



# Federal Emergency Management Agency

Washington, D.C. 20472

August 25, 2009

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:  
Case No.: 09-07-1191R

The Honorable Steve Ehlmann  
County Executive  
St. Charles County  
County Executive Office  
Historic Courthouse  
100 North Third Street  
St. Charles, MO 63301

Community: St. Charles County, MO  
Community No.: 290315

104

Dear Mr. Ehlmann:

This responds to a request that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) comment on the effects that a proposed project would have on the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for St. Charles County, Missouri and Incorporated Areas, in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated June 1, 2009, Mr. George M. Stock, P.E., President, Stock & Associates Consulting Engineers, Inc., requested that FEMA evaluate the effects that the proposed Cottleville Trails Project would have on the flood hazard information shown on the effective FIRM and FIS report. The proposed project will include construction of a bypass channel, excavation of lakes, and placement of fill along Dardenne Creek and construction of a bypass channel, construction of two bridges, and placement of fill along Crooked Creek. The proposed area of revision in your community will extend along Dardenne Creek from just downstream of County Highway N to approximately 2,250 feet downstream of County Highway K, and along Crooked Creek from approximately 1,300 feet upstream to approximately 11,110 feet upstream of its confluence with Dardenne Creek (confluence).

All data required to complete our review of this request for a Conditional Letter of Map Revision (CLOMR) were submitted with letters from Mr. Stock.

Because this revision request also affects the City of Cottleville, a separate CLOMR for that community was issued on the same date as this CLOMR.

We reviewed the submitted data and the data used to prepare the effective FIRM for your community and determined that the proposed project meets the minimum floodplain management criteria of the NFIP. The submitted existing conditions HEC-RAS hydraulic computer models, dated July 21, 2009, based on updated topographic information, were used as the base conditions models in our review of the proposed conditions model for this CLOMR request. We believe that, if the proposed project is constructed as shown on the submitted topographic work map entitled "Cottleville Trails Flood Study – Proposed Conditions," prepared by Stock & Associates Consulting Engineers, Inc., dated June 16, 2009, and the data listed below are received, a revision to the FIRM would be warranted.

RECEIVED  
AUG 28 2009

COUNTY EXECUTIVE OFFICE

**Dardenne Creek**

Our comparison of existing conditions to the effective flood hazard information revealed that the Base (1-percent-annual-chance) Flood Elevations (BFEs) for Dardenne Creek increased and decreased. The maximum increase in BFE, 1.2 feet, will occur approximately 150 feet upstream of County Highway N. The maximum decrease in BFE, 1.0 foot, will occur approximately 7,875 feet upstream of County Highway N.

As a result of the proposed project, the BFEs will decrease compared to the existing conditions BFEs for Dardenne Creek. The maximum decrease in BFE, 0.4 foot, will occur approximately 8,700 feet upstream of County Highway N.

As a result of the proposed project and updated topographic information, the BFEs will increase and decrease compared to the effective BFEs for Dardenne Creek. The maximum increase in BFE, 1.2 feet, will occur approximately 150 feet upstream of County Highway N. The maximum decrease in BFE, 1.0 foot, will occur approximately 7,875 feet upstream of County Highway N.

As a result of the proposed project and updated topographic information, the width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, will increase in some areas and decrease in other areas compared to the effective SFHA width along Dardenne Creek. The maximum increase in SFHA width in your community, approximately 250 feet, will occur approximately 3,200 feet downstream of County Highway K. The maximum decrease in SFHA width, approximately 250 feet, will occur approximately 4,900 feet upstream of County Highway N.

As a result of the proposed project and updated topographic information, the width of the regulatory floodway will increase in some areas and decrease in other areas compared to the effective floodway width along Dardenne Creek. The maximum increase in floodway width, approximately 250 feet, will occur approximately 3,200 feet downstream of County Highway K. The maximum decrease in floodway width in your community, approximately 250 feet, will occur approximately 4,900 feet upstream of County Highway N.

**Crooked Creek**

Our comparison of existing conditions to the effective flood hazard information revealed that the BFEs for Crooked Creek did not change, considering overflow effects from Dardenne Creek.

As a result of the proposed project, the BFEs will decrease compared to the existing conditions BFEs for Crooked Creek. The maximum decrease in BFE, 2.5 feet, will occur approximately 5,600 feet upstream of the confluence.

As a result of the proposed project and updated topographic information, the BFEs will not change compared to the effective BFEs for Crooked Creek, considering overflow effects from Dardenne Creek.

As a result of the proposed project and updated topographic information, the width of the SFHA will increase in some areas and decrease in other areas compared to the effective SFHA width along Crooked Creek. The maximum increase in SFHA width, approximately 250 feet, will occur approximately 5,720 feet upstream of the confluence. The maximum decrease in SFHA width, approximately 380 feet, will occur approximately 10,620 feet upstream of the confluence.

As a result of the proposed project and updated topographic information, the width of the regulatory floodway will increase in some areas and decrease in other areas compared to the effective floodway width along Crooked Creek. The maximum decrease in floodway width, approximately 2,300 feet, will occur approximately 6,150 feet upstream of the confluence. The maximum increase in floodway width, approximately 300 feet, will occur approximately 10,480 feet upstream of the confluence.

Upon completion of the project, your community may submit the data listed below and request that we make a final determination on revising the effective FIRM and FIS report.

- Detailed application and certification forms, which were used in processing this request, must be used for requesting final revisions to the maps. Therefore, when the map revision request for the area covered by this letter is submitted, Form 1, entitled "Overview & Concurrence Form," must be included. (A copy of this form is enclosed.)
- The detailed application and certification forms listed below may be required if as-built conditions differ from the preliminary plans. If required, please submit new forms (copies of which are enclosed) or annotated copies of the previously submitted forms showing the revised information.

Form 2, entitled "Riverine Hydrology & Hydraulics Form"

Form 3, entitled "Riverine Structures Form"

Hydraulic analyses, for as-built conditions, of the base flood; the 10-percent-, 2-percent-, and 0.2-percent-annual-chance floods; and the regulatory floodway, together with a topographic work map showing the revised floodplain and floodway boundaries, must be submitted with Form 2.

- Effective October 1, 2007, FEMA revised the fee schedule for reviewing and processing requests for conditional and final modifications to published flood information and maps. In accordance with this schedule, the current fee for this map revision request is \$4,800 and must be received before we can begin processing the request. Please note, however, that the fee schedule is subject to change, and requesters are required to submit the fee in effect at the time of the submittal. Payment of this fee shall be made in the form of a check or money order, made payable in U.S. funds to the National Flood Insurance Program, or by credit card (Visa or MasterCard only). The payment, along with the revision application, must be forwarded to the following address:

LOMC Clearinghouse  
6730 Santa Barbara Court  
Elkridge, MD 21075

- Documentation of the individual legal notices that were sent to all property owners affected by any shift or increase in width of the SFHAs along Dardenne Creek and Crooked Creek
- A copy of the public notice distributed by your community stating its intent to revise the regulatory floodway, or a statement by your community that it has notified all affected property owners and affected adjacent jurisdictions
- An annotated copy of the FIRM, at the scale of the effective FIRM, that shows the revised base floodplain boundary delineations along Dardenne Creek and Crooked Creek

- As-built plans, certified by a registered professional engineer, of all proposed project elements
- Community acknowledgment of the map revision request

After receiving appropriate documentation to show that the project has been completed, FEMA will initiate a revision to the FIRM and FIS report. Because the BFEs would change as a result of the project, a 90-day appeal period would be initiated, during which community officials and interested persons may appeal the revised BFEs based on scientific or technical data.

The basis of this CLOMR is, in whole or in part, a channel-modification/culvert project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities assure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel and culvert rests with your community.

This CLOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the Consultation Coordination Officer (CCO) for your community. Information on the CCO for your community may be obtained by calling the Mitigation Division of FEMA in Kansas City, Missouri, at (816) 283-7003. If you have any questions regarding this CLOMR, please call our Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,



Siamak Esfandiary, Ph.D., P.E., CFM,  
Program Specialist  
Engineering Management Branch  
Mitigation Directorate

For: William R. Blanton Jr., CFM, Chief  
Engineering Management Branch  
Mitigation Directorate

Enclosures

cc: The Honorable Donald Yarber  
Mayor, City of Cottleville

Mr. Steven G. Lauer  
Director  
Planning & Zoning Division  
St. Charles County

Mr. Gerald R. Harlbert  
City Engineer  
City of Cottleville

Mr. George M. Stock, P.E.  
President  
Stock & Associates Consulting  
Engineers, Inc.

## **Change of Address for Letter of Map Change (LOMC) Submissions**

Starting July 9, 2009, all new Letter of Map Change (LOMC) requests or additional data submittals for requests in progress should be sent to the address listed below.

**LOMC Clearinghouse  
6730 Santa Barbara Court  
Elkridge, MD 21075**

To expedite processing, please address your request to the attention of the following processing specialists:

**ATTENTION: LOMA MANAGER**

Use for MT-1 Requests, including Letters of Map Revision-Based on Fill (LOMR-Fs), Letters of Map Amendment (LOMAs), Conditional Letters of Map Revision-Based on Fill (CLOMR-Fs), and Conditional Letters of Map Amendment (CLOMAs).

**ATTENTION: LOMR MANAGER**

Use for MT-2 Requests, including Letters of Map Revision (LOMRs) and Conditional Letters of Map Revision (CLOMRs).

Starting July 9, 2009, for MT-1 Requests and August 3, 2009, for MT-2 Requests, responsibility for review and processing of these requests has been assigned by FEMA Region to the following Production and Technical Services (PTS) contracting teams:

**Regions I, V, VII, X: STARR  
Regions II, III, VI: RAMPP  
Regions IV, VIII, IX: BakerAECOM**

If you have any questions about your type of request, please contact our Map Assistance Center at **1-877 FEMA MAP (1-877-336-2627)** or visit our website at **[www.fema.gov/hazard/map/lomc.shtm](http://www.fema.gov/hazard/map/lomc.shtm)**.

**U.S. DEPARTMENT OF HOMELAND SECURITY - FEDERAL EMERGENCY MANAGEMENT AGENCY  
OVERVIEW & CONCURRENCE FORM**

*O.M.B No. 1660-0016  
Expires: 12/31/2010*

**PAPERWORK BURDEN DISCLOSURE NOTICE**

Public reporting burden for this form is estimated to average 1 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, U.S. Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

**A. REQUESTED RESPONSE FROM DHS-FEMA**

This request is for a (check one):

- CLOMR: A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).
- LOMR: A letter from DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72)

**B. OVERVIEW**

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301	City of Katy	TX	480301	0005D	02/08/83
480287	Harris County	TX	48201C	0220G	09/28/90

2. a. Flooding Source:

- b. Types of Flooding:  Riverine  Coastal  Shallow Flooding (e.g., Zones AO and AH)  
 Alluvial fan  Lakes  Other (Attach Description)

3. Project Name/Identifier:

4. FEMA zone designations affected: (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision:

a. The basis for this revision request is (check all that apply)

- Physical Change  Improved Methodology/Data  Regulatory Floodway Revision  Base Map Changes  
 Coastal Analysis  Hydraulic Analysis  Hydrologic Analysis  Corrections  
 Weir-Dam Changes  Levee Certification  Alluvial Fan Analysis  Natural Changes  
 New Topographic Data  Other (Attach Description)

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following structures (check all that apply)

- Structures:  Channelization  Levee/Floodwall  Bridge/Culvert  
 Dam  Fill  Other (Attach Description)



**PAPERWORK REDUCTION ACT**

Public reporting burden for this form is estimated to average 3.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, U.S. Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

Flooding Source:

**Note:** Fill out one form for each flooding source studied

**A. HYDROLOGY**

1. Reason for New Hydrologic Analysis (check all that apply)

- Not revised (skip to section B)     
  No existing analysis     
  Improved data  
 Alternative methodology     
  Proposed Conditions (CLOMR)     
  Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)
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3. Methodology for New Hydrologic Analysis (check all that apply)

- Statistical Analysis of Gage Records     
  Precipitation/Runoff Model  
 Regional Regression Equations     
  Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered?  Yes  No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

**B. HYDRAULICS**

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit				
Upstream Limit				

2. Hydraulic Method/Model Used

## B. HYDRAULICS (CONTINUED)

### 3. Pre-Submittal Review of Hydraulic Models

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs may help verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. **These tools do not replace engineering judgment.** CHECK-2 and CHECK-RAS can be downloaded from [http://www.fema.gov/plan/prevent/fhm/frm\\_soft.shtm](http://www.fema.gov/plan/prevent/fhm/frm_soft.shtm). We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. Review of your submittal and resolution of valid modeling discrepancies may result in reduced review time.

### 4. Models Submitted

	Natural Run		Floodway Run		Datum
Duplicate Effective Model*	File Name:	Plan Name:	File Name:	Plan Name:	_____
Corrected Effective Model*	File Name:	Plan Name:	File Name:	Plan Name:	_____
Existing or Pre-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	_____
Revised or Post-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	_____
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	_____

\* For details, refer to the corresponding section of the instructions.

Digital Models Submitted? (Required)

## C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Digital Mapping (GIS/CADD) Data Submitted

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach a **copy of the effective FIRM and/or FBFM**, annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

Annotated FIRM and/or FBFM (Required)

## D. COMMON REGULATORY REQUIREMENTS\*

1. For LOMR/CLOMR requests, do Base Flood Elevations (BFEs) increase?  Yes  No
  - a. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations**:
    - The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
    - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot.
  - b. For LOMR requests, does this request require property owner notification and acceptance of BFE increases?  Yes  No  
If Yes, please attach **proof of property owner notification and acceptance (if available)**. Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.
2. Does the request involve the placement or proposed placement of fill?  Yes  No  
If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.
3. For LOMR requests, is the regulatory floodway being revised?  Yes  No  
If Yes, attach **evidence of regulatory floodway revision notification**. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)
4. For LOMR/CLOMR requests, does this request have the potential to impact an endangered species?  Yes  No  
If Yes, please submit documentation to the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA). Section 9 of the ESA prohibits anyone from "taking" or harming an endangered species. If an action might harm an endangered species, a permit is required from U.S. Fish and Wildlife Service or National Marine Fisheries Service under Section 10 of the ESA.  
  
For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA.

\* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

**PAPERWORK REDUCTION ACT**

Public reporting burden for this form is estimated to average 7 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, U.S. Department of Homeland Security, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

Flooding Source:  
**Note:** Fill out one form for each flooding source studied

**A. GENERAL**

Complete the appropriate section(s) for each Structure listed below:

- Channelization ..... complete Section B
- Bridge/Culvert ..... complete Section C
- Dam/Basin ..... complete Section D
- Levee/Floodwall ..... complete Section E
- Sediment Transport..... complete Section F (if required)

Description Of Structure

**1. Name of Structure:**

Type (check one):     Channelization                       Bridge/Culvert                       Levee/Floodwall                       Dam/Basin

Location of Structure:

Downstream Limit/Cross Section:

Upstream Limit/Cross Section:

**2. Name of Structure:**

Type (check one):     Channelization                       Bridge/Culvert                       Levee/Floodwall                       Dam/Basin

Location of Structure:

Downstream Limit/Cross Section:

Upstream Limit/Cross Section:

**3. Name of Structure:**

Type (check one)     Channelization                       Bridge/Culvert                       Levee/Floodwall                       Dam/Basin

Location of Structure:

Downstream Limit/Cross Section:

Upstream Limit/Cross Section:

**NOTE:** For more structures, attach additional pages as needed.

## B. CHANNELIZATION

Flooding Source:

Name of Structure:

### 1. Accessory Structures

The channelization includes (check one):

- |  |  |
|--|--|
| <input type="checkbox"/> Levees [Attach Section E (Levee/Floodwall)]                 | <input type="checkbox"/> Drop structures                         |
| <input type="checkbox"/> Superelevated sections                                      | <input type="checkbox"/> Transitions in cross sectional geometry |
| <input type="checkbox"/> Debris basin/detention basin [Attach Section D (Dam/Basin)] | <input type="checkbox"/> Energy dissipator                       |
| <input type="checkbox"/> Other (Describe):   |  |

### 2. Drawing Checklist

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

### 3. Hydraulic Considerations

The channel was designed to carry \_\_\_\_\_ (cfs) and/or the \_\_\_\_\_-year flood.

The design elevation in the channel is based on (check one):

- Subcritical flow       Critical flow       Supercritical flow       Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

- Inlet to channel     Outlet of channel     At Drop Structures     At Transitions  
 Other locations (specify):

### 4. Sediment Transport Considerations

Was sediment transport considered?     Yes     No    If Yes, then fill out Section F (Sediment Transport).  
If No, then attach your explanation for why sediment transport was not considered.

## C. BRIDGE/CULVERT

Flooding Source:

Name of Structure:

### 1. This revision reflects (check one):

- Bridge/culvert not modeled in the FIS  
 Modified bridge/culvert previously modeled in the FIS  
 Revised analysis of bridge/culvert previously modeled in the FIS

### 2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8):

If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

### 3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

- |   |  |
|---|--|
| <input type="checkbox"/> Dimensions (height, width, span; radius, length) | <input type="checkbox"/> Erosion Protection                                    |
| <input type="checkbox"/> Shape (culverts only)                            | <input type="checkbox"/> Low Chord Elevations – Upstream and Downstream        |
| <input type="checkbox"/> Material   | <input type="checkbox"/> Top of Road Elevations – Upstream and Downstream      |
| <input type="checkbox"/> Beveling or Rounding                             | <input type="checkbox"/> Structure Invert Elevations – Upstream and Downstream |
| <input type="checkbox"/> Wing Wall Angle                                  | <input type="checkbox"/> Stream Invert Elevations – Upstream and Downstream    |
| <input type="checkbox"/> Skew Angle                                       | <input type="checkbox"/> Cross-Section Locations                               |
| <input type="checkbox"/> Distances Between Cross Sections                 |  |

### 4. Sediment Transport Considerations

Was sediment transport considered?     Yes     No    If yes, then fill out Section F (Sediment Transport).  
If No, then attach your explanation for why sediment transport was not considered.

D. DAM/BASIN

Flooding Source:

Name of Structure:

- 1. This request is for (check one):  Existing dam  New dam  Modification of existing dam
- 2. The dam was designed by (check one):  Federal agency  State agency  Local government agency  Private organization

Name of the agency or organization:

- 3. The Dam was permitted as (check one):

- a.  Federal Dam  State Dam

Provide the permit or identification number (ID) for the dam and the appropriate permitting agency or organization

Permit or ID number          Permitting Agency or Organization

- b.  Local Government Dam  Private Dam

Provided related drawings, specification and supporting design information.

- 4. Does the project involve revised hydrology?  Yes  No

If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

Was the dam/basin designed using critical duration storm?

- Yes, provide supporting documentation with your completed Form 2.
- No, provide a written explanation and justification for not using the critical duration storm.

- 5. Does the submittal include debris/sediment yield analysis?  Yes  No

If yes, then fill out Section F (Sediment Transport).

If No, then attach your explanation for why debris/sediment analysis was not considered.

- 6. Does the Base Flood Elevation behind the dam or downstream of the dam change?

Yes  No    If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

- 7. Please attach a copy of the formal Operation and Maintenance Plan



2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

- b. Is there an indication from historical records that ice-jamming can affect the BFE?  Yes  No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

- a. Openings through the levee system (check one):  exists  does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

- a. The maximum levee slope landside is:  
 b. The maximum levee slope floodside is:  
 c. The range of velocities along the levee during the base flood is: (min.) to (max.)  
 d. Embankment material is protected by (describe what kind):  
 e. Riprap Design Parameters (check one):  Velocity  Tractive stress  
 Attach references

Reach	Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
					D <sub>100</sub>	D <sub>50</sub>	Thickness	
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								

(Extend table on an added sheet as needed and reference each entry)

**E. LEVEE/FLOODWALL (CONTINUED)**

**4. Embankment Protection (continued)**

- f. Is a bedding/filter analysis and design attached?  Yes  No
- g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

**5. Embankment And Foundation Stability**

- a. Identify locations and describe the basis for selection of critical location for analysis:

Overall height: Sta.       ; height       ft.

Limiting foundation soil strength:

Sta.       , depth       to

strength  $\phi$  =       degrees, c =       psf

slope: SS =       (h) to       (v)

(Repeat as needed on an added sheet for additional locations)

- b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):
- c. Summary of stability analysis results:

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

- d. Was a seepage analysis for the embankment performed?  Yes  No

If Yes, describe methodology used:

- e. Was a seepage analysis for the foundation performed?  Yes  No

- f. Were uplift pressures at the embankment landside toe checked?  Yes  No

- g. Were seepage exit gradients checked for piping potential?  Yes  No

- h. The duration of the base flood hydrograph against the embankment is       hours.

Attach engineering analysis to support construction plans.

**E. LEVEE/FLOODWALL (CONTINUED)**

**6. Floodwall And Foundation Stability**

a. Describe analysis submittal based on Code (check one):

UBC (1988) or  Other (specify):

b. Stability analysis submitted provides for:

Overturning  Sliding If not, explain:

c. Loading included in the analyses were:

Lateral earth @  $P_A =$  psf,  $P_p =$  psf

Surcharge-Slope @ ,  surface psf

Wind @  $P_w =$  psf

Seepage (Uplift);  Earthquake @  $P_{eq} =$  %g

1%-annual-chance significant wave height: ft.

1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: Extend table on an added sheet as needed and reference)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection  is,  is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

7. Settlement

- a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin?  Yes  No
- b. The computed range of settlement is        ft. to        ft.
- c. Settlement of the levee crest is determined to be primarily from :
  - Foundation consolidation
  - Embankment compression
  - Other (Describe):
- d. Differential settlement of floodwalls  has  has not been accommodated in the structural design and construction.  
Attach engineering analysis to support construction plans.

8. Interior Drainage

- a. Specify size of each interior watershed:  
Draining to pressure conduit:        acres  
Draining to ponding area:        acres
- b. Relationships Established
  - Ponding elevation vs. storage  Yes  No
  - Ponding elevation vs. gravity flow  Yes  No
  - Differential head vs. gravity flow  Yes  No
- c. The river flow duration curve is enclosed:  Yes  No
- d. Specify the discharge capacity of the head pressure conduit:        cfs
- e. Which flooding conditions were analyzed?
  - Gravity flow (Interior Watershed)  Yes  No
  - Common storm (River Watershed)  Yes  No
  - Historical ponding probability  Yes  No
  - Coastal wave overtopping  Yes  NoIf No for any of the above, attach explanation.
- f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection.  Yes  No  
If No, attach explanation.
- g. The rate of seepage through the levee system for the base flood is        cfs
- h. The length of levee system used to drive this seepage rate in item g:        ft.

**E. LEVEE/FLOODWALL (CONTINUED)**

**8. Interior Drainage (continued)**

i. Will pumping plants be used for interior drainage?  Yes  No

If Yes, include the number of pumping plants:  
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic?  Yes  No

If the pumps are electric, are there backup power sources?  Yes  No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

**9. Other Design Criteria**

a. The following items have been addressed as stated:

- Liquefaction  is  is not a problem
- Hydrocompaction  is  is not a problem
- Heave differential movement due to soils of high shrink/swell  is  is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?  
 Yes  No

Attach supporting documentation

d. Sediment Transport Considerations:

Was sediment transport considered?  Yes  No If Yes, then fill out Section F (Sediment Transport).  
If No, then attach your explanation for why sediment transport was not considered.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

- a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations?  Yes  No
- b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?  
 Yes  No
- c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?  
 Yes  No

If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

- a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations?  Yes  No  
If No, please attach supporting documentation.

12. Operations and Maintenance Plan

Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge:    Volume            acre-feet

Debris load associated with the base flood discharge:    Volume            acre-feet

Sediment transport rate            (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:

Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.



# Federal Emergency Management Agency

Washington, D.C. 20472

August 25, 2009

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:  
Case No.: 09-07-1191R

The Honorable Donald Yarber  
Mayor, City of Cottleville  
City Hall  
5490 Fifth Street  
Cottleville, MO 63304

Community: City of Cottleville, MO  
Community No.: 290898

104

Dear Mayor Yarber:

This responds to a request that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) comment on the effects that a proposed project would have on the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for St. Charles County, Missouri and Incorporated Areas (the effective FIRM and FIS report for your community), in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated June 1, 2009, Mr. George M. Stock, P.E., President, Stock & Associates Consulting Engineers, Inc., requested that FEMA evaluate the effects that the proposed Cottleville Trails Project would have on the flood hazard information shown on the effective FIRM and FIS report. The proposed project will include construction of a bypass channel, excavation of lakes, and placement of fill along Dardenne Creek and construction of a bypass channel, construction of two bridges, and placement of fill along Crooked Creek. The proposed area of revision in your community will extend along Dardenne Creek from just downstream of County Highway N to approximately 2,250 feet downstream of County Highway K, and along Crooked Creek from its confluence with Dardenne Creek (confluence) to approximately 1,300 feet upstream.

All data required to complete our review of this request for a Conditional Letter of Map Revision (CLOMR) were submitted with letters from Mr. Stock.

Because this revision request also affects the unincorporated areas of St. Charles County, a separate CLOMR for that community was issued on the same date as this CLOMR.

We reviewed the submitted data and the data used to prepare the effective FIRM for your community and determined that the proposed project meets the minimum floodplain management criteria of the NFIP. The submitted existing conditions HEC-RAS hydraulic computer models, dated July 21, 2009, based on updated topographic information, were used as the base conditions models in our review of the proposed conditions model for this CLOMR request. We believe that, if the proposed project is constructed as shown on the submitted topographic work map entitled "Cottleville Trails Flood Study - Proposed Conditions," prepared by Stock & Associates Consulting Engineers, Inc., dated June 16, 2009, and the data listed below are received, a revision to the FIRM would be warranted.

## Dardenne Creek

Our comparison of existing conditions to the effective flood hazard information revealed that the Base (1-percent-annual-chance) Flood Elevations (BFEs) for Dardenne Creek increased and decreased. The maximum increase in BFE, 1.2 feet, will occur approximately 150 feet upstream of County Highway N.

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COUNTY EXECUTIVE OFFICE

The maximum decrease in BFE, 1.0 foot, will occur approximately 7,875 feet upstream of County Highway N.

As a result of the proposed project, the BFEs will decrease compared to the existing conditions BFEs for Dardenne Creek. The maximum decrease in BFE, 0.4 foot, will occur approximately 8,700 feet upstream of County Highway N.

As a result of the proposed project and updated topographic information, the BFEs will increase and decrease compared to the effective BFEs for Dardenne Creek. The maximum increase in BFE, 1.2 feet, will occur approximately 150 feet upstream of County Highway N. The maximum decrease in BFE, 1.0 foot, will occur approximately 7,875 feet upstream of County Highway N.

As a result of the proposed project and updated topographic information, the width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, will increase in some areas and decrease in other areas compared to the effective SFHA width along Dardenne Creek. The maximum increase in SFHA width, approximately 270 feet, will occur approximately 1,800 feet upstream of County Highway N. The maximum decrease in SFHA width in your community, approximately 200 feet, will occur approximately 4,200 feet downstream of County Highway K.

As a result of the proposed project and updated topographic information, the width of the regulatory floodway will increase in some areas and decrease in other areas compared to the effective floodway width along Dardenne Creek. The maximum increase in floodway width in your community, approximately 70 feet, will occur approximately 4,600 feet upstream of County Highway N. The maximum decrease in floodway width, approximately 860 feet, will occur approximately 2,400 feet upstream of County Highway N.

### **Crooked Creek**

Our comparison of existing conditions to the effective flood hazard information revealed that the BFEs for Crooked Creek did not change, considering overflow effects from Dardenne Creek.

As a result of the proposed project, the BFEs will decrease compared to the existing conditions BFEs for Crooked Creek. The maximum decrease in BFE in your community, 0.3 foot, will occur approximately 260 feet upstream of the confluence.

As a result of the proposed project and updated topographic information, the BFEs will not change compared to the effective BFEs for Crooked Creek, considering overflow effects from Dardenne Creek.

As a result of the proposed project and updated topographic information, the width of the SFHA in your community will decrease compared to the effective SFHA width along Crooked Creek. The maximum decrease in SFHA width, approximately 100 feet, will occur approximately 1,050 feet upstream of the confluence.

As a result of the proposed project and updated topographic information, the width of the regulatory floodway in your community will decrease compared to the effective floodway width along Crooked Creek. The maximum decrease in floodway width, approximately 530 feet, will occur at the confluence.

Upon completion of the project, your community may submit the data listed below and request that we make a final determination on revising the effective FIRM and FIS report.

- Detailed application and certification forms, which were used in processing this request, must be used for requesting final revisions to the maps. Therefore, when the map revision request for the area covered by this letter is submitted, Form 1, entitled "Overview & Concurrence Form," must be included. (A copy of this form is enclosed.)
- The detailed application and certification forms listed below may be required if as-built conditions differ from the preliminary plans. If required, please submit new forms (copies of which are enclosed) or annotated copies of the previously submitted forms showing the revised information.

Form 2, entitled "Riverine Hydrology & Hydraulics Form"

Form 3, entitled "Riverine Structures Form"

Hydraulic analyses, for as-built conditions, of the base flood; the 10-percent-, 2-percent-, and 0.2-percent-annual-chance floods; and the regulatory floodway, together with a topographic work map showing the revised floodplain and floodway boundaries, must be submitted with Form 2.

- Effective October 1, 2007, FEMA revised the fee schedule for reviewing and processing requests for conditional and final modifications to published flood information and maps. In accordance with this schedule, the current fee for this map revision request is \$4,800 and must be received before we can begin processing the request. Please note, however, that the fee schedule is subject to change, and requesters are required to submit the fee in effect at the time of the submittal. Payment of this fee shall be made in the form of a check or money order, made payable in U.S. funds to the National Flood Insurance Program, or by credit card (Visa or MasterCard only). The payment, along with the revision application, must be forwarded to the following address:

LOMC Clearinghouse  
6730 Santa Barbara Court  
Elkridge, MD 21075

- Documentation of the individual legal notices that were sent to all property owners affected by any shift or increase in width of the SFHAs along Dardenne Creek and Crooked Creek
- A copy of the public notice distributed by your community stating its intent to revise the regulatory floodway, or a statement by your community that it has notified all affected property owners and affected adjacent jurisdictions
- An annotated copy of the FIRM, at the scale of the effective FIRM, that shows the revised base floodplain boundary delineations along Dardenne Creek and Crooked Creek
- As-built plans, certified by a registered professional engineer, of all proposed project elements
- Community acknowledgment of the map revision request

After receiving appropriate documentation to show that the project has been completed, FEMA will initiate a revision to the FIRM and FIS report. Because the BFEs would change as a result of the project,


a 90-day appeal period would be initiated, during which community officials and interested persons may appeal the revised BFEs based on scientific or technical data.

The basis of this CLOMR is, in whole or in part, a channel-modification/culvert project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities assure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel and culvert rests with your community.

This CLOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the SFHA. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the Consultation Coordination Officer (CCO) for your community. Information on the CCO for your community may be obtained by calling the Mitigation Division of FEMA in Kansas City, Missouri, at (816) 283-7003. If you have any questions regarding this CLOMR, please call our Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,



Siamak Esfandiary, Ph.D., P.E., CFM,  
Program Specialist  
Engineering Management Branch  
Mitigation Directorate

For: William R. Blanton Jr., CFM, Chief  
Engineering Management Branch  
Mitigation Directorate

Enclosures

cc: The Honorable Steve Ehlmann  
County Executive  
St. Charles County

Mr. Gerald R. Harlbert  
City Engineer  
City of Cottleville

Mr. Steven G. Lauer  
Director  
Planning & Zoning Division  
St. Charles County

Mr. George M. Stock, P.E.  
President  
Stock & Associates Consulting Engineers, Inc.