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July 6, 2001

Robert F. Shea
Acting Administrator, Federal Insurance
and Mitigation Administration
Federal Emergency Management Agency
500 C Street, SW
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Dear Mr. Shea:

Pursuant to your letter of July 3, 2001, on behalf of Columbia Venture, LLC we have mailed the enclosed written summary and supporting information to those persons on the attached list. We have mailed and also faxed a copy of the written summary to Michael Buckley at 202-646-4596 and copied those attorneys referenced below. For the sake of time we have also submitted a copy with enclosures to Michael D. Brown, general counsel for FEMA.

Very truly yours,

[redacted]

WCB:kdt
Enclosure
cc: Michael Buckley (w/encl)
Michael D. Brown, Esq. (w/encl)
[redacted]
Buford Mabry, Esq. – SCDNR (w/encl)

TECHNICAL BASIS FOR DETERMINATION OF NO FLOODWAY ON THE RICHLAND COUNTY SIDE OF THE CONGAREE LEVEE

SUBMITTED TO FEDERAL EMERGENCY MANAGEMENT AGENCY

BY

COLUMBIA VENTURE, LLC

JULY 6, 2001

I. INTRODUCTION AND FACTUAL BACKGROUND

This discussion involves the September 26, 2000 Appeal Resolution of a Flood Insurance Study that affects both Richland and Lexington Counties, South Carolina. Columbia Venture LLC (CV) has been recognized as an appellant in this proceeding by FEMA.

CV is a South Carolina LLC whose partners include some of the largest and best known companies in the State and southeast. Burroughs & Chapin Company, Inc. (B&C) is the Managing Partner. B&C is over 100 years old and is a leader in South Carolina's strong, tourism-based economy. Lockwood-Greene (LG) is one of the world's largest engineering firms. Regent Partners is an Atlanta based developer of office and commercial space with holdings in strategically key areas throughout Atlanta and the Southeast. Carolina First is the largest financial institution headquartered in South Carolina.

CV is the owner of 4,800 ± acres of land in Richland County, South Carolina located on the eastern side of the Congaree River near Columbia, South Carolina. This land historically has been protected by an extensive levee system (sometimes called the "Manning Dike"), which also protects the largest wastewater treatment plant in the state, a school and farming and mining properties. The Congaree River is the political boundary separating Richland and Lexington Counties.

In 1994, FEMA accepted a "no rise" letter when a Letter of Map Revision (LOMR) was required for purposes of allowing the South Carolina Department of Transportation (SCDOT) to construct the 12th Street Extension on land that previously had been designated as "floodway" on the Lexington County side of the river. While it is not directly relevant to this proceeding, anecdotal and circumstantial evidence suggests that FEMA and SCDOT knew when this "no rise" letter was issued that construction of the 12th Street Extension on the Lexington County side would cause a shift in the floodway to the Richland County side of the river, if the presence of the Manning Dike were ignored. Anecdotal evidence also suggests that affected communities and property owners on the Richland side of the river were not notified of this new determination, as required by 44 C.R.F. 65.12. CV was not an owner at this time.

In 1995 FEMA issued the currently operative, official flood insurance map (the "1995 FIRM or 1995 map") for the Columbia, South Carolina Congaree River floodplain. This map provides for no floodway on the Richland County side of the river. All previous maps to the official 1995 map (the current map) had indicated no floodway on the Richland County side. Officially, there never has been floodway designated on the Richland County side.

Between the 1995 map and the September 2000 Appeal Resolution, FEMA put forth three additional, different versions of maps for this area and CV supplied a great deal of technical data and consulted with the technical consultants for FEMA at their offices in Fairfax, Virginia to assist in determining the best science available for purposes of delineating the Congaree River floodway. After extensive good faith, face to face discussions with FEMA's technical consultants and input of detailed technical data from both parties, on August 12, 1999 FEMA issued a preliminary FIS and FIRM which showed no floodway on the Richland County side of the Manning Dike. This map was subjected to a 90-day comment period by FEMA.

During this comment period, FEMA accepted data and political and policy arguments from a very vocal minority who, on information and belief, are either opposed to growth in general or,

more specifically, to CV's announced plans to build a high tech research park behind the Manning Dike. Even the then-Director of FEMA was persuaded to weigh in on the issue, in spite of the fact that no official map had ever been issued imposing floodway landward of the Manning Dike. Among these objecting were a professor of statistics at USC, [redacted] who presently is designated as an appellant in this proceeding but who, on information and belief, is not an affected landowner, and the South Carolina Department of Natural Resources (SCDNR). CV has questioned the standing of both of these appellants for several reasons, among them being that [redacted] is not an affected landowner as provided by FEMA's regulations and SCDNR serves as the state flood insurance coordinator for FEMA and receives funding from FEMA. It can be argued that FEMA's own agent appealed a FEMA decision, or put another way, FEMA used this opportunity to appeal its own decision. This reversal was not based on data submitted by Appellants because no one offered technical data, which could have caused a change in position.

The official period for appealing the August 12, 1999 map ended in December 1999 and a final map was expected around February 1999. It was not forthcoming. FEMA "went to ground" and was not responsive to requests for information from CV. Dates for release of the Final Letter of Determination were extended and extended again. Again, CV knows of no technical data submitted by any party during this period, which could have caused FEMA to change its position.

However, on September 26, 2000, FEMA issued the Appeal Resolution, which is the subject of this proceeding, completely reversing its well studied and well debated conclusion of August 12, 1999 and designated over 70% of CV's property on the landward side of the Manning Dike as floodway. The City of Columbia's wastewater treatment plant, Heathwood Hall School and other property owners also are adversely affected by this dramatic change in direction by FEMA. Incidentally, as part of its development plan, CV proposes improvement of the existing levee system to a 500-year event level, to be certified by FEMA. CV is advised that no levee in the U.S. certified to this level has ever failed to protect property behind it. This will, of course, also protect Columbia's wastewater treatment plant and the school, and other properties.

CV immediately appealed the change in policy and set about to prove its case with the best experts in the country. [redacted] of Exponent, Inc. prepared models using the most advanced technology available and the best available data. (See February 15, 2001 submittal by CV, which includes the Exponent model, as well as technical submittals from Lockwood Green and SME&E, a soils expert.) (See also attachment 2, Exponent Clarification Report dated April 27, 2001). This modeling, its techniques and results were then subjected to peer review by [redacted] and [redacted] of Brigham Young University ([redacted] is one of the country's foremost experts in 2D modeling and the use of SMS, the most current, state of the art software. (See attachment 3). CV also consulted with [redacted], distinguished professor and head of the Environmental Engineering Department at the University of South Carolina who, like [redacted], confirmed [redacted] methodology and findings of no floodway and appeared at the April 27 meeting.

FEMA's determination that a floodway exists in Richland County is based on an out-of-date application of two-dimensional software, and is too limited in geographic coverage and topographic detail to be used for this purpose. As noted, on February 15, 2001, CV submitted to FEMA an expanded analysis that was based on more current software, more accurate data, and greater geographic coverage. As referenced above, this model, prepared by Exponent Inc.,

corrected the flaws in FEMA's study. After making this submittal, CV asked FEMA for a meeting of its experts with FEMA's technical contractor to discuss the perceived shortcomings in the FEMA model. This is a normal and customary process but, strangely, in this case, was refused by FEMA. After considerable urging from CV, as a substitute for the requested meeting of experts, FEMA held a public, and very political, meeting on April 27, 2001 in Columbia. No representatives from FEMA's technical contractor participated or commented. A clarification of CV's February 15 analysis was submitted at the April 27 meeting as previously referenced. No other parties submitted any technical data, clarification or otherwise. CV's submittal demonstrated, again, that there is no floodway on the Richland County side of the river. The scientific and technical superiority of this analysis was confirmed in the previously mentioned April 24, 2001 peer review clarification by [redacted] and [redacted], also submitted at the April 27, 2001 meeting.

Scientific and technical superiority of the Exponent model, also was confirmed in the June 6, 2001 letter to FEMA from SCDOT which, in effect, disavows use of the 20 year old SCDOT model by FEMA in this instance. (See attachment 4). The 20-year old model FEMA used for floodway determination was actually commissioned by SCDOT for the purpose of designing the I-77 bridge layout, not for the purpose of floodway determination, because, among other deficiencies, the boundaries are too close, the geographic area too small and the topographic data is stale and inaccurate. It should not have been used in this instance when state of the art software and more accurate data were readily available.

After the April 27, 2001 public meeting it became apparent from correspondence from FEMA that it intended to disregard information submitted for clarification of CV's position at the April 27, 2001 public meeting. FEMA set a June 20, 2001 date for a public meeting at which a Letter of Final Determination was to be issued and in the transmittal setting that meeting clearly indicated to CV and others that it would not consider all of the technical information which had been submitted by CV. CV again requested a meeting of its technical experts with FEMA's technical contractor. This was denied and ultimately this mediation proceeding mediation was scheduled.

In summary, FEMA has been mapping this area for the past seven years. CV respectfully submits that FEMA now has the best available science and most technically accurate data before it as demonstrated by Exponent, Inc.'s February 15, 2001 submission and subsequent clarifications. These confirm that there is no floodway on the Richland County side of the Congaree River. It is hoped that the process on July 24 will allow a decision to be made based upon all of the technical information and, in this regard, CV believes it is critical that the technical contractors for FEMA participate in this meeting.

II. SUMMARY OF CRITICAL ISSUES

While there are a number of issues with which CV disagrees with FEMA, the overriding technical issue is whether there is floodway on the Richland County side of the Congaree River behind the Manning Dike. Another issue for determination in this proceeding is how to most correctly determine floodway in an area that historically has been protected by levees that have not been certified. CV challenges the science and engineering that FEMA used to support its determination of the location of the floodway on the Richland County side of the river. CV does

not concede FEMA's determination of Base Flood Elevations (BFEs) but for purposes of this proceeding and analysis will assume their correctness.

SUMMARY ANSWER

There is no floodway on the Richland County side of the river. This conclusion is based on the best available science and the most technically correct data as discussed throughout the balance of this submittal, the February 14, 2001 submittal and the related attachments. FEMA also failed to properly calibrate its HEC-2 one-dimensional model (used to determine BFEs and floodway) using the data generated by FEMA's two-dimensional RMA2 model. FEMA arbitrarily assumed that a floodway would extend to and include the I-77 relief bridge. FEMA appears to justify this leap on its guidelines (FEMA 37), which state that effective floodway should be retained wherever possible. The critical question is, however, what constitutes the effective floodway? FEMA's 37 does not vest FEMA with unbridled discretion to determine floodway on an ad hoc basis and calibrating the HEC-2 model with invalid and ad hoc assumptions produces a result that in the end is no less arbitrary, invalid and ad hoc.

1. FEMA's 2-D Model Result Was Incorrect.

   FEMA used a two-dimensional model prepared by USGS/SCDOT (prepared in the late 1970's), which had been designed for the purpose of trying to size openings under I-77 and not for purposes of determining floodway.

   FEMA's model did not use the latest technological innovations. The two-dimensional model used by CV used the most modern technology, which allowed for a more comprehensive analysis and more accurate results.

   CV's model covered a larger geographical area than FEMA's model and incorporated a larger number of data points as well as using more current conditions topographically.

   Independent peer review by [redacted] of Brigham Young University confirmed that the two-dimensional model Exponent, Inc. prepared on behalf of CV was far superior to FEMA's and yielded a more scientifically accurate result of no floodway.

   Additionally, SCDOT, in its letter dated June 6, 2001, also confirmed that the Exponent, Inc. model was superior to FEMA's and would produce a more accurate result.

   Given these facts and applying the applicable criteria under FEMA's (NFIP) regulations as to what constitutes a floodway as set forth within the Legal and Regulatory Framework section of this submittal, the only valid conclusion that can be reached is there is no floodway on the Richland County side of the Congaree River.

2. <u>FEMA Dealt Inappropriately With the Question of How To Deal With A Substantial But Uncertified Levee In A Floodway Determination</u>.

FEMA's staff has repeatedly stated that its determination of floodway in Richland County was made "without levee" (see FEMA 37, 7-4). That is not true. As stated on Page 28 of the Appeal Resolution Document (ARD), "the dike configuration was not removed...." In fact, what FEMA did was consider the levee but it erred when it failed to properly input into the HEC 2 model the appropriate flow boundaries for the floodway as determined by FEMA's 2-D flow analysis. This error was further compounded by the errors in FEMA's original 2-D work used to determine whether effective flow would exist behind the levee.

FEMA's floodway designation is not supportable because it uses a dual set of standards. Page 12 of the Appeal Resolution Document that accompanied their September 26, 2000 map says that even though levees in Richland County may partially fail, they would still block conveyance in the Richland County floodplain (See Attachment 1). In effect, FEMA concedes that parts of the levee system are hydraulically independent and will influence both flow patterns and floodway boundaries. In other words, the levees will remain substantially intact during the 100-year flood and a two-dimensional model is necessary to analyze the flow patterns. Guidance on Page 7-4 of FEMA 37 applies only to simple floodway determinations where it is technically appropriate to consider only "with or without" levee scenarios.

FEMA, by its own actions, concedes that it is not technically appropriate to use guidance on Page 7-4 due to the complexity of this specific situation. FEMA, in fact, used the more appropriate guidance on Page 5-6, which is for cases where one-dimensional models (i.e. HEC-2) "*will not provide satisfactory information for floodplain management and flood insurance purposes.*" Once FEMA made the determination that the flow characteristics behind the levee are too complex for a one-dimensional model, and that a two-dimensional flow model was necessary, the simple guidance on Page 7-4 becomes inappropriate. The reason is that the levee obstructs the waterway in a manner that can only be determined by a two-dimensional flow model. Therefore, the guidance on page 7-4 cannot legitimately be reintroduced to the analysis or discussion, unless the guidelines on Page 5-5 are carried out and the flow characteristics behind the levee are determined. Once this is done, it would then be necessary to create a one-dimensional model that matches the flow characteristics computed by the two-dimensional model. FEMA did not properly calibrate the results of their two-dimensional flow analysis when they created their one-dimensional model. Although FEMA's two-dimensional flow analysis for the adopted breach scenario (incorrectly so) shows a small amount of flow behind the levee, their one-dimensional model shows nearly 10 times as much flow on the Richland County side of the river. This additional floodway presented in the September 2000 map was arbitrary and unsupported by empirical evidence. The necessity to use a two-dimensional flow model to determine flow characteristics behind the levee is confirmed by SCDOT having had to use a two-dimensional model for the 1981 report.

III. LEGAL AND REGULATORY FRAMEWORK FOR DETERMINING THE BOUNDARIES OF A REGULATORY FLOODWAY

The legal and regulatory framework for determining the boundaries of a regulatory floodway for purposes of the National Flood Insurance Act, as amended (the "Act"), and the National Flood Insurance Program ("NFIP") regulations is set forth in Title 44 of the Code of Federal Regulations. The NFIP regulations first define a "regulatory floodway" as the "channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height." 44 C.F.R. §59.1. The NFIP regulations establishing floodplain management criteria for flood-prone communities in 44 C.F.R. Part 60, Subpart A then provide in relevant part:

> When the Administrator has provided a notice of final base flood elevations ... and has provided data from which the community shall designate its regulatory floodway, the community shall:
>
> ...
>
> (2) Select and adopt a regulatory floodway based on the principle that the area chosen for the regulatory floodway must be designed to carry the waters of the base flood, without increasing the water surface elevations of that flood more than one food at any point[.]

44 C.F.R. §60.3(d)(2).

Thus, the NFIP regulations, read in conjunction, provide that an affected community shall select and adopt a regulatory floodway designed to carry the waters of a "base flood,"[1] without increasing the water surface elevation of such flood "more than one food at any point." 44 C.F.R. §§59.1; 60.3(d)(2).

In applying this legal standard to the determination of a regulatory floodway, FEMA recognizes that the complexity of topography and variability of hydrologic and hydraulic action in any given flood-prone area may give rise to differing determinations, depending on the quality or accuracy of the computer modeling program adopted. To assist technical contractors in delineating the boundaries of a regulatory floodway, FEMA provided, in its publication entitled "Flood Insurance Study Guidelines and Specifications for Study Contractors" ("FEMA Guidelines" or "FEMA Pub. 37"), technical guidance for performing the required flood insurance studies ("FISs") which serve as the basis for such delineations. The FEMA Guidelines, however, while required to be given deference, provide only general guidance to a study contractor and do not prescribe a particular software or modeling program. Nor do the guidelines prescribe a formulaic result in any particular floodway determination.

Rather, the concept of a regulatory floodway in the NFIP regulations is fundamentally a regulatory concept, predicated on the use of the best scientific evidence and most technically correct data available. Implicit in the NFIP regulations and the FEMA Guidelines is the notion

[1] A "base flood" is defined as a flood "having a percent chance of being equaled or exceeded in any given year," i.e., a "100 year flood." See 44 C.F.R. §59.1.

that a regulatory floodway in a riverplain is, in addition to the water surface elevation limitations set forth in 44 C.F.R. §60.3(d)(2), characterized by the following three defining factors:

- First, a floodway must provide a significant velocity corridor in a direction parallel to the river;

- Second, a floodway must allow for a coherent flow pattern in the context of a 100 year flood, which pattern must have a beginning and an end, by allowing the base flood discharge to return to the river; and

- Third, a designated floodway must serve as an unobstructed waterway that has historically and customarily conveyed part or all of a base flood discharge.

For reasons set forth below, and as previously demonstrated by CV's technical consultants, none of these defining characteristics is present on the landward side of the Manning Dike in Richland County and, therefore, it would be inappropriate to have a map showing floodway on the Richland County side of the river.

IV. DISCUSSION

A. LEVEE CHARACTERISTICS

The affected area of Richland County is dissected by a number of levees, it contains a school, farming and mining operations, and it has a major wastewater treatment for the City of Columbia. The main levees that encircle the Richland County floodplain are the Manning Dike, which starts on the north end and parallels the river down past I-77, the Gills Creek levees, which border Gills Creek on both sides from Bluff Road to the Congaree River, and the Hunting Club levee, which parallels I-77 and blocks potential flows that may come through the relief bridge. The levees are generally 15 feet high and 100 feet wide at the bottom.

Although these levees have been present since the 1800's, and were very substantially improved in the 1950s and '60s, they are currently uncertified. The reason these levees remain uncertified is that FEMA did not allow them to be upgraded after they issued the 1994 "no rise" letter for the 12th Street Extension, which arguably moved the floodway into Richland County. Although FEMA's guidelines call for the elimination of all uncertified levees when doing hydraulic analysis, in both the August 12, 1999 and September 26, 2000 studies, FEMA concluded that the network of dikes is so extensive, they will significantly affect flow patterns even if levee breaches occur. There has been only one historical breach of the Manning Dike, which occurred during the 1976 flood. The width of this breach was approximately 100 feet and it was caused by the improper installation of a sewer outfall line by the City. Minor ponding occurred in Richland County during this flood but the Gills Creek and Hunting Club levees remained intact so there was no conveyance through the area. This breach proves without a doubt that the existing Manning Dike affects the conveyance in the area landward of the levee.

B. HOW DID FEMA DO THE FLOODWAY DETERMINATION?

In order to analyze these complex flow patterns the appeal resolution document that accompanied the September 26, 2000 map uses a two-dimensional model, which was sponsored by the SCDOT and developed by the USGS in 1981. Their approach was to assume specific levee breach scenarios. They assumed that the north and south Gills Creek levee, and the Hunting Club levee, a combined length of 11 miles of levee would completely disappear. CV finds this assumption incomprehensible given that FEMA states in the Appeal Resolution Report, Page 13, that the largest breach is likely to reach a width of only 120 feet and 2 or 3 such breaches could occur during the 100-year event (See Attachment 6), but for purposes of CV's analysis it has assumed the same breach scenario. It would take about 500 independent levee breaches to achieve FEMA's scenario.

Nevertheless, FEMA analyzed this scenario using the USGS model. They concluded simply that some water would flow through Richland County if their breach scenario came to pass. Without examining the characteristics and patterns of how this water flows through, FEMA now makes the assumption that "the large (1,320 feet wide) relief bridge is critical to conveying the Congaree River flow during a 100-year flood" (See Attachment 7).

FEMA also assumed that once the water went through the relief bridge, it would return to the main river. This assumption turns out to be incorrect but there was no way for FEMA to know this because their two-dimensional model did not extend far enough downstream. As was confirmed later in the June 6, 2001 letter from the South Carolina Department of Transportation, the USGS model should not be used for purposes of delineating the Congaree River floodway because it covers too small an area, it was developed for bridge design purposes, and it is based on outdated software.

The expanded two-dimensional flow that FEMA received from CV on February 15, 2001 overcomes these deficiencies. This model adopts FEMA's assumptions for the 100-year flow and breach scenarios. The expanded model shows that, during a combination of FEMA's two worst-case breach scenarios, water landward of the Manning Dike no significant velocity corridor, no coherent flow pattern, and that the eastern relief bridge on Interstate 77 diverts flow away from the main channel of the Congaree River. Instead of rejoining the main river, the water ponds up in the Gills Creek area, even with the implausible levee breach scenario posed by FEMA.

In summary, FEMA did not examine the characteristics of the potential flows in Richland County but merely satisfied themselves that some water flow could exist if 11 miles of levee vanished. It is not necessary to develop a complex two-dimensional flow model if that is the only question to be answered. FEMA failed to examine the flow characteristics in Richland County and mistakenly assumed that water flowing through the relief bridge would go back to the main river instead of reaching a dead end. Furthermore, FEMA did not specify the progression in time of their levee breach scenario. This is a critical element for distinguishing between floodways and floodplain storage areas. CV concludes that FEMA's floodway determination in Richland County is heavily flawed and should not be adopted because it is scientifically and technically inadequate.

C. HOW DID CV PERFORM THE FLOODWAY DETERMINATION?

Our approach was to prepare the data and provide the analysis that FEMA did not do in order to fully evaluate the elements of the floodway definition. First, we researched historical flood records and other data for the Congaree River. Second, we performed extensive field investigations and detailed topographic surveys of the floodplain features. Third, we conducted an expanded, detailed two-dimensional flow analysis, calibrating the model to available field data.

Our results show that for the breach scenarios adopted by FEMA, flow velocities are generally small, except at the breach location and bridge openings. Also, the direction of flow is chaotic, and generally not parallel to the river, especially near the breach locations. For the breach at the school, water is actually flowing to the north, which is opposite to the rivers flow direction. The results show that there are large areas of the floodplain that have velocities lower than 1 foot per second. No continuous flow corridor is observable.

Our analysis shows that the potential levee breach flows entering Richland County separate from the main river as they flow through the school and the treatment plant. The I-77 relief bridge causes this flow separation, which was located approximately one mile to the east of the Congaree River. The reason that a bridge was located in Richland County landward of the existing Manning Dike is that, at the time of the highway's design, planners were not sure of what development patterns would actually take place in Richland County. They were also aware of a proposed levee known as the Ottare dike that might be constructed in Lexington County. The designers built surplus openings in the bridge because they were not sure if this dike would be built. The Ottare dike was never constructed however, and the Manning Dike has been maintained in place. It is clear that Highway designers intended for the vast majority of river flows to travel through Lexington County because bridge openings on that side are approximately 3 times longer compared to the Richland County side. Once water passes through the Richland County relief bridge, it travels to the southeast and ponds up in the Gills Creek area. Although water can enter the Richland County floodplain through levee breaches, the existing development and the distance location of the I-77 relief bridge do not allow this water to return to the river.

While we used FEMA's assumed breach scenarios, our analysis indicates that these scenarios are statistically implausible. Several hundred independent breaches would have to simultaneously occur along the Gills Creek and Hunting Club levees to remove them completely. Furthermore, the 1,000 foot breach by the school would take so long to fully develop that FEMA's scenario could not exist until well after the peak of the flood had passed. Applying the levee breach methods contained in Chapter 9 of FEMA's 1999 HAZUS Technical Manual indicates that during a levee breach, the Richland County floodplain will function as a ponding area. It will take a significant amount of time before the area fills up with enough water in order for any conveyance to occur. It is likely that the flood peak will pass before a series of fully widened series of levee breaches can develop.

FEMA's suggested floodway is not an unobstructed waterway and will not function as one even in the most extreme breach condition. Furthermore, floodplain management within the Richland County floodplain has considered the I-77 relief bridge to be extraneous, because flood conveyance through it is not anticipated. Considering the existing conditions, it does not make

sense for floodplain managers to reserve FEMA's suggested floodway corridor because it has significant obstructions and conflicts with existing land use patterns.

V. CONCLUSION

Our analysis shows that potential flows in the Richland County Floodplain caused by levee breaches fail all three tests for meeting in the floodway definition. The presence of flowing water by itself is an insufficient basis to establish floodway jurisdiction. When FEMA imposes a floodway on a community, it must be tangible, achievable, and enforceable. Given the existing conditions in the Richland County floodplain, a floodway cannot be designated to achieve these objectives.

Respectfully submitted

[redacted]

General Counsel, Burroughs & Chapin Company, Inc.

Winston & Strawn

By: [redacted]

Haynsworth Sinkler Boyd, P.A.

By: [redacted]

July 6, 2001

ATTACHMENTS

1. Page 12 of the Appeal Resolution Document accompanying the September 26, 2000 Preliminary Map.

2. April 27, 2001 Exponent Clarification Report with computation.

3. April 24, 2001 Peer Review Report by [redacted] and [redacted].

4. June 6, 2001 letter to FEMA from SCDOT.

5. CV's corrected depiction of the floodway with supporting HEC-2 computation.

6. Page 13 of the Appeal Resolution Document accompanying the September 26, 2000 Preliminary Map.

7. Page 23 of the Appeal Resolution Document accompanying the September 26, 2000 Preliminary Map.

8. Exponent data files 06/29/2001 (Compact Disk)