SOUTH CAROLINA ELECTRIC & GAS

SCANA®
POWER FOR LIVING

INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN

FOR THE

WATEREE STATION
FGD POND

RICHLAND COUNTY, SOUTH CAROLINA

JULY 2016

SOUTH CAROLINA
GARRETT AND MOORE, INC
No. C3371
CERTIFICATE OF AUTHORIZATION

GARRETT & MOORE
Engineering for the Power and Waste Industries

SOUTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
22411
7/22/16
J. STEFAN BRAY

1 OVERVIEW

The EPA Administrator, Gina McCarthy, signed the Disposal of Coal Combustion Residuals from Electric Utilities final rule on December 19, 2014, and it was published in the Federal Register (FR) on April 17, 2015. The regulations provide a comprehensive set of requirements for the safe disposal of coal combustion residuals (CCRs), commonly known as coal ash, from coal-fired power plants. The rule will be administered as part of the Resource Conservation and Recovery Act [RCRA, 42 United States Code (U.S.C.) §6901 et seq.], using the Subtitle D approach.

South Carolina Electric & Gas (SCE&G) is subject to the CCR Rule. Based on SCE&G's review of the rule, the forebay portion of the **Flue Gas Desulfurization (FGD) Pond at SCE&G Wateree Station** has been determined to be an existing CCR surface impoundment subject to the CCR rule requirements.

2 PURPOSE

The purpose of this report is to document that the Wateree Station FGD Pond Inflow Design Flood Control System Plan meets the requirements of CCR rule §257.82 – *Hydrologic and Hydraulic Capacity Requirements.*

3 APPLICABLE REGULATIONS

CCR rule §257.82 – *Hydrologic and Hydraulic Capacity Requirements* states the following:

> (a) The owner or operator of an existing or new CCR surface impoundment or any lateral expansion of a CCR surface impoundment must design, construct, operate, and maintain an inflow design flood control system as specified in paragraphs (a)(1) and (2) of this section.
>
> (1) The inflow design flood control system must adequately manage flow into the CCR unit during and following the peak discharge of the inflow design flood specified in paragraph (a)(3) of this section.
>
> (2) The inflow design flood control system must adequately manage flow from the CCR unit to collect and control the peak discharge resulting from the inflow design flood specified in paragraph (a)(3) of this section.
>
> (3) The inflow design flood is:
>
> > (i) For a high hazard potential CCR surface impoundment, as determined under § 257.73(a)(2) or § 257.74(a)(2), the probable maximum flood;
> >
> > (ii) For a significant hazard potential CCR surface impoundment, as determined under § 257.73(a)(2) or § 257.74(a)(2), the 1,000-year flood;
> >
> > (iii) For a low hazard potential CCR surface impoundment, as determined under § 257.73(a)(2) or § 257.74(a)(2), the 100-year flood; or
> >
> > (iv) For an incised CCR surface impoundment, the 25-year flood.

(b) Discharge from the CCR unit must be handled in accordance with the surface water requirements under § 257.3–3.

(c) Inflow design flood control system plan—(1) Content of the plan. The owner or operator must prepare initial and periodic inflow design flood control system plans for the CCR unit according to the timeframes specified in paragraphs (c)(3) and (4) of this section. These plans must document how the inflow design flood control system has been designed and constructed to meet the requirements of this section. Each plan must be supported by appropriate engineering calculations. The owner or operator of the CCR unit has completed the inflow design flood control system plan when the plan has been placed in the facility's operating record as required by § 257.105(g)(4).

40 CFR Rule § 257.3-3 Surface Water states the following:

(a) For purposes of section 4004(a) of the Act, a facility shall not cause a discharge of pollutants into waters of the United States that is in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES) under section 402 of the Clean Water Act, as amended.

(b) For purposes of section 4004(a) of the Act, a facility shall not cause a discharge of dredged material or fill material to waters of the United States that is in violation of the requirements under section 404 of the Clean Water Act, as amended.

(c) A facility or practice shall not cause non-point source pollution of waters of the United States that violates applicable legal requirements implementing an areawide or Statewide water quality management plan that has been approved by the Administrator under Section 208 of the Clean Water Act, as amended.

4 FGD POND DESCRIPTION

Wateree Station is coal-fired electric generation plant located along the Wateree River near Eastover, Richland County, South Carolina. The FGD Pond is used to manage wastewater generated from the flue gas desulfurization scrubber system. The FGD pond was constructed in accordance with construction permit (permit 19263-IW) issued from the South Carolina Department of Health and Environmental Control (SCDHEC) on December 7, 2009, and placed into operation in accordance with an operation approval issued by DHEC on April 10, 2010. Effluent discharge for the FGD Pond is regulated under NPDES Permit #SC0002038.

The FGD Pond includes two forebays (1.1 and 1.15-acres), a primary settling pond, and a secondary settling pond.

Based on SCE&G's review of the rule, the FDG Pond at Wateree Station is a low hazard potential CCR surface impoundment.

5 FLOW INTO THE POND

Given the FDG Pond is considered a low hazard potential CCR surface impoundment, in accordance with 257.82 (a)(1) and 257.82 (a)(3), the FGD Pond's inflow design flood control system must adequately manage flow **into** the CCR unit during and following the peak discharge of the 100-year flood.

The topographic grades associated with the FGD Pond are significantly higher than those of the surrounding land surface. Sheet 3 from the FGD Pond construction plans (Attachment 1) illustrates the location of the pond and associated grades. The FGD Pond rim sits at elevation 137.0 around the forebays and at elevation 134.0 around the primary and secondary settling ponds. Surrounding grades in the vicinity of the pond range between Elevation 117 and Elevation 127.

The Federal Emergency Management Agency (FEMA) provides mapping for the 100-year flood. The FGD Pond occurs on FEMA's FIRM Panel map 45079C0575K. As shown on the FIRM map (Attachment 2), the FGD Pond is located outside of the published 100-year floodplain. Therefore, discharge from the 100-year flood does not flow into the FGD Pond from surrounding areas

As constructed, flow into the FGD Pond during and following the peak discharge of the 100-year flood is limited to normal operational flows and direct precipitation from the 100-year storm event that falls on the pond.

The normal operating pool of the forebays resulting from plant flows is elevation 134.0. As prescribed by the Richland County Stormwater Management Ordinance, the rainfall depth for the 100-year, 24-hour storm event in Richland County is 8.4 inches. Therefore, the 100-year water surface in the pond forebays is elevation 134.7, and the resultant freeboard is 2.3 feet. The normal operating pool of the primary and secondary settling ponds, resulting from plant flows, is elevation 129.0. Given the 100-year storm event's 8.4 inch rainfall depth, the 100-year water surface in the primary and secondary settling ponds is elevation 129.7, and the resultant freeboard is 4.3 feet. Therefore, flow into the pond during and following the peak discharge of the 100-year flood can be adequately managed via safe containment and storage in the pond.

6 FLOW FROM THE POND

Given the FGD Pond is considered a low hazard potential CCR surface impoundment, in accordance with 257.82 (a)(2) and 257.82 (a)(3), the pond's inflow design flood control system must adequately manage flow **from** the CCR unit to collect and control the peak discharge resulting from the 100-year flood.

The FGD pond is dewatered using an effluent pump station that includes two submersible pumps capable of evacuating the pond at a rate of 200 gpm each. Flow out of the pond is pumped via the pump station and effluent forcemain to a downstream receiving management unit in accordance with the facility's NPDES permit. The FGD Pond's dewatering system will discharge the 100-year flood in a controlled manner to return the pond to its' normal operating, pre-flood conditions. Therefore, the existing systems can adequately collect and control the peak discharge from the FGD Pond resulting from the 100-year flood.

7 DISCHARGE FROM THE POND

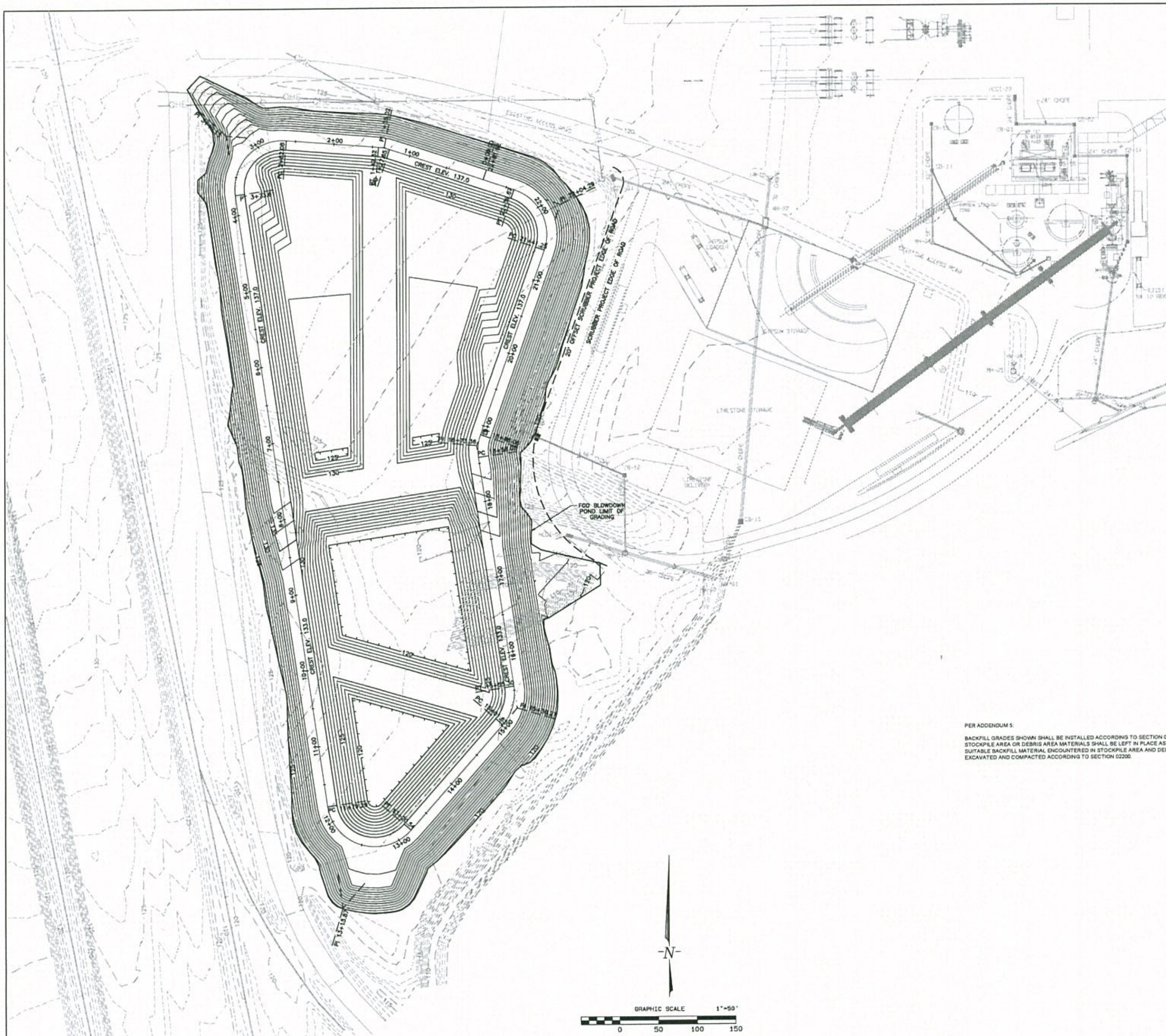
§257.82 (b) requires discharge from the FGD Pond must be handled in accordance with the surface water requirements under § 257.3–3.

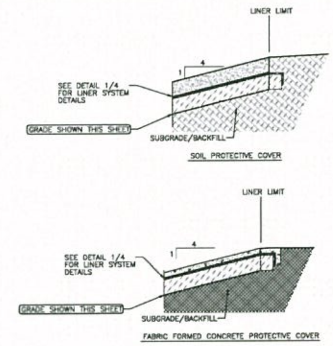
As previously mentioned, discharge from the FGD Pond is regulated in accordance with a National Pollutant Discharge Elimination System (NPDES) permit issued by the SCDHEC. The NPDES permit grants Wateree Station permission to discharge from the facility to the Wateree River in accordance with effluent limitations, monitoring requirements and other conditions. The NPDES permit is issued in accordance with the provisions of the Federal Clean Water Act. Therefore, by complying with the NPDES permit, the discharge from the FGD Pond is being handled in accordance with the surface water requirements under § 257.3-3.

8 CONCLUSION

As constructed, the Wateree Station FGD pond is not susceptible to inflow from the 100-year flood. The pond is capable of receiving and storing permitted wastewater flows as well as direct rainfall from the 100-year, 24-hour storm. The FGD Pond's effluent pump station is sufficient to collect and discharge the 100-year flood in a controlled manner. The discharge from the FGD Pond is permitted under a NPDES permit is issued in accordance with the provisions of the Federal Clean Water Act. Based on the discussions above, the Wateree Station FGD Pond Inflow Design Flood Control System Plan meets the requirements of CCR rule §257.82 – *Hydrologic and Hydraulic Capacity Requirements.*

ATTACHMENT 1





GRADE REPRESENTATION 1/3

PER ADDENDUM 5:

BACKFILL GRADES SHOWN SHALL BE INSTALLED ACCORDING TO SECTION 02200. NO PORTION OF STOCKPILE AREA OR DEBRIS AREA MATERIALS SHALL BE LEFT IN PLACE AS SUBGRADE BACKFILL. SUITABLE BACKFILL MATERIAL ENCOUNTERED IN STOCKPILE AREA AND DEBRIS AREA SHALL BE EXCAVATED AND COMPACTED ACCORDING TO SECTION 02200.

DATE: September 1, 2008	REVISION	DATE
DESIGNED BY: LBG	1)	
DRAWN BY: LBG/CMF	2)	
CHECKED BY: LBG	3)	
APPROVED BY: LBG	4)	

GARRETT & MOORE, INC.
Engineering Services for the Power and Waste Industries

SCE&G WATEREE STATION
FGD SCRUBBER BLOWDOWN WASTEWATER POND

SUBGRADE PLAN

JOB NUMBER

SHEET 3

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 17908 L. BERNARD GARRETT, JR.

SOUTH CAROLINA GARRETT AND MOORE, INC. CERTIFICATE OF AUTHORIZATION No. C3371

10/8/08

Path: V:\SCE&G\Wateree\FGD Wastewater\CADD\Permit Dwgs.pro Plot Date/Time: Wed Oct 8,2008 / 10:20:20

ATTACHMENT 2

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was State Plane South Carolina FIPS 3900. The horizontal datum was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

Spatial Reference System Division National Geodetic Survey, NOAA Silver Spring Metro Center 1315 East-West Highway Silver Spring, Maryland 20910 (301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by Richland County, South Carolina.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the *Flood Insurance Study report* (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

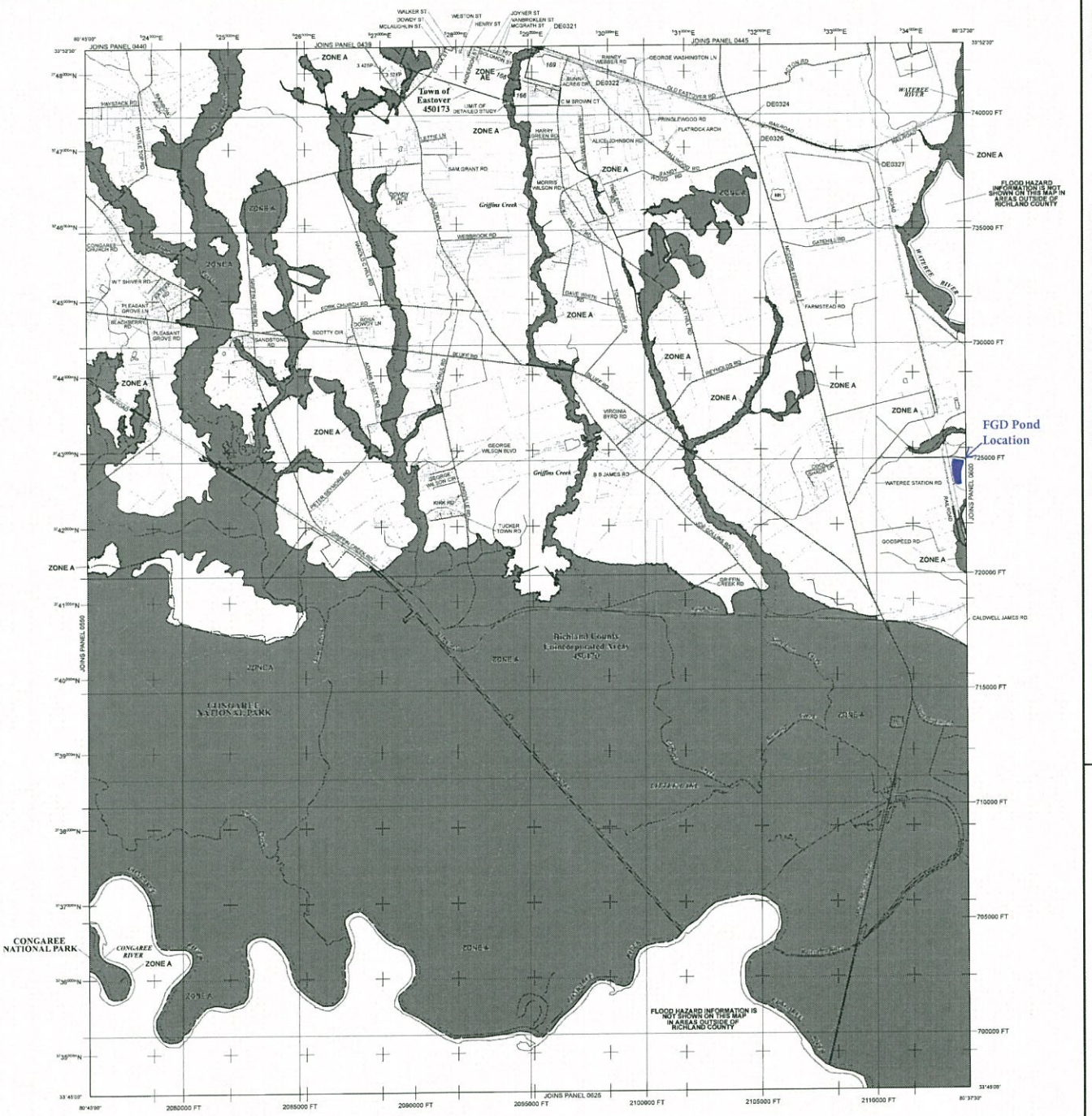
Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a *Flood Insurance Study report*, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.

DNR

This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of South Carolina and the Federal Emergency Management Agency (FEMA). The State of South Carolina has implemented a long term approach of floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map floodplain areas at the local level. As a part of this effort, the state of South Carolina has joined in a Cooperating Technical State agreement with FEMA to produce and maintain this digital FIRM.

http://www.dnr.state.sc.us/



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equalled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

- ZONE A — No Base Flood Elevations determined.
- ZONE AE — Base Flood Elevations determined.
- ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99 — Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- A–A — Cross section line
- 23–23 — Transect line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4275000mE — 1000-meter Universal Transverse Mercator grid ticks, zone 17
- 8000000 FT — 5000-foot grid values: South Carolina State Plane coordinate system (FIPSZONE = 3900), Lambert projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
January 19, 1994

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
February 28, 2003
September 29, 2010 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, to incorporate previously issued Letters of Map Revision, and to reflect updated topographic information.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0575K

FIRM

FLOOD INSURANCE RATE MAP

RICHLAND COUNTY, SOUTH CAROLINA AND INCORPORATED AREAS

PANEL 575 OF 650

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EASTOVER, TOWN OF	450173	0575	K
RICHLAND COUNTY	450170	0575	K

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER 45079C0575K

MAP REVISED SEPTEMBER 29, 2010

Federal Emergency Management Agency