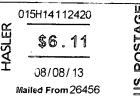
Beth A. Rogers Doddridge County Clerk Room 102 118 East Court St. West Union, WV 26456



7012 1010 0001 4282 8584





RON & JUDITH COLLEGE EVELYN HEINTZELMIN HC 67 BOX 66 WEST UNION, WV 26456



SENDER: COMPLETE THIS SECTION	COMPLETE THIS SECTION ON DEL	COMPLETE THIS SECTION ON DELIVERY			
 Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired. Print your name and address on the reverse 	A. Signature	☐ Agent ☐ Addressee			
 so that we can return the card to you. Attach this card to the back of the mailpiece, or on the front if space permits. 	B. Received by (Printed Name)	C. Date of Delivery			
1. Article Addressed to: 13-046 Ron & Judith College Evelyn Heintzelmin HC 67 Box 66 West Union, WV 26456	□ D. Is delivery address different from item 1? □ Yes If YES, enter delivery address below: □ No				
· •	3. Service Type XX Certified Mail	ail eipt for Merchandise			
	4. Restricted Delivery? (Extra Fee)	☐ Yes			
2. Article Number (Transfer from service label) 7012 101	0 0001 4282 8584	*			
PS Form 3811, February 2004 Domestic	Return Receipt	102595-02-M-1540			

Legal Advertisement:

Doddridge County

Floodplain Permit Application

Please take notice that on the 7th day of August, 2013 **EQT GATHERING, LLC – FLINT RUN** filed an application for a Floodplain Permit to develop land located at or about: **SURFACE OWNERS: CHARLEEN UNDERWOOD, GRANT DISTRICT, 33.2 ACRES, DEED BOOK 302 PG 349, TAX MAP 6 PARCEL 18.**

The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours.

Any interested persons who desire to comment shall present the same in writing by August 20, 2013.

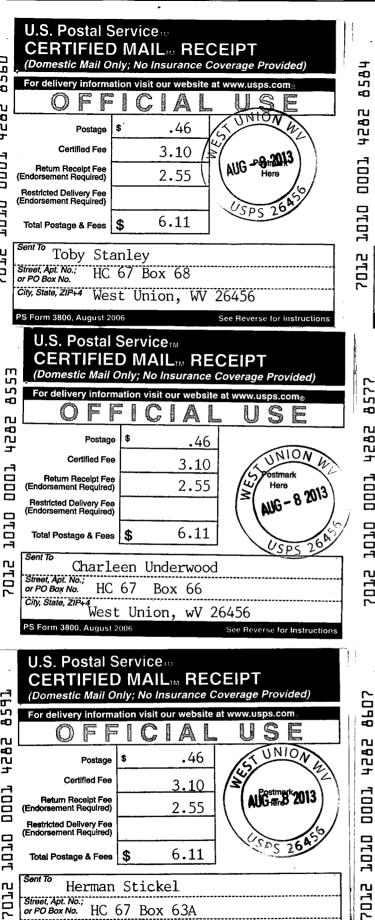
Delivered to the:

Clerk of the County Court

118 E. Court Street, West Union, WV 26456.

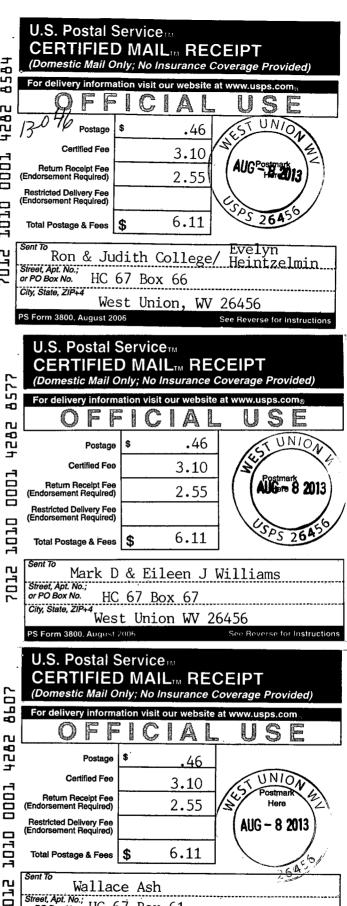
Beth A Rogers, Doddridge County Clerk

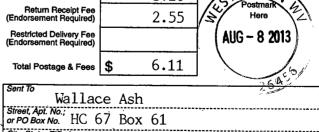
Dan Wellings, Doddridge County Flood Plain Manager



City, State, ZIP+4 West Union, WV 26456

PS Form 3800, August 2006





City, State, ZIP+4 West Union, WV 26456

See Reverse for Instructions

SENDER: COMPLETE THIS SECTION	COMPLETE THIS SECTION ON DELIVERY				
 Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired. Print your name and address on the reverse so that we can return the card to you. Attach this card to the back of the mailpiece, or on the front if space permits. 	A. Signature X Muh Ull Agent Addresse B. Received by (Printed Name) C. Date of Deliver 8-12-13				
1. Article Addressed to: 13-04 6	D. Is delivery address different from item 1? Yes If YES, enter delivery address below: No				
Mark D & Eileen J Williams HC 67 Box 67 West Union, WV 26456					
	3. Service Type ADCertified Mail				
	4. Restricted Delivery? (Extra Fee)				
2. Article Number 7012 1010 (Transfer from service label)	0001 4282 8577				
PS Form 3811, February 2004 Domestic Ret	urn Receipt 102595-02-M-1540				

United States Postal Service



First-Class Mail Postage & Fees Paid USPS Permit No. G-10

Sender: Please print your name, address, and ZIP+4 this box **BETH A ROGERS** DODDRIDGE COUNTY ÉLÉRK 118 E. COURT ST., RM 102 WEST UNION, WV 26456

SENDER: COMPLETE THIS SECTION	COMPLETE THIS SECTION ON DELIVERY
■ Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired. ■ Print your name and address on the reverse so that we can return the card to you. ■ Attach this card to the back of the mailpiece, or on the front if space permits. 1. Article Addressed to: 13-04 € Charleen Underwood HC 67 Box 66 West Union, WV 26456	A. Signature X. Harley Underson Agent Addressee B. Received by (Printed Name) C. Date of Delivery Agent Addressee D. Is delivery address different from item 1? If YES, enter delivery address below:
	3. Service Type Ordertifled Mail
2. Article Number (Transfer from service label) 7012 1010	0001 4282 8553
PS Form 3811, February 2004 Domestic Ret	urn Receipt 102595-02-M-1540

UNITED STATES POSTAL SERVICE



First-Class Mail Postage & Fees Paid USPS Permit No. G-10

 Sender, Please pṛint your name, address, and ZIP+4 in this box BETH A ROGERS

DO DODDRIDGE COUNTY CLERK

118 E. COURT ST., RM 102

WEST UNION, WV 26456

SENDER: COMPLETE THIS SECTION	COMPLETE THIS SECTION ON DELIVERY
 Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired. Print your name and address on the reverse so that we can return the card to you. Attach this card to the back of the mailpiece, or on the front if space permits. 	A. Signature Agent Addressee B. Received by (Printed Name) C. Date of Delivery C. Date of Delivery
1. Article Addressed to: 13-046	D. Is delivery address different from item 1?
Toby Stanley HC 67 Box 68 West Union, WV 26456	
	3. Service Type XXII Certified Mail ☐ Express Mall ☐ Registered ☐ Return Receipt for Merchandise ☐ Insured Mail ☐ C.O.D.
	4. Restricted Delivery? (Extra Fee) ☐ Yes
2. Article Number 7012 1010 (Transfer from service label)	0001 4282 8560
PS Form 3811, February 2004 Domestic Reti	urn Receipt 102595-02-M-1540

UNITED STATES POSTAL SERVICE



First-Class Mail Postage & Fees Paid USPS Permit No. G-10

Sender: Please print/your name, address, and ZIP+4 in this box • AUG 12 BETH A ROGERS SOODDRIDGE COUNTY CLERK និរិ្ឋាំ 8 E. COURT ST., RM 102 2013 WEST UNION, WV 26456

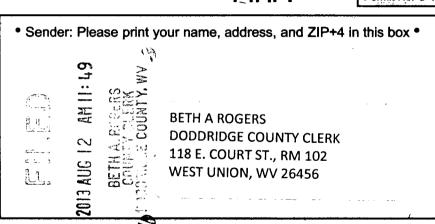
SENDER: COMPLETE THIS SECTION	COMPLETE THIS SECTION ON DELIVERY				
 Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired. Print your name and address on the reverse so that we can return the card to you. Attach this card to the back of the mailpiece, or on the front if space permits. 1. Article Addressed to: 	A. Signature X				
Wallace Ash HC 67 Box 61 West Union, WV 26456	If YES, enter delivery address below: ☐ No				
	3. Service Type Certified Mail				
	4. Restricted Delivery? (Extra Fee) ☐ Yes				
2. Article Number (Transfer from service label) 7012 1010	0001 4282 8607				
PS Form 3811, February 2004 Domestic Retu	urn Receipt 102595-02-M-1540				

UNITED STATES POSTAL SERVICE



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First-Class Mail Postage & Fees Paid USPS Permit No. G-10



SENDER: COMPLETE THIS SECTION	COMPLETE THIS SECTION ON DELIVERY
 Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired. Print your name and address on the reverse so that we can return the card to you. Attach this card to the back of the mailpiece, or on the front if space permits. 	A. Signature X Junes State (NEST Agent With
1. Article Addressed to: 13-046 Herman Stickel HC 67 Box 63A	D. Is delivery address different from item 1? Tyes If YES, enter delivery address below:
West Union, WV 26456	
	3. Service Type Certified Mail
	4. Restricted Delivery? (Extra Fee) ☐ Yes
2. Article Number (Transfer from service label)	0001 4282 8591
PS Form 3811, February 2004 Domestic Ret	urn Réceipt

United States Postal Service



First-Class Mail Postage & Fees Paid USPS Permit No. G-10

Sender: Please print your name, address, and ZIP+4 in this box 9 **BETH A ROGERS** DODDRIDGE COUNTY CLERK 118 E. COURT ST., RM 102 WEST UNION, WV 26456

By: BH - MEH - AML

Asst. Chief Tax Deputy

W. C .Underwood Jr.

Sheriff of Doddridge County

The Person paying Money into the Treasury shall forthwith file one of these Receipts with the County Clerk

Doddridge County, West Virginia

228 No.

Date:

August 1, 2013

Customer copy

Received: #13-046 eqt flint run

\$3,886.00

In Payment For:

Building Permits (LP)

For:

12-Flood Plain Ordinance #20 Fund

By: BH - MEH - AML

Asst. Chief Tax Deputy

W. C .Underwood Jr.

Sheriff of Doddridge County

By: BH - MEH - AML
Asst. Chief Tax Deputy

W. C .Underwood Jr.
Sheriff of Doddridge County

The Person paying Money into the Treasury shall forthwith file one of these Receipts with the County Clerk

Doddridge County, West Virginia

Fund

No. 255

Date: August 7, 2013

Customer copy

Received: #13-046 eqt flint run

\$1,000.00

In Payment For:

318 Building Permits (LP)

For: 12-Flood Plain Ordinance #20

By: BH - MEH - AML

Asst. Chief Tax Deputy

W. C .Underwood Jr.

Sheriff of Doddridge County

Legal Advertisement:

Doddridge County

Floodplain Permit Application

Please take notice that on the 7th day of August, 2013

EQT GATHERING, LLC – FLINT RUN filed an
application for a Floodplain Permit to develop land located at or
about: SURFACE OWNERS: CHARLEEN UNDERWOOD, GRANT

DISTRICT, 33.2 ACRES, DEED BOOK 302 PG 349, TAX MAP
6 PARCEL 18.

The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours.

Any interested persons who desire to comment shall present the same in writing by August 27, 2013.

Delivered to the:

Clerk of the County Court

118 E. Court Street, West Union, WV 26456.

Beth A Rogers, Doddridge County Clerk

Dan Wellings, Doddridge County Flood Plain Manager

Please replace this for the other one.
This is Correct Date August 27, 13.
This is Correct Date August 27, 13.

Legal Advertisement:

Doddridge County

Floodplain Permit Application

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EQT GATHERING, LLC – FLINT RUN filed an
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118 E. Court Street, West Union, WV 26456.

Beth A Rogers, Doddridge County Clerk

Dan Wellings, Doddridge County Flood Plain Manager

P. 01

TRANSACTION REPORT

AUG-07-2013 WED 11:00 AM

FOR: DODDRIDGE CO. CLERK

304 873 1840

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Legal Advertisement:

Doddridge County

Floodplain Permit Application

13-046

Please take notice that on the 7th day of August, 2013

EQT GATHERING, LLC – FLINT RUN filed an application for a Floodplain Permit to develop land located at or about: SURFACE OWNERS: CHARLEEN UNDERWOOD, GRANT DISTRICT, 33.2 ACRES, DEED BOOK 302 PG 349, TAX MAP 6 PARCEL 18.

The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours.

Any interested persons who desire to comment shall present the same in writing by August 26, 2013.

Delivered to the:

Clerk of the County Court

118 E. Court Street, West Union, WV 26456.

Beth A Rogers, Doddridge County Clerk

Dan Wellings, Doddridge County Flood Plain Manager

P. 01

TRANSACTION REPORT

AUG-07-2013 WED 01:26 PM

FOR:

DODDRIDGE CO. CLERK

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Legal Advertisement:

Doddridge County

Floodplain Permit Application

13-046

Please take notice that on the 7th day of August, 2013 EQT GATHERING, LLC – FLINT RUN filed an application for a Floodplain Permit to develop land located at or about: SURFACE OWNERS: CHARLEEN UNDERWOOD, GRANT DISTRICT, 33.2 ACRES, DEED BOOK 302 PG 349, TAX MAP 6 PARCEL 18.

The Application is on file with the Clerk of the County Court and may be inspected or copied during regular business hours. Any interested persons who desire to comment shall present the same in writing by August 27, 2013.

Delivered to the:

Clerk of the County Court 118 E. Court Street, West Union, WV 26456.

Beth A Rogers, Doddridge County Clerk Dan Wellings, Doddridge County Flood Plain Manager

Please replace this for the other one.

This is Correct Date August 27, 13.

This is Correct Date August 27, 13.

This is Correct Date August 27, 13.

TRANSACTION REPORT

AUG-07-2013 WED 01:28 PM

FOR:

DODDRIDGE CO. CLERK

304 873 1840

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Legal Advertisement:

Doddridge County

Floodplain Permit Application

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EQT GATHERING, LLC – FLINT RUN filed an
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DISTRICT, 33.2 ACRES, DEED BOOK 302 PG 349, TAX MAP
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Delivered to the:

Clerk of the County Court

118 E. Court Street, West Union, WV 26456.

Beth A Rogers, Doddridge County Clerk

Dan Wellings, Doddridge County Flood Plain Manager

Please replace this for the other one.

This is Correct Date August 27, 13.

This is Correct Date August 27, 13.

Thanks

Cottel

DODDRIDGE COUNTY FLOODPLAIN DEVELOPMENT PERMIT

PURPOSE FOR PERMIT: WG-100 PIPELINE	
ISSUED TO EQT GATHERING, LLC	7 -
ADDRESS: 625 LIBERTY AVE. SUITE PITTSBURGH, PA 15222	1700
PROJECT ADDRESS: <u>BIG FLINT RUN NEAR</u> POUERTY RUN	BELOW
ISSUED BY: Dan Wellings	j.
DATE: 08/28/2013 THE PERMIT EXPIRES 180 DAYS FROM THIS DATE	

THIS PERMIT MUST BE POSTED ON THE PREMISES IN A CONSPICUOUS PLACE SO AS TO BE CLEARLY VISIBLE FROM THE STREET.

DODDRIDGE COUNTY FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

SECTION 1: GENERAL PROVISIONS (APPLICANT TO READ AND SIGN)

- 1. No work may start until a permit is issued.
- 2. The permit may be revoked if any false statements are made herein.
- 3. If revoked, all work must cease until permit is re-issued.
- **4.** Development shall not be used or occupied until a Certificate of Compliance is issued.
- 5. The permit will expire if no work is commenced within six months of issuance.
- **6.** Applicant is hereby informed that other permits may be required to fulfill local, state, and federal requirements.
- **7.** Applicant hereby gives consent to the Floodplain Administrator/Manager or his/her representative to make inspections to verify compliance.
- 8. I, THE APPLICANT CERTIFY THAT ALL STATEMENTS HEREIN AND IN ATTACHMENTS TO THIS APPLICATION ARE, TO THE BEST OF MY KNOWLEDGE, TRUE AND ACCURATE.

APPLICANT'S SIGNATURE 7/30/13

SECTION 2: PROPOSE DEVELOPMENT (TO BE COMPLETED BY APPLICANT).

IF THE APPLICANT IS NOT A NATURAL PERSON, THE NAME, ADDRESS, AND TELEPHONE NUMBER OF A NATURAL PERSON WHO SHALL BE APPOINTED BY THE APPLICANT TO RECEIVE NOTICE PURSUANT TO ANY PROVISION OF THE CURRENT DODDRIDGE COUNTY FLOODPLAIN ORDINANCE.

APPLICANT'S NAME: Stephanie Frazier / EQT Gathering, LLC **ADDRESS:** 625 Liberty Ave, Suite 1700, Pittsburgh, PA 15222

TELEPHONE NUMBER: 412 – 553 - 5798

113 JUL 31 AM 9: 07

To avoid delay in processing the application, please provide enough information to easily identify the project location.

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES) A. STRUCTURAL DEVELOPMENT

	<u>ACT</u>	IVITY				<u>STRUCTUR</u>	AL TYPE
0 0 0 0 0	New Structu Addition Alteration Relocation Demolition Manufactur	red/Mo			0 0 0 0 0	Non-resident	more than 4 Family) tial (floodproofing) se (res. & com.)
B.			MENT ACTIV		Duillin	- [V]	Disalisis
	Fill	[]	Mining	[]	Drillin	g [X]	Pipelining
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	Other (pleas		•	•			
2.	SUBMIT ALI IF STANDAR SKETCH ON THE LOT. SI INDICATING	STAND RD SITE A SEPA HOW TH BUILDI S OR LA	PLANS HAVE I RATE 8 ½ X 11 IE LOCATION (NG SETBACKS IND USES ON	NNS, IF AN NOT BEEN INCH SHE OF THE IN , SIZE & H	IY HAVE I PREPA EET OF F TENDEC EIGHT.	E BEEN PREPAR RED: PAPER THE SHAD CONSTRUCTI	RED. APE AND LOCATION OF ON OR LAND USE TING BUILDINGS,
J,	JIGH AND L	7016 III	il Jali Cil.				
ACT	JAL TOTAL (CONST	RUCTION C	OSTS OF	THE C	OMPLETE DI	EVELOPMENT
IRRE	SPECTIVE O	F WHE	THER ALL O	R ANY P	ART O	F THE SUBJE	CT PROPOSED
CON	STRUCTION	PROJE	CT IS WITH	IN THE F	LOOD	PLAIN \$ 6	77,200

D. ADJACENT AND/OR AFFECTED LANDOWNERS:

1. NAME AND ADDRESS OF ALL OWNERS OF SURFACE TRACTS ADJACENT TO THE AREA OF THE SURFACE TRACT (UP & DOWN STREAM) UPON WHICH THE PROPOSED ACTIVITY WILL OCCUR AND ALL OTHER SURFACE OWNERS UP & DOWN STREAM) WHO OWN PROPERTY THAT MAY BE AFFECTED BY FLOODING AS IS DEMONSTRATED BY A FLOODPLAIN STUDY OR SURVEY (IF ONE HAS BEEN COMPLETED).

See Attached List

1. NAME AND ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON ANY ADJACENT PROPERTY AT THE TIME THE FLOODPLAIN PERMIT APPLICATION IS FILED AND THE NAME AND ADDRESS OF AT LEAST ONE ADULT RESIDING IN ANY HOME ON ANY PROPERTY THAT MAY BE AFFECTED BY FLOODING AS IS DEMONSTRATED BY A FLOODPLAIN STUDY OR SURVEY.

See Attached List

E. CONFIRMATION FORM

THE APPLICANT ACKNOWLEDGES, AGREES, AND CONFIRMS THAT HE/IT WILL PAY WITHIN 30 DAYS OF RECEIPT OF INVOICE BY THE COUNTY FOR ALL EXPENSES RELATIVE TO THE PERMIT APPLICATION PROCESS GREATER THAN THE REQUIRED DEPOSIT FOR EXPENSES INCLUDING:

- (A) PERSONAL SERVICE OF PROCESS BY THE DODDRIDGE COUNTY SHERIFF AT THE RATES PERMITTED BY LAW FOR SUCH SERVICE.
- (B) SERVICE BY CERTIFIED MAIL RETURN RECEIPT REQUESTED.
- (C) PUBLICATION.
- (D) COURT REPORTING SERVICES AT ANY HEARINGS REQUESTED BY THE APPLICANT.
- (E) CONSULTANTS AND/OR HEARING EXPERTS UTILIZED BY DODDRIDGE COUNTY FLOODPLAIN ADMINISTRATOR/MANAGER OR FLOODPLAIN APPEALS BOARD FOR REVIEW OF MATERIALS AND/OR TESTIMONY REGARDING THE EFFICACY OF GRANTING OR DENYING THE APPLICANT'S FLOODPLAIN PERMIT.

NAME (PRINT):	Stephanie Frazier	/ /
SIGNATURE:		DATE: 7/30/13
	()) 000	

After completing SECTION 2, APPLICANT should submit form to Floodplain Administrator/Manager or his/her representative for review.

Name and Address of Surface Owner Tracts Adjacent to Flint Run

Track #	Map-Par.	Dist.	Acres	Surface Owner/ Name	Street Address	City	State	Zip	Phone#
302-349	6-18	Grant	33.20	Charleen Underwood	HC 67 Box 66	West Union	W۷	26456	304-873-2725
302-350	6-18.1	Grant	122.38	Toby Stanley	HC 67 Box 68	West Union	W۷	26456	304-873-3331
302-351	6-18.3	Grant	5.02	Toby Stanley	HC 67 Box 68	West Union	۷V	26456	304-873-3331
302-348	6-13	Grant	59.75	Mark D. & Eileen J. Williams	HC 67 Box 67	West Union	W۷	26456	304-873-2433
302-347	6-20	Grant	83.53	Ron and Judith College; Evelyn Heintzelmin	234 Philadelphia Ave.	Waynesboro	PA	17268	717-762-7289
	6-18.2	Grant	33.20	Charleen Underwood	HC 67 Box 66	West Union	W۷	26456	304-873-2725
	6-20.3	Grant	3.65	Herman Stickel	HC 67 Box 63A	West Union	W۷	26456	304-873-1372
	6-24	Grant	68.89	Wallace Ash	HC 67 Box 61	West Union	WV	26456	304-873-2083

SECTION 3: FLOODPLAIN DETERMINATION (to be completed by Floodplain Administrator/Manager or his/her representative)

THE PROPOSED DEVELOPMENT:

[]

THE PROPOSED DEVELOPINENT:
THE PROPOSED DEVELOPMENT IS LOCATED ON:
FIRM Panel: 130 Dated: 10/04/201/
[] Is <u>NOT</u> located in a Specific Flood Hazard Area (Notify applicant that the application review is complete and NO FLOOPLAIN DEVELOPMENT PERMIT IS REQUIRED).
Is located in Special Flood Hazard Area. FIRM zone designation 100-Year flood elevation is: 777.65 NGVD
[] Unavailable
[] The proposed development is located in a floodway. FBFM Panel No Dated
Signed Mulling DATE 08/28/2013
SECTION 4: ADDITIONAL INFORMATION REQUIRED (To be completed by Floodplain Administrator/Manager or his/her representative)
The applicant must submit the documents checked below before the application can be processed.

dimensions and proposed development.

A plan showing the location of all existing structures, water bodies, adjacent roads, lot

0	Development plans, drawn to scale, and specifications, including where applicable: details for anchoring structures, storage tanks, proposed elevation of lowest floor, (including basement or crawl space), types of water resistant materials used below the first floor, details of flood proffing of utilities located below the first floor and details of enclosures below the first floor. Also
[]	Subdivision or other development plans (If the subdivision or development exceeds 50 lots or 5 acres, whichever is the lesser, the applicant must provide 100-year flood elevations if they are not otherwise available).
[]	Plans showing the extent of watercourse relocation and/or landform alterations.
[]	Top of new fill elevationFt. NGVD (MSL). For floodproofing structures applicant must attach certification from registered engineer or architect.
[]	Certification from a registered engineer that the proposed activity in a regulatory floodway will not result in any increase in the height of the 100-year flood. A copy of all data and calculations supporting this finding must also be submitted.
[]	Manufactured homes located in a floodplain area must have a West Virginia Contractor's License and a Manufactured Home Installation License as required by the Federal Emergency Management Agency (FEMA).
[]	Other:

SECTION 5: PERMIT DETERMINATION (To be completed by Floodplain Administrator/Manager or his/her representative)

I have determined that the proposed activity (type is or is not) in conformance with provisions of the Floodplain Ordinance adopted by the County Commission of Doddridge County on May 21, 2013. The permit is issued subject to the conditions attached to and made part of this permit.

with the	odplain Administrator/Manager found that the above was not in conformance provisions of the Doddridge County Floodplain Ordinance and/or denied that on, the applicant may complete an appealing process below.
APPEAL	S: Appealed to the County Commission of Doddridge County? [] Yes {} No
	Hearing Date: County Commission Decision - Approved [] Yes [] No
CONDITION	
	S-BUILT ELEVATIONS (To be submitted by APPLICANT before
	S-BUILT ELEVATIONS (To be submitted by APPLICANT before Compliance is issued). Not Applicable
ertificate of	Compliance is issued). Not Applicable
ertificate of	photogrammin representation of control and deliberation of control.
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ertificate of the following in the follo	Compliance is issued). Not Applicable formation must be provided for project structures. This section must be registered professional engineer or a licensed land surveyor (or attach a his application). 2 BELOW: (As-Built) Elevation of the top of the lowest floor (including basement or
ne following in ompleted by a ertification to to the DMPLETE 1 OR a craw	formation must be provided for project structures. This section must be registered professional engineer or a licensed land surveyor (or attach a his application). 2 BELOW: Il (As-Built) Elevation of the top of the lowest floor (including basement or space isFT. NGVD (MSL)
ertificate of ne following in ompleted by a ertification to t OMPLETE 1 OR 1 Actual	Compliance is issued). Not Applicable formation must be provided for project structures. This section must be registered professional engineer or a licensed land surveyor (or attach a his application). 2 BELOW: (As-Built) Elevation of the top of the lowest floor (including basement or

Administrator/Manager or his/her representative).

The Floodplain Administrator/Manager or his/her representative will complete this section as applicable based on inspection of the project to ensure compliance with the Doddridge County Floodplain Ordinance.

INSPECTIONS:
DATE: 12/05/13 BY: Dan Wells DEFICIENCIES? YN
comments Visited site 07/25/2013 - no pounit
Visited site 12/05/2013 - reclaimation
SECTION 8: CERTIFICATE OF COMPLIANCE (To be completed by Floodplain
Administrator/Manager or his/her representative).
Certificate of Compliance issued: DATE: 12/06/13BY: Dan Welling
CERTIFICATE OF COMPLIANCE
FOR DEVELOPMENT IN SPECIAL FLOOD HAZARD AREA
(OWNER MUST RETAIN)
PERMIT NUMBER: 13-046 PERMIT DATE: 8/28/2013
PURPOSE
construction LOCATION: WG-100 Pipeline Big Flint Ron

OWNER'S ADDRESS:_	EQT				
	625 Liberty Ave. Saite, 1700	<u>-</u>			
	Pittsburgh PA 15222				
	//	_			

THE FOLLOWING MUST BE COMPLETED BY THE FLOODPLAIN ADMINISTRATOR/MANAGER OR HIS/HER AGENT.

COMPLIANCE IS HEREBY CERTIFIED WITH THE REQUIREMENT OF THE FLOODPLAIN ORDINANCE ADOPTED BY THE COUNTY COMMISSION OF DODDRIDGE COUNTY ON MAY 21, 2013.

SIGNED Walley DATE 12/06/2013

DODDRIDGE COUNTY FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

SECTION 1: GENERAL PROVISIONS (APPLICANT TO READ AND SIGN)

- 1. No work may start until a permit is issued.
- 2. The permit may be revoked if any false statements are made herein.
- **3.** If revoked, all work must cease until permit is re-issued.
- **4.** Development shall not be used or occupied until a Certificate of Compliance is issued.
- **5.** The permit will expire if no work is commenced within six months of issuance.
- **6.** Applicant is hereby informed that other permits may be required to fulfill local, state, and federal requirements.
- **7.** Applicant hereby gives consent to the Floodplain Administrator/Manager or his/her representative to make inspections to verify compliance.
- 8. I, THE APPLICANT CERTIFY THAT ALL STATEMENTS HEREIN AND IN ATTACHMENTS TO THIS APPLICATION ARE, TO THE BEST OF MY KNOWLEDGE, TRUE AND ACCURATE.

APPLICANT'S SIGNATURE

DATE

SECTION 2: PROPOSE DEVELOPMENT (TO BE COMPLETED BY APPLICANT).

IF THE APPLICANT IS NOT A NATURAL PERSON, THE NAME, ADDRESS, AND TELEPHONE NUMBER OF A NATURAL PERSON WHO SHALL BE APPOINTED BY THE APPLICANT TO RECEIVE NOTICE PURSUANT TO ANY PROVISION OF THE CURRENT DODDRIDGE COUNTY FLOODPLAIN ORDINANCE.

APPLICANT'S NAME: Stephanie Frazier / EQT Gathering, LLC

ADDRESS: 625 Liberty Ave, Suite 1700, Pittsburgh, PA 15222

TELEPHONE NUMBER: 412 – 553 - 5798

hanie Frazier

BUILDER'S NAME:	Pete Gould and Sons						
ADDRESS:	RR 1 Box 129, Smithfield, WV 26437						
TELEPHONE NUMBER:	(304) 889-2950						
FNGINFFR'S NAME: Fric	Hershey / Rettew Associates						
	Avenue, Lancaster, PA 17603						
	,						
TELEPHONE NUMBER: 1	-800-738-8395						
approximately 100' west of	rossing is located in Grant District, Doddridge County, of Big Flint Road and 700' north of the intersection with Sink s 39°21'29.2"N and 80°42'43.1"W						
NAME OF SURFACE OWNER/OWNERS (IF NOT THE APPLICANT) Charleen Underwood							
ADDRESS OF SURFACE OWN Union, WV, 26456	ER/OWNERS (IF NOT THE APPLICANT) HC 67 Box 66, West						
DISTRICT: Grant							
	RTY PURCHASED:Enza B. Smith July 7, 1964						
LAND BOOK DESCRIPTION:_	 -						
DEED BOOK REFERENCE: Tra							
TAX MAP REFERENCE: Map							
•	OF PROPERTY: Residence and outbuildings						
	ULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT						
PROPERTY: Charleen Under							
	ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE						
SUBJECT PROPERTY: HC 67	Box 66, West Union, WV, 26456						

To avoid delay in processing the application, please provide enough information to easily identify the project location.

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES) A. STRUCTURAL DEVELOPMENT

ACTIVITY

STRUCTURAL TYPE

() () () () () () B.	(New Structure Addition Alteration Relocation Demolition Manufactured/Mobil Home OTHER DEVEOPLMENT ACTIVITIES:			0 0 0 0	Residential (1 – 4 Family) Residential (more than 4 Family) Non-residential (floodproofing) Combined Use (res. & com.) Replacement			
[] =[] [X] [] [] [X] [] []		Fill [] Mining [] Drilling [X] Pipelining Grading Excavation (except for STRUCTURAL DEVELOPMENT checked above) Watercourse Altercation (including dredging and channel modification) Drainage Improvements (including culvert work) Road, Street, or Bridge Construction (Temporary Bridge only) Subdivision (including new expansion) Individual Water or Sewer System Other (please specify)						ve)	
C.	2.	STANDARD SITE PLAN OR SKETCH (See Attached) 1. SUBMIT ALL STANDARD SITE PLANS, IF ANY HAVE BEEN PREPARED. 2. IF STANDARD SITE PLANS HAVE NOT BEEN PREPARED: SKETCH ON A SEPARATE 8 ½ X 11 INCH SHEET OF PAPER THE SHAPE AND LOCATION O THE LOT. SHOW THE LOCATION OF THE INTENDED CONSTRUCTION OR LAND USE INDICATING BUILDING SETBACKS, SIZE & HEIGHT. IDENTIFY EXISTING BUILDINGS, STRUCTURES OR LAND USES ON THE PROPERTY. 3. SIGN AND DATE THE SKETCH.							PE AND LOCATION OF ON OR LAND USE
									VELOPMENT CT PROPOSED
СО	CONSTRUCTION PROJECT IS WITHIN THE FLOODPLAIN \$677,200								

D. ADJACENT AND/OR AFFECTED LANDOWNERS:

1. NAME AND ADDRESS OF ALL OWNERS OF SURFACE TRACTS ADJACENT TO THE AREA OF THE SURFACE TRACT (UP & DOWN STREAM) UPON WHICH THE PROPOSED ACTIVITY WILL OCCUR AND ALL OTHER SURFACE OWNERS UP & DOWN STREAM) WHO OWN PROPERTY THAT MAY BE AFFECTED BY FLOODING AS IS DEMONSTRATED BY A FLOODPLAIN STUDY OR SURVEY (IF ONE HAS BEEN COMPLETED).

See Attached List

1. NAME AND ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON ANY ADJACENT PROPERTY AT THE TIME THE FLOODPLAIN PERMIT APPLICATION IS FILED AND THE NAME AND ADDRESS OF AT LEAST ONE ADULT RESIDING IN ANY HOME ON ANY PROPERTY THAT MAY BE AFFECTED BY FLOODING AS IS DEMONSTRATED BY A FLOODPLAIN STUDY OR SURVEY.

See Attached List

E. CONFIRMATION FORM

THE APPLICANT ACKNOWLEDGES, AGREES, AND CONFIRMS THAT HE/IT WILL PAY WITHIN 30 DAYS OF RECEIPT OF INVOICE BY THE COUNTY FOR ALL EXPENSES RELATIVE TO THE PERMIT APPLICATION PROCESS GREATER THAN THE REQUIRED DEPOSIT FOR EXPENSES INCLUDING:

- (A) PERSONAL SERVICE OF PROCESS BY THE DODDRIDGE COUNTY SHERIFF AT THE RATES PERMITTED BY LAW FOR SUCH SERVICE.
- (B) SERVICE BY CERTIFIED MAIL RETURN RECEIPT REQUESTED.
- (C) PUBLICATION.
- (D) COURT REPORTING SERVICES AT ANY HEARINGS REQUESTED BY THE APPLICANT.
- (E) CONSULTANTS AND/OR HEARING EXPERTS UTILIZED BY DODDRIDGE COUNTY FLOODPLAIN ADMINISTRATOR/MANAGER OR FLOODPLAIN APPEALS BOARD FOR REVIEW OF MATERIALS AND/OR TESTIMONY REGARDING THE EFFICACY OF GRANTING OR DENYING THE APPLICANT'S FLOODPLAIN PERMIT.

NAME (PRINT):	Stephanie Frazier	7/20/5
SIGNATURE:	(//N)	DATE:
		/

After completing SECTION 2, APPLICANT should submit form to Floodplain Administrator/Manager or his/her representative for review.

Name and Address of Surface Owner Tracts Adjacent to Flint Run

Track #	Map-Par.	Dist.	Acres	Surface Owner/ Name	Surface Owner/ Name Street Address City		State	Zip	Phone#
302-349	6-18	Grant	33.20	Charleen Underwood	HC 67 Box 66 West Union		W۷	26456	304-873-2725
302-350	6-18.1	Grant	122.38	Toby Stanley	HC 67 Box 68	West Union	WV	26456	304-873-3331
302-351	6-18.3	Grant	5.02	Toby Stanley	HC 67 Box 68	West Union	WV	26456	304-873-3331
302-348	6-13	Grant	59.75	Mark D. & Eileen J. Williams	HC 67 Box 67	West Union	wv	26456	304-873-2433
302-347	6-20	Grant	83.53	Ron and Judith College; Evelyn Heintzelmin	234 Philadelphia Ave.	Waynesboro	PA	17268	717-762-7289
Jan	6-18.2	Grant	33.20	Charleen Underwood	HC 67 Box 66	West Union	W۷	26456	304-873-2725
	6-20.3	Grant	3.65	Herman Stickel	HC 67 Box 63A	West Union	W۷	26456	304-873-1372
A STATE OF THE STA	6-24	Grant	68.89	Wallace Ash	HC 67 Box 61	West Union	W۷	26456	304-873-2083

SECTION 3: FLOODPLAIN DETERMINATION (to be completed by Floodplain Administrator/Manager or his/her representative)

THE PROPOSED DEVELOPMENT:

THE P	ROPOSED DEVELOPMENT IS LOCATED ON:	
	Panel:	
Dated	<u> </u>	
[] review	Is <u>NOT</u> located in a Specific Flood Hazard Area (Notify applicant that the application is complete and NO FLOOPLAIN DEVELOPMENT PERMIT IS REQUIRED).	
[]	Is located in Special Flood Hazard Area. FIRM zone designation	
	100-Year flood elevation is:NGVD (MS	šL)
[]	Unavailable	
[]	The proposed development is located in a floodway. FBFM Panel No Dated	
[]	See section 4 for additional instructions.	
	SIGNED DATE	
	ON 4: ADDITIONAL INFORMATION REQUIRED (To be completed by Iplain Administrator/Manager or his/her representative)	
The approces	oplicant must submit the documents checked below before the application can be ssed.	
[]	A plan showing the location of all existing structures, water bodies, adjacent roads, lot dimensions and proposed development.	t

()	Development plans, drawn to scale, and specifications, including where applicable: details for anchoring structures, storage tanks, proposed elevation of lowest floor, (including basement or crawl space), types of water resistant materials used below the first floor, details of flood proffing of utilities located below the first floor and details of enclosures below the first floor. Also
()	Subdivision or other development plans (If the subdivision or development exceeds 50 lots or 5 acres, whichever is the lesser, the applicant must provide 100-year flood elevations if they are not otherwise available).
[]	Plans showing the extent of watercourse relocation and/or landform alterations.
0	Top of new fill elevationFt. NGVD (MSL). For floodproofing structures applicant must attach certification from registered engineer or architect.
()	Certification from a registered engineer that the proposed activity in a regulatory floodway will not result in any increase in the height of the 100-year flood. A copy of all data and calculations supporting this finding must also be submitted.
[]	Manufactured homes located in a floodplain area must have a West Virginia Contractor's License and a Manufactured Home Installation License as required by the Federal Emergency Management Agency (FEMA).
[]	Other:

SECTION 5: PERMIT DETERMINATION (To be completed by Floodplain Administrator/Manager or his/her representative)

I have determined that the proposed activity (type is or is not) in conformance with provisions of the Floodplain Ordinance adopted by the County Commission of Doddridge County on May 21, 2013. The permit is issued subject to the conditions attached to and made part of this permit.

SIGNED	DATE
with the prov	ain Administrator/Manager found that the above was not in conformance risions of the Doddridge County Floodplain Ordinance and/or denied that he applicant may complete an appealing process below.
APPEALS:	Appealed to the County Commission of Doddridge County? [] Yes {} No Hearing Date:
	County Commission Decision - Approved [] Yes [] No
CONDITIONS	:
-	
Certificate of Con The following inform	ultt Elevations (To be submitted by APPLICANT before inpliance is issued). Not Applicable nation must be provided for project structures. This section must be stered professional engineer or a licensed land surveyor (or attach a application).
COMPLETE 1 OR 2 B	ELOW:
•	s-Built) Elevation of the top of the lowest floor (including basement or ce isFT. NGVD (MSL)
2 Actual (A	s Built) elevation of floodproofing isFT. NGVD (MSL)
Note: Any work applicant.	performed prior to submittal of the above information is at risk of the

7

SECTION 7: COMPLIANCE ACTION (To be completed by the Floodplain

Administrator/Manager or his/her representative).

The Floodplain Administrator/Manager or his/her representative will complete this section as applicable based on inspection of the project to ensure compliance with the Doddridge County Floodplain Ordinance.

INSPECTIONS:	
DATE:	BY:
DEFICIENCIES ? Y/N	
COMMENTS	
SECTION 8: CERTIFICATE OF COM Administrator/Manager or his/ho	PLIANCE (To be completed by Floodplain er representative).
	<u> </u>
Certificate of Compliance issued: DATE:	BY:
CERTIFICA	TE OF COMPLIANCE
FOR DEVELOPMENT IN	SPECIAL FLOOD HAZARD AREA
(OWNE	R MUST RETAIN)
PERMIT NU	
PERMIT DA	TE:
PURPOSE –	
CONSTRUCTION LOCATION:	

OWNER'S ADDRESS:	
THE FOLLOWING MUST BE COMPLETED B	SY THE FLOODPLAIN
ADMINISTRATOR/MANAGER OR HIS/HER	R AGENT.
COMPLIANCE IS HEREBY CERTIFIED	WITH THE REQUIREMENT OF THE
FLOODPLAIN ORDINANCE ADOPTED BY T	·
DODDRIDGE COUNTY ON MAY 21, 2013.	
DODDRIDGE COOKTT ON WAT 21, 2013.	
SIGNED	DATE

EQT



Big Flint

07/25/2013



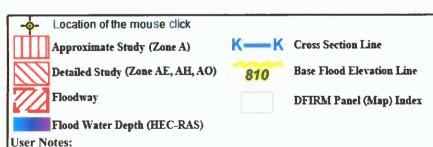
Removing temp. bridge

12/05/2013 UJW

WV Flood Map



Map Created on 8/5/2013



Disclaimer:

The online 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. To obtain more detailed information in areas where Base Flood Elevations have been determined, users are encouraged to consult the latest Flood Profile data contained in the official flood insurance study. These studies are available online at www.msc.fema.gov.

WV Flood Tool is supported by FEMA, WV NFIP Office, and WV GIS Technical Center (http://www.MapWV.gov/flood)

Flood Hazard Area:

Advisory Flood Height: N/A

Water Depth: N/A

Elevation: About 773 feet

Location (long, lat): 80.712021 W, 39.358025 N

Location (UTM 17N): (524810, 4356548)

FEMA Issued Flood Map: 130

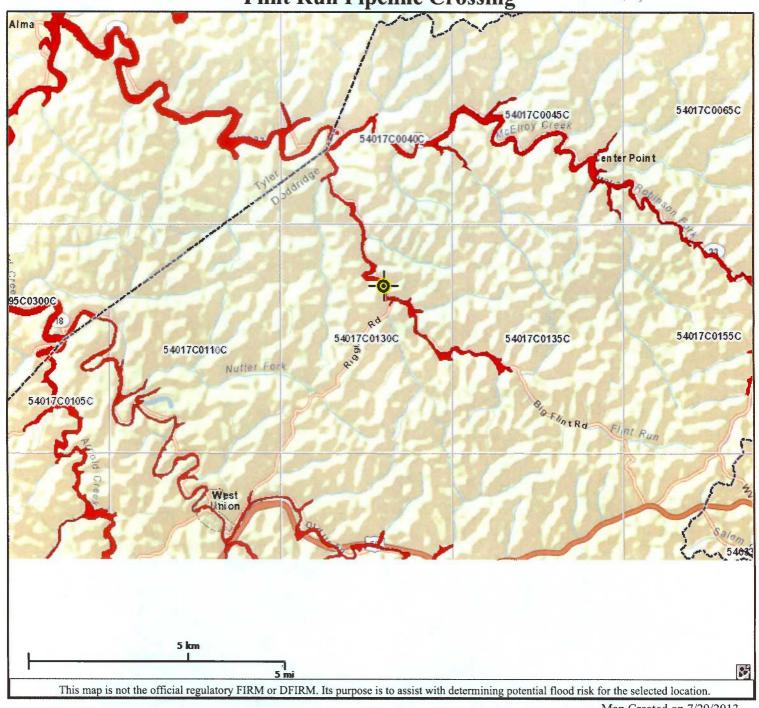
Contacts:

CRS Information:
Flood Profile: No Profile
HEC-RAS Model: No Model

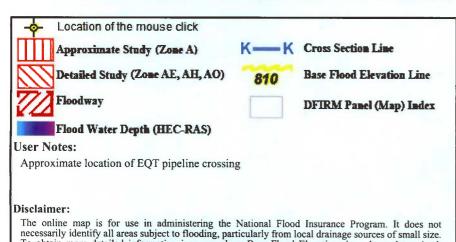
Parcel Number:

13-045

Flint Run Pipeline Crossing



Map Created on 7/29/2013



To obtain more detailed information in areas where Base Flood Elevations have been determined, users are encouraged to consult the latest Flood Profile data contained in the official flood insurance study. These studies are available online at www.msc.fema.gov.

WV Flood Tool is supported by FEMA, WV NFIP Office, and WV GIS Technical Center (http://www.MapWV.gov/flood)

Flood Hazard Area: Selected site is WITHIN the

FEMA 100-year floodplain.

Flood Zone: A

Advisory Flood Height: N/A

Water Depth: N/A

Elevation: About 775 feet

Location (long, lat): 80.712197 W, 39.358123 N

Location (UTM 17N): (524795, 4356559)

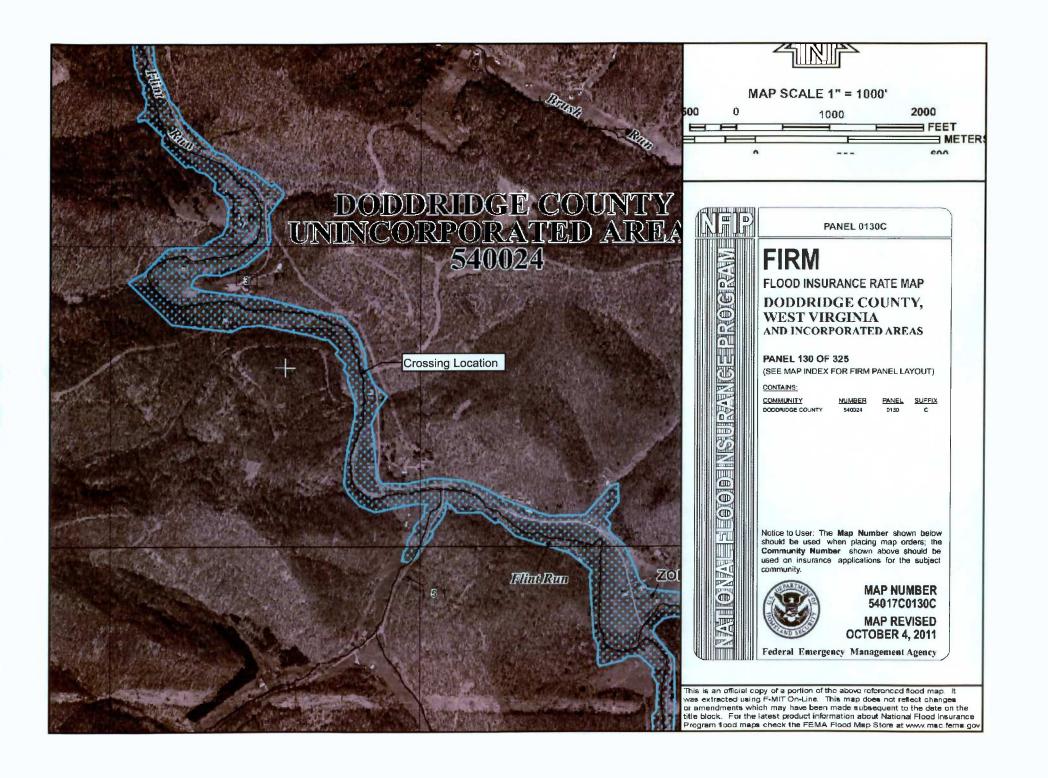
FEMA Issued Flood Map: 54017C0130C

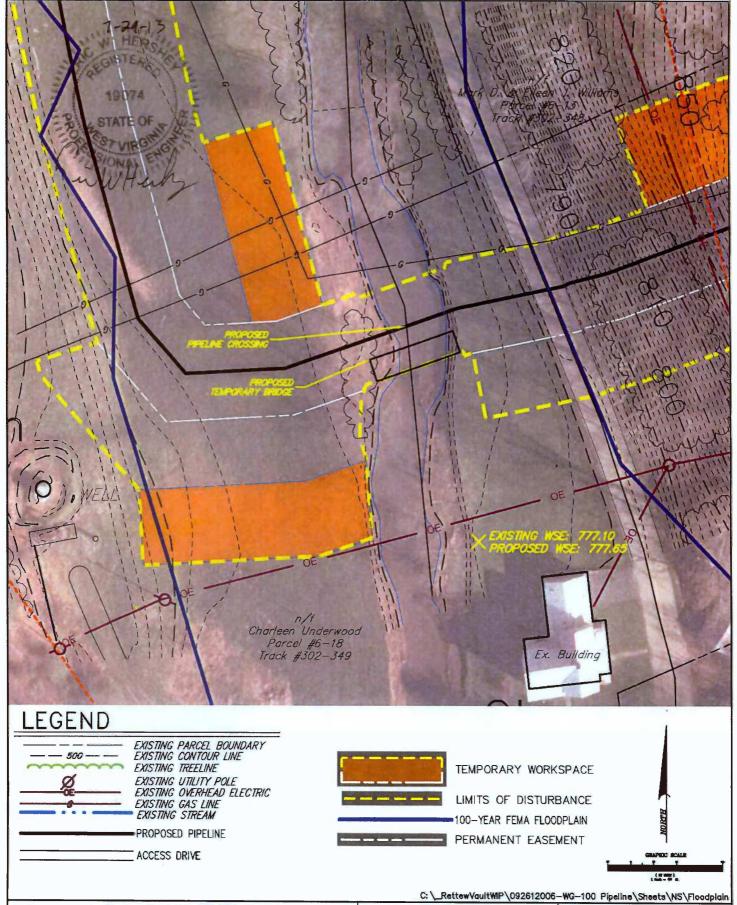
Contacts: Doddridge County

CRS Information: No CRS information available

Flood Profile: No Profile **HEC-RAS Model: No Model**

Parcel Number:





FLOODPLAIN EXHIBIT

WG-100 PIPELINE

GRANT TAX DISTRICT

DODDRIDGE COUNTY, WV



RETIEW Associates, Inc. 3020 Coumble Ave., Lancaster, PA 17603 Phone (717) 394-3721 • Fax (717) 394-1063 DRAWN BY: JGJ

DATE: 7/29/2013

SCALE: 1" = 50'

DWG. NO. 092612006



FLOODPLAIN STUDY

FOR

FLINT RUN

DODDRIDGE COUNTY, WEST VIRGINIA PROJECT NO. 092612006

Prepared by:

RETTEW ASSOCIATES, INC. 3020 Columbia Avenue Lancaster, PA 17603

July 29, 2013

TABLE OF CONTENTS

BACKGROUND	1
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EXISTING HEC-RAS OUTPUT	
PROPOSED HEC-RAS OUTPUT	

The Flint Run temporary bridge crossing site is a proposed temporary bridge located on the west side of Big Flint Road (CR 3) in Doddridge County, WV. The purpose of this study is to establish the existing and proposed 100-year floodplain on the property in accordance with applicable local and state requirements.

FLOODPLAIN STUDY

HYDROLOGY

Flint Run generally flows from the south to the north of the property. The flow utilized for this flood study was computed using the equations developed in the USGS report *Estimation of Flood-Frequency Discharges for Rural, Unregulated Streams in West Virginia*. A 100-year flow of 3,612 cfs was used for the pre and post floodplain study. A watershed map showing the drainage area from the USGS mapping is included herein.

HYDRAULICS

The Corps of Engineers' HEC-RAS computer program, version 4.1, was utilized to establish water surface elevations for the 100-year flow. The average starting slopes for normal depth calculations were obtained from the USGS map for the stream.

The HEC-RAS cross sections through the properties were obtained from the 2-foot contour mapping. No detailed information was available for the temporary bridge therefore it was entered into the HEC-RAS model using the best available measurements.

The proposed condition floodplain study was run to show the increases in water surfaces will remain under 1 foot after the development is constructed. To model the encroachment in the floodplain, the proposed grading approach and bridge was input in to HEC-RAS.

The HEC-RAS input and output are contained herein, and include the summary tables, and the profile and cross section plots for both the existing and proposed floodplains.

Cross Section Water Surface Elevation Summary

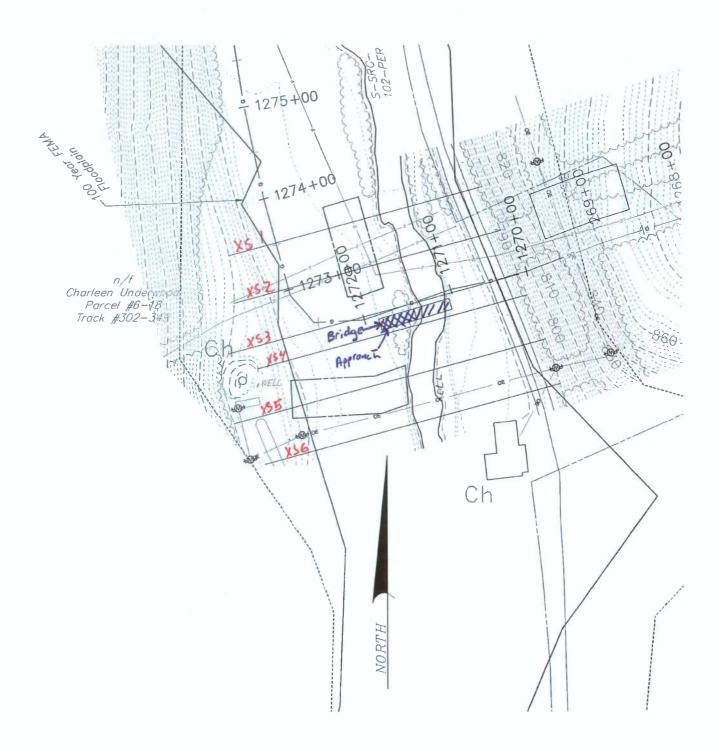
Cross Section	Existing WSE	Proposed WSE	Change
6	777.10	777.65	+0.55
5	776.72	777.45	+0.73
4	776.90	777.56	+0.66
3	776.71	777.05	+0.34
2	775.56	775.56	0
1	775.46	775.46	0

HEC-RAS River: Flint Run Reach: flint run Profile: PF 1

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Ch!
, icaon	111101010		24 (2) (13	(cfs)	(ft) ·	(ft)	(ft)	(f1)	(IVft)	(ft/s)	(sq ft)	(ft)	
lint run	6	PF 1	existing	3612.00	768,70	777.10		777.99	0.002769	8.86	626.76	190.08	0.54
llint run		PF 1	prop	3612.00	768.70	777.65		778.29	0.001935	7.73	736.18	207.71	0.46
1000	11 12	47.5	11000										
flint run	5	PF 1	existing	3612.00	768.60	776.72		777.82	0.003402	9.57	551.94	170.08	0.59
flint run	5	PF 1	btob	3612.00	768.60	777.45		778.18	0.002145	8.06	686.65	194.88	0.48
17. 17.	75.4 (4.7)	75.5											
lint run	4	PF 1	existing	3612.00	768.40	776.90		777.55	0.001987	7.53	701.02	186.89	0.46
llint run	4	PF 1	prop	3612.00	768.40	777.56	774.01	778.02	0.001329	6.47	828.37	199.51	0.38
	State of the	1250111	91,514										-,
flint run	3	PF 1	existing	3612.00	768.40	776.71	775.47	777.48	0.002587	8.41	653.02	188.70	0.51
flint run	3	PF 1	prop	3612.00	768.40	777.05	775.46	777.68	0.002061	7.71	717.87	195.36	0.46
	\$15.50 \$1.50	100	1000000										
Rint run	2	PF 1	existing	3612.00	768.20	775.56	775.56	777.21	0.005506	11.27	449.38	168.00	
Hint run	2	PF 1	prop	3612.00	768.20	775.56	775.56	777.21	0.005506	11.27	449.38	168.00	0.73
100000000000000000000000000000000000000	5, 55	1,17 1 1 1	1.11										
flint run	1	PF 1	existing	3612.00	768.10	775.46	774.68	776.64	0.004003	9.64	520.90	174.21	
flint run	1	PF 1	prop	3612.00	768.10	775.46	774.68	776.64	0.004003	9.64	520.90	174.21	0.63

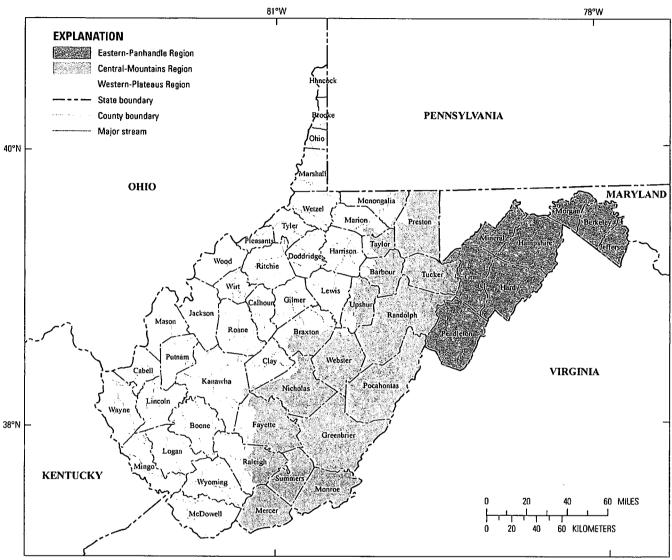
HEC-RAS River: Flint Run Reach; flint run Profile: PF 1

Reach	River Sta	Profile	Plan	E.G. Elev	W.S. Elev	Vel Head	Fretn Loss	C & E Loss	Q Left	O Channel	Q Right	Top Width
	PAPER MA	ayyar bass	Charles and	(ft)	(ft)	(ft)	(ft)	(0)	(cfs)	(cls)	(cls)	(ft)
flint run	6	PF 1	existing	777.99	777.10	0.89	0.15	0.02	766.18	2468.99	376.83	190.08
filnt run	6	PF 1	prop	778.29	777.65	0.64	0.10	0.01	922.63	2294.58	394.79	207.71
National Control		14 3 10 4	141641									
filnt run	5	PF 1	existing	777.82	776.72	1.10	0.13	0.14	473.80	2661.61	476.59	170.08
flint run	5	PF 1	prop	778.18	777.45	0.73	0.08	0.08	646.34	2443.93	521.74	194.88
	The said of	140 00 120										
flint run	4	PF 1	existing	777.55	776.90	0.65	0.05	0.01	980.82	2449.47	181.72	186.89
fiint run	4	PF 1	prop	778.02	777.56	0.46			1112.35	2268.80	230.85	199.51
Page 1 to Co.	254534574	114,345,433										
flint run	3	PF 1	existing	777.48	776.71	0.77	0.18	0.09	1133.26	2330.35	148.39	188.70
fiint run	3	PF 1	prop	777.68	777.05	0.63	0.16	0.31	1220.54	2222.96	168.50	195.36
44,544			50.505.00									
fiint run	2	PF 1	existing	777.21	775.56	1.66	0.23	0.14	563.64	2978.13	70.22	168.00
filnt run	2	PF 1	prop	777.21	775.56	1.66	0.23	0.14	563.64	2978.13	70.22	168.00
	1 1 1 1 1 1 1	N	Burger Jane									
flint run	1	PF 1	existing	776.64	775.46	1.18			533.56	2873.29	205.15	174.21
flint run	1	PF 1	btob	776.64	775.46	1.18			533.56	2873.29	205.15	174.21



	APPENDIX	

	FLOW CALCU	JLATIONS	



Base from U.S. Geological Survey 1:100,000 digital line graphics for state boundaries and streams and from the West Virginia Department of Environmental Protection 1:24,000 digital data for county boundaries. Universal Transverse Mercator projection, zone 17, NAD 83.

Figure 4. The Eastern Panhandle, Central Mountains, and Western Plateaus Regions of West Virginia for which equations for estimation of flood frequency discharges were developed in this study.

Table 4. Equations used to estimate selected flood-frequency discharges for streams in the Eastern Panhandle, Central Mountains, and Western Plateaus Regions of West Virginia.

[PK(n_n), peak discharge in cubic feet per second for the (n.n)-year recurrence interval; PK(n), peak discharge in cubic feet per second for the (n)-year recurrence rence interval; %, percent; AOP, annual-occurrence probability; DRNAREA, drainage area in square miles]

Equation	Standard error of the model, in percent	Average standard error of sampling, in percent	Average prediction error, in percent	Equivalent yea of record, unitless
Eastern Panhandle Region	(Range in DRNAREA fr	om 0.21 to 1,461 for 57 st	reamgage stations)	
PKI_I(90%AOP) = 29.6 DRNAREA 0.818	43.4	10.3	44.8	3.4
$PK1_5(67\%AOP) = 46.4 DRNAREA^{0.828}$	35.7	8.9	36.9	3.3
$PK2(50\%AOP) = 59.8 DRNAREA^{0.832}$	32.1	8.6	33.4	4.1
$PK5(20\%AOP) = 105 DRNAREA^{0.838}$	25.6	8.9	27.2	10.6
PK10(10%AOP) = 145 DRNAREA 0.842	22.5	9.5	24.5	19.1
PK25(4%AOP) = 204 DRNAREA 0.848	19.7	10.3	22.4	34.1
PK50(2%AOP) = 254 DRNAREA 0.852	18.6	11.1	21.7	46.1
PK100(1%AOP) = 307 DRNAREA 0.855	18.3	11.6	21.7	56.7
$PK200(0.5\%AOP) = 365 DRNAREA^{0.859}$	18.4	12.4	22.4	64.7
$PK.500(0.2\%AOP) = 447 DRNAREA^{0.864}$	19.4	13.5	23.8	70.9
Central Mountains Region	(Range in DRNAREA fro	om 0.10 to 1,619 for 83 st	reamgage stations)	
PK1_1(90%AOP) = 33.4 DRNAREA 0.914	40.0	8.3	41.0	2.4
$PK1_5(67\%AOP) = 53.8 DRNAREA^{0.887}$	34.6	7.3	35.4	2.0
$PK2(50\%AOP) = 69.4 DRNAREA^{0.873}$	33.4	7.3	34.2	2.1
PK5(20%AOP) = 116 DRNAREA 0.845	34.1	8.0	35.1	3.2
PK10(10%AOP) = 153 DRNAREA 0.831	36.3	8.6	37.4	4.0
$PK25(4\%AOP) = 206 DRNAREA^{0.816}$	39.9	9.8	41.2	4.8
PK50(2%AOP) = 250 DRNAREA 0.807	42.9	10.6	44.4	5.3
PK100(1%AOP) = 297 DRNAREA 0.800	46.2	11.3	47.9	5.6
$PK200(0.5\%AOP) = 347 DRNAREA^{0.793}$	49.7	12.0	51.5	5.9
$PK500(0.2\%AOP) = 420 DRNAREA^{0.785}$	54.3	13.1	56.3	6.1
Western Plateaus Region (Range in DRNAREA fro	m 0.13 to 1,516 for 106 st	reamgage stations)	
PK1_1(90%AOP) = 56.9 DRNAREA ^{0.763}	38.2	7.6	39.1	3.8
PK1_5(67%AOP) = 97.8 DRNAREA 0.741	33.4	6.5	34.1	2.8
$PK2(50\%AOP) = 129 DRNAREA^{0.730}$	31.6	6.1	32.2	2.8
$PK5(20\%AOP) = 221 DRNAREA^{0.710}$	29.3	6.5	30.0	4.4
PK10(10%AOP) = 292 DRNAREA 0.699	28.9	6.5	29.7	5.9
PK25(4%AOP) = 391 DRNAREA 0.688	29.4	7.3	30.3	7.9
PK50(2%AOP) = 472 DRNAREA 0.681	30.2	7.6	31.3	9.1
PK100(1%AOP) = 557 DRNAREA 0.674	31.4	8.0	32.5	10.1
PK200(0.5%AOP) = 647 DRNAREA 0.668	32.7	8.3	33.9	10.8
PK500(0.2%AOP) = 775 DRNAREA (0.661	34.8	8.9	36.1	11.4



Prepared in cooperation with the West Virginia Department of Transportation, Division of Highways

Estimation of Flood-Frequency Discharges for Rural, Unregulated Streams in West Virginia

Scientific Investigations Report 2010-5033

Estimation of Flood-Frequency Discharges for Rural, Unregulated Streams in West Virginia

By Jeffrey B. Wiley and John T. Atkins, Jr.
Prepared in cooperation with the West Virginia Department of Transportation, Division of Highways

Scientific Investigations Report 2010–5033

U.S. Department of the Interior U.S. Geological Survey

U.S. Department of the Interior KEN SALAZAR, Secretary

U.S. Geological Survey Marcia K. McNutt, Director

U.S. Geological Survey, Reston, Virginia: 2010

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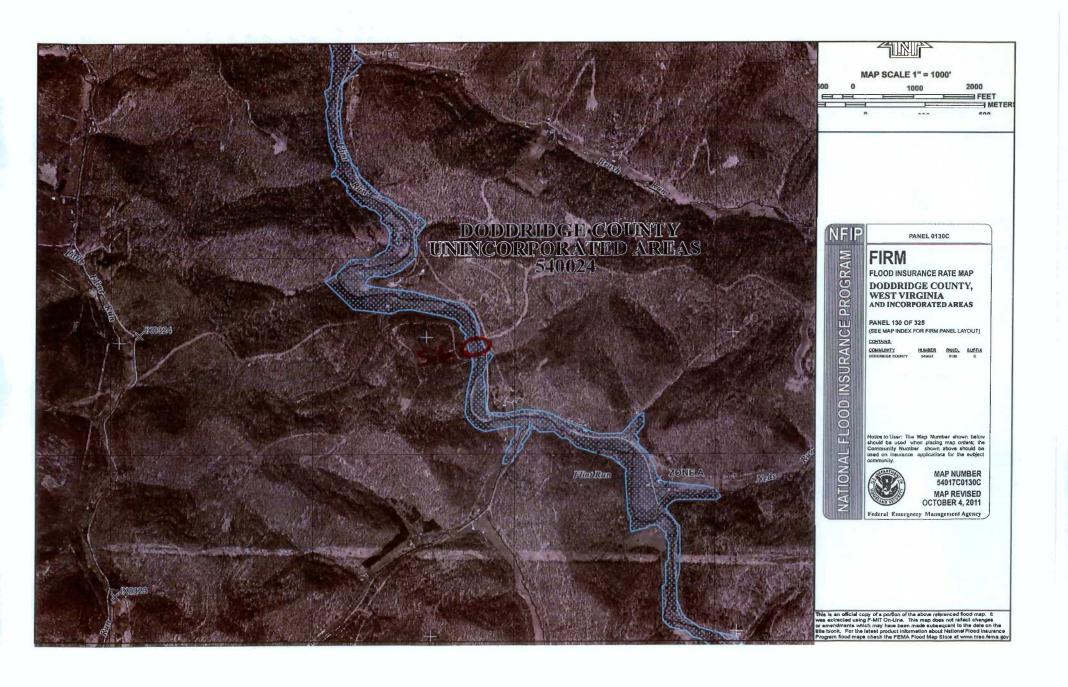
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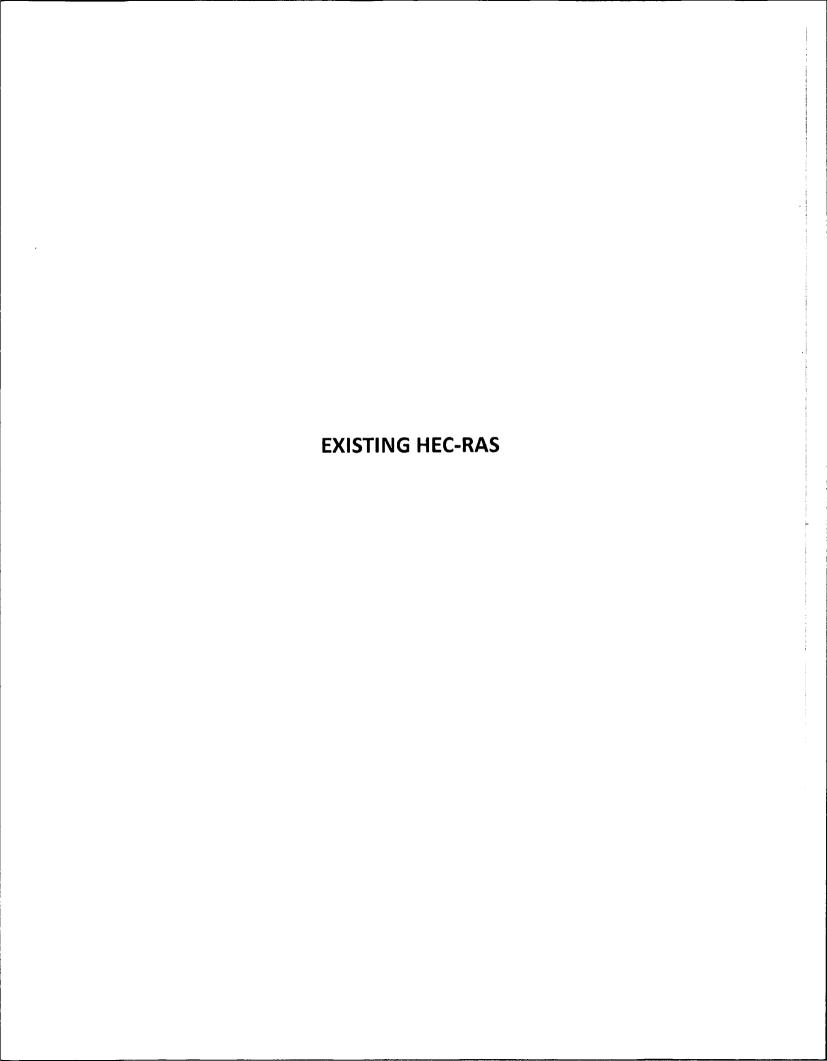
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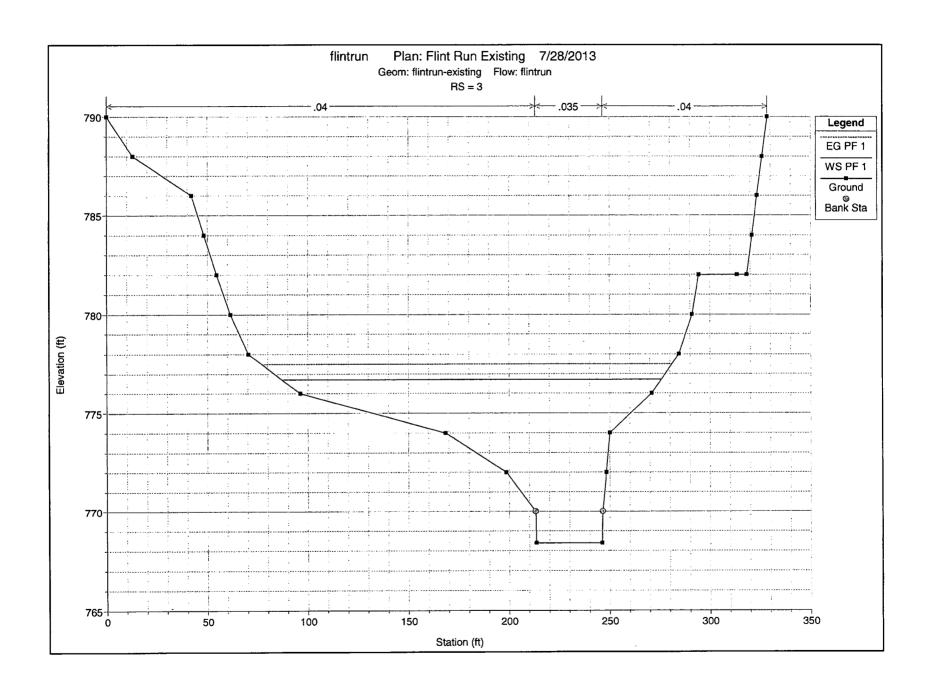
Suggested citation:

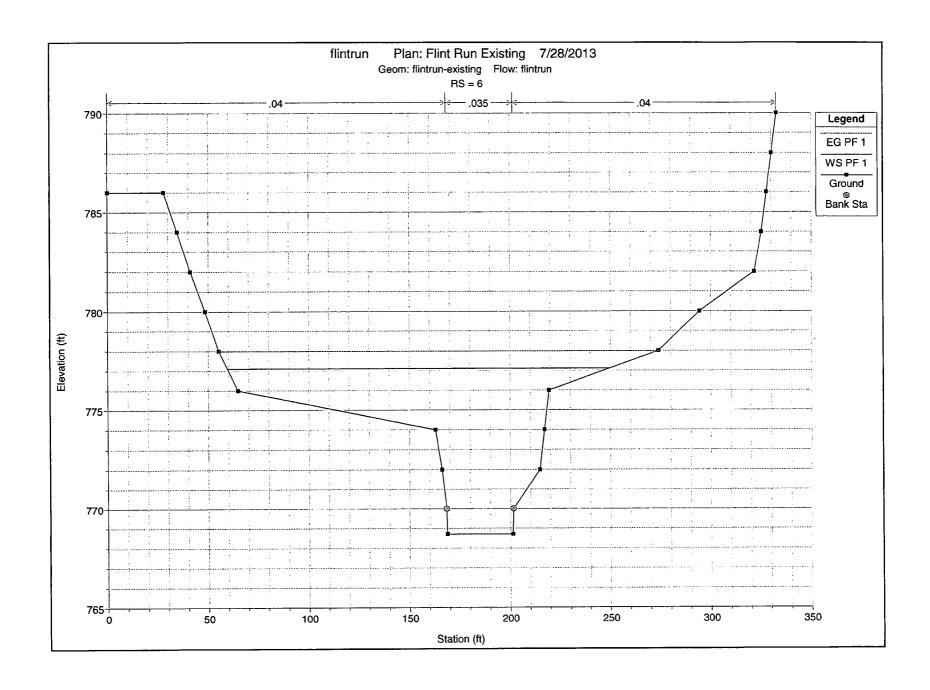
Wiley, J.B., and Atkins, J.T., Jr., 2010, Estimation of flood-frequency discharges for rural, unregulated streams in West Virginia: U.S. Geological Survey Scientific Investigations Report 2010–5033, 78 p.

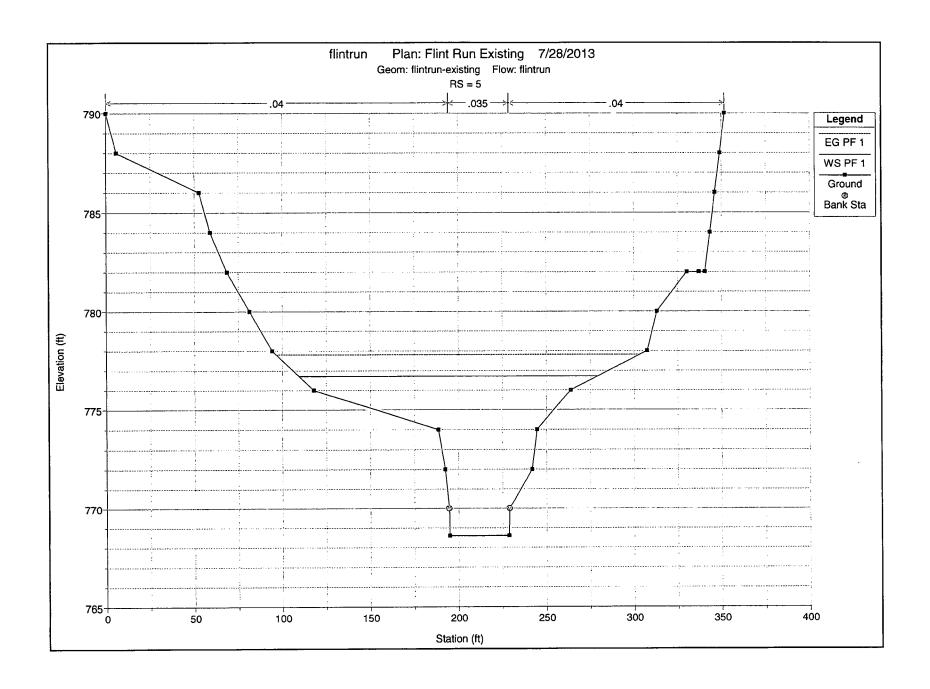


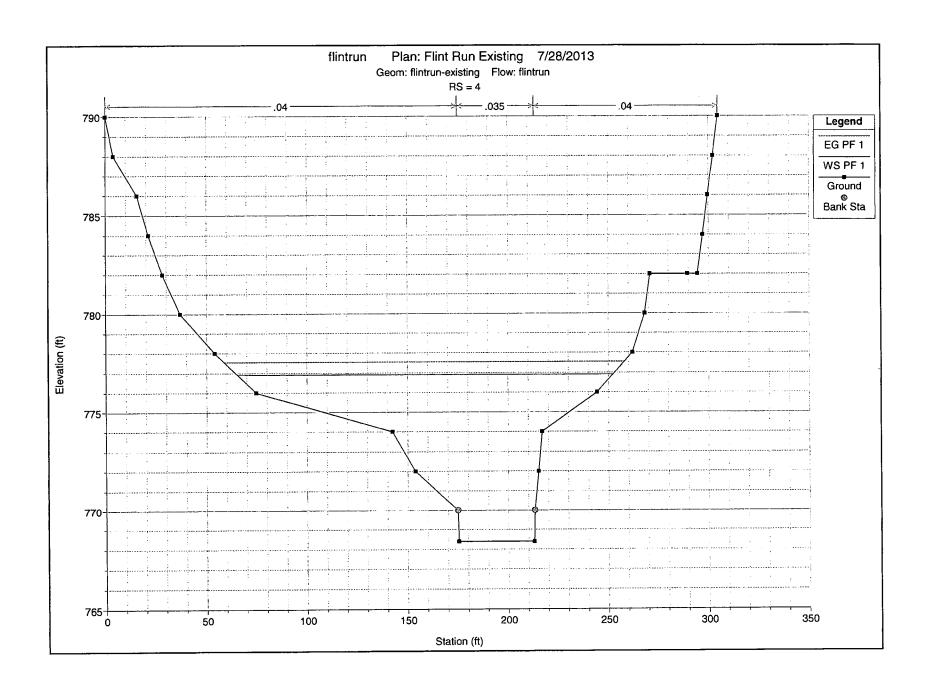


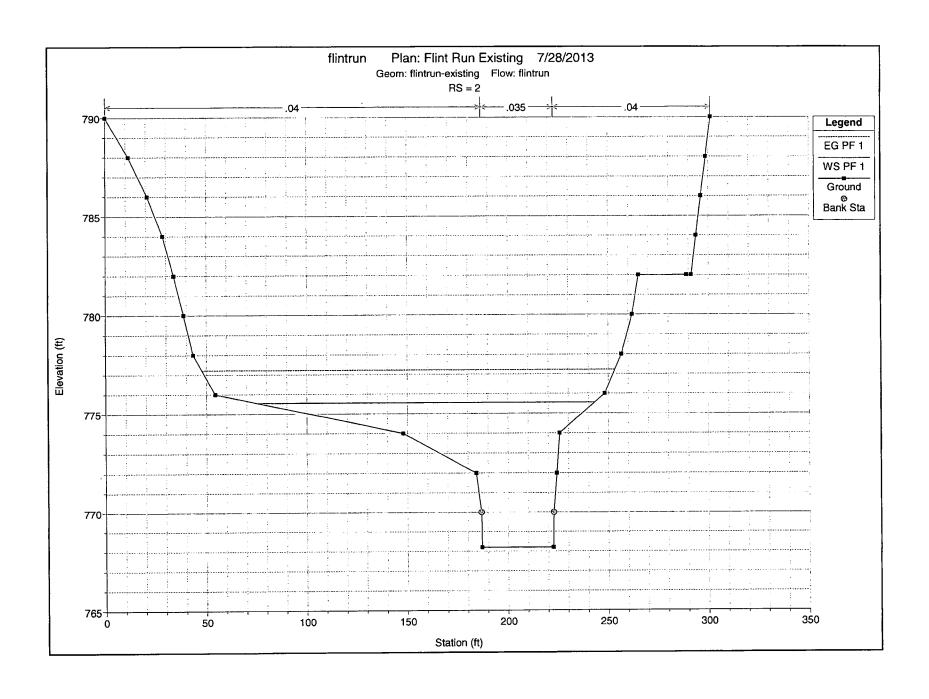


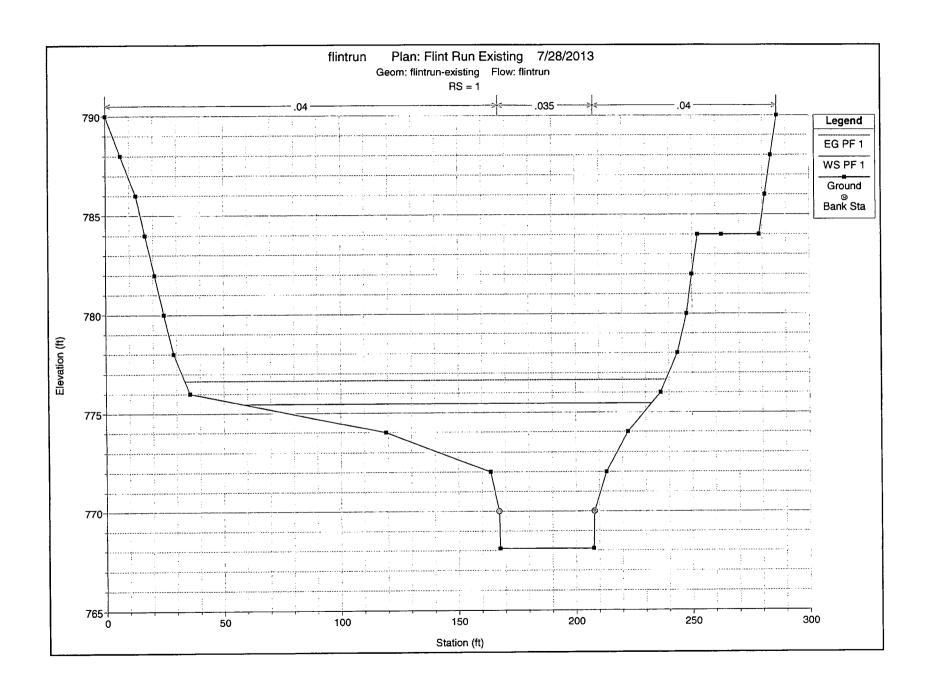


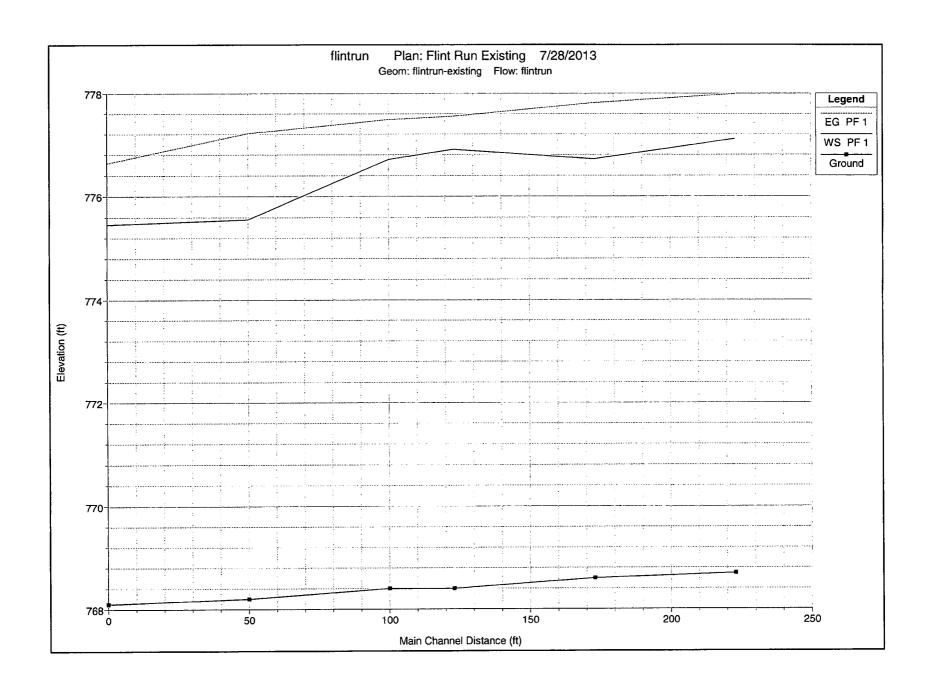












HEC-RAS Version 4.1.0 Jan 2010 U.S. Army Corps of Engineers Hydrologic Engineering Center 609 Second Street Davis, California

Х	Х	xxxxxx	хх	ХХ		XX	xx	Х	Х	XXXX
X	X	X	Х	Х		Х	Х	X	X	X
Х	X	X	Х			Χ	Χ	Х	Х	X
XXX	XXXX	XXXX	X		XXX	XX	XX	XXX	XXX	XXXX
Х	Х	X	Х			Χ	Χ	Х	Х	X
X	X	X	Х	Х		Χ	Х	Х	Х	X
X	Х	XXXXXX	XX	XX		Χ	Х	Х	Х	XXXXX

PROJECT DATA

Project Title: flintrun

Project File: flintrun.prj Run Date and Time: 7/28/2013 11:43:23 AM

Project in English units

PLAN DATA

Plan Title: Flint Run Existing

Plan File: h:\Projects\09261\092612006\NS\Floodplain\flintrun.p01

Geometry Title: flintrun-existing

Geometry File: h:\Projects\09261\092612006\NS\Floodplain\flintrun.q01

Flow Title : flintrun

: h:\Projects\09261\092612006\NS\Floodplain\flintrun.f01 Flow File

Plan Summary Information:

Number of: Cross Sections = 6 Multiple Openings = Inline Structures = 0 Culverts 0 =

0 Lateral Structures = 0 Bridges

Computational Information
Water surface calculation tolerance = Critical depth calculation tolerance = 0.01 Maximum number of iterations 20 Maximum difference tolerance Flow tolerance factor 0.3 0.001

Computation Options

Critical depth computed only where necessary

Conveyance Calculation Method: At breaks in n values only Friction Slope Method:

Computational Flow Regime:

Subcritical Flow

FLOW DATA

Flow Title: flintrun

Flow File: h:\Projects\09261\092612006\NS\Floodplain\flintrun.f01

Flow Data (cfs)

River Flint Run Reach flint run RS

PF 1 3612

Boundary Conditions

River

Reach

Profile

Upstream

Downstream

Flint Run

flint run

PF 1

Normal S = 0.004

GEOMETRY DATA

Geometry Title: flintrun-existing

Geometry File: h:\Projects\09261\092612006\NS\Floodplain\flintrun.g01

CROSS SECTION

RIVER: Flint Run

REACH: flint run

RS: 6

INPUT

Description:

Station Ele	evation	Data	num=	23	_		_		
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	786	27.9	786	34.5	· 784	41.1	782	48.4	780
55.Ž	778	64.7	776	162.9	774	166.1	772	168.3	770
168.6	768.7	201.2	768.7	201.5	770	214.8	772	217.1	774
219.4	776	274	778	294.4	780	321.7	782	325.2	784
327.8	786	330.3	788	332.8	790				

Manning's n Values num= Sta Sta n Val 168.3 .04

3 n Val n Val Sta .035 201.5

Right 201.5 Lengths: Left Channel Right Coeff Contr. Expan. Bank Sta: Left . 3 50 50 50 .1 168.3

CROSS SECTION

RIVER: Flint Run REACH: flint run

RS: 5

INPUT

Description									
Station El	evation	Data	num <u>⇒</u>	26	_				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	790	5.9	788	52.8	786	59	784	68.5	782
81.4	780	94.3	778	117.9	776	188.6	774	192.5	772
194.6	770	194.9	768.6	228.6	768.6	228.9	770	241.8	772

Page 2

244.7 776 337.1 78 351.8 79	340.5	776 782	flintr 307.5 343.4	run.rep 778 784	313.1 346.2	780 786	330.2 349.1	782 788
Manning's n Val Sta n Va 0 .0	l Sta	num= n Val .035	3 Sta 228.9	n Val .04				
Bank Sta: Left 194.6	Right 228.9	Lengths:	Left Ch 50	nanne1 50	Right 50	Coeff	Contr. .1	Expan. .3
CROSS SECTION								
RIVER: Flint Ru REACH: flint ru		RS: 4						
INPUT Description: Station Elevati Sta Ele 0 79 36.9 78 174.9 77 216.9 77 289.5 78 304.7 79	v Sta 0 3.9 0 54.1 0 175.2 4 244.3 2 294.5	num= Elev 788 778 768.4 776 782	26 Sta 15.6 74.7 212.9 262 297.1	Elev 786 776 768.4 778 784	Sta 21.2 142.5 213.2 268.1 299.6	Elev 784 774 770 780 786	Sta 28.1 153.8 215.1 270.8 302.2	Elev 782 772 772 782 788
Manning's n Val Sta n Va 0 .0	1 Sta	num= n Val .035	3 Sta 213.2	n Val .04				
Bank Sta: Left 174.9	Right 213.2	Lengths:	Left Ch 23	nannel 23	Right 23	Coeff	Contr. .1	Expan.
CROSS SECTION								
RIVER: Flint Ru REACH: flint ru	n n	RS: 3						
INPUT Description: Station Elevati Sta Ele 0 79 61.4 78 213.1 77 250.1 77 313.5 78 328.5 79	v Sta 0 12.9 0 70.4 0 213.4 4 270.9 2 318.3	num= Elev 788 778 768.4 776 782	26 Sta 42.1 96.2 246.2 284.5 320.9	Elev 786 776 768.4 778 784	Sta 48.3 168.4 246.5 291.1 323.4	Elev 784 774 770 780 786	Sta 54.6 198.6 248.3 294.4 325.9	Elev 782 772 772 782 788
Manning's n Val Sta n Va 0 .0	1 Sta	num= n Val .035	3 Sta 246.5	n Val .04				
Bank Sta: Left 213.1	Right 246.5	Lengths:	Left Cl 50	hannel 50	Right 50	Coeff	Contr.	Expan.
CROSS SECTION								

RIVER: Flint Run

		flintr	un.rep				
REACH: flint run	RS: 2		J				
INPUT Description: Station Elevation Data Sta Elev Sta 0 790 11.4 38.7 780 43.4 186.7 770 187 225.7 774 248.2 289.1 782 291.5 301.2 790	num= Elev 788 778 768.2 776 782	26 Sta 20.8 54.4 222.4 256.6 293.9	Elev 786 776 768.2 778 784	Sta 28.4 147.9 222.7 262 296.3	Elev 784 774 770 780 786	Sta 33.8 184.1 224.2 265.2 298.75	Elev 782 772 772 782 788
Manning's n Values Sta n Val Sta 0 .04 186.7	num= n Val .035	3 Sta 222.7	n Val .04				
Bank Sta: Left Right 186.7 222.7	Lengths:	Left Ch 50	nannel 50	Right 50	Coeff	Contr. .1	Expan.
CROSS SECTION							
RIVER: Flint Run REACH: flint run	RS: 1						
INPUT Description: Station Elevation Data Sta Elev Sta 0 790 6.3 24.6 780 28.7 167.3 770 167.6 222.3 774 236.4 252.4 784 262.6 286.3 790	num= Elev 788 778 768.1 776 784	26 Sta 12.8 35.6 207.6 243.6 278.7	Elev 786 776 768.1 778 784	Sta 16.7 119.2 207.9 247.6 281.2	Elev 784 774 770 780 786	Sta 20.7 163.7 213.1 249.9 283.7	Elev 782 772 772 782 788
Manning's n Values Sta n Val Sta O .04 167.3	num= n Val .035	3 Sta 207.9	n Val .04				
Bank Sta: Left Right 167.3 207.9	Coeff Co	ntr. i	Expan. .3				

SUMMARY OF MANNING'S N VALUES

River:Flint Run

Reach	River Sta.	n1	n2	n3
flint run flint run flint run flint run flint run flint run	6 5 4 3 2 1	.04 .04 .04 .04 .04	.035 .035 .035 .035 .035	.04 .04 .04 .04 .04

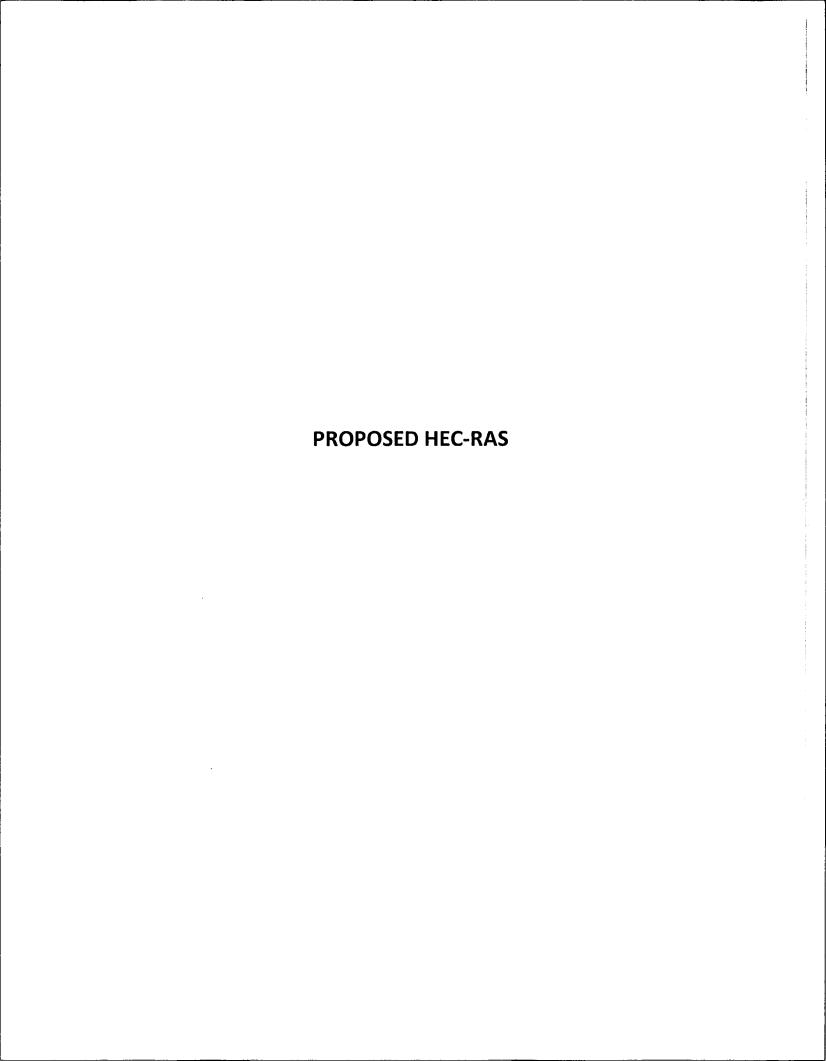
flintrun.rep

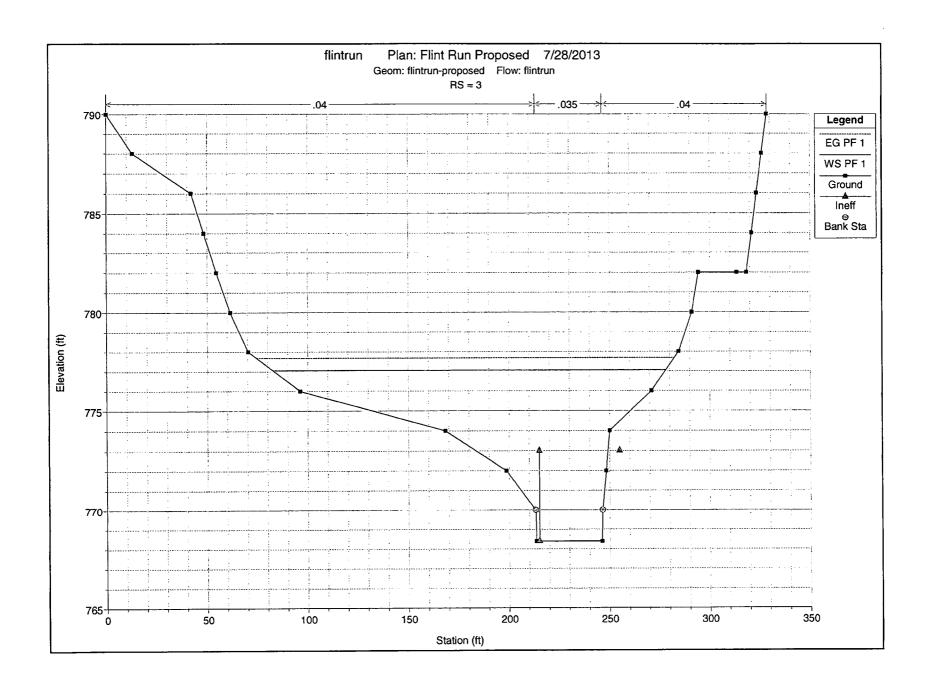
River: Flint Run

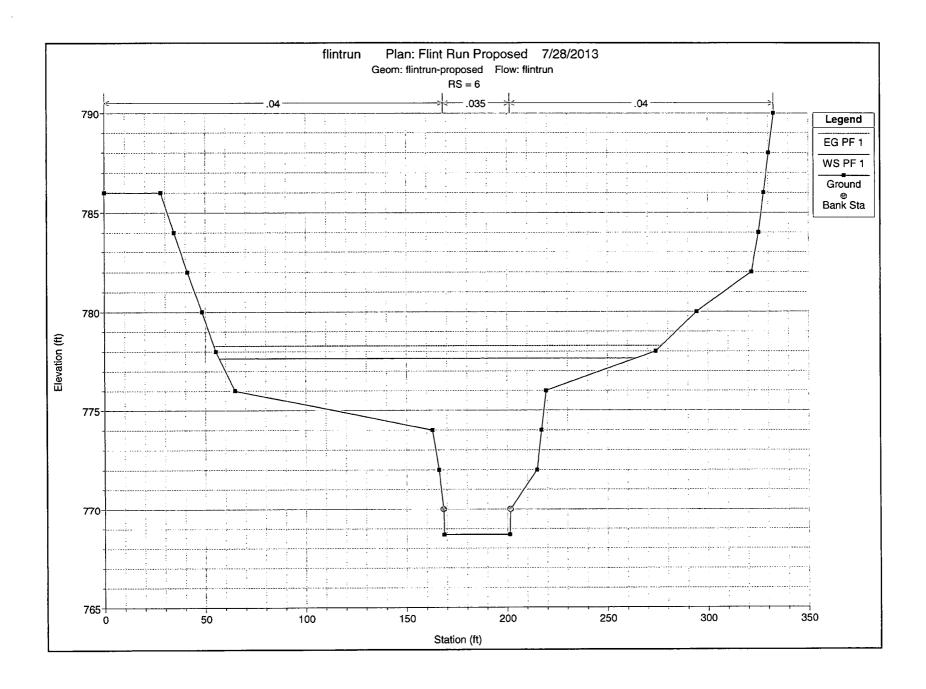
Reach	River Sta.	Left	Channel	Right
flint run flint run flint run flint run flint run flint run	6 5 4 3 2 1	50 50 23 50 50	50 50 23 50 50	50 50 23 50 50

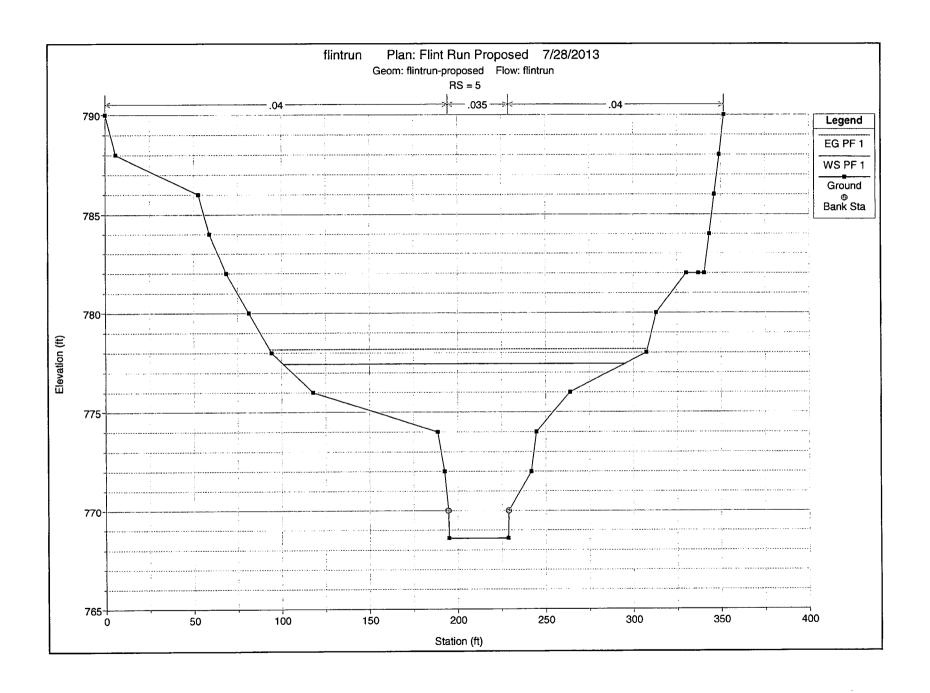
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS River: Flint Run

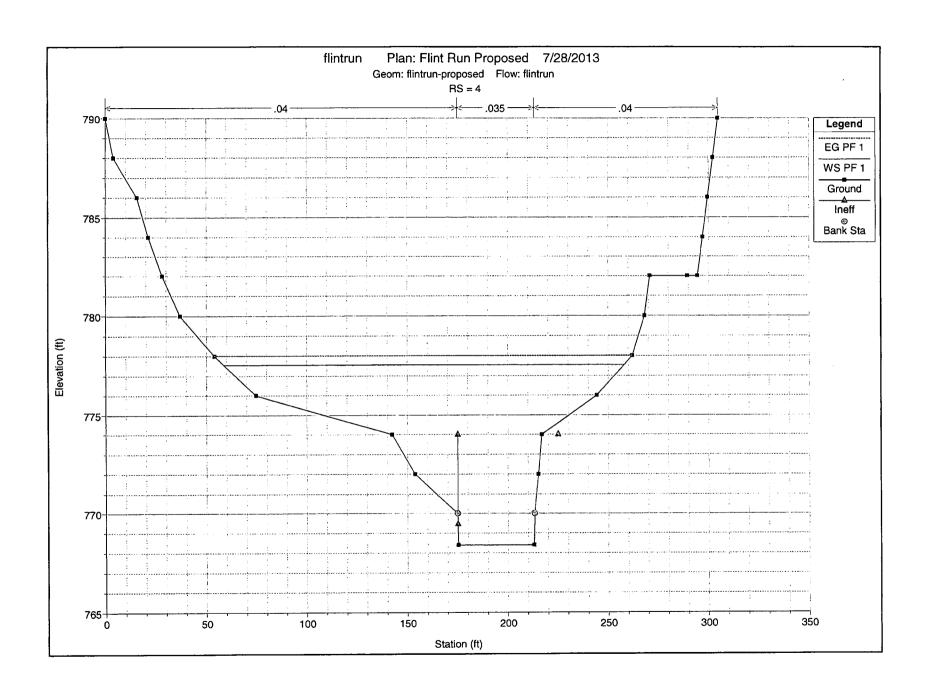
Reach	River Sta.	Contr.	Expan.
flint run flint run flint run flint run flint run flint run	6 5 4 3 2	.1 .1 .1 .1 .1	.3 .3 .3 .3

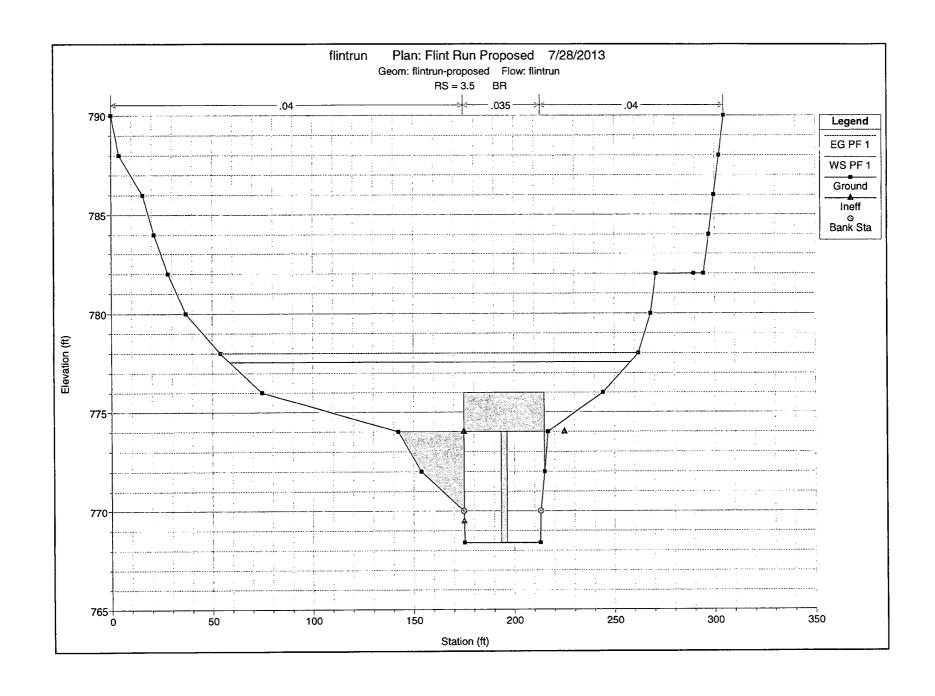


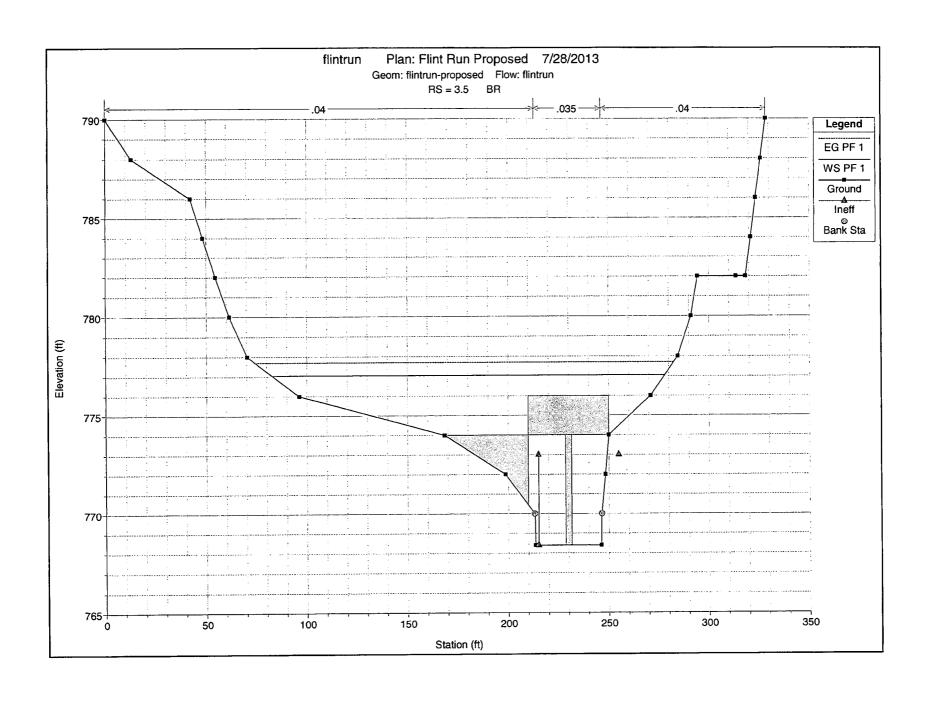


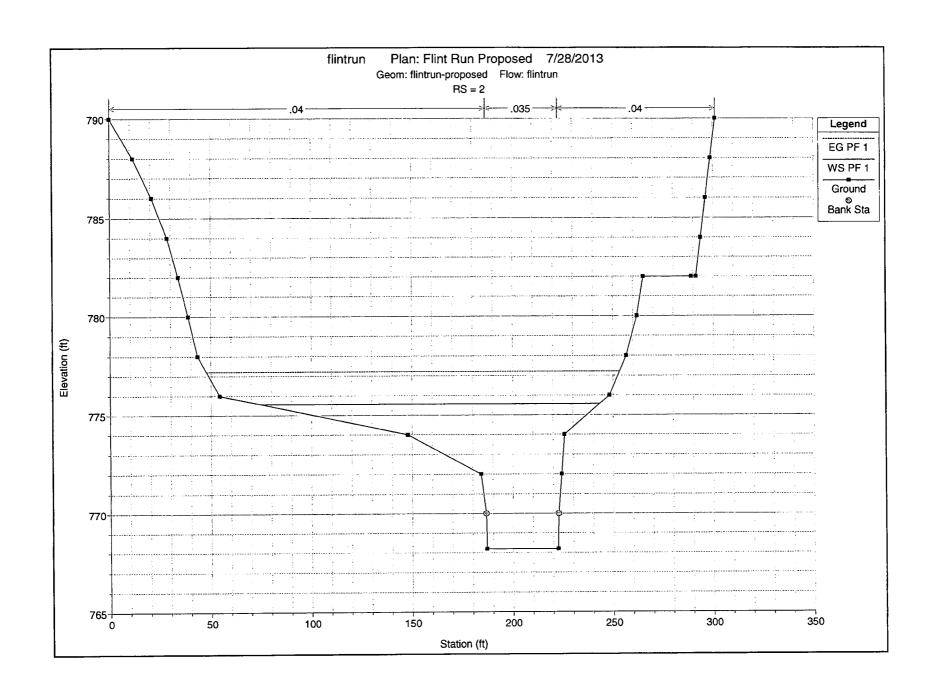


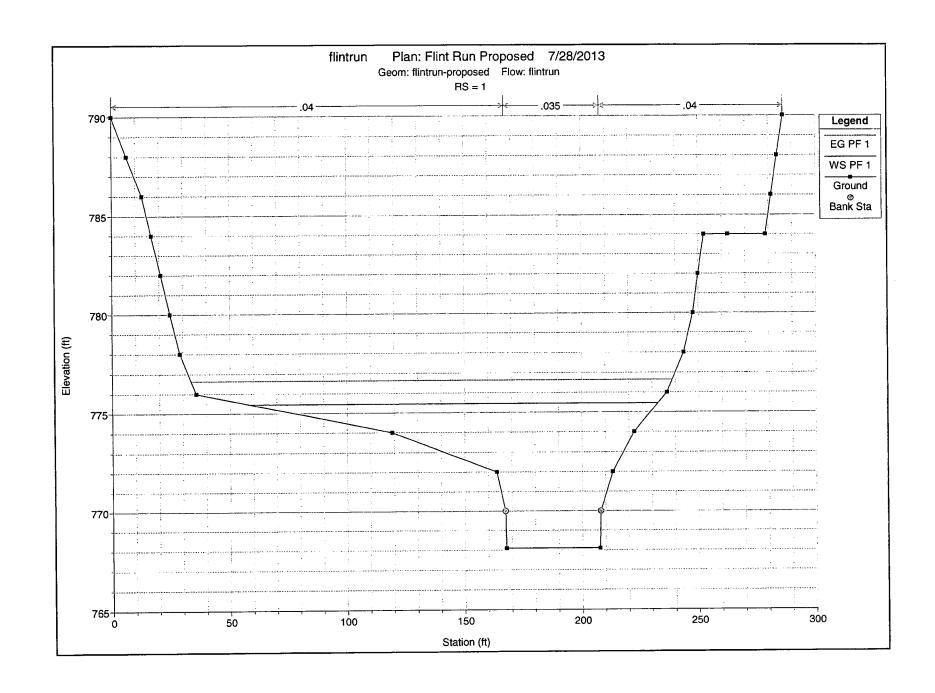


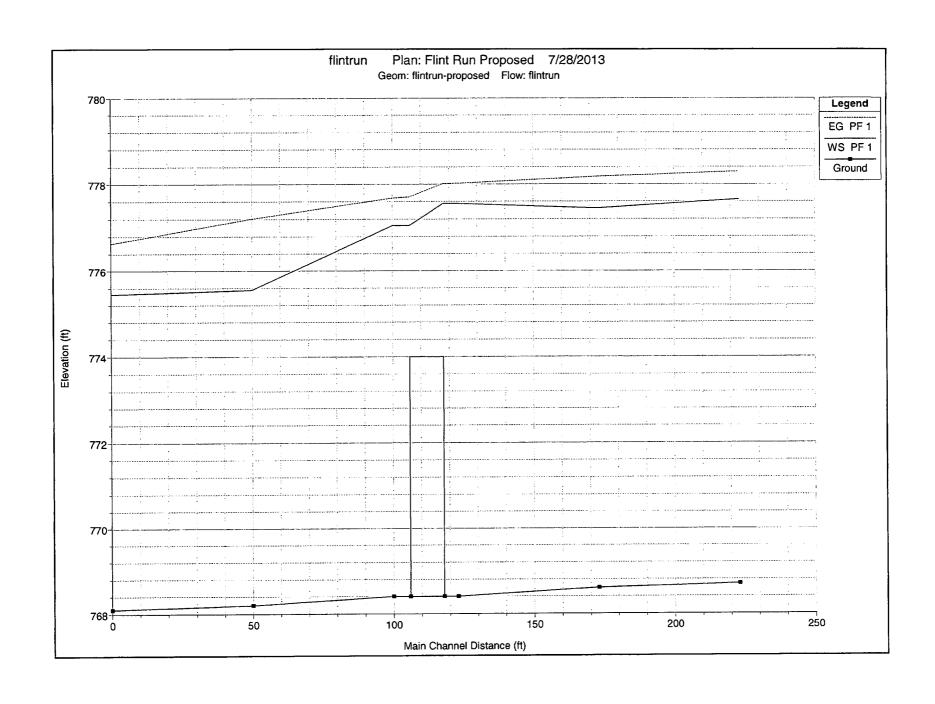












HEC-RAS Version 4.1.0 Jan 2010 U.S. Army Corps of Engineers Hydrologic Engineering Center 609 Second Street Davis, California

Х	х	XXXXXX	XX	XX		XX	ХХ	Х	X	XXXX
x		X	Х	Х		Χ	Х	Х	Х	X
x		X	X			Х	Х	X	Х	X
XXX	κχχχ	XXXX	X		XXX	XX	XX	XXX	XXX	XXXX
X	Х	Х	Х			Χ	Χ	Х	Х	Х
x	X	X	X	Х		Х	X	Х	Х	X
X	x	XXXXXX	XX	XX		Х	X	X	Х	XXXXX

PROJECT DATA

Project Title: flintrun

Project File: flintrun.prj Run Date and Time: 7/29/2013 8:21:26 AM

Project in English units

PLAN DATA

Plan Title: Flint Run Proposed

Plan File: h:\Projects\09261\092612006\NS\Floodplain\flintrun.p02

Geometry Title: flintrun-proposed

Geometry File: h:\Projects\09261\092612006\NS\Floodplain\flintrun.g02

: flintrun Flow Title

flow File

Plan Summary Information:

Multiple Openings = 6 Number of: Cross Sections =

0 Inline Structures = 0 Culverts =

Lateral Structures = 0 Bridges 1

Computational Information
Water surface calculation tolerance = 0.01 Critical depth calculation tolerance = 20 Maximum number of iterations 0.3 Maximum difference tolerance = 0.001 Flow tolerance factor

Computation Options

Critical depth computed only where necessary

Conveyance Calculation Method: At breaks in n values only

Average Conveyance Friction Slope Method:

Subcritical Flow Computational Flow Regime:

FLOW DATA

Flow Title: flintrun

Flow File: h:\Projects\09261\092612006\NS\Floodplain\flintrun.f01

Flow Data (cfs)

River Flint Run

Reach flint run RS

PF 1 3612

Boundary Conditions

River

Reach

Profile

Upstream

Downstream

Flint Run Normal S = 0.004 flint run PF 1

GEOMETRY DATA

Geometry Title: flintrun-proposed Geometry File: h:\Projects\09261\092612006\NS\Floodplain\flintrun.g02

CROSS SECTION

RIVER: Flint Run REACH: flint run

RS: 6

Description:

Station El		Data	num=	23	_		_		
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	786	27.9	786	34.5	784	41.1	782	48.4	780
55.2	778		776	162.9	774	166.1	772	168.3	770
168.6	768.7	201.2	768.7	201.5	770	214.8	772	217.1	774
219.4	776	274	778	294.4	780	321.7	782	325.2	784
327.8	786	330.3	788	332.8	790				

Manning's n Values num≔ n Val Sta n Val Sta Sta n Val .04 .035 201.5 168.3 .04

Lengths: Left Channel Coeff Contr. Expan. Right 201.5 Right Bank Sta: Left .1 168.3 50 50

CROSS SECTION

RIVER: Flint Run

REACH: flint run

RS: 5

INPUT

Description Station Ele		Data	num=	26	_		_		_7
Sta	Elev	sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	790	5.9	788	52.8	786	59	784 774	68.5 192.5	782 772
81.4	780	94.3	778	117.9	776 768.6	188.6 228.9	774	241.8	772
194.6	770	194.9	768.6	228.6		220.9	770	241.0	112
				Pag	ge 2				

244.7 774 263.9 337.1 782 340.5 351.8 790	776 782	flintru 307.5 343.4	n.rep 778 784	313.1 346.2	780 786	330.2 349.1	782 788
Manning's n Values Sta n Val Sta 0 .04 194.6	num= n Val .035	3 Sta 228.9	n Val .04				
Bank Sta: Left Right 194.6 228.9	Lengths:	Left Cha 50	nnel 50	Right 50	Coeff	Contr. .1	Expan.
CROSS SECTION							
RIVER: Flint Run REACH: flint run	RS: 4						
INPUT Description: Station Elevation Data Sta Elev Sta 0 790 3.9 36.9 780 54.1 174.9 770 175.2 216.9 774 244.3 289.5 782 294.5 304.7 790	num= Elev 788 778 768.4 776 782	26 Sta 15.6 74.7 212.9 262 297.1	Elev 786 776 768.4 778 784	Sta 21.2 142.5 213.2 268.1 299.6	Elev 784 774 770 780 786	Sta 28.1 153.8 215.1 270.8 302.2	Elev 782 772 772 782 788
Manning's n Values Sta n Val Sta 0 .04 174.9	num= n Val .035	3 Sta 213.2	n Val .04				
Bank Sta: Left Right 174.9 213.2 Ineffective Flow num= Sta L Sta R Elev 0 170 774 220 304.7 774	-	Left Cha 23 t	anne1 23	Right 23	Coeff	Contr. .3	Expan. .5
BRIDGE							
RIVER: Flint Run REACH: flint run	RS: 3.5						
INPUT Description: Distance from Upstream XS Deck/Roadway width Weir Coefficient Upstream Deck/Roadway Co	= 1 = 2.						
Sta Hi Cord Lo Cord 0 774 215 776 774	Sta H 175 215	i Cord Lo 774 774	o Cord	Sta H ⁻ 175 305	i Cord 776 776	Lo Cord 774	
Upstream Bridge Cross Sec Station Elevation Data Sta Elev Sta 0 790 3.9 36.9 780 54.1 174.9 770 175.2 216.9 774 244.3	tion Data num= Elev 788 778 768.4 776	26 Sta 15.6 74.7 212.9 262 Page	Elev 786 776 768.4 778 e 3	Sta 21.2 142.5 213.2 268.1	Elev 784 774 770 780	Sta 28.1 153.8 215.1 270.8	Elev 782 772 772 782

```
flintrun.rep
                                                         299.6
                                                                    786
                                                                           302.2
                                                                                       788
   289.5
                     294.5
                                782
                                                  784
              782
                                       297.1
   304.7
              790
                                         3
Manning's n Values
                             num=
                             n Val
                      Sta
                                         Sta
                                                n Val
     Sta n Val
              .04
                     174.9
                              .035
                                       213.2
                                                  .04
                   Right 213.2
                             Coeff Contr.
                                              Expan.
Bank Sta: Left
          174.9
                                       . 3
                                                  . 5
                                    2
Ineffective Flow
                       num=
   Sta L Sta R
                      Elev
                             Permanent
              170
                       774
        0
                                  F
            304.7
                                   F
                       774
      220
Downstream Deck/Roadway Coordinates
               6
    num=
      Sta Hi Cord Lo Cord
                                 Sta Hi Cord Lo Cord
                                                            Sta Hi Cord Lo Cord
                                                            210
                                                                     776
                                                                              774
                                 210
                                         774
        0
              774
                                                                     776
                       774
                                          774
                                                            329
               776
                                 250
      250
Downstream Bridge Cross Section Data
Station Elevation Data
                                                                    Elev
                                                                              Sta
                                                                                      Elev
                                                  Elev
                                                            Sta
                               Elev
                                         Sta
                       Sta
      Sta
              Elev
                                                                             54.6
                                                           48.3
                                                                     784
774
                                                                                       782
       0
               790
                       12.9
                                788
                                         42.1
                                                   786
                                 778
                                                                            198.6
                                                                                       772
                                        96.2
                                                   776
                                                          168.4
               780
                       70.4
    61.4
                                                                     770
                                                                            248.3
                                                                                       772
                     213.4
                              768.4
                                       246.2
                                                 768.4
                                                          246.5
   213.1
               770
                                                          291.1
                                                                            294.4
                                                   778
                                                                     780
                                                                                       782
                     270.9
               774
                                776
                                       284.5
   250.1
               782
                                 782
                                        320.9
                                                   784
                                                          323.4
                                                                     786
                                                                            325.9
                                                                                       788
                      318.3
   313.5
   328.5
               790
Manning's n Values
                                          3
                             num=
                             n Val
                      Sta
                                        Sta
                                                 n Val
      Sta n Val
                                                   .04
               .04
                     213.1
                                .035
                                       246.5
Bank Sta: Left
213.1
                             Coeff Contr.
                   Right
                                              Expan.
                                        . 3
                                                  . 5
                   246.5
Ineffective Flow
                      ทบฑ=
            Sta R
                       Elev Permanent
   Sta L
              205
                        773
        0
                                 F
      255
             328.5
                                   F
Upstream Embankment side slope
                                                           O horiz. to 1.0 vertical
                                                          O horiz. to 1.0 vertical
Downstream Embankment side slope
                                                  =
Maximum allowable submergence for weir flow = Elevation at which weir flow begins = Energy head used in spillway design = Spillway height used in design =
                                                         .98
                                                  = Broad Crested
Weir crést shape
Number of Piers = 1
Pier Data
Pier Station
                                   195
                                                             230
                                           Downstream=
                 Upstream=
Upstream
               num=
                           2
              Elev
    Width
                       Width
                                Elev
       3
               768
                        3
                                 774
Downstream
               num=
    Width
              Elev
                       Width
                                Elev
        3
               768
Number of Bridge Coefficient Sets = 1
Low Flow Methods and Data
```

		flintr	un.rep				
Energy Selected Low Flow Methods	= Highes	t Energy	Answer				
High Flow Method Pressure and Weir 1 Submerged Inlet Submerged Inlet Max Low Cord	t Cd	= t Cd = =	.8				
Additional Bridge Paramete Add Friction compor Do not add Weight of Class B flow crition inside the brid Criteria to check	nent to M component cal depth dge at th	to Mome computa e upstre	itions u eam end				
CROSS SECTION							
RIVER: Flint Run REACH: flint run	RS: 3						
INPUT Description: Station Elevation Data Sta Elev Sta 0 790 12.9 61.4 780 70.4 213.1 770 213.4 250.1 774 270.9 313.5 782 318.3 328.5 790	num= Elev 788 778 768.4 776 782	26 Sta 42.1 96.2 246.2 284.5 320.9	Elev 786 776 768.4 778 784	Sta 48.3 168.4 246.5 291.1 323.4	Elev 784 774 770 780 786	Sta 54.6 198.6 248.3 294.4 325.9	Elev 782 772 772 782 788
Manning's n Values Sta n Val Sta 0 .04 213.1	num= n Val .035	3 Sta 246.5	n Val .04				
Bank Sta: Left Right 213.1 246.5 Ineffective Flow num= Sta L Sta R Elev 0 205 773 255 328.5 773	Lengths: 2 Permanen F F	50	nanne1 50	Right 50	Coeff	Contr.	Expan. .5
CROSS SECTION							
RIVER: Flint Run REACH: flint run	RS: 2						
INPUT Description: Station Elevation Data Sta Elev Sta 0 790 11.4 38.7 780 43.4 186.7 770 187 225.7 774 248.2 289.1 782 291.5 301.2 790	num= Elev 788 778 768.2 776 782	26 Sta 20.8 54.4 222.4 256.6 293.9	Elev 786 776 768.2 778 784	Sta 28.4 147.9 222.7 262 296.3	Elev 784 774 770 780 786	Sta 33.8 184.1 224.2 265.2 298.75	Elev 782 772 772 782 788

3 Sta n Val Page 5

num= Sta n Val

Manning's n Values Sta n Val

0 .04 186.7 .035 222.7 .04	04
----------------------------	----

Right Coeff Contr. Expan. Lengths: Left Channel 50 50 Bank Sta: Left 186.7 Right 222.7 50 .3 .1

CROSS SECTION

RIVER: Flint Run REACH: flint run

RS: 1

INPUT

Description:

Station Elevation Data	num=	26			_		_
Sta Elev Sta	. Elev	Sta	Elev	Sta	Elev	Sta	Elev
0 790 6.3	788	12.8	786	16.7	784	20.7	782
24.6 780 28.7	778	35.6	776	119.2	774	163.7	772
167.3 770 167.6	768.1	207.6	768.1	207.9	770	213.1	772
222.3 774 236.4	776	243.6	778	247.6	780	249.9	782
252.4 784 262.6	784	278.7	784	281.2	786	283.7	788
286.3 790							

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
0 .04 167.3 .035 207.9 .04

Bank Sta: Left Right Coeff Contr. Expan. 167.3 207.9 .1 .3

SUMMARY OF MANNING'S N VALUES

River:Flint Run

Reach	River Sta.	n1	n2	n3
flint run flint run	6 5	.04	.035 .035	.04
flint run	4	.04	.035	.04
flint run flint run	3.5 3	Bridge .04	.035	.04
flint run	2	.04	. 035	.04
flint run	1	. 04	.035	.04

SUMMARY OF REACH LENGTHS

River: Flint Run

Reach	River Sta.	Left	Channel	Right
flint run flint run flint run flint run	6 5 4 3.5	50 50 23 Bridge	50 50 23	50 50 23
flint run flint run flint run	3.3 3 2 1	50 50	50 50	50 50

flintrun.rep

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS River: Flint $\ensuremath{\mathsf{Run}}$

Reach	River Sta.	Contr.	Expan
flint run flint run flint run	6 5 4	.1 .1 .3	.3 .3 .5
flint run flint run flint run flint run	3.5 B 3 2 1	ridge .3 .1 .1	.5 .3 .3

RETTEW

We answer to you.

Engineers

Planners Surveyors

Landscape Architects

Environmental

Consultants

5143 Stoneham Rd. Ste 100, North Canton, OH 44720 • Phone: (330) 818-9770

E-mail: rettew@rettew.com ● Web site: rettew.com

July 29, 2013

Mr. Dan Wellings Floodplain Administrator Doddridge County 118 East Court Street West Union, WV 26456

RE: WG-100 Pipeline

EQT Gathering, LLC

Floodplain Permitting - Flint Run

Doddridge County, WV

RETTEW Project No. 092612006

Dear Mr. Wellings:

On behalf of EQT Gathering, LLC (EQT), please find attached a floodplain permit application for a pipeline crossing of Flint Run adjacent to Big Flint Road in Doddridge County. The associated HEC-RAS study and relevant mapping are also attached. Project is located at approx. 39°21′29.2″N and 80°42′43.1″W.

All disturbance associated with the project is temporary in nature only and the entire project site will be restored to existing grade following construction. During construction there will be a temporary bridge placed across Big Flint Run and this has been included in hydraulic calculations. There are no other structures associated with the project and there will be no stream alteration or relocation.

Increases in base flood elevation are less than 1 foot throughout the study area; therefore, no properties are "adversely affected" as defined by the Doddridge County Floodplain Ordinance.

All wetland and stream crossings associated with the pipeline have been authorized under Nationwide Permit 12 as verified by the United States Army Corps of Engineers on 2/12/2013 and 5/20/2013 (File LHR-2012-00860-OHR). The project also has a National Pollutant Discharge Elimination System Water Pollution Control Permit, WV permit no. 0115924 on 4/16/13 and 5/29/13.

Please contact me at gjones@rettew.com or (717)-743-0313 if any additional information is needed.

Sincerely,

Griffith Jones
Project Manager

Enclosures

copy: Stephanie Frazier, EQT Gathering, LLC (via email)

File

2013 JUL 31 AM 9:





Dan Wellings <wellingsd8@gmail.com>

EQT Gathering Project - WG-100 Floodplain Permit

2 messages

Frazier, Stephanie <SFrazier@eqt.com>
To: "wellingsd8@gmail.com" <wellingsd8@gmail.com>

Tue, Jul 30, 2013 at 4:22 PM

Good afternoon Mr. Wellings,

I wanted to follow up with you about the floodplain permit application that we prepared. It will be delivered to you via FedEx tomorrow at 118 East Court Street. I am hopeful that we can discuss the permit and address any questions or concerns you might have. If you would like an electronic copy of the permit application, please let me know. For your convenience, I've attached a copy of the floodplain permit application.

Thanks,

Stephanie Frazier

Stephanie Frazier

Senior Permitting Coordinator - Environmental

EQT Corporation

625 Liberty Avenue

Suite 1700

Pittsburgh, PA 15222

Office: 412.553.5798

Mobile: 412.925.1446

Fax: 412.395.3166

E-Mail: SFrazier@eqt.com



www.egt.com

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v1.e

Scan_2013.0730 WG-100 Doddridge Floodplain Permit.pdf 5374K

Dan Wellings <wellingsd8@gmail.com> To: "Frazier, Stephanie" <SFrazier@eqt.com> Wed, Jul 31, 2013 at 5:06 PM

Stephanie,

EQT's WG-110 pipeline floodplain application was delivered this afternoon.

I have not got to see the paper copy yet, I am working from my home computer, but I did review the application you attached to my e-mail.

I assume the paper copy is the same.

I will need some more info to process application.

- 1. The cover sheet also needs to summarize the results of the HEC-RAS study more thoroughly. I need the determined pre BFE stated, the amount of change the projects impact will have during and after development (to the nearest hundredth of a foot), and the post BFE stated. The "1 foot rule" is accumulative and I must keep track of the changes in the area.
- 2. The cover sheet must be signed and sealed by a licensed engineer.
- 3. I need an itemized breakdown of the total construction costs of all work, including materials, within the designated floodplain to show how you arrived at the cost and application fee submitted.

Some work has already been performed.

The temporary bridge is in place and a dirt road constructed in or near the floodplain. ALL WORK WITHIN THE FLOODPLAIN MUST STOP UNTIL A PERMIT IS GRANTED!

Dan Wellings, PS Doddridge County Floodplain Manager

[Quoted text hidden]





143 Stoneham Rd. Ste 100, North Canton, OH 44720 • Phone: (330) 818-9770

E-mail: rettew@rettew.com • Web site: rettew.com

Engineers Planners Surveyors Landscape Architects

Environmental Consultants

August 5, 2013

Mr. Dan Wellings Floodplain Administrator Doddridge County 118 East Court Street West Union, WV 26456

RE:

WG-100 Pipeline
EQT Gathering, LLC
Floodplain Permitting – Flint Run
Doddridge County, WV
RETTEW Project No. 092612006

Dear Mr. Wellings:

On behalf of EQT Gathering, LLC (EQT), please find attached a floodplain permit application for a pipeline crossing of Flint Run adjacent to Big Flint Road in Doddridge County. The associated HEC-RAS study and relevant mapping are also attached. Project is located at approx. 39°21′29.2″N and 80°42′43.1″W.

All disturbance associated with the project is temporary in nature only and the entire project site will be restored to existing grade following construction.

The Flint Run pipeline crossing site includes a temporary bridge located on the west side of Big Flint Road (CR 3) in Doddridge County, WV. A study of the temporary bridge crossing was completed to establish the existing and proposed 100-year floodplain on the property using currently accepted technical concepts.

The flow utilized for this flood study was computed using the equations developed in the USGS report Estimation of Flood-Frequency Discharges for Rural, Unregulated Streams in West Virginia. A 100-year flow of 3,612 cfs was used for the pre and post floodplain study. The Corps of Engineers' HEC-RAS computer program, version 4.1, was utilized to establish base flood elevations for the 100-year flow.

The HEC-RAS cross sections through the properties were obtained from the 2-foot contour mapping. No detailed information was available for the temporary bridge therefore it was entered into the HEC-RAS model using the best available measurements. To model the encroachment in the floodplain, the proposed grading approach and bridge was input in to HEC-RAS. The proposed condition floodplain study was run to show that the increases in base flood elevation will remain under 1 foot after the development is constructed.



Page 2 of 2 August 5, 2013 RETTEW Project No. 092612006

The summary table below summarizes the elevations for both the existing and proposed floodplains.

Cross Section Base Flood Elevation Summary

Cross Section	Existing BFE	Proposed BFE	Change
6	777.10	777.65	+0.55
5	776.72	777.45	+0.73
4	776.90	777.56	+0.66
3	776.71	777.05	+0.34
2	775.56	775.56	0
1	775.46	775.46	0

Based upon this study, the temporary bridge will not cause any unacceptable increases in the flood heights on the subject property or any adjacent properties, block drainage from the subject property and adjacent properties, deflection of floodwaters onto adjacent existing structures, or increase stream velocity therefore initiating or exacerbating erosion problems. Further, the temporary bridge structure will be removed following installation of the pipeline and preconstruction BFE will be restored.

All wetland and stream crossings associated with the pipeline have been authorized under Nationwide Permit 12 as verified by the United States Army Corps of Engineers on 2/12/2013 and 5/20/2013 (File LHR-2012-00860-OHR).

Please contact me at gjones@rettew.com or (717)-743-0313 if any additional information is needed.

Sincerely,

Griffith Jones

Project Manager

Eric W. Hershey, PE **Senior Engineer**

Enclosures

Stephanie Frazier, EQT Gathering, LLC (via email) сору:

File



The summary table below summarizes the elevations for both the existing and proposed floodplains.

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2	775.56	775.56	0
1	775.46	775.46	0

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All wetland and stream crossings associated with the pipeline have been authorized under Nationwide Permit 12 as verified by the United States Army Corps of Engineers on 2/12/2013 and 5/20/2013 (File LHR-2012-00860-OHR).

Please contact me at gjones@rettew.com or (717)-743-0313 if any additional information is needed.

Sincerely,

Griffith Jones
Project Manager

Eric W. Hershey, PE Senior Engineer

Enclosures

copy: Stephanie Frazier, EQT Gathering, LLC (via email)

File





Dan Wellings <wellingsd8@gmail.com>

WG-100 cost break down

1 message

Frazier, Stephanie <SFrazier@eqt.com>
To: "wellingsd8@gmail.com" <wellingsd8@gmail.com>

Thu, Aug 1, 2013 at 9:36 AM

base lay ("per foot" price)
mile of pipeline ROW in the floodplain
pipeline cost in floodplain
bridge total
stone rce
total cost of construction
base fee for projects greater than 100,000 - \$1000
basis over 100,000
\$5 per 1000
subtotal additional fee
Base Fee plus Additional Fee
first check
Deposit "Deposit for Expenses"

separate check
second check

Stephanie Frazier

Senior Permitting Coordinator - Environmental

EQT Corporation

625 Liberty Avenue

Suite 1700

Pittsburgh, PA 15222

Office: 412.553.5798

Mobile: 412.925.1446

Fax: 412.395.3166

E-Mail: SFrazier@eqt.com



www.eqt.com

 ${\Bbb P}$ Think Green - Not every email needs to be printed.



www.eqt.com

v1.e

Megan Landfried 115 Professonal Bridgport w. 3 26330

Floodplain Permit Application and Property of the Property of 2013:

2013:
Delivered to the:
Clerk of the County Court
118 E. Court Street, West Union, WY 26456.
Beth A. Rogers, Doddridge County Clerksis,
Dan Wellings, Doddridge County Flood Plain Manager
18 13-2xb



STATE OF WEST VIRGINIA. COUNTY OF DODDRIDGE, TO WIT

I, Virginia Nicholson, Editor of THE HERALD RECORD, a weekly newspaper published regularly, in Doddridge County, West Virginia, Do Hereby Certify Upon Oath That the Accompanying Legal Notice Theodolain Permo was published in said paper for. successive weeks beginning with the issue ending with the issue of that said notice contains ... 168 amounts to the sum of \$. . . FOR FIRST PUBLICATION, SECOND **PUBLICATION IS 75% OF THE FIRST PUBLICATION** and each publication thereafter **EDITOR** SWORN TO AND SUBSCRIBED BEFORE ME THIS THE DAY 2013 NOTARY PUBLIC