a previous paragraph. The following are the results of this effort:

a. For all four tables, the factor of safety for evacuation is increased to 2.0 with the designation of river stage 29, in lieu of stage 30, as the point at which the evacuation of the flood plain is to be initiated.

b. Tables D-6 and D-7 provide a better balance of factors of safety for the flood response actions over those presented in table D-5. This balance is accomplished by lowering the flood alert stage from 12 to stage 11 in both tables along with up to 2 feet of lowering of the stages for the other actions. The factors of safety are lower than 2.0 for all actions in table D-6. Table D-7 does provide factors of safety of 2.0 for 2 actions, but 2 actions have factors of safety less than 2.0, 1 with a factor of only 1.3.

c. Tables D-8 and D-9 provide further improvement in the factors of safety presented in tables D-6 and D-7 with factors of safety equal to or close to 2.0. The improvement is primarily the result of lowering the flood alert stage to stage 10 from stage 11. While both tables provide an appropriate balance of warning times and actions, table D-9 provides a factor of safety of at least 2.0 for both the installation of the closures at Ferry Street and Main Street. Table D-10 presents a comparison of the stage heights and safety factors from tables D-5, D-8, and D-9.

TABLE D-4

EVALUATION OF WARNING AND ACTION TIMES (1)

Determination of available times based on selected
gage heights and the Composite Hydrograph

Action	Gage Height	Time in minutes
Flood Alert	12.0	90
Start Ferry St. Closure	17.0	
Flood Stage	20.0	210
Start Main St. Closure	22.0	
Finish Ferry St. Closure	26.5	300
Finish Main St. Closure	29.3	
Initiate Evacuation	30.0	420
Top of Levee/Floodwall	34.9	

Evaluation

<u>Operation</u>	<u>Time Needed (Minutes)</u>	<u>Time Available (Minutes)</u>	<u>Safety Factor</u>	<u>Net Minutes</u>
Flood alert to start of Ferry St. Closure	45	90	2.0	45
Ferry St. Closure- start to finish	45	270	6.0	225
Flood alert to start of Main St. Closure	45	210	4.7	165
Main St. Closure- start to finish	45	300	6.7	255
Evacuation-start to finish	60	420	7.0	360

(1) This table reflects gage-operation values presented in the May 1990 Operation and Maintenance Manual.

TABLE D-5

EVALUATION OF WARNING AND ACTION TIMES (1)

Determination of available times based on selected
gage heights and the SPS Hydrograph

Action	Gage Height	Time in minutes
Flood Alert	12.0	
Start Ferry St. Closure	17.0	
Flood Stage	20.0	
Start Main St. Closure	22.0	
Finish Ferry St. Closure	26.5	
Finish Main St. Closure	29.3	
Initiate Evacuation	30.0	
Top of Levee/Floodwall	34.9	

Evaluation

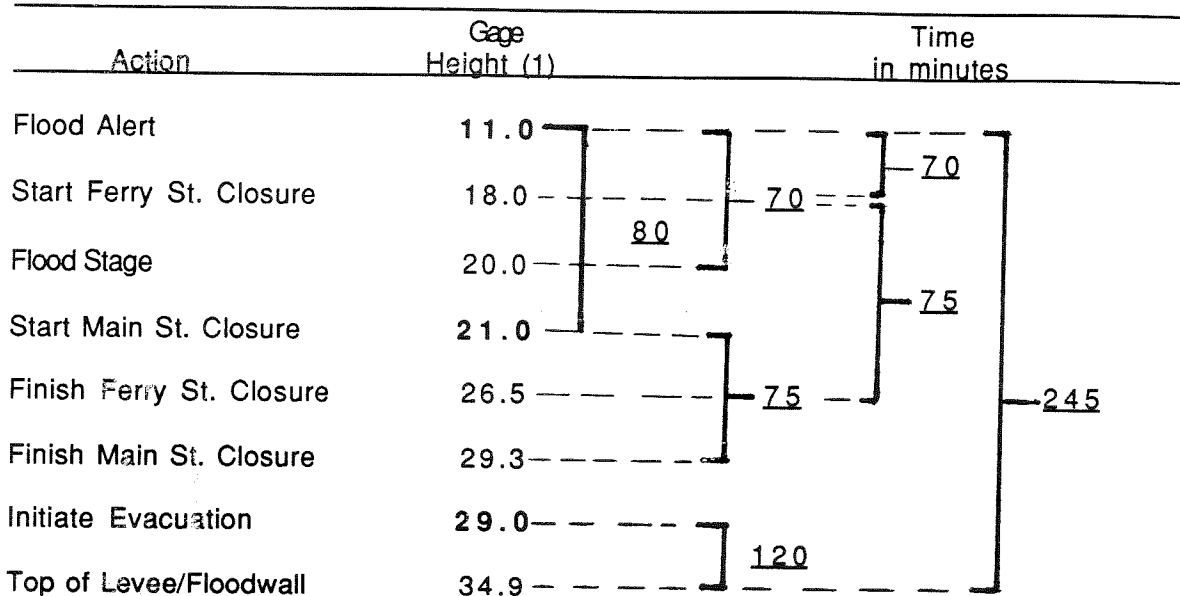
<u>Operation</u>	<u>Time Needed (Minutes)</u>	<u>Time Available (Minutes)</u>	<u>Safety Factor</u>	<u>Net Minutes</u>
Flood alert to start of Ferry St. Closure	45	50	1.1	5
Ferry St. Closure-start to finish	45	90	2.0	45
Flood alert to start of Main St. Closure	45	90	2.0	45
Main St. Closure-start to finish	45	70	1.6	25
Evacuation-start to finish	60	70	1.2	10

(1) This table reflects gage-operation values presented in the May 1990 Operation and Maintenance Manual.

TABLE D-6

EVALUATION OF WARNING AND ACTION TIMES

Determination of available times based on selected
gage heights and the SPS Hydrograph

Evaluation

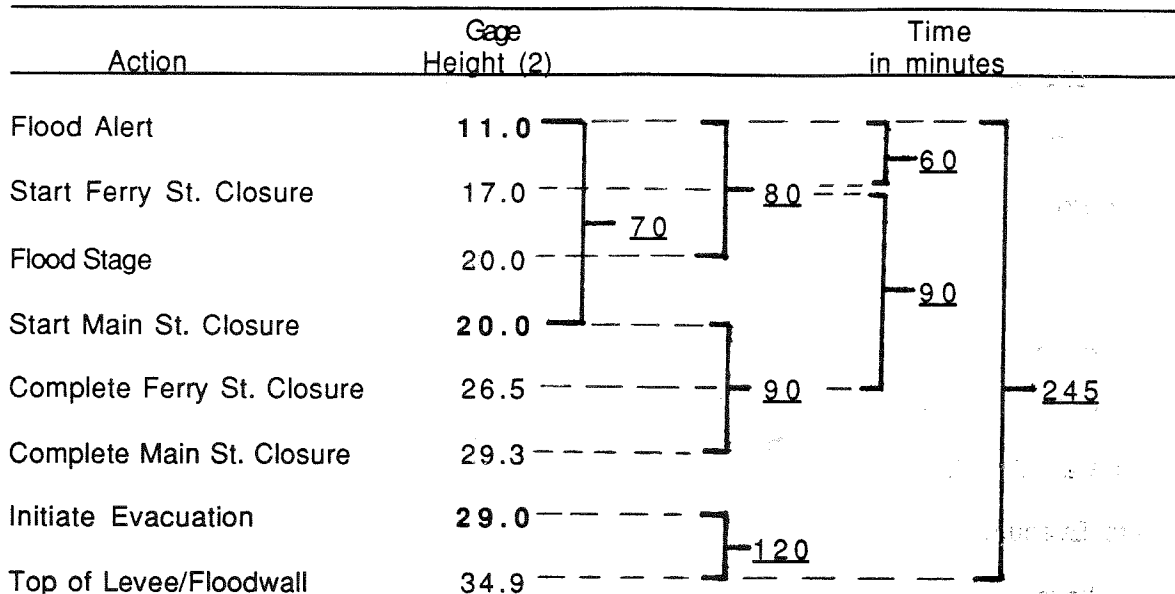
<u>Operation</u>	<u>Time Needed (Minutes)</u>	<u>Time Available (Minutes)</u>	<u>Safety Factor</u>	<u>Net Minutes</u>
Flood alert to start of Ferry St. Closure	4.5	7.0	1.6	2.5
Ferry St. Closure-start to finish	4.5	7.5	1.7	3.0
Flood alert to start of Main St. Closure	4.5	8.0	1.8	3.5
Main St. Closure-start to finish	4.5	7.5	1.7	3.0
Evacuation-start to finish	6.0	12.0	2.0	6.0

(1) The values in bold print represent changes to values presented in the May 1990 Operation and Maintenance Manual.

TABLE D-7

EVALUATION OF WARNING AND ACTION TIMES (2)

Determination of available times based on selected
gage heights and the SPS Hydrograph

Evaluation

<u>Operation</u>	<u>Time Needed (Minutes)</u>	<u>Time Available (Minutes)</u>	<u>Safety Factor</u>	<u>Net Minutes</u>
Flood alert to start of Ferry St. Closure	45	60	1.3	15
Ferry St. Closure-start to finish	45	90	2.0	45
Flood alert to start of Main St. Closure	45	70	1.6	25
Main St. Closure-start to finish	45	90	2.0	45
Evacuation-start to finish	60	120	2.0	60

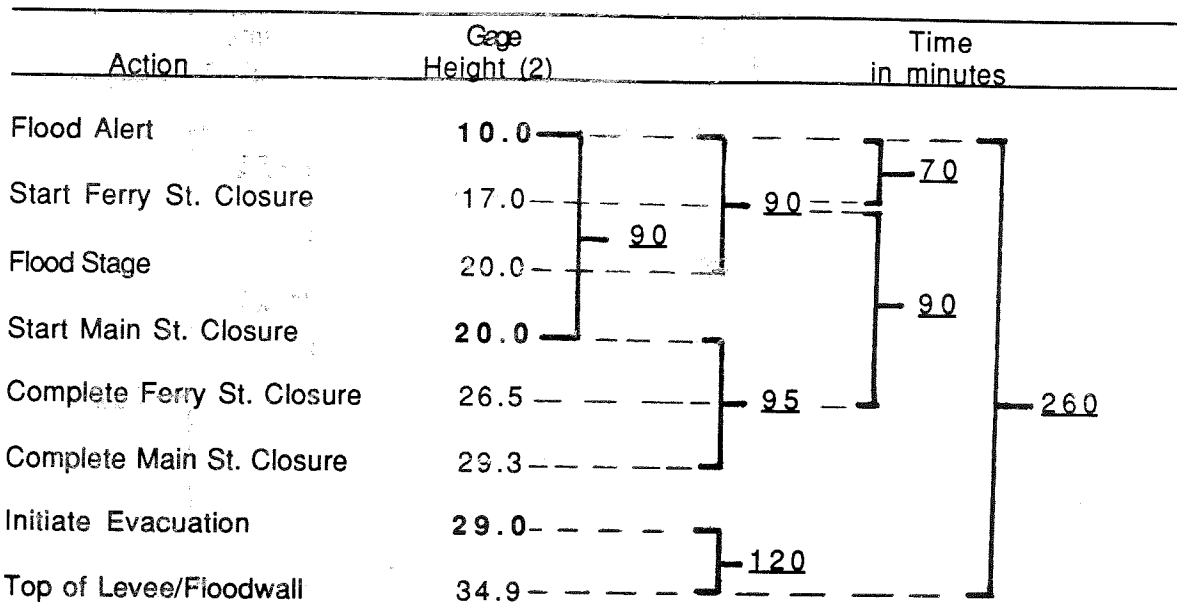
(1) This table reflects an attempt to get safety factors of at least 2.0.

(2) The values in bold print represent changes to values presented in the May 1990 Operation and Maintenance Manual.

TABLE D-8

EVALUATION OF WARNING AND ACTION TIMES (2)

Determination of available times based on selected
gage heights and the SPS Hydrograph

Evaluation

<u>Operation</u>	<u>Time Needed (Minutes)</u>	<u>Time Available (Minutes)</u>	<u>Safety Factor</u>	<u>Net Minutes</u>
Flood alert to start of Ferry St. Closure	45	70	1.6	25
Ferry St. Closure-start to finish	45	90	2.0	45
Flood alert to start of Main St. Closure	45	90	2.0	45
Main St. Closure-start to finish	45	95	2.1	50
Evacuation-start to finish	60	120	2.0	60

(1) This table reflects an attempt to get safety factors of at least 2.0.

(2) The values in bold print represent changes to values presented in the May 1990 Operation and Maintenance Manual.

TABLE D-9

EVALUATION OF WARNING AND ACTION TIMES (2)

Determination of available times based on selected
gage heights and the SPS Hydrograph

Action	Gage Height (2)	Time in minutes
Flood Alert	10.0	
Start Ferry St. Closure	17.0	75
Flood Stage	20.0	100
Start Main St. Closure	21.0	80
Complete Ferry St. Closure	26.5	90
Complete Main St. Closure	29.3	260
Initiate Evacuation	29.0	120
Top of Levee/Floodwall	34.9	

Evaluation:

<u>Operation</u>	<u>Time Needed (Minutes)</u>	<u>Time Available (Minutes)</u>	<u>Safety Factor</u>	<u>Net Minutes</u>
Flood alert to start of Ferry St. Closure	45	75	1.7	30
Ferry St. Closure-start to finish	45	80	1.8	35
Flood alert to start of Main St. Closure	45	100	2.2	55
Main St. Closure-start to finish	45	90	2.0	45
Evacuation-start to finish	60	120	2.0	60

(1) This table reflects an attempt to get safety factors of at least 2.0.

(2) The values in bold print represent changes to values presented in the May 1990 Operation and Maintenance Manual.

TABLE D-10

EVALUATION SUMMARY

<u>Action</u>	<u>From Table D-5</u>		<u>From Table D-8</u>		<u>From Table D-9</u>	
	<u>Gage Height</u>	<u>Safety Factor</u>	<u>Gage Height</u>	<u>Safety Factor</u>	<u>Gage Height</u>	<u>Safety Factor</u>
Flood alert to start of Ferry St. Closure	12.0 to 17.0	1.1	10.0 to 18.0	1.7	10.0 to 17.0	1.6
Ferry St. Closure-start to finish	17.0 to 26.5	2.0	18.0 to 26.5	1.8	17.0 to 26.5	2.0
Flood alert to start of Main St. Closure	12.0 to 22.0	2.0	10.0 to 21.0	2.2	10.0 to 20.0	2.0
Main St. Closure-start to finish	22.0 to 29.3	1.6	21.0 to 29.3	2.0	20.0 to 29.3	2.1
Evacuation-start to finish	30.0 to 34.9	1.2	29.0 to 34.9	2.0	29.0 to 34.9	2.0

Conclusions/Recommendations. Based on the information presented in this analysis, it is determined that:

a. The Standard Project Flood hydrograph best represents the magnitude of flooding and the rate of rise of flood waters that could be expected to occur at Scottsville. This hydrograph indicates that the James River could be expected to rise from about 6 feet to 36 feet in a period of 5 hours, for a rate of rise of 6 feet per hour.

b. The evaluation and designation of flood warning times and actions should be based on the Standard Project Flood hydrograph.

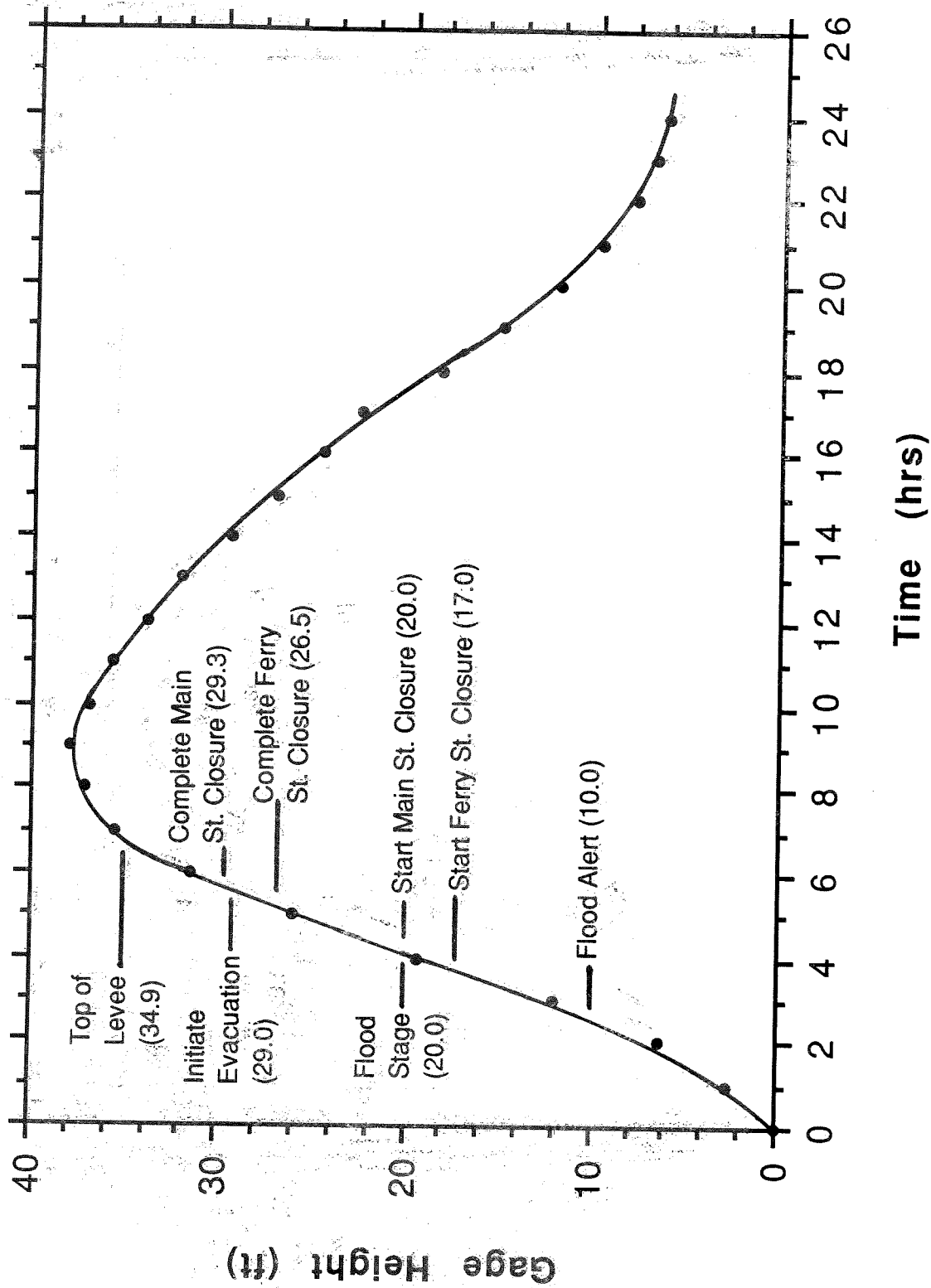


FIGURE D-4. SPS HYDROGRAPH WITH ADOPTED WARNING TIMES AND ACTIONS