

SAMPLE

LETTERS



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
DIVISION OF STRUCTURES
SUITE 1100, JAMES K. POLK BUILDING
NASHVILLE, TENNESSEE 37243-0339

GERALD F. NICELY
COMMISSIONER

PHIL BREDESEN
GOVERNOR

December 4, 2006

Mr. Jim Bivens
Roadway Specialist Supervisor 2
Survey and Design Office
Suite 1200, J.K. Polk Bldg.
Nashville, TN 37243-0348

Subject: PE # 35945-1491-94
Project # BRZE-3500(33)
Pea Vine Road over
Porters Creek at L.M. 9.51
Hardeman County

Dear Mr. Bivens:

This office has completed the hydraulic analysis of the subject project and is forwarding the following hydraulic information for your use in completing plans. The proposed grade received March 30, 2006 is satisfactory for final design.

The proposed structure at station 76+87.50 (\pm) over Porters Creek will be a 111'-6" (\pm), 3-span, 75° skew reinforced concrete girder bridge. The beginning bridge station will be 76+31.75.

Drainage Area = 56.30 mi²
Design Discharge (10 yr.) = 7230 cfs

Comments:

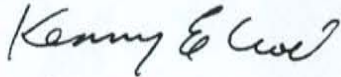
- ◆ Adequate ROW should be provided for rip-rap slope protection at the bridge abutments. Final rip-rap dimensions are shown on attached layout.
- ◆ The road is to be closed and traffic is to be maintained on existing routes.
- ◆ This project is not in a FEMA floodway, floodplain, or study area.
- ◆ If 1 acre or more of land will be disturbed during construction, submission to Environmental Division, Permits Section of a NOI (Notice of Intent) form for a NPDES (National Pollutant Discharge Elimination System) permit is required. Please refer to the Roadway Design Guidelines and Instructional Bulletins for the information required by the Permits Section for permit processing.

Mr. Bivens
December 4, 2006
Page 2

- ◆ The Environmental Division, Permits Section will provide a comprehensive permit assessment when half size plans including erosion control at all stream crossings, a list of stations and impacts, and a copy of the USGS Quad map with impact locations indicated are provided.

If you have any questions or if we can be of any further assistance, you may contact this office at (615) 741-3351.

Sincerely,



(for)
Edward P. Wasserman
Engineering Director, Structures

JKZ: APW: pc

Enclosures

cc: Mr. Jeff Jones
Mr. Sam Cardwell
Mr. Doug Delaney
Mr. Rick Pack
Mr. John Hewitt
Mr. Freddy Miller
Mr. Houston Walker



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
 Suite 1200 James K. Polk Building
 NASHVILLE, TENNESSEE 37243-0340

MEMORANDUM

TO: Mr. Andrew Miller, Region 4 Right of Way (1 Full & 1 Half Size)
 Mr. Charles Green, Region 4 Utilities (1 Full & 1 Half Size)
 Mr. Scotty Plunk, Region 4 Construction (1 Full & 1 Half Size))
 Mr. Joe Warren, Region 4 Traffic (Half Size)
 Mr. Len Oliver, Materials & Test (Half Size)
 Mr. Edward Wasserman, Structures Division (Full Size)
 Mr. Mike Clinard, Right of Way (Half Size)
 Mr. Joe Shaw, Utilities (Half Size)
 Mr. Doug Delaney, Environmental Planning (8 Half Size & 1 Half Size X-Sections)
 Ms. Angie Duncan, Environmental Planning & Permits (1 Half Size Plans & X-Sections)
 Mr. Jody Knox, Region 4, Environmental Coordinator (Half Size)
 Mr. John Morris, Quality Assurance (Half Size)
 Mr. Ali Hangul, Quality Assurance (Half Size)
 Mr. David Horne, Pavement Design (Half Size)
 Mr. Willie E. Spencer, County Mayor (Full Size)
 Mr. David C. Sipes, Hwy Chief Admin Office (Full Size)
 Mr. Don Roe, BellSouth (Full Size)
 Mr. Clyde Dellinger, Bolivar Gas (Full Size)
 Mr. Randy Plunk, Bolivar Electric Department (Full Size)

FROM: *JB* Jim Bivens, Roadway Specialist Supervisor II
 Design Division

DATE: August 14, 2006

SUBJECT: Right-of-Way Field Review
 Project No. BRZE-350000(33), 35945-2491-94
 PPRM Pin # 106053.00
 Pea Vine Road,
 Bridge Over Porters Creek, L.M. 9.51
 Hardeman County

JKZ
APW

This will confirm verbal arrangements that have been made regarding a Right of Way Field Review for this project. Persons desiring to attend, please meet at the 1st Floor Conference Room, Region 4 Office, 300 Benchmark Place, Jackson, TN, on Tuesday, September 12, 2006 at 10:00 a.m.

Prints of the plans are enclosed for names listed above. Please have comments ready before the review is made. If you are unable to attend but have comments, please submit your comments in writing to the above address prior to meeting or by e-mail, jimmie.bivens@state.tn.us.

JB/job

cc: Mr. Sam Cardwell
 Ms. Amy Crowley
 File

Mr. Freddy Miller
 Mr. Terrance Sanders

Ms. Dawn Pruett
 Ms. Lisa Smith, Reg. 4



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
DIVISION OF STRUCTURES
SUITE 1100, JAMES K. POLK BUILDING
NASHVILLE, TENNESSEE 37243-0339

GERALD F. NICELY
COMMISSIONER

PHIL BREDESEN
GOVERNOR

April 3, 2006

Mr. Jim Bivens
Survey and Design Office
Suite 1200 James K. Polk Bldg.

Subject: BRZE-3500(33)
PE # 35945-1491-94
Pea Vine Road over
Porters Creek L.M. 9.51
Hardeman County

Dear Mr. Bivens:

A preliminary review has been made of the subject project and the following comments are for your use in developing ROW plans. The structure sizes are to be considered tentative and you will receive additional design data at a later date.

Porters Creek @ station 78+89.50

117 ft. ±, 3 span, 75° skew concrete girder bridge, beginning bridge station 78+31.00±

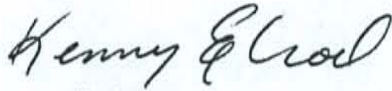
Comments:

- ◆ The proposed grade we received on Mar. 30, 2006, is satisfactory for hydraulic design.
- ◆ Adequate ROW should be provided for rip-rap slope protection at the bridge abutments. Final rip-rap dimensions will be included with our final design information.
- ◆ The road is to be closed and traffic is to be maintained on existing routes.
- ◆ If 1 acre or more of land will be disturbed during construction, submission to Environmental Division of a NOI (Notice of Intent) form for a NPDES (National Pollutant Discharge Elimination System) permit is required. Please refer to the Roadway Design Guidelines and Instructional Bulletins for the information required by the Environmental Permits Section for permit processing.
- ◆ These comments are not a comprehensive list of permit requirements. The Environmental Division should be provided half size plans for technical studies to determine the presence of wetlands, endangered species or any other environmental factors that may affect project development. The Environmental Permits Section will provide a comprehensive permit assessment for the entire project when plans are provided to them.

Mr. Bivens
April 3, 2006
Page 2

If you have any questions or if we can be of any further assistance, you may contact this office at (615) 741-5290.

Sincerely,

A handwritten signature in black ink that reads "Henry E. Crod". The signature is written in a cursive style with a large initial "H".

(for)

Edward P. Wasserman
Engineering Director, Structures

JKZ: kre:peavine.prel

cc: Mr. Jeff Jones
Mr. Doug Delaney
Mr. Sam Cardwell
Mr. Freddy Miller



1- Bridge

597

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
NASHVILLE, TENNESSEE 37243-0340

MEMORANDUM

TO: Mr. Edward Wasserman
Civil Engineering Director
Structures Division
1100 James K. Polk Bldg.

FROM: *AV* Jim Bivens
Roadway Specialist Supervisor II
Design Office

*Leak: 10/9/07
GA: 4-4-06*

DATE: March 30, 2006

SUBJECT: Project No. BRZE-3500(33), 35945-1491-94
PPRM Pin # 106053.00
Pea Vine Road,
Bridge Over Porters Creek, L.M. 9.51
Hardeman County

Transmitted here with are the following:

| No. Copies | Description |
|------------|--|
| 1 | ½ Size Set of preliminary roadway plans w/x-sections, Porters Creek X-Sections |
| 1 | Roll Upstream & Downstream Flood Plain Profiles |
| 1 | Roll Existing Survey, flood plane alignments |
| 1 | Roll Existing Bridge Data, existing bridge sketch, exist Pea Vine Road profile, Porter Creek Profile |
| | |

Remarks: For your use in providing grade approval.

Please contact me at 741-2725 or email, jimmie.bivens@state.tn.us if you have any questions or comments. Electronic files are available.

JOB/job

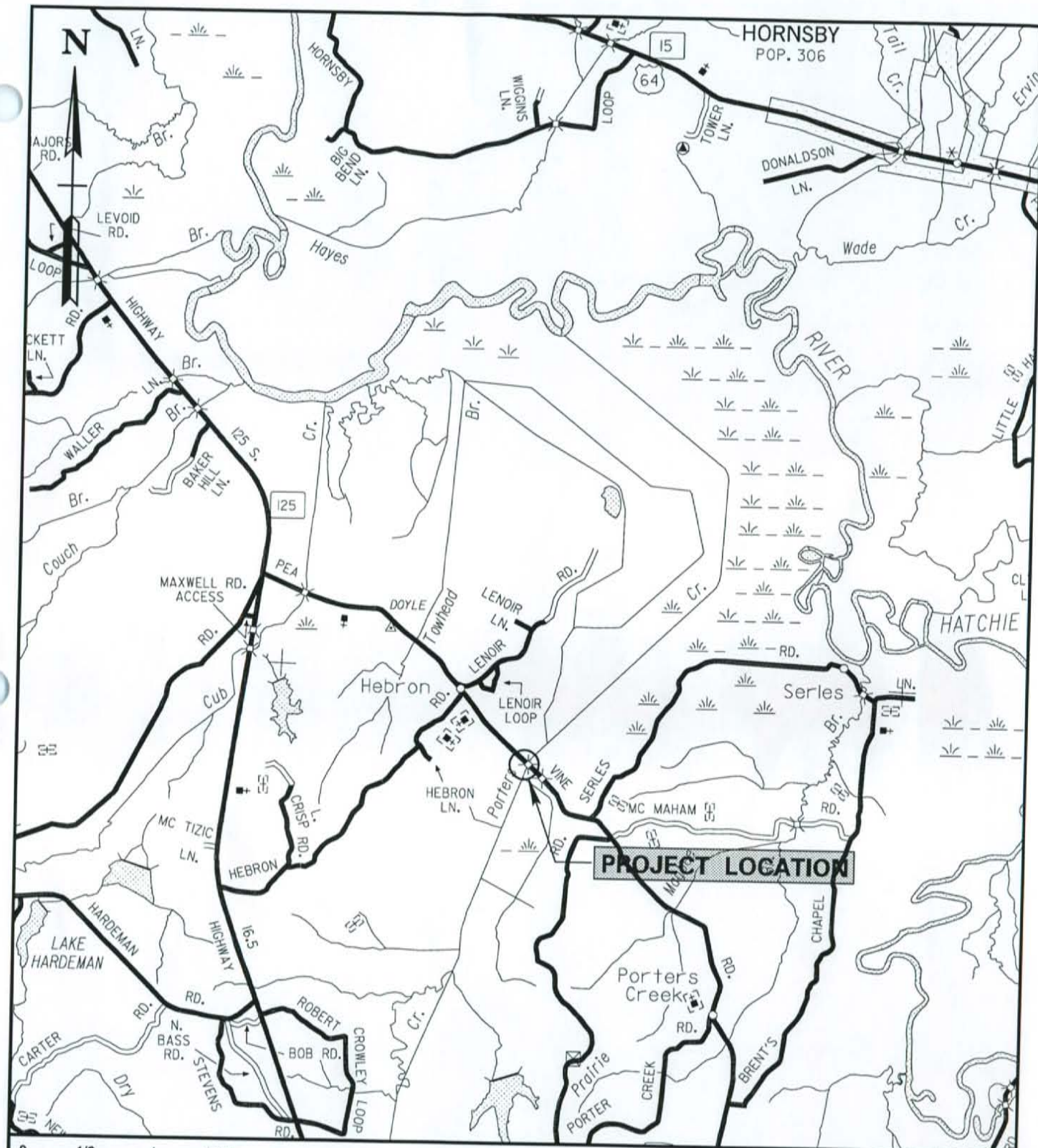
Attachments

cc: Mr. Freddy Miller
Ms. Dawn Pruett
File

Mr. Sam Cardwell
Mr. Terrance Sanders

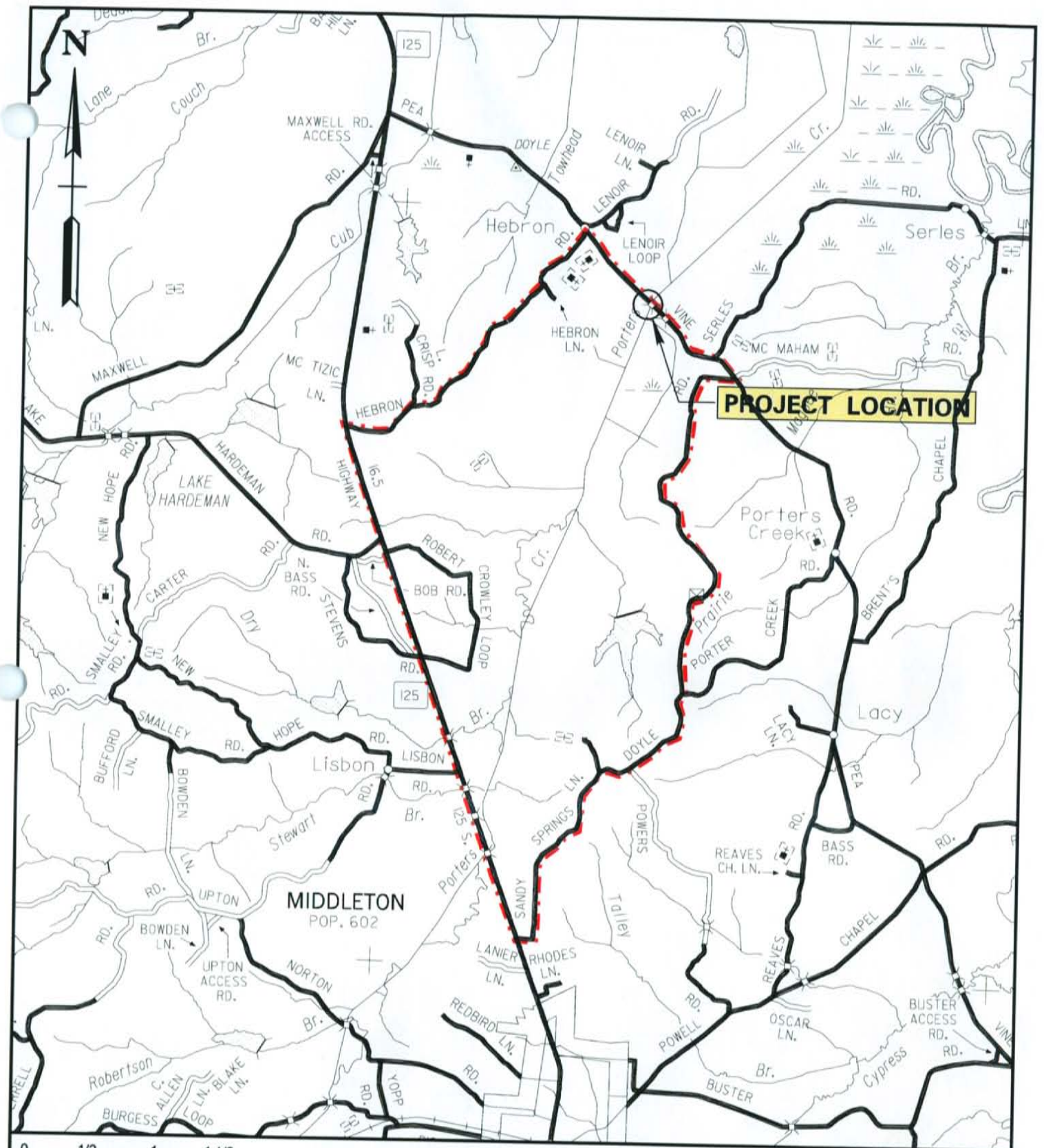


MAPS



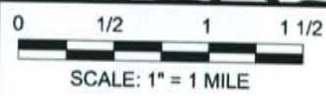
AREA MAP

**PEA VINE ROAD (1615) HARDEMAN COUNTY
 BRIDGE OVER PORTERS CREEK @ L.M. 9.51
 BRIDGE ID 35016150013**

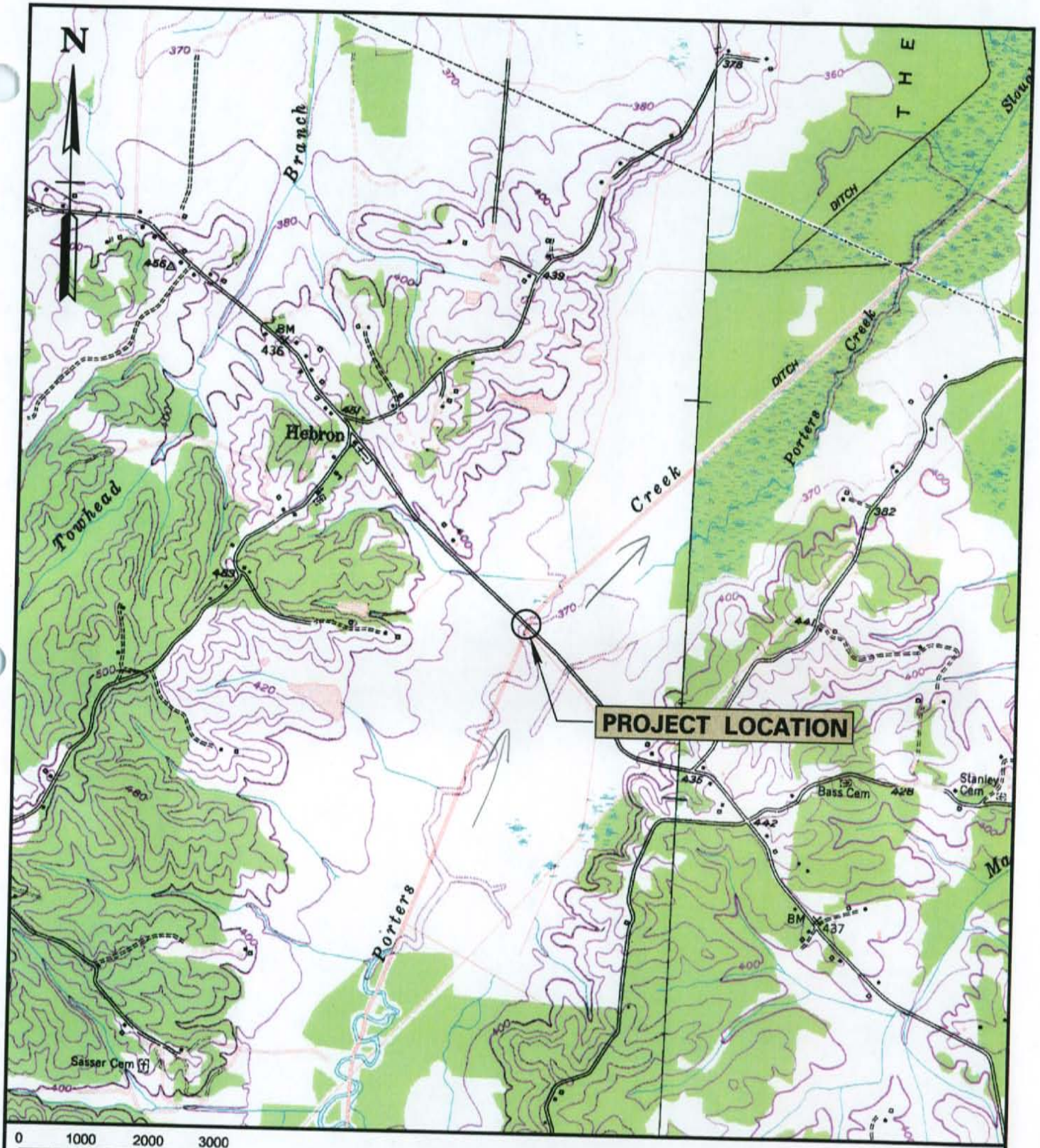


PROJECT LOCATION

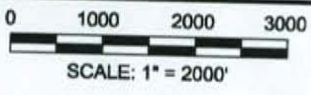
MIDDLETON
POP. 602



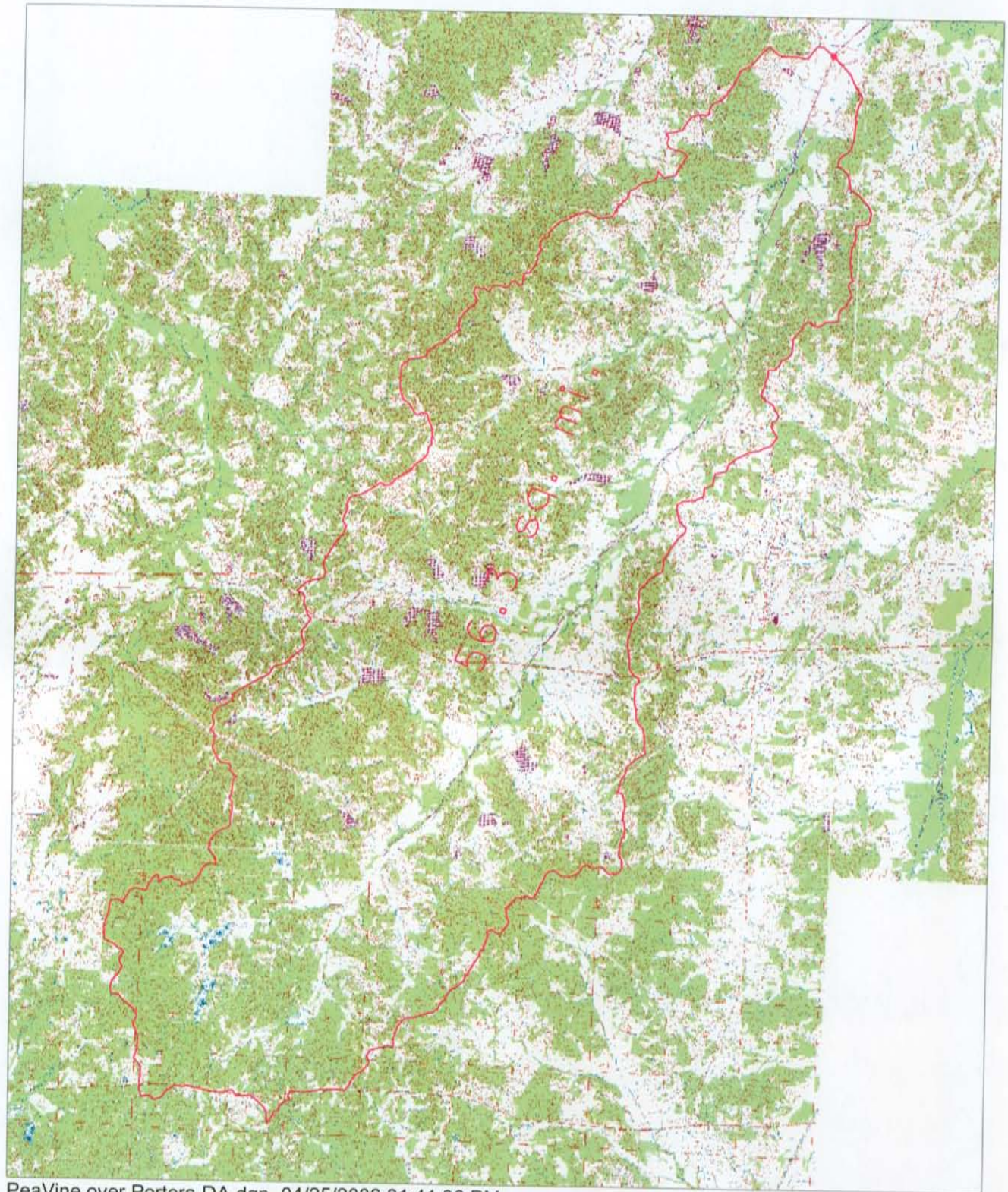
DETOUR MAP
PEA VINE ROAD (1615) HARDEEMAN COUNTY
BRIDGE OVER PORTER'S CREEK @ L.M. 9.51
BRIDGE ID 35016150001
LENGTH = 13.85 MILES



PROJECT LOCATION



PROJECT MAP
PEA VINE ROAD (1615) HARDEMAN COUNTY
BRIDGE OVER PORTERS CREEK @ L.M. 9.51
BRIDGE ID 35016150013
U.S.G.S. HEBRON & HORNSBY QUADS



PeaVine over Porters DA.dgn 04/25/2006 01:41:36 PM

PHOTOS

PEA VINE ROAD OVER PORTERS CREEK



ABOVE: Bridge Location Number

BELOW: Upstream



PEA VINE ROAD OVER PORTERS CREEK

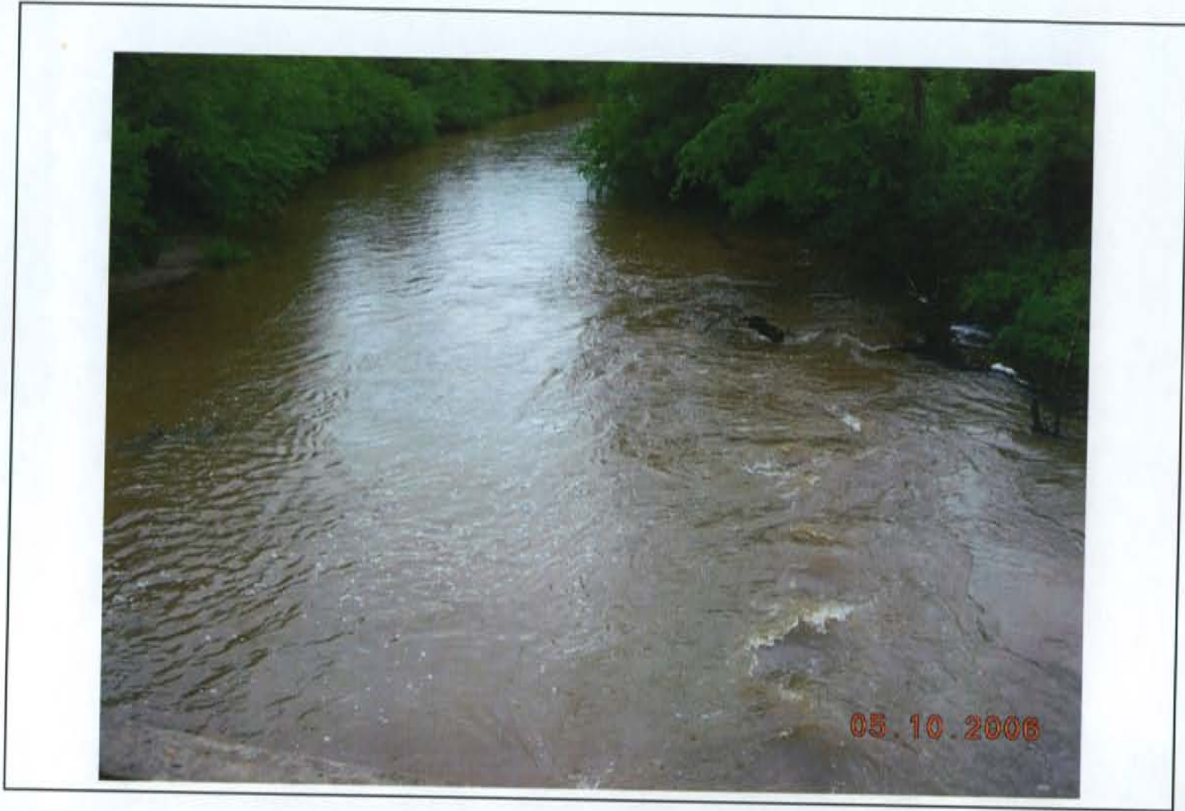


ABOVE: Upstream Left Bank

BELOW: Upstream Right Bank



PEA VINE ROAD OVER PORTERS CREEK



ABOVE: Downstream

BELOW: Downstream Left Bank



PEA VINE ROAD OVER PORTERS CREEK



ABOVE: Downstream Right Bank/Floodplain

BELOW: Western Approach



PEA VINE ROAD OVER PORTERS CREEK



ABOVE: Eastern Approach

SUMMARY

**STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES**

HYDRAULIC REPORT

Date: 11/29/06 Designer: AMANDA WHITLOCK

A. SITE DATA

1. LOCATION

| | | | |
|-----------------|----------------------|---------------|----------------------|
| Name of Stream: | <u>Porters Creek</u> | Channel Mile: | <u>N/A</u> |
| Route Name: | <u>Pea Vine Road</u> | P.E. No.: | <u>35945-1491-94</u> |
| Route No.: | <u>1615</u> | Project No.: | <u>BRZE-3500(33)</u> |
| County: | <u>Hardeman</u> | USGS Quad #: | <u>440-NW</u> |
| City: | <u>Middleton</u> | Name: | <u>Hebron, Tenn.</u> |

2. VICINITY

See attached location map or bridge survey.

| | | |
|----------------------------------|------------------|------------------------|
| Nature of Stream Bed: | <u>Silt/Sand</u> | |
| Bank subject to Erosion: | <u>6</u> | Extreme = 10 No = 0 |
| Should Drift be a consideration: | <u>4</u> | Severe = 10 Stable = 0 |

3. EXISTING BRIDGE DATA

| | |
|-----------------------|------------------------------|
| Bridge Location No.: | <u>35-1615-9.51</u> |
| Bridge Selection No.: | <u>35016150013</u> |
| Bridge Length: | <u>105 ft</u> |
| Bridge Width: | <u>24 ft</u> |
| Bridge Type: | <u>PCCS</u> |
| Bridge Skew: | <u>90 °</u> |
| Drainage Area: | <u>56.30 mi²</u> |
| Design Discharge: | <u>3700 ft³/s</u> |
| Design Frequency: | <u>2 year</u> |
| Design Water Area: | <u>372.69 ft²</u> |
| Design Elevation: | <u>368.51 ft</u> |
| Design Backwater: | <u>0.32 ft</u> |
| Design Velocity: | <u>9.93 ft/s</u> |
| Overtopping El.: | <u>373.73 ft</u> |

4. EXISTING WATER STAGES AT PROPOSED BRIDGE SITE

| | | | |
|-------------------------------|--------------------------------|------------|------------------------|
| Ordinary High Water Elevation | <u> </u> ft | Frequency: | <u>500 year</u> |
| High Water Elevation | <u>376.19</u> ft | Date: | <u>1/2006</u> |
| Maximum High Water El.: | <u>373.11</u> ft | Source: | <u>Parole Evidence</u> |
| Datum Elevation: | <u>360.18</u> ft | | |
| Reservoir Name | <u>N/A</u> | | |
| Maximum Pool Elevation | <u>N/A</u> ft | | |
| Minimum Pool Elevation: | <u>N/A</u> ft | | |

B. HYDROLOGICAL ANALYSIS

1. FLOOD RECORDS

- Flood Frequency Prediction Methods - 2003 USGS
- U.S.G.S.
- Corps of Engineers
- TVA
- Other _____
- Stream Gage No.: _____ At Site In Vicinity
- None Available

2. DRAINAGE AREA: 56.30 mi² Calculated Published

3. DISCHARGE

| Frequency: (Year) | 2 | 5 | 10 | 25 | 50 | 100 | 500 |
|---------------------------------|------|------|------|------|-------|-------|-------|
| Magnitude: (ft ³ /s) | 3700 | 5770 | 7230 | 9170 | 10700 | 12200 | 16100 |

Source:

- Flood Frequency Prediction Methods - 2003 USGS ROI SRE MRE
- TVA
- Corps of Engineers
- Federal Insurance Study _____ County or City
- Other _____

4. STREAM SLOPE

From U.S.G.S. Quad Map: _____ ft/ft From Flood Flow Profiles: 0.00167
 From Site Survey Data: _____ ft/ft Slope Used: 0.00167

C. HYDRAULIC ANALYSIS OF PROPOSED BRIDGE

1. PROPOSED STRUCTURE: 111'-6", 3-span, 75° skew, Type I I-beam Bridge

| | | |
|---|-----------------|--|
| Station ----- | <u>76+87.50</u> | (±) |
| Drainage Area ----- | <u>56.30</u> | mi ² |
| Design Frequency ----- | <u>10</u> | year |
| Design Discharge ----- | <u>7230</u> | ft ³ /s |
| Design Velocity ----- | <u>10.44</u> | ft/s |
| Design Waterway Area ----- | <u>692.72</u> | ft ² below elevation <u>371.14</u> ft |
| Design Bridge Backwater ----- | <u>1.51</u> | ft |
| Design Bridge Backwater El. ----- | <u>370.97</u> | ft |
| Roadway Overtopping El. ----- | <u>374.39</u> | ft |
| Is Bridge Backwater a consideration? - | <u>Yes</u> | |
| <u>100 yr. Design Bridge Backwater</u> ----- | <u>5.15</u> | ft |
| <u>100 yr. Design Bridge Backwater El.</u> -- | <u>375.53</u> | ft |

Describe Control:

- Inlet Outlet

Final Layout: See Drawing No. _____

| | YES / NO | Comments |
|-----------------------------------|----------|---------------------|
| Are Spur Dikes Needed | NO | Reason: |
| Is Channel Transitioning Involved | NO | See attached detail |
| Is Channel Change Involved | NO | See attached detail |
| Is Bank Protection Needed | NO | See attached detail |

D. SCOUR ANALYSIS OF PROPOSED BRIDGE

1. CHANNEL CHARACTERISTICS

- a. USGS/TDOT "observed" scour ranking at existing bridge is _____, or at nearest bridge upstream / downstream is _____ (Br. No. _____).
- b. USGS/TDOT "potential" scour ranking at existing bridge is _____, or at nearest bridge upstream / downstream is _____ (Br. No. _____).
- c. Current stage of channel evolution : Stable Degrading Widening Aggrading
- d. Streambed material type: silt/sand ; coarse gravelly sand ; gravel/cobbles ; gravel and cobbles on rock ; slab rock

2. COMPUTED SCOUR DEPTH

Maximum Scour @ 50 Years

- a. Design discharge (50 yr.) = 10,700 ft³/s
- b. Design velocity (50 yr.) = 7.02 ft/s
- c. Estimated degradation / aggradation = _____ ft
- d. Estimated contraction scour = 33.27 ft
- e. Estimated pier scour = 3.82 ft
- f. Estimated total scour depth = 37.09 ft
- g. Preliminary ftg. and/or pile tip elev. (based on soils report?) (): _____
- h. Comments : _____

E. OTHER AGENCY REVIEW and/or APPROVAL

| YES | NO | |
|-------------------------------------|-------------------------------------|---|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Corps of Engineers - Individual |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Corps of Engineers - Nationwide |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Tennessee Valley Authority |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | U. S. Coast Guard |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Tennessee Wildlife Resource Agency |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | State Water Quality Control |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Federal Highway Administration |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Federal Emergency Management Agency |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Local Government, if participating in FEMA Program |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Individual ARAP required |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | General ARAP required |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | National Pollutant Discharge Elimination System (NPDES) |

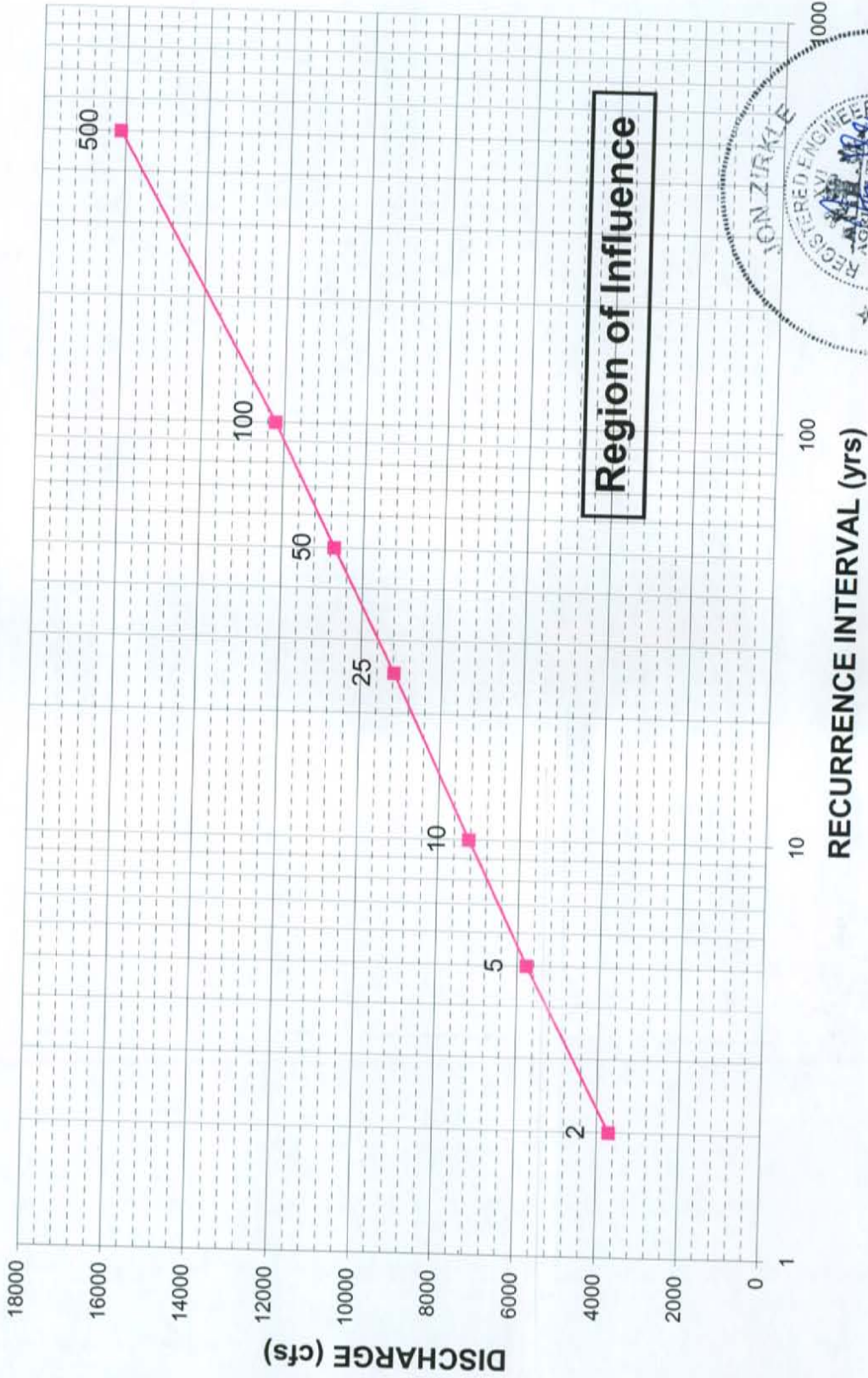
Is the location governed by the National Flood Insurance Program Regulations? (Y/N): NO
 Has the TDOT policy on selection of Design Flood Frequency been satisfied? (Y/N): YES

F. REMARKS: _____

ANALYSIS

FLOOD FREQUENCY

Pea Vine Road over Porters Creek at L.M. 9.51



TDOT Version 2.0.3

SINGLE-VARIABLE REGIONAL-REGRESSION EQUATION (SRE) METHOD FOR TENNESSEE
Flood frequency estimates for:

Porters Creek

Hydrologic Area: HA 4 LAT: 35 9 25 LNG: 88 53 0

Explanatory variable:

Contributing drainage area: 56.30 square miles

| RI | DISCHARGE (cfs) | - SE (%) | + SE (%) | 90% PRED. INTERVAL | |
|-----|--------------------|----------|----------|--------------------|---------|
| 2 | 3650.0 | -31.0 | 44.9 | 1970.0 | 6750.0 |
| 5 | 5550.0 | -30.1 | 43.0 | 3070.0 | 10100.0 |
| 10 | 6860.0 | -30.5 | 43.8 | 3750.0 | 12500.0 |
| 25 | 8520.0 | -31.8 | 46.6 | 4520.0 | 16100.0 |
| 50 | 9760.0 | -33.1 | 49.4 | 5010.0 | 19000.0 |
| 100 | 11000.0 | -34.5 | 52.6 | 5450.0 | 22200.0 |
| 500 | 13900.0 | -37.9 | 61.1 | 6300.0 | 30700.0 |

REGION-OF-INFLUENCE (ROI) METHOD FOR TENNESSEE

Flood frequency estimates for:

Porters Creek

Hydrologic Area: HA 4 LAT: 35 9 25 LNG: 88 53 0

Explanatory variables:

Contributing drainage area: 56.30 square miles

Channel slope: 8.80 ft/mi

Climate factor: 2.41

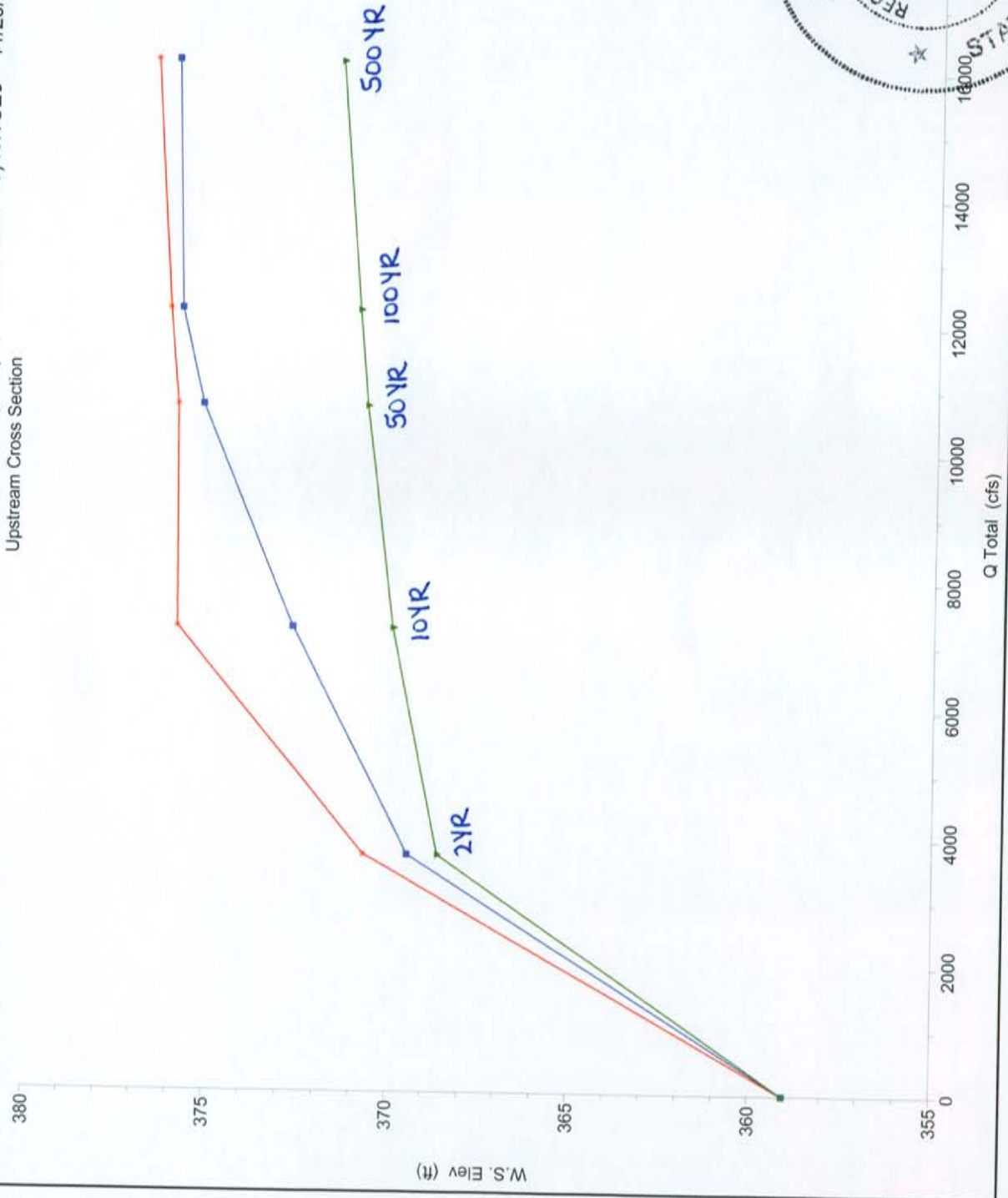
Log(Physiographic factor): 0.0346

| RI | DISCHARGE (cfs) | - SE (%) | + SE (%) | 90% PRED. INTERVAL | |
|-----|--------------------|----------|----------|--------------------|---------|
| 2 | 3700.0 | -26.5 | 36.0 | 2220.0 | 6170.0 |
| 5 | 5770.0 | -22.5 | 29.0 | 3780.0 | 8810.0 |
| 10 | 7230.0 | -22.5 | 29.0 | 4740.0 | 11000.0 |
| 25 | 9170.0 | -24.4 | 32.2 | 5760.0 | 14600.0 |
| 50 | 10700.0 | -26.5 | 36.0 | 6400.0 | 17800.0 |
| 100 | 12200.0 | -28.8 | 40.5 | 6960.0 | 21500.0 |
| 500 | 16100.0 | -34.4 | 52.5 | 8000.0 | 32500.0 |



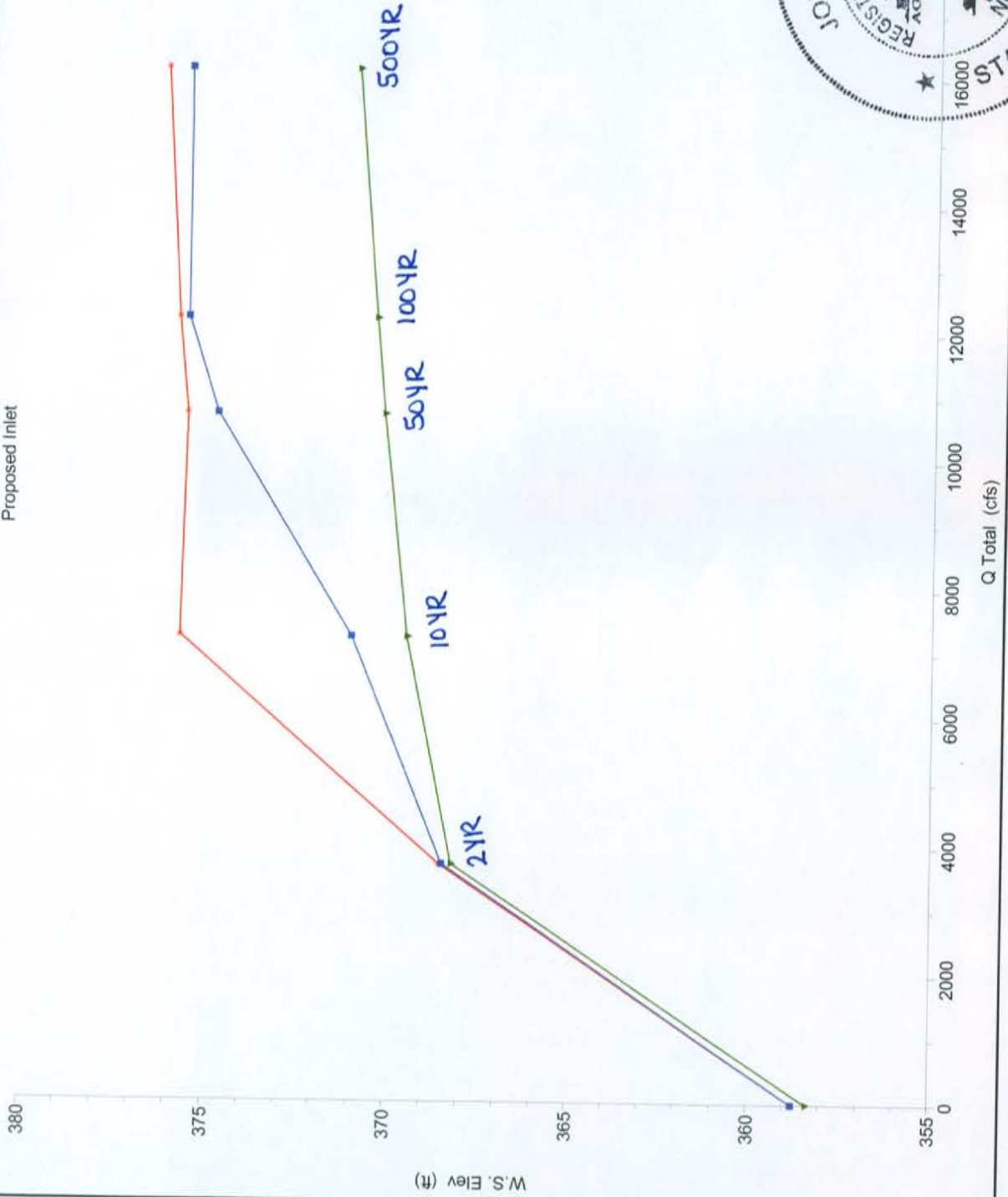
Pea Vine over Porters Plan: 1) Ex3 11/27/2006 2) Prop3 11/27/2006 3) NWSE3 11/29/2006
 Upstream Cross Section

| Legend | |
|--------|-------------------|
| —●— | W.S. Elev - Ex3 |
| —■— | W.S. Elev - Prop3 |
| —▲— | W.S. Elev - NWSE3 |

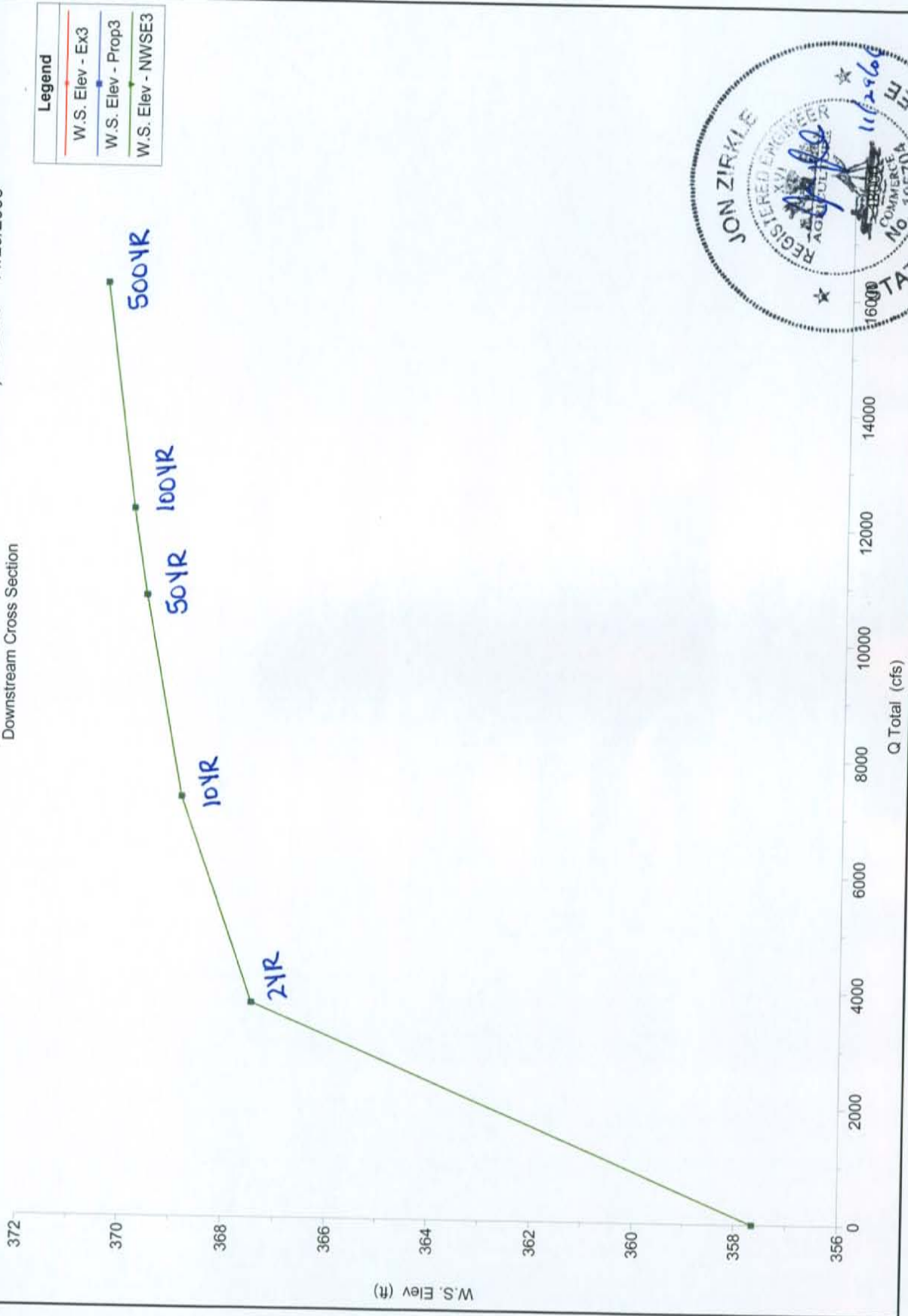


Pea Vine over Porters Plan: 1) Ex3 11/27/2006 2) Prop3 11/27/2006 3) NWSE3 11/29/2006
Proposed Inlet

| Legend | |
|--------|-------------------|
| —●— | W.S. Elev - Ex3 |
| —■— | W.S. Elev - Prop3 |
| —▲— | W.S. Elev - NWSE3 |



Pea Vine over Porters Plan: 1) Ex3 11/27/2006 2) Prop3 11/27/2006 3) NWSE3 11/29/2006
Downstream Cross Section

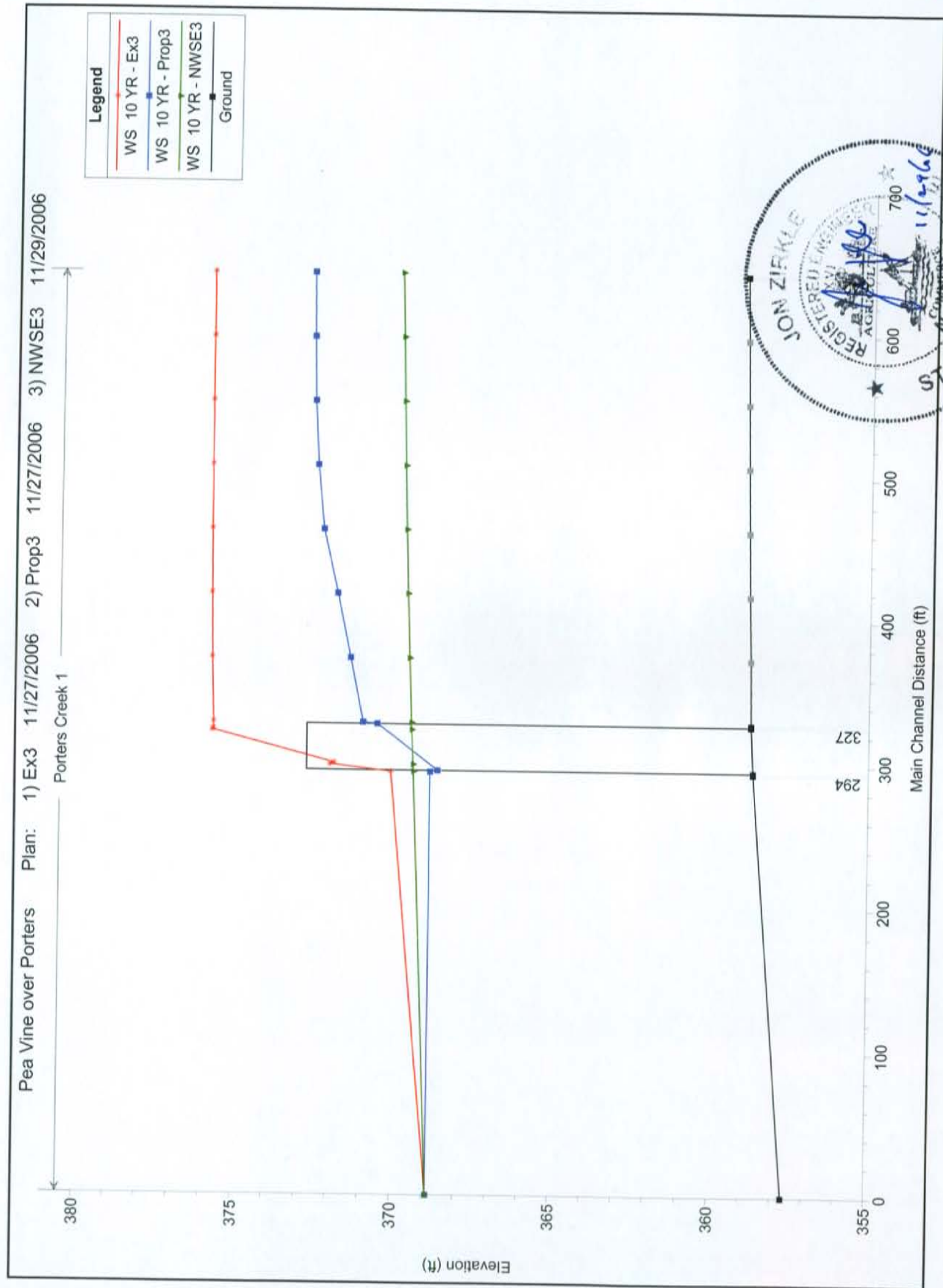


Legend

| |
|-------------------|
| W.S. Elev - Ex3 |
| W.S. Elev - Prop3 |
| W.S. Elev - NWSE3 |



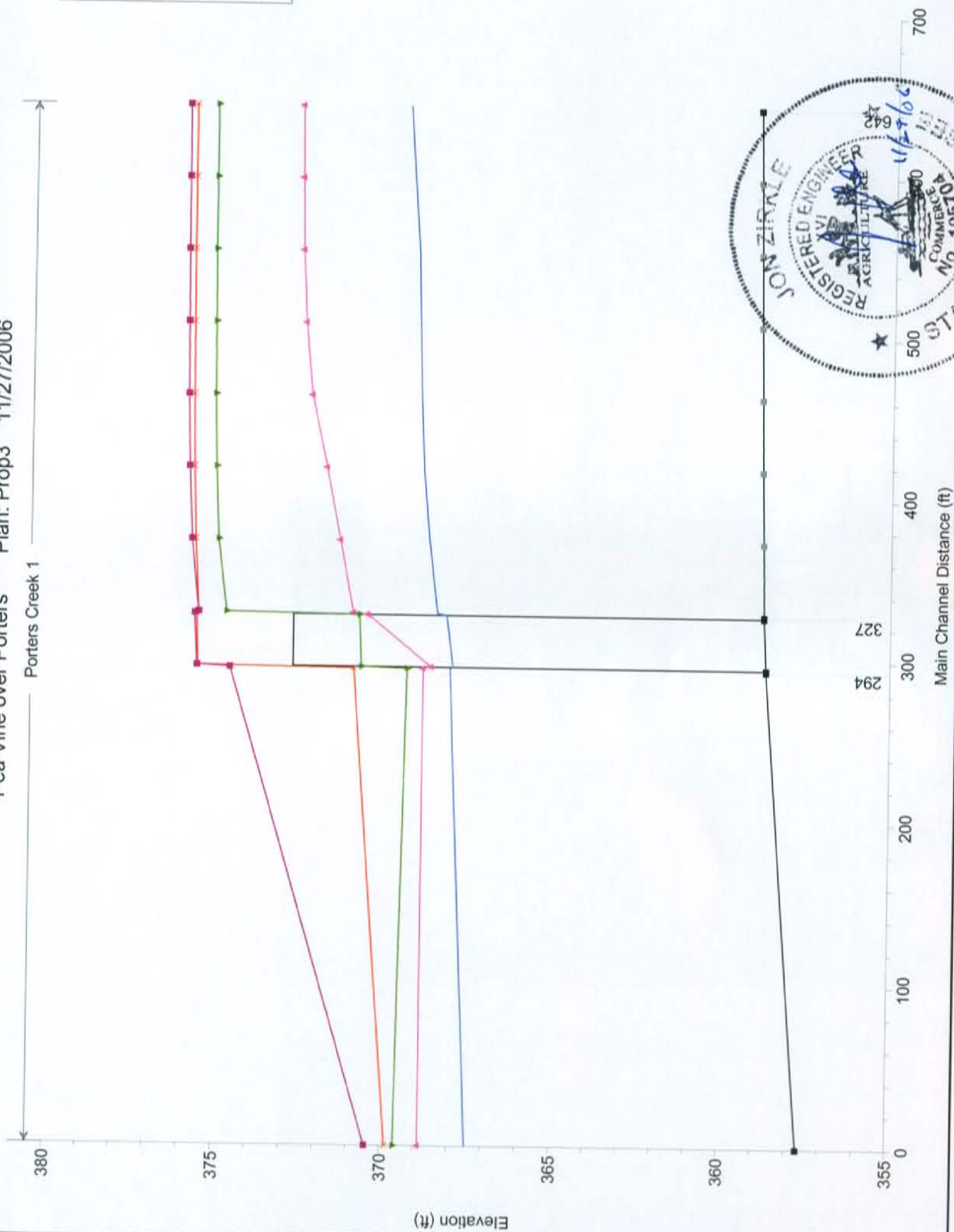
10-YEAR
PROFILE

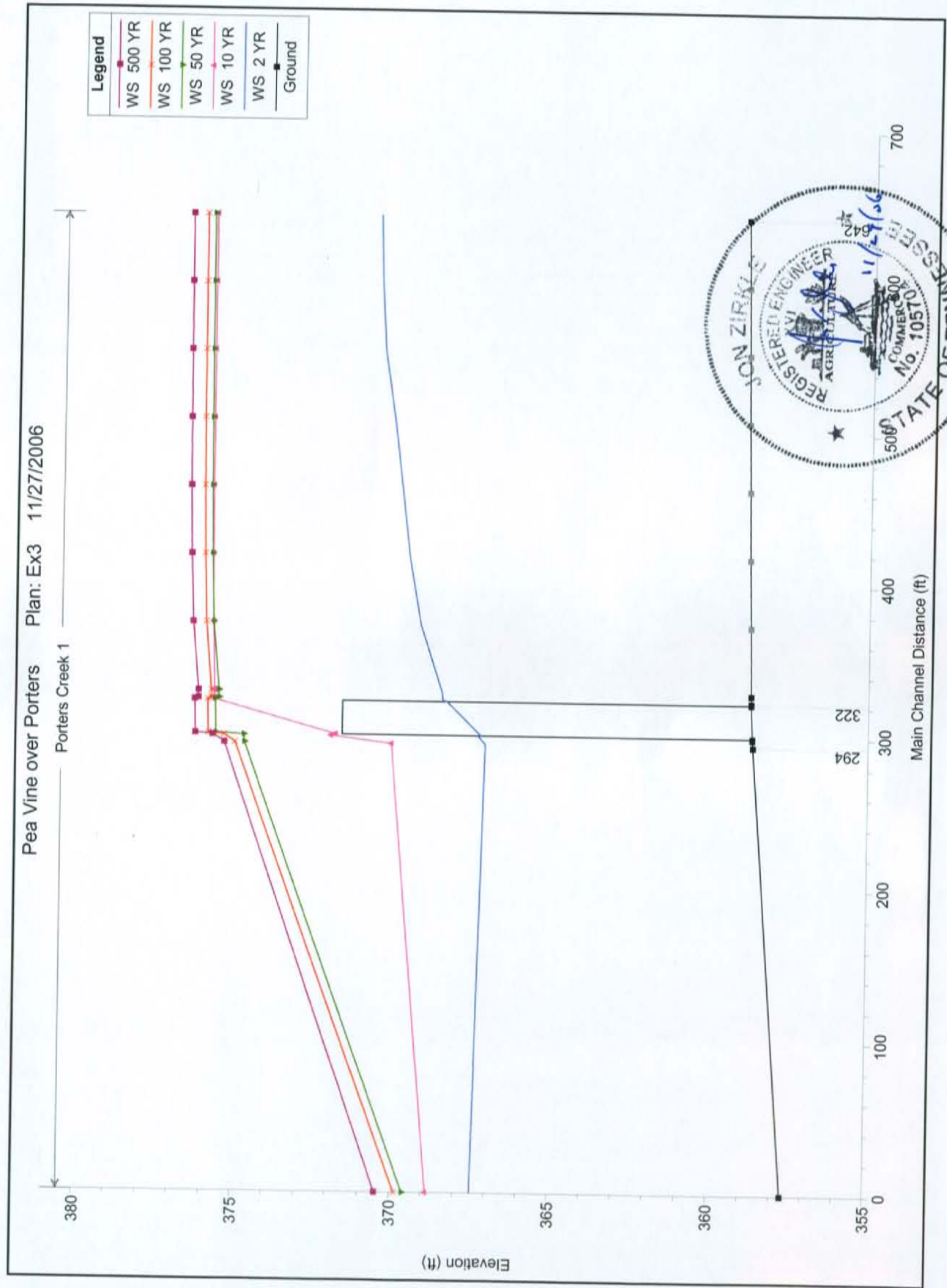


Pea Vine over Porters Plan: Prop3 11/27/2006

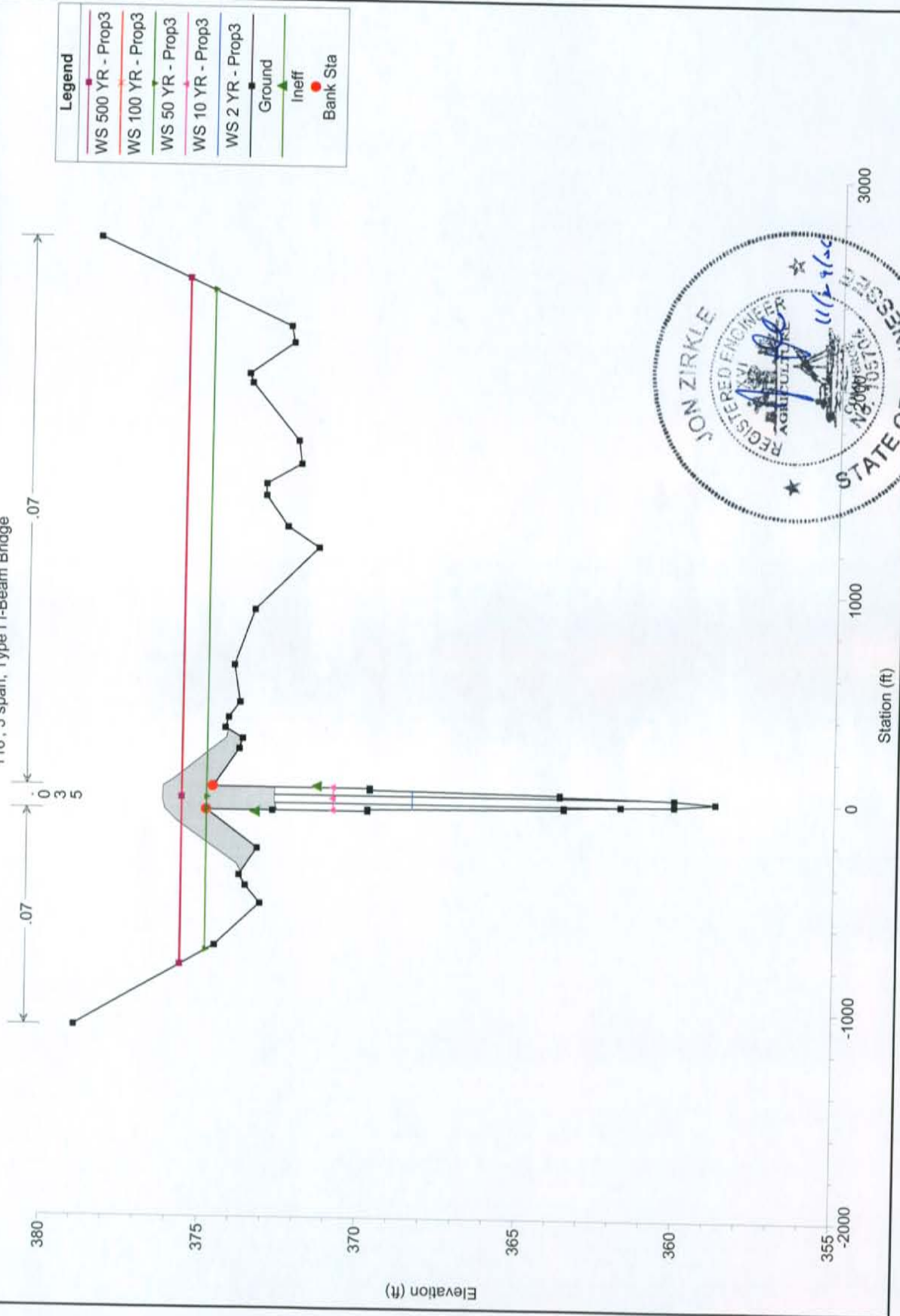
Porters Creek 1

| Legend | |
|-----------|-----------------------------------|
| WS 500 YR | (Red line with square markers) |
| WS 100 YR | (Orange line with square markers) |
| WS 50 YR | (Green line with square markers) |
| WS 10 YR | (Pink line with square markers) |
| WS 2 YR | (Blue line with square markers) |
| Ground | (Black line with square markers) |

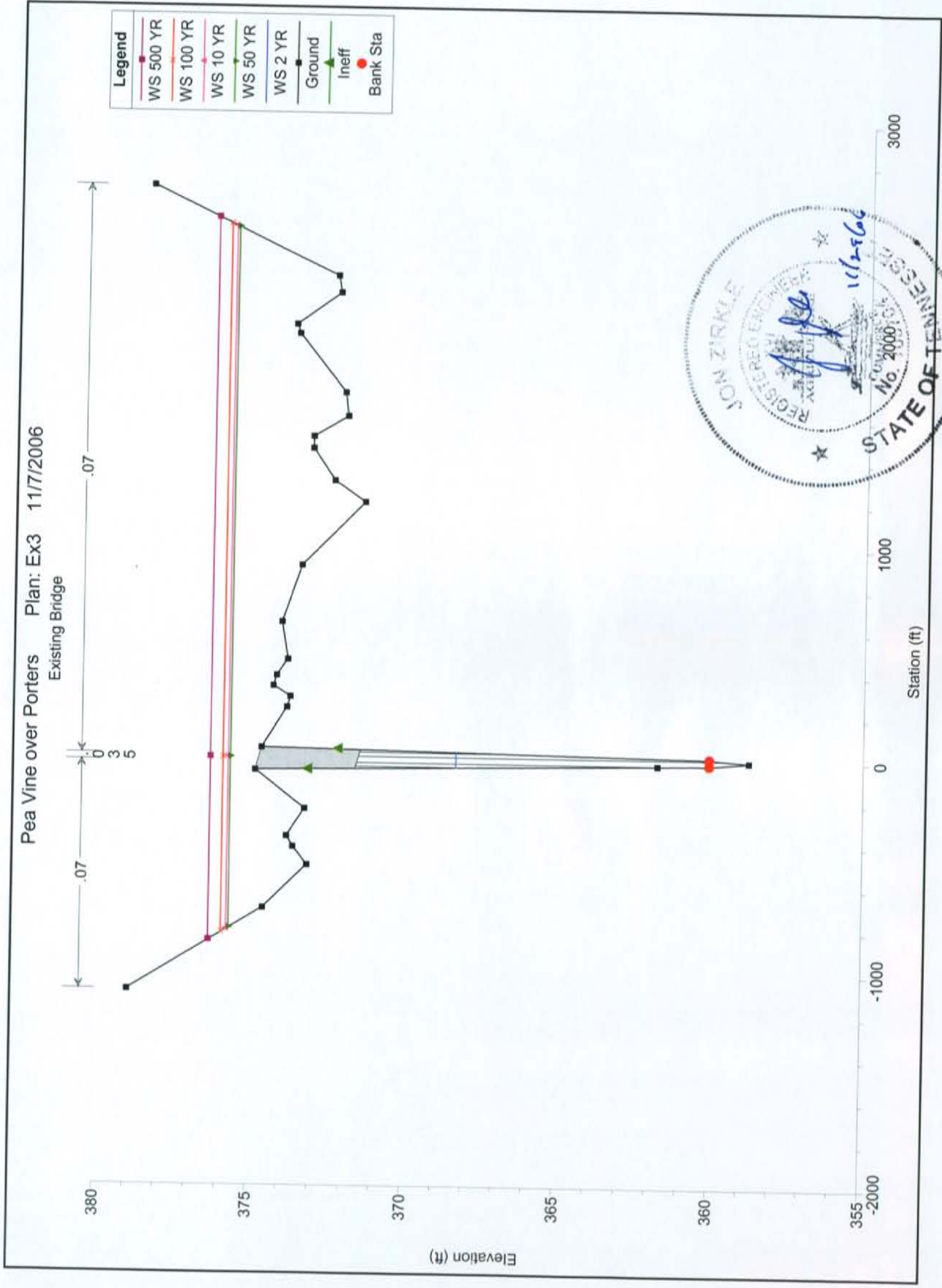




Pea Vine over Porters Plan: 1) Prop3 11/7/2006 2) Ex3 11/7/2006 3) NWSE3 11/7/2006
116' 3 span, Type I I-Beam Bridge

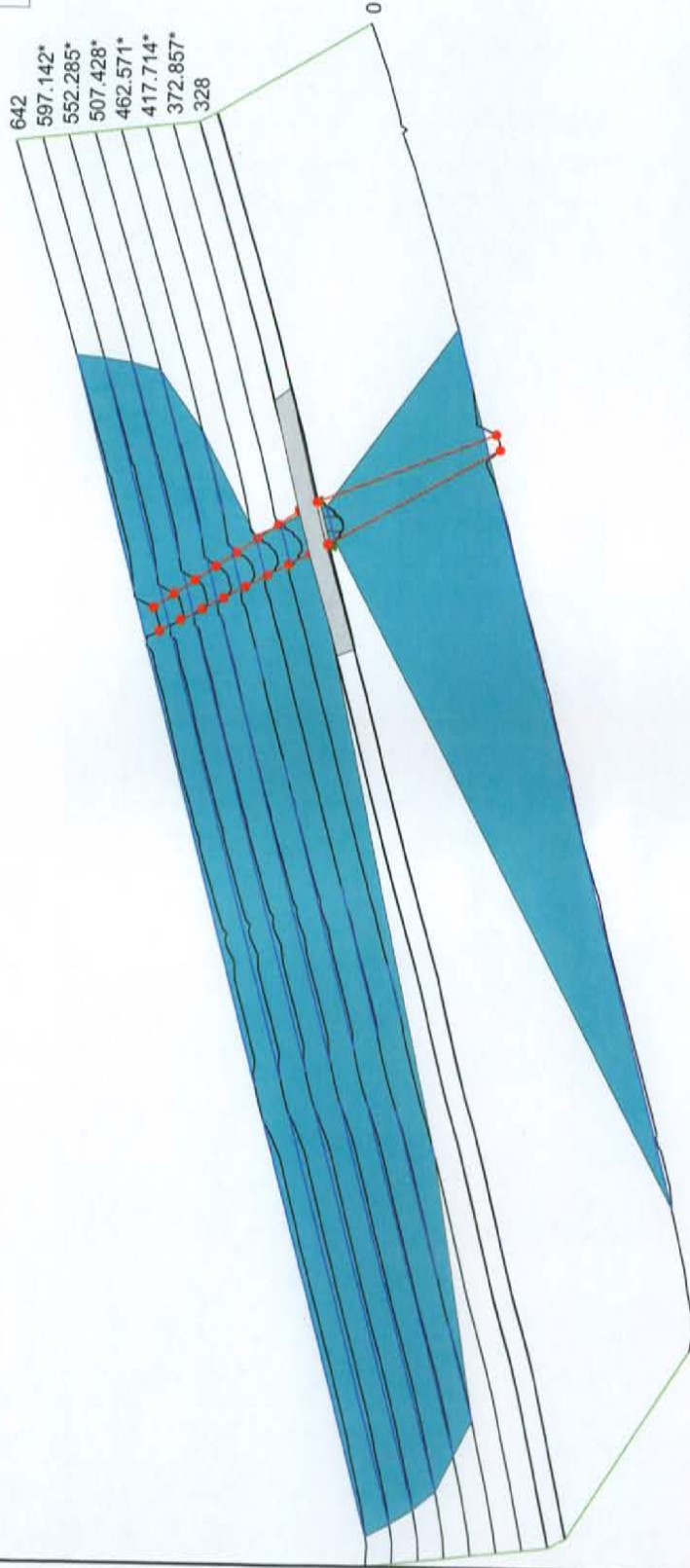


EXISTING



Pea Vine over Porters Plan: Prop3 11/27/2006

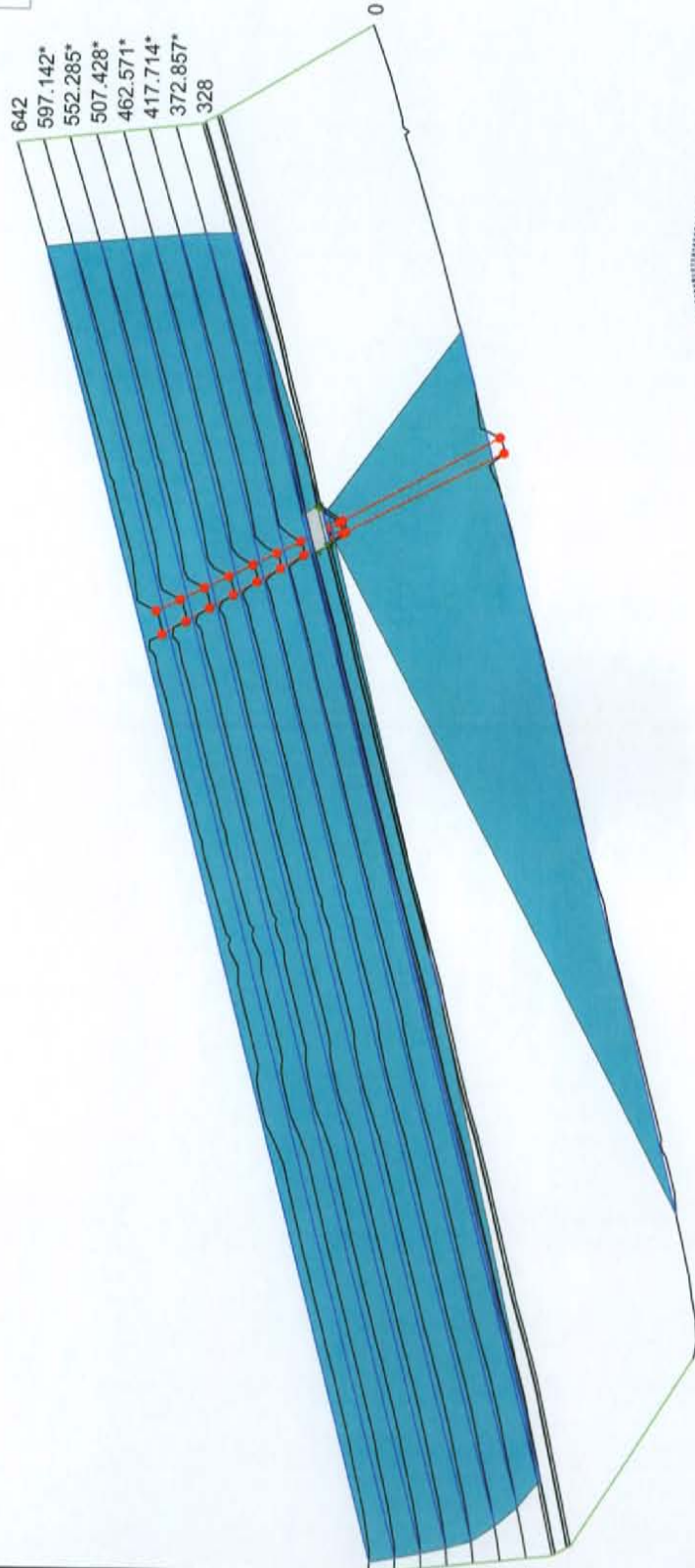
| Legend | |
|--------|----------|
| | WS 10 YR |
| | Ground |
| | Bank Sta |
| | Ground |
| | Ineff |



EXISTING

Pea Vine over Porters Plan: Ex3 11/27/2006

| Legend | |
|---|----------|
|  | WS 10 YR |
|  | Ground |
|  | Bank Sta |
|  | Ground |
|  | Ineff |



HEC-RAS River: Porters Creek Reach: 1

| Reach | River Sta | Profile | Plan | Q Total (cfs) | Min Ch El (ft) | W.S. Elev (ft) | Crit W.S. (ft) | E.G. Elev (ft) | E.G. Slope (ft/ft) | Vel Chnl (ft/s) | Flow Area (sq ft) | Top Width (ft) | Froude # | Chl |
|-------|-----------|---------|-------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|----------|-----|
| 1 | 642 | 2 YR | Ex3 | 3700.00 | 359.04 | 370.66 | 363.82 | 370.70 | 0.000120 | 2.37 | 5611.03 | 2431.80 | 0.12 | |
| 1 | 642 | 2 YR | Prop3 | 3700.00 | 359.04 | 369.46 | 363.82 | 369.59 | 0.000323 | 3.61 | 3134.20 | 1690.56 | 0.20 | |
| 1 | 642 | 2 YR | NWSE3 | 3700.00 | 359.04 | 368.62 | 363.82 | 368.91 | 0.000657 | 4.87 | 1919.25 | 1345.12 | 0.28 | |
| 1 | 642 | 10 YR | Ex3 | 7230.00 | 359.04 | 375.81 | 366.80 | 375.81 | 0.000017 | 1.14 | 21487.45 | 3468.97 | 0.05 | |
| 1 | 642 | 10 YR | Prop3 | 7230.00 | 359.04 | 372.66 | 366.80 | 372.69 | 0.000100 | 2.40 | 11114.96 | 3004.49 | 0.11 | |
| 1 | 642 | 10 YR | NWSE3 | 7230.00 | 359.04 | 369.92 | 366.80 | 370.24 | 0.000834 | 5.97 | 3977.95 | 1944.81 | 0.32 | |
| 1 | 642 | 50 YR | Ex3 | 10700.00 | 359.04 | 375.87 | 369.50 | 375.88 | 0.000036 | 1.66 | 21717.92 | 3475.53 | 0.07 | |
| 1 | 642 | 50 YR | Prop3 | 10700.00 | 359.04 | 375.18 | 369.50 | 375.19 | 0.000051 | 1.91 | 19318.14 | 3406.68 | 0.08 | |
| 1 | 642 | 50 YR | NWSE3 | 10700.00 | 359.04 | 370.70 | 369.50 | 371.04 | 0.000979 | 6.77 | 5713.86 | 2487.21 | 0.35 | |
| 1 | 642 | 100 YR | Ex3 | 12200.00 | 359.04 | 376.11 | 369.76 | 376.13 | 0.000042 | 1.81 | 22558.70 | 3499.33 | 0.08 | |
| 1 | 642 | 100 YR | Prop3 | 12200.00 | 359.04 | 375.79 | 369.76 | 375.81 | 0.000049 | 1.93 | 21442.04 | 3467.68 | 0.08 | |
| 1 | 642 | 100 YR | NWSE3 | 12200.00 | 359.04 | 370.94 | 369.76 | 371.30 | 0.001067 | 7.17 | 6314.04 | 2581.13 | 0.37 | |
| 1 | 642 | 500 YR | Ex3 | 16100.00 | 359.04 | 376.56 | 370.41 | 376.57 | 0.000061 | 2.21 | 24117.37 | 3543.03 | 0.09 | |
| 1 | 642 | 500 YR | Prop3 | 16100.00 | 359.04 | 375.99 | 370.41 | 376.01 | 0.000078 | 2.45 | 22113.97 | 3486.76 | 0.11 | |
| 1 | 642 | 500 YR | NWSE3 | 16100.00 | 359.04 | 371.52 | 370.41 | 371.87 | 0.001145 | 7.66 | 7639.17 | 2711.70 | 0.38 | |
| 1 | 328 | 2 YR | Ex3 | 3700.00 | 358.76 | 368.54 | 366.65 | 370.19 | 0.003613 | 11.12 | 459.39 | 73.29 | 0.65 | |
| 1 | 328 | 2 YR | Prop3 | 3700.00 | 358.76 | 368.46 | 365.73 | 369.18 | 0.002388 | 6.82 | 542.87 | 87.70 | 0.48 | |
| 1 | 328 | 2 YR | NWSE3 | 3700.00 | 358.36 | 368.20 | 363.92 | 368.64 | 0.000963 | 5.95 | 1533.31 | 1281.55 | 0.34 | |
| 1 | 328 | 10 YR | Ex3 | 7230.00 | 358.76 | 375.68 | 370.18 | 375.78 | 0.000275 | 4.51 | 8334.47 | 3294.14 | 0.20 | |
| 1 | 328 | 10 YR | Prop3 | 7230.00 | 358.76 | 370.97 | 368.20 | 372.26 | 0.003548 | 9.11 | 793.73 | 109.82 | 0.60 | |
| 1 | 328 | 10 YR | NWSE3 | 7230.00 | 358.36 | 369.46 | 368.81 | 369.91 | 0.001176 | 7.14 | 3550.67 | 2027.63 | 0.38 | |
| 1 | 328 | 50 YR | Ex3 | 10700.00 | 358.76 | 375.53 | 374.52 | 375.81 | 0.000693 | 7.12 | 7872.39 | 3271.91 | 0.31 | |
| 1 | 328 | 50 YR | Prop3 | 10700.00 | 358.76 | 374.71 | 370.40 | 375.08 | 0.000949 | 5.96 | 5421.03 | 3124.52 | 0.32 | |
| 1 | 328 | 50 YR | NWSE3 | 10700.00 | 358.36 | 370.14 | 369.52 | 370.64 | 0.001440 | 8.23 | 5077.70 | 2475.93 | 0.43 | |
| 1 | 328 | 100 YR | Ex3 | 12200.00 | 358.76 | 375.79 | 374.84 | 376.05 | 0.000703 | 7.24 | 8706.52 | 3311.92 | 0.32 | |
| 1 | 328 | 100 YR | Prop3 | 12200.00 | 358.76 | 375.53 | 371.01 | 375.73 | 0.000584 | 4.91 | 8060.49 | 3271.57 | 0.25 | |
| 1 | 328 | 100 YR | NWSE3 | 12200.00 | 358.36 | 370.38 | 369.83 | 370.89 | 0.001513 | 8.55 | 5696.16 | 2581.56 | 0.44 | |
| 1 | 328 | 500 YR | Ex3 | 16100.00 | 358.76 | 376.19 | 375.38 | 376.47 | 0.000850 | 8.10 | 10050.08 | 3375.38 | 0.35 | |
| 1 | 328 | 500 YR | Prop3 | 16100.00 | 358.76 | 375.54 | 374.64 | 375.89 | 0.001012 | 6.46 | 8082.26 | 3272.62 | 0.33 | |
| 1 | 328 | 500 YR | NWSE3 | 16100.00 | 358.36 | 370.97 | 370.40 | 371.43 | 0.001525 | 8.87 | 7271.13 | 2744.07 | 0.44 | |
| 1 | 323 | 2 YR | Ex3 | 3700.00 | 358.75 | 368.51 | 366.61 | 370.17 | 0.003636 | 11.14 | 458.23 | 73.21 | 0.65 | |
| 1 | 323 | 2 YR | NWSE3 | 3700.00 | 358.34 | 368.19 | 363.92 | 368.64 | 0.000970 | 5.98 | 1523.75 | 1280.49 | 0.34 | |
| 1 | 323 | 10 YR | Ex3 | 7230.00 | 358.75 | 375.67 | 370.18 | 375.78 | 0.000274 | 4.50 | 8348.05 | 3294.60 | 0.20 | |
| 1 | 323 | 10 YR | NWSE3 | 7230.00 | 358.34 | 369.45 | 368.78 | 369.90 | 0.001189 | 7.18 | 3530.95 | 2026.69 | 0.38 | |
| 1 | 323 | 50 YR | Ex3 | 10700.00 | 358.75 | 375.53 | 374.78 | 375.80 | 0.000692 | 7.12 | 7872.39 | 3271.89 | 0.31 | |
| 1 | 323 | 50 YR | NWSE3 | 10700.00 | 358.34 | 370.09 | 369.35 | 370.63 | 0.001529 | 8.56 | 5696.16 | 2581.56 | 0.44 | |
| 1 | 323 | 100 YR | Ex3 | 12200.00 | 358.75 | 375.78 | 374.71 | 376.04 | 0.000703 | 7.24 | 8706.52 | 3311.92 | 0.32 | |
| 1 | 323 | 100 YR | NWSE3 | 12200.00 | 358.34 | 370.36 | 369.83 | 370.87 | 0.001531 | 8.60 | 5665.38 | 2581.56 | 0.44 | |
| 1 | 323 | 500 YR | Ex3 | 16100.00 | 358.75 | 376.18 | 375.38 | 376.47 | 0.000851 | 8.10 | 10047.88 | 3375.06 | 0.35 | |

UPSTREAM

PROPOSED INLET

EXISTING INLET

10YR PROPOSED BW = 1.51' ; 100YR PROPOSED BW = 5.15'

2YR EXISTING BW = 0.32'

10YR EXISTING BW = 6.22'

100YR EXISTING BW = 5.42'



HEC-RAS River: Porters Creek Reach: 1 (Continued)

| Reach | River Sta | Profile | Plan | Q Total (cfs) | Min Ch El (ft) | W.S. Elev (ft) | Crit W.S. (ft) | E.G. Elev (ft) | E.G. Slope (ft/ft) | Vel Chnl (ft/s) | Flow Area (sq ft) | Top Width (ft) | Froude # Chl |
|-------|-----------|---------|--------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| 1 | 323 | 500 YR | NWSE3 | 16100.00 | 358.34 | 370.95 | 370.39 | 371.42 | 0.001536 | 8.90 | 7249.29 | 2740.37 | 0.45 |
| 1 | 322 | | Bridge | | | | | | | | | | |
| 1 | 299 | 2 YR | Ex3 | 3700.00 | 358.70 | 367.35 | 366.58 | 369.65 | 0.005877 | 12.98 | 379.94 | 67.56 | 0.81 |
| 1 | 299 | 2 YR | NWSE3 | 3700.00 | 358.29 | 368.14 | 363.94 | 368.61 | 0.001011 | 6.10 | 1482.50 | 1277.69 | 0.35 |
| 1 | 299 | 10 YR | Ex3 | 7230.00 | 358.70 | 371.99 | 370.13 | 374.68 | 0.004051 | 14.63 | 748.14 | 227.94 | 0.73 |
| 1 | 299 | 10 YR | NWSE3 | 7230.00 | 358.29 | 369.40 | 368.70 | 369.87 | 0.001234 | 7.31 | 3483.53 | 2038.32 | 0.39 |
| 1 | 299 | 50 YR | Ex3 | 10700.00 | 358.70 | 374.73 | 374.40 | 375.45 | 0.001486 | 10.10 | 5374.91 | 3141.38 | 0.45 |
| 1 | 299 | 50 YR | NWSE3 | 10700.00 | 358.29 | 370.05 | 369.51 | 370.59 | 0.001552 | 8.52 | 4967.79 | 2430.34 | 0.44 |
| 1 | 299 | 100 YR | Ex3 | 12200.00 | 358.70 | 375.37 | 375.02 | 375.79 | 0.001037 | 8.67 | 7416.45 | 3249.61 | 0.38 |
| 1 | 299 | 100 YR | NWSE3 | 12200.00 | 358.29 | 370.31 | 369.80 | 370.83 | 0.001561 | 8.68 | 5630.68 | 2564.85 | 0.45 |
| 1 | 299 | 500 YR | Ex3 | 16100.00 | 358.70 | 375.73 | 375.35 | 376.20 | 0.001260 | 9.70 | 8604.79 | 3306.43 | 0.42 |
| 1 | 299 | 500 YR | NWSE3 | 16100.00 | 358.29 | 370.91 | 370.35 | 371.37 | 0.001557 | 8.95 | 7220.48 | 2729.03 | 0.45 |
| 1 | 294 | 2 YR | Ex3 | 3700.00 | 358.68 | 367.13 | 366.56 | 369.58 | 0.006436 | 13.37 | 366.81 | 66.56 | 0.84 |
| 1 | 294 | 2 YR | Prop3 | 3700.00 | 358.68 | 368.06 | 365.65 | 368.86 | 0.002784 | 7.18 | 515.12 | 86.38 | 0.52 |
| 1 | 294 | 2 YR | NWSE3 | 3700.00 | 358.28 | 368.13 | 363.93 | 368.60 | 0.001021 | 6.12 | 1471.64 | 1276.45 | 0.35 |
| 1 | 294 | 10 YR | Ex3 | 7230.00 | 358.68 | 370.10 | 370.10 | 374.22 | 0.007426 | 17.80 | 586.87 | 81.66 | 0.96 |
| 1 | 294 | 10 YR | Prop3 | 7230.00 | 358.68 | 368.86 | 368.12 | 371.23 | 0.007308 | 12.34 | 585.76 | 89.70 | 0.85 |
| 1 | 294 | 10 YR | NWSE3 | 7230.00 | 358.28 | 369.39 | 368.70 | 369.87 | 0.001246 | 7.34 | 3469.89 | 2047.67 | 0.39 |
| 1 | 294 | 50 YR | Ex3 | 10700.00 | 358.68 | 374.70 | 374.70 | 375.45 | 0.001509 | 10.17 | 5330.42 | 3138.92 | 0.46 |
| 1 | 294 | 50 YR | Prop3 | 10700.00 | 358.68 | 369.33 | 370.32 | 373.83 | 0.013052 | 17.03 | 628.47 | 91.65 | 1.15 |
| 1 | 294 | 50 YR | NWSE3 | 10700.00 | 358.28 | 370.02 | 369.40 | 370.57 | 0.001592 | 8.62 | 4909.80 | 2421.50 | 0.45 |
| 1 | 294 | 100 YR | Ex3 | 12200.00 | 358.68 | 375.01 | 375.01 | 375.70 | 0.001499 | 10.28 | 6311.10 | 3195.91 | 0.46 |
| 1 | 294 | 100 YR | Prop3 | 12200.00 | 358.68 | 370.93 | 370.93 | 374.56 | 0.009936 | 15.29 | 797.92 | 109.83 | 1.00 |
| 1 | 294 | 100 YR | NWSE3 | 12200.00 | 358.28 | 370.29 | 369.51 | 370.82 | 0.001593 | 8.75 | 5582.48 | 2556.81 | 0.45 |
| 1 | 294 | 500 YR | Ex3 | 16100.00 | 358.68 | 375.35 | 375.35 | 376.10 | 0.001824 | 11.49 | 7385.32 | 3248.03 | 0.51 |
| 1 | 294 | 500 YR | Prop3 | 16100.00 | 358.68 | 374.60 | 374.60 | 375.48 | 0.002211 | 9.08 | 5326.72 | 3116.35 | 0.49 |
| 1 | 294 | 500 YR | NWSE3 | 16100.00 | 358.28 | 370.89 | 370.34 | 371.36 | 0.001572 | 8.99 | 7192.93 | 2725.81 | 0.45 |
| 1 | 0 | 2 YR | Ex3 | 3700.00 | 357.64 | 367.47 | 364.29 | 368.20 | 0.001672 | 7.69 | 1116.17 | 1008.86 | 0.44 |
| 1 | 0 | 2 YR | Prop3 | 3700.00 | 357.64 | 367.47 | 364.29 | 368.20 | 0.001672 | 7.69 | 1116.17 | 1008.86 | 0.44 |
| 1 | 0 | 2 YR | NWSE3 | 3700.00 | 357.64 | 367.47 | 364.29 | 368.20 | 0.001672 | 7.69 | 1116.17 | 1008.86 | 0.44 |
| 1 | 0 | 10 YR | Ex3 | 7230.00 | 357.64 | 368.86 | 368.59 | 369.43 | 0.001671 | 8.43 | 3388.70 | 2118.70 | 0.45 |
| 1 | 0 | 10 YR | Prop3 | 7230.00 | 357.64 | 368.86 | 368.59 | 369.43 | 0.001671 | 8.43 | 3388.70 | 2118.70 | 0.45 |
| 1 | 0 | 10 YR | NWSE3 | 7230.00 | 357.64 | 368.86 | 368.59 | 369.43 | 0.001671 | 8.43 | 3388.70 | 2118.70 | 0.45 |
| 1 | 0 | 50 YR | Ex3 | 10700.00 | 357.64 | 369.59 | 369.22 | 370.07 | 0.001671 | 8.81 | 4990.20 | 2464.80 | 0.46 |
| 1 | 0 | 50 YR | Prop3 | 10700.00 | 357.64 | 369.59 | 369.22 | 370.07 | 0.001671 | 8.81 | 4990.20 | 2464.80 | 0.46 |
| 1 | 0 | 50 YR | NWSE3 | 10700.00 | 357.64 | 369.59 | 369.22 | 370.07 | 0.001671 | 8.81 | 4990.20 | 2464.80 | 0.46 |
| 1 | 0 | 100 YR | Ex3 | 12200.00 | 357.64 | 369.85 | 369.39 | 370.32 | 0.001673 | 8.95 | 5629.70 | 2729.03 | 0.46 |

EXISTING OUTLET

PROPOSED OUTLET

DOWNSTREAM



HEC-RAS River: Porters Creek Reach: 1 (Continued)

| Reach | River Sta | Profile | Plan | Q Total (cfs) | Min Ch El (ft) | W.S. Elev (ft) | Crit W.S. (ft) | E.G. Elev (ft) | E.G. Slope (ft/ft) | Vel Chnl (ft/s) | Flow Area (sq ft) | Top Width (ft) | Froude # Chl |
|-------|-----------|---------|-------|------------------|-------------------|-------------------|-------------------|-------------------|-----------------------|--------------------|----------------------|-------------------|--------------|
| 1 | 0 | 100 YR | Prop3 | 12200.00 | 357.64 | 369.85 | 369.39 | 370.32 | 0.001673 | 8.95 | 5629.70 | 2464.80 | 0.46 |
| 1 | 0 | 100 YR | NWSE3 | 12200.00 | 357.64 | 369.85 | 369.39 | 370.32 | 0.001673 | 8.95 | 5629.70 | 2464.80 | 0.46 |
| 1 | 0 | 500 YR | Ex3 | 16100.00 | 357.64 | 370.45 | 369.80 | 370.87 | 0.001671 | 9.25 | 7149.53 | 2595.60 | 0.46 |
| 1 | 0 | 500 YR | Prop3 | 16100.00 | 357.64 | 370.45 | 369.80 | 370.87 | 0.001671 | 9.25 | 7149.53 | 2595.60 | 0.46 |
| 1 | 0 | 500 YR | NWSE3 | 16100.00 | 357.64 | 370.45 | 369.80 | 370.87 | 0.001671 | 9.25 | 7149.53 | 2595.60 | 0.46 |



PROPOSED

Plan: Prop3 Porters Creek 1 RS: 327 Profile: 2 YR

| | | Element | Inside BR US | Inside BR DS |
|-----------------------|-------------|------------------------|--------------|--------------|
| E.G. US. (ft) | 369.29 | | | |
| W.S. US. (ft) | 368.60 | E.G. Elev (ft) | 369.23 | 369.08 |
| Q Total (cfs) | 3700.00 | W.S. Elev (ft) | 368.36 | 368.18 |
| Q Bridge (cfs) | 3700.00 | Crit W.S. (ft) | 365.99 | 365.91 |
| Q Weir (cfs) | | Max Chl Dpth (ft) | 9.60 | 9.50 |
| Weir Sta Lft (ft) | | Vel Total (ft/s) | 7.51 | 7.63 |
| Weir Sta Rgt (ft) | | Flow Area (sq ft) | 492.80 | 484.63 |
| Weir Submerg | | Froude # Chl | 0.54 | 0.55 |
| Weir Max Depth (ft) | | Specif Force (cu ft) | 2663.50 | 2628.80 |
| Min El Weir Flow (ft) | 371.45 | Hydr Depth (ft) | 6.06 | 5.99 |
| Min El Prs (ft) | 372.73 | W.P. Total (ft) | 112.00 | 111.13 |
| Delta EG (ft) | 0.29 | Conv. Total (cfs) | 56178.9 | 54918.8 |
| Delta WS (ft) | 0.35 | Top Width (ft) | 81.28 | 80.87 |
| BR Open Area (sq ft) | 916.90 | Frctn Loss (ft) | 0.14 | 0.00 |
| BR Open Vel (ft/s) | 7.63 | C & E Loss (ft) | 0.01 | 0.08 |
| Coef of Q | | Shear Total (lb/sq ft) | 1.19 | 1.24 |
| Br Sel Method | Energy only | Power Total (lb/ft s) | 8.95 | 9.43 |

Plan: Prop3 Porters Creek 1 RS: 327 Profile: 10 YR

| | | Element | Inside BR US | Inside BR DS |
|-----------------------|-------------|------------------------|--------------|--------------|
| E.G. US. (ft) | 372.37 | | | |
| W.S. US. (ft) | 371.14 | E.G. Elev (ft) | 372.40 | 372.16 |
| Q Total (cfs) | 7230.00 | W.S. Elev (ft) | 370.85 | 370.47 |
| Q Bridge (cfs) | 6986.25 | Crit W.S. (ft) | 368.58 | 368.50 |
| Q Weir (cfs) | 243.75 | Max Chl Dpth (ft) | 12.09 | 11.79 |
| Weir Sta Lft (ft) | 1065.59 | Vel Total (ft/s) | 9.98 | 10.44 |
| Weir Sta Rgt (ft) | 2213.24 | Flow Area (sq ft) | 724.51 | 692.72 |
| Weir Submerg | 0.00 | Froude # Chl | 0.66 | 0.71 |
| Weir Max Depth (ft) | 0.93 | Specif Force (cu ft) | 5545.21 | 5430.52 |
| Min El Weir Flow (ft) | 371.45 | Hydr Depth (ft) | 7.00 | 6.69 |
| Min El Prs (ft) | 372.73 | W.P. Total (ft) | 145.99 | 144.45 |
| Delta EG (ft) | 0.41 | Conv. Total (cfs) | 89494.1 | 83632.3 |
| Delta WS (ft) | 0.60 | Top Width (ft) | 103.57 | 103.57 |
| BR Open Area (sq ft) | 916.90 | Frctn Loss (ft) | 0.21 | 0.01 |
| BR Open Vel (ft/s) | 10.09 | C & E Loss (ft) | 0.04 | 0.08 |
| Coef of Q | | Shear Total (lb/sq ft) | 2.02 | 2.24 |
| Br Sel Method | Energy/Weir | Power Total (lb/ft s) | 20.18 | 23.35 |

Plan: Prop3 Porters Creek 1 RS: 327 Profile: 50 YR

| | | Element | Inside BR US | Inside BR DS |
|-----------------------|----------|----------------------|--------------|--------------|
| E.G. US. (ft) | 375.11 | | | |
| W.S. US. (ft) | 374.76 | E.G. Elev (ft) | 375.02 | 374.46 |
| Q Total (cfs) | 10700.00 | W.S. Elev (ft) | 374.85 | 372.90 |
| Q Bridge (cfs) | 4469.54 | Crit W.S. (ft) | 370.77 | 370.70 |
| Q Weir (cfs) | | Max Chl Dpth (ft) | 16.09 | 14.22 |
| Weir Sta Lft (ft) | | Vel Total (ft/s) | 2.06 | 7.02 |
| Weir Sta Rgt (ft) | | Flow Area (sq ft) | 5197.74 | 1524.70 |
| Weir Submerg | | Froude # Chl | 0.11 | 0.41 |
| Weir Max Depth (ft) | | Specif Force (cu ft) | 11987.65 | 8550.06 |
| Min El Weir Flow (ft) | 371.45 | Hydr Depth (ft) | 1.90 | 1.55 |
| Min El Prs (ft) | 372.73 | W.P. Total (ft) | 2996.16 | 1246.45 |
| Delta EG (ft) | 0.72 | Conv. Total (cfs) | 214898.2 | 100307.2 |
| Delta WS (ft) | 1.81 | Top Width (ft) | 2734.26 | 9847.08 |
| BR Open Area (sq ft) | 916.90 | Frctn Loss (ft) | 0.15 | 0.01 |
| BR Open Vel (ft/s) | 4.87 | C & E Loss (ft) | 0.41 | 0.06 |



Plan: Prop3 Porters Creek 1 RS: 327 Profile: 50 YR (Continued)

| | | | | |
|---------------|-------------|------------------------|------|------|
| Coef of Q | | Shear Total (lb/sq ft) | 0.27 | 0.87 |
| Br Sel Method | Energy only | Power Total (lb/ft s) | 0.55 | 6.10 |

Plan: Prop3 Porters Creek 1 RS: 327 Profile: 100 YR

| | | | | |
|-----------------------|-------------|------------------------|--------------|--------------|
| E.G. US. (ft) | 375.76 | Element | Inside BR US | Inside BR DS |
| W.S. US. (ft) | 375.56 | E.G. Elev (ft) | 375.70 | 375.65 |
| Q Total (cfs) | 12200.00 | W.S. Elev (ft) | 375.62 | 375.58 |
| Q Bridge (cfs) | 3383.37 | Crit W.S. (ft) | 374.03 | 373.94 |
| Q Weir (cfs) | | Max Chl Dpth (ft) | 16.86 | 16.90 |
| Weir Sta Lft (ft) | | Vel Total (ft/s) | 1.64 | 1.63 |
| Weir Sta Rgt (ft) | | Flow Area (sq ft) | 7421.32 | 7506.10 |
| Weir Submerg | | Froude # Chl | 0.08 | 0.08 |
| Weir Max Depth (ft) | | Specif Force (cu ft) | 16639.72 | 16894.69 |
| Min El Weir Flow (ft) | 371.45 | Hydr Depth (ft) | 2.45 | 2.48 |
| Min El Prs (ft) | 372.73 | W.P. Total (ft) | 3294.80 | 3291.08 |
| Delta EG (ft) | 0.15 | Conv. Total (cfs) | 323684.4 | 329820.1 |
| Delta WS (ft) | 0.16 | Top Width (ft) | 3032.88 | 3028.68 |
| BR Open Area (sq ft) | 916.90 | Frctn Loss (ft) | 0.04 | 0.00 |
| BR Open Vel (ft/s) | 3.69 | C & E Loss (ft) | 0.00 | 0.04 |
| Coef of Q | | Shear Total (lb/sq ft) | 0.20 | 0.19 |
| Br Sel Method | Energy only | Power Total (lb/ft s) | 0.33 | 0.32 |

Plan: Prop3 Porters Creek 1 RS: 327 Profile: 500 YR

| | | | | |
|-----------------------|-------------|------------------------|--------------|--------------|
| E.G. US. (ft) | 375.89 | Element | Inside BR US | Inside BR DS |
| W.S. US. (ft) | 375.54 | E.G. Elev (ft) | 375.78 | 375.70 |
| Q Total (cfs) | 16100.00 | W.S. Elev (ft) | 375.64 | 375.56 |
| Q Bridge (cfs) | 4412.94 | Crit W.S. (ft) | 374.55 | 374.46 |
| Q Weir (cfs) | | Max Chl Dpth (ft) | 16.88 | 16.88 |
| Weir Sta Lft (ft) | | Vel Total (ft/s) | 2.15 | 2.16 |
| Weir Sta Rgt (ft) | | Flow Area (sq ft) | 7492.78 | 7467.22 |
| Weir Submerg | | Froude # Chl | 0.11 | 0.11 |
| Weir Max Depth (ft) | | Specif Force (cu ft) | 17364.02 | 17365.89 |
| Min El Weir Flow (ft) | 371.45 | Hydr Depth (ft) | 2.46 | 2.47 |
| Min El Prs (ft) | 372.73 | W.P. Total (ft) | 3303.91 | 3286.10 |
| Delta EG (ft) | 0.41 | Conv. Total (cfs) | 327498.6 | 327737.3 |
| Delta WS (ft) | 0.94 | Top Width (ft) | 3041.99 | 3023.71 |
| BR Open Area (sq ft) | 916.90 | Frctn Loss (ft) | 0.08 | 0.00 |
| BR Open Vel (ft/s) | 4.81 | C & E Loss (ft) | 0.00 | 0.22 |
| Coef of Q | | Shear Total (lb/sq ft) | 0.34 | 0.34 |
| Br Sel Method | Energy only | Power Total (lb/ft s) | 0.74 | 0.74 |



EXISTING

Plan: Ex3 Porters Creek 1 RS: 322 Profile: 2 YR

| | | Element | Inside BR US | Inside BR DS |
|-----------------------|-------------|------------------------|--------------|--------------|
| E.G. US. (ft) | 370.15 | | | |
| W.S. US. (ft) | 368.47 | E.G. Elev (ft) | 370.11 | 369.78 |
| Q Total (cfs) | 3700.00 | W.S. Elev (ft) | 368.33 | 367.51 |
| Q Bridge (cfs) | 3700.00 | Crit W.S. (ft) | 366.87 | 366.81 |
| Q Weir (cfs) | | Max Chl Dpth (ft) | 9.58 | 8.81 |
| Weir Sta Lft (ft) | | Vel Total (ft/s) | 8.75 | 9.93 |
| Weir Sta Rgt (ft) | | Flow Area (sq ft) | 423.08 | 372.69 |
| Weir Submerg | | Froude # Chl | 0.68 | 0.80 |
| Weir Max Depth (ft) | | Specif Force (cu ft) | 2806.12 | 2657.21 |
| Min EI Weir Flow (ft) | 372.17 | Hydr Depth (ft) | 6.27 | 5.75 |
| Min EI Prs (ft) | 371.64 | W.P. Total (ft) | 106.82 | 98.19 |
| Delta EG (ft) | 0.43 | Conv. Total (cfs) | 42801.1 | 36878.3 |
| Delta WS (ft) | 0.91 | Top Width (ft) | 67.48 | 64.78 |
| BR Open Area (sq ft) | 667.75 | Frctn Loss (ft) | 0.19 | 0.01 |
| BR Open Vel (ft/s) | 9.93 | C & E Loss (ft) | 0.15 | 0.06 |
| Coef of Q | | Shear Total (lb/sq ft) | 1.85 | 2.39 |
| Br Sel Method | Energy only | Power Total (lb/ft s) | 16.16 | 23.68 |

Plan: Ex3 Porters Creek 1 RS: 322 Profile: 10 YR

| | | Element | Inside BR US | Inside BR DS |
|-----------------------|-------------|------------------------|--------------|--------------|
| E.G. US. (ft) | 375.78 | | | |
| W.S. US. (ft) | 375.67 | E.G. Elev (ft) | 375.73 | 374.82 |
| Q Total (cfs) | 7230.00 | W.S. Elev (ft) | 375.72 | 371.86 |
| Q Bridge (cfs) | 1153.54 | Crit W.S. (ft) | 370.27 | 370.22 |
| Q Weir (cfs) | | Max Chl Dpth (ft) | 16.97 | 13.16 |
| Weir Sta Lft (ft) | | Vel Total (ft/s) | 0.89 | 10.76 |
| Weir Sta Rgt (ft) | | Flow Area (sq ft) | 8139.49 | 671.95 |
| Weir Submerg | | Froude # Chl | 0.04 | 0.66 |
| Weir Max Depth (ft) | | Specif Force (cu ft) | 16082.27 | 6553.88 |
| Min EI Weir Flow (ft) | 372.17 | Hydr Depth (ft) | 2.47 | |
| Min EI Prs (ft) | 371.64 | W.P. Total (ft) | 3535.74 | 235.30 |
| Delta EG (ft) | 1.10 | Conv. Total (cfs) | 325844.6 | 53060.7 |
| Delta WS (ft) | 3.69 | Top Width (ft) | 3301.29 | |
| BR Open Area (sq ft) | 667.75 | Frctn Loss (ft) | 0.03 | 0.01 |
| BR Open Vel (ft/s) | 1.73 | C & E Loss (ft) | 0.88 | 0.14 |
| Coef of Q | | Shear Total (lb/sq ft) | 0.07 | 3.31 |
| Br Sel Method | Energy only | Power Total (lb/ft s) | 0.06 | 35.62 |

Plan: Ex3 Porters Creek 1 RS: 322 Profile: 50 YR

| | | Element | Inside BR US | Inside BR DS |
|-----------------------|----------|----------------------|--------------|--------------|
| E.G. US. (ft) | 375.80 | | | |
| W.S. US. (ft) | 375.53 | E.G. Elev (ft) | 375.69 | 375.66 |
| Q Total (cfs) | 10700.00 | W.S. Elev (ft) | 375.64 | 375.62 |
| Q Bridge (cfs) | 1782.88 | Crit W.S. (ft) | 374.29 | 374.37 |
| Q Weir (cfs) | | Max Chl Dpth (ft) | 16.89 | 16.92 |
| Weir Sta Lft (ft) | | Vel Total (ft/s) | 1.35 | 1.36 |
| Weir Sta Rgt (ft) | | Flow Area (sq ft) | 7899.13 | 7893.31 |
| Weir Submerg | | Froude # Chl | 0.07 | 0.07 |
| Weir Max Depth (ft) | | Specif Force (cu ft) | 15777.72 | 15745.03 |
| Min EI Weir Flow (ft) | 372.17 | Hydr Depth (ft) | 2.40 | 2.40 |
| Min EI Prs (ft) | 371.64 | W.P. Total (ft) | 3524.23 | 3524.25 |
| Delta EG (ft) | 0.35 | Conv. Total (cfs) | 311568.7 | 311185.5 |
| Delta WS (ft) | 0.80 | Top Width (ft) | 3289.78 | 3288.88 |
| BR Open Area (sq ft) | 667.75 | Frctn Loss (ft) | 0.03 | 0.00 |
| BR Open Vel (ft/s) | 2.67 | C & E Loss (ft) | 0.00 | 0.20 |



Plan: Ex3 Porters Creek 1 RS: 322 Profile: 50 YR (Continued)

| | | | | |
|---------------|-------------|------------------------|------|------|
| Coef of Q | | Shear Total (lb/sq ft) | 0.17 | 0.17 |
| Br Sel Method | Energy only | Power Total (lb/ft s) | 0.22 | 0.22 |

Plan: Ex3 Porters Creek 1 RS: 322 Profile: 100 YR

| | | Element | Inside BR US | Inside BR DS |
|-----------------------|-------------|------------------------|--------------|--------------|
| E.G. US. (ft) | 376.04 | E.G. Elev (ft) | 375.93 | 375.91 |
| W.S. US. (ft) | 375.78 | W.S. Elev (ft) | 375.89 | 375.86 |
| Q Total (cfs) | 12200.00 | Crit W.S. (ft) | 374.29 | 374.49 |
| Q Bridge (cfs) | 1761.62 | Max Chl Dpth (ft) | 17.14 | 17.16 |
| Q Weir (cfs) | | Vel Total (ft/s) | 1.40 | 1.40 |
| Weir Sta Lft (ft) | | Flow Area (sq ft) | 8715.53 | 8712.81 |
| Weir Sta Rgt (ft) | | Froude # Chl | 0.07 | 0.07 |
| Weir Submerg | | Specif Force (cu ft) | 17905.62 | 17879.94 |
| Weir Max Depth (ft) | | Hydr Depth (ft) | 2.62 | 2.62 |
| Min EI Weir Flow (ft) | 372.17 | W.P. Total (ft) | 3563.15 | 3563.08 |
| Min EI Prs (ft) | 371.64 | Conv. Total (cfs) | 361055.8 | 360840.3 |
| Delta EG (ft) | 0.25 | Top Width (ft) | 3328.69 | 3327.70 |
| Delta WS (ft) | 0.42 | Frctn Loss (ft) | 0.03 | 0.00 |
| BR Open Area (sq ft) | 667.75 | C & E Loss (ft) | 0.00 | 0.11 |
| BR Open Vel (ft/s) | 2.64 | Shear Total (lb/sq ft) | 0.17 | 0.17 |
| Coef of Q | | Power Total (lb/ft s) | 0.24 | 0.24 |
| Br Sel Method | Energy only | | | |

Plan: Ex3 Porters Creek 1 RS: 322 Profile: 500 YR

| | | Element | Inside BR US | Inside BR DS |
|-----------------------|-------------|------------------------|--------------|--------------|
| E.G. US. (ft) | 376.47 | E.G. Elev (ft) | 376.35 | 376.32 |
| W.S. US. (ft) | 376.18 | W.S. Elev (ft) | 376.30 | 376.27 |
| Q Total (cfs) | 16100.00 | Crit W.S. (ft) | 374.77 | 374.72 |
| Q Bridge (cfs) | 1870.79 | Max Chl Dpth (ft) | 17.55 | 17.57 |
| Q Weir (cfs) | | Vel Total (ft/s) | 1.60 | 1.60 |
| Weir Sta Lft (ft) | | Flow Area (sq ft) | 10093.04 | 10079.27 |
| Weir Sta Rgt (ft) | | Froude # Chl | 0.08 | 0.08 |
| Weir Submerg | | Specif Force (cu ft) | 22032.41 | 21975.23 |
| Weir Max Depth (ft) | | Hydr Depth (ft) | 2.97 | 2.97 |
| Min EI Weir Flow (ft) | 372.17 | W.P. Total (ft) | 3627.79 | 3626.83 |
| Min EI Prs (ft) | 371.64 | Conv. Total (cfs) | 450683.3 | 449705.2 |
| Delta EG (ft) | 0.27 | Top Width (ft) | 3393.33 | 3391.44 |
| Delta WS (ft) | 0.46 | Frctn Loss (ft) | 0.03 | 0.00 |
| BR Open Area (sq ft) | 667.75 | C & E Loss (ft) | 0.00 | 0.12 |
| BR Open Vel (ft/s) | 2.80 | Shear Total (lb/sq ft) | 0.22 | 0.22 |
| Coef of Q | | Power Total (lb/ft s) | 0.35 | 0.36 |
| Br Sel Method | Energy only | | | |



PROPOSED
CONTRACTION
SCOUR



HEC-RAS Plan: Prop03 River: Porters Creek Reach: 1

| Reach | River Sta | Profile | Q Left (cfs) | Q Channel (cfs) | Q Right (cfs) | W.S. Elev (ft) | Min Ch El (ft) | Max Ch Dpth (ft) | Top Width (ft) | Vel Left (ft/s) | Vel Chnl (ft/s) | Vel Right (ft/s) | Hydr Dpth L (ft) | Hydr Dpth C (ft) | Hydr Dpth R (ft) |
|-------|-----------|---------|--------------|-----------------|---------------|----------------|----------------|------------------|----------------|-----------------|-----------------|------------------|------------------|------------------|------------------|
| 1 | 642 | 2 YR | 83.34 | 2279.29 | 1337.37 | 369.56 | 359.04 | 10.52 | 1743.31 | 0.69 | 3.48 | 0.53 | 0.65 | 10.49 | 1.70 |
| 1 | 642 | 10 YR | 513.78 | 2006.72 | 4709.50 | 372.75 | 359.04 | 13.71 | 3027.34 | 0.36 | 2.35 | 0.52 | 2.15 | 13.68 | 3.95 |
| 1 | 642 | 50 YR | 1217.63 | 1919.64 | 7562.74 | 375.20 | 359.04 | 16.16 | 3409.33 | 0.36 | 1.90 | 0.50 | 3.72 | 16.13 | 6.16 |
| 1 | 642 | 100 YR | 1496.46 | 2008.03 | 8695.51 | 375.82 | 359.04 | 16.78 | 3470.02 | 0.38 | 1.92 | 0.53 | 4.11 | 16.75 | 6.76 |
| 1 | 642 | 500 YR | 2012.13 | 2591.74 | 11496.12 | 375.99 | 359.04 | 16.95 | 3486.76 | 0.49 | 2.45 | 0.68 | 4.22 | 16.92 | 6.92 |
| 1 | 328 | 2 YR | | 3700.00 | | 368.60 | 358.76 | 9.84 | 88.30 | | 6.66 | | | 6.29 | |
| 1 | 328 | 10 YR | | 7230.00 | | 371.14 | 358.76 | 12.38 | 109.86 | | 8.90 | | | 7.39 | |
| 1 | 328 | 50 YR | 399.32 | 7076.50 | 3224.18 | 374.76 | 358.76 | 16.00 | 3138.62 | 0.63 | 5.83 | 0.86 | 0.98 | 10.84 | 1.57 |
| 1 | 328 | 100 YR | 838.57 | 6320.70 | 5040.72 | 375.56 | 358.76 | 16.80 | 3276.50 | 0.70 | 4.85 | 0.89 | 1.63 | 11.63 | 2.33 |
| 1 | 328 | 500 YR | 1092.59 | 8399.59 | 6607.82 | 375.54 | 358.76 | 16.78 | 3272.62 | 0.93 | 6.46 | 1.18 | 1.61 | 11.61 | 2.31 |
| 1 | 327 | Bridge | | | | | | | | | | | | | |
| 1 | 294 | 2 YR | | 3700.00 | | 368.25 | 358.68 | 9.57 | 87.17 | | 6.96 | | | 6.10 | |
| 1 | 294 | 10 YR | | 7230.00 | | 370.54 | 358.68 | 11.86 | 109.75 | | 9.57 | | | 6.88 | |
| 1 | 294 | 50 YR | | 10119.98 | 580.02 | 372.96 | 358.68 | 14.28 | 1135.63 | | 9.91 | 0.89 | | 9.25 | 0.63 |
| 1 | 294 | 100 YR | 802.63 | 6470.64 | 4926.72 | 375.40 | 358.68 | 16.72 | 3263.54 | 0.71 | 5.00 | 0.90 | 1.56 | 11.55 | 2.25 |
| 1 | 294 | 500 YR | 549.52 | 10932.58 | 4617.89 | 374.60 | 358.68 | 15.92 | 3116.35 | 0.94 | 9.08 | 1.30 | 0.92 | 10.76 | 1.49 |
| 1 | 0 | 2 YR | 159.17 | 2939.52 | 601.31 | 367.47 | 357.64 | 9.83 | 1008.86 | 2.15 | 7.69 | 0.91 | 4.41 | 9.33 | 0.69 |
| 1 | 0 | 10 YR | 238.55 | 3703.56 | 3287.89 | 368.86 | 357.64 | 11.22 | 2118.70 | 2.04 | 8.43 | 1.16 | 0.68 | 10.72 | 1.49 |
| 1 | 0 | 50 YR | 374.51 | 4134.47 | 6191.02 | 369.59 | 357.64 | 11.95 | 2318.15 | 1.40 | 8.81 | 1.46 | 0.93 | 11.45 | 2.14 |
| 1 | 0 | 100 YR | 459.03 | 4298.31 | 7442.66 | 369.85 | 357.64 | 12.21 | 2464.80 | 1.26 | 8.95 | 1.56 | 0.90 | 11.71 | 2.37 |
| 1 | 0 | 500 YR | 803.52 | 4668.05 | 10628.44 | 370.45 | 357.64 | 12.81 | 2595.60 | 1.28 | 9.25 | 1.77 | 1.34 | 12.31 | 2.88 |

channel ratio ≈ 1:1

PROPOSED
PIER SCOUR

Plan: Prop3 Porters Creek 1 RS: 327 Profile: 2 YR

| Element | Value | Inside BR US | Inside BR DS |
|-----------------------|-------------|--------------|--------------|
| E.G. US. (ft) | 369.29 | | |
| W.S. US. (ft) | 368.60 | | |
| Q Total (cfs) | 3700.00 | 369.23 | 369.08 |
| Q Bridge (cfs) | 3700.00 | 368.36 | 368.18 |
| Q Weir (cfs) | | 365.99 | 365.91 |
| Weir Sta Lft (ft) | | 9.60 | 9.50 |
| Weir Sta Rgt (ft) | | 7.51 | 7.63 |
| Weir Submerg | | 492.80 | 484.63 |
| Weir Max Depth (ft) | | 0.54 | 0.55 |
| Min El Weir Flow (ft) | 371.45 | 2663.50 | 2628.80 |
| Min El Prs (ft) | 372.73 | 6.06 | 5.99 |
| Delta EG (ft) | 0.29 | 112.00 | 111.13 |
| Delta WS (ft) | 0.35 | 56178.9 | 54918.8 |
| BR Open Area (sq ft) | 916.90 | 81.28 | 80.87 |
| BR Open Vel (ft/s) | 7.63 | 0.14 | 0.00 |
| Coef of Q | | 0.01 | 0.08 |
| Br Sel Method | Energy only | 1.19 | 1.24 |
| | | 8.95 | 9.43 |

Plan: Prop3 Porters Creek 1 RS: 327 Profile: 10 YR

| Element | Value | Inside BR US | Inside BR DS |
|-----------------------|-------------|--------------|--------------|
| E.G. US. (ft) | 372.37 | | |
| W.S. US. (ft) | 371.14 | | |
| Q Total (cfs) | 7230.00 | 372.40 | 372.16 |
| Q Bridge (cfs) | 6986.25 | 370.85 | 370.47 |
| Q Weir (cfs) | 243.75 | 368.58 | 368.50 |
| Weir Sta Lft (ft) | 1065.59 | 12.09 | 11.79 |
| Weir Sta Rgt (ft) | 2213.24 | 9.98 | 10.44 |
| Weir Submerg | 0.00 | 724.51 | 692.72 |
| Weir Max Depth (ft) | 0.93 | 0.66 | 0.71 |
| Min El Weir Flow (ft) | 371.45 | 5545.21 | 5430.52 |
| Min El Prs (ft) | 372.73 | 7.00 | 6.69 |
| Delta EG (ft) | 0.41 | 145.99 | 144.45 |
| Delta WS (ft) | 0.60 | 89494.1 | 83632.3 |
| BR Open Area (sq ft) | 916.90 | 103.57 | 103.57 |
| BR Open Vel (ft/s) | 10.09 | 0.21 | 0.01 |
| Coef of Q | | 0.04 | 0.08 |
| Br Sel Method | Energy/Weir | 2.02 | 2.24 |
| | | 20.18 | 23.35 |

Plan: Prop3 Porters Creek 1 RS: 327 Profile: 50 YR

| Element | Value | Inside BR US | Inside BR DS |
|-----------------------|----------|--------------|--------------|
| E.G. US. (ft) | 375.11 | | |
| W.S. US. (ft) | 374.76 | | |
| Q Total (cfs) | 10700.00 | 375.02 | 374.46 |
| Q Bridge (cfs) | 4469.54 | 374.85 | 372.90 |
| Q Weir (cfs) | | 370.77 | 370.70 |
| Weir Sta Lft (ft) | | 16.09 | 14.22 |
| Weir Sta Rgt (ft) | | 2.06 | 7.02 |
| Weir Submerg | | 5197.74 | 1524.70 |
| Weir Max Depth (ft) | | 0.11 | 0.41 |
| Min El Weir Flow (ft) | 371.45 | 11987.65 | 8550.06 |
| Min El Prs (ft) | 372.73 | 1.90 | 1.55 |
| Delta EG (ft) | 0.72 | 2996.16 | 1246.43 |
| Delta WS (ft) | 1.81 | 214898.2 | 100301.2 |
| BR Open Area (sq ft) | 916.90 | 2734.26 | 984.08 |
| BR Open Vel (ft/s) | 4.87 | 0.15 | 0.01 |
| | | 0.41 | 0.06 |



Plan: Prop3 Porters Creek 1 RS: 327 Profile: 50 YR (Continued)

| | | | | |
|---------------|-------------|------------------------|------|------|
| Coef of Q | | Shear Total (lb/sq ft) | 0.27 | 0.87 |
| Br Sel Method | Energy only | Power Total (lb/ft s) | 0.55 | 6.10 |

Plan: Prop3 Porters Creek 1 RS: 327 Profile: 100 YR

| | | | | |
|-----------------------|-------------|------------------------|--------------|--------------|
| E.G. US. (ft) | 375.76 | Element | Inside BR US | Inside BR DS |
| W.S. US. (ft) | 375.56 | E.G. Elev (ft) | 375.70 | 375.65 |
| Q Total (cfs) | 12200.00 | W.S. Elev (ft) | 375.62 | 375.58 |
| Q Bridge (cfs) | 3383.37 | Crit W.S. (ft) | 374.03 | 373.94 |
| Q Weir (cfs) | | Max Chl Dpth (ft) | 16.86 | 16.90 |
| Weir Sta Lft (ft) | | Vel Total (ft/s) | 1.64 | 1.63 |
| Weir Sta Rgt (ft) | | Flow Area (sq ft) | 7421.32 | 7506.10 |
| Weir Submerg | | Froude # Chl | 0.08 | 0.08 |
| Weir Max Depth (ft) | | Specif Force (cu ft) | 16639.72 | 16894.69 |
| Min El Weir Flow (ft) | 371.45 | Hydr Depth (ft) | 2.45 | 2.48 |
| Min El Prs (ft) | 372.73 | W.P. Total (ft) | 3294.80 | 3291.08 |
| Delta EG (ft) | 0.15 | Conv. Total (cfs) | 323684.4 | 329820.1 |
| Delta WS (ft) | 0.16 | Top Width (ft) | 3032.88 | 3028.68 |
| BR Open Area (sq ft) | 916.90 | Frctn Loss (ft) | 0.04 | 0.00 |
| BR Open Vel (ft/s) | 3.69 | C & E Loss (ft) | 0.00 | 0.04 |
| Coef of Q | | Shear Total (lb/sq ft) | 0.20 | 0.19 |
| Br Sel Method | Energy only | Power Total (lb/ft s) | 0.33 | 0.32 |

Plan: Prop3 Porters Creek 1 RS: 327 Profile: 500 YR

| | | | | |
|-----------------------|-------------|------------------------|--------------|--------------|
| E.G. US. (ft) | 375.89 | Element | Inside BR US | Inside BR DS |
| W.S. US. (ft) | 375.54 | E.G. Elev (ft) | 375.78 | 375.70 |
| Q Total (cfs) | 16100.00 | W.S. Elev (ft) | 375.64 | 375.56 |
| Q Bridge (cfs) | 4412.94 | Crit W.S. (ft) | 374.55 | 374.46 |
| Q Weir (cfs) | | Max Chl Dpth (ft) | 16.88 | 16.88 |
| Weir Sta Lft (ft) | | Vel Total (ft/s) | 2.15 | 2.16 |
| Weir Sta Rgt (ft) | | Flow Area (sq ft) | 7492.78 | 7467.22 |
| Weir Submerg | | Froude # Chl | 0.11 | 0.11 |
| Weir Max Depth (ft) | | Specif Force (cu ft) | 17364.02 | 17365.89 |
| Min El Weir Flow (ft) | 371.45 | Hydr Depth (ft) | 2.46 | 2.47 |
| Min El Prs (ft) | 372.73 | W.P. Total (ft) | 3303.91 | 3286.10 |
| Delta EG (ft) | 0.41 | Conv. Total (cfs) | 327498.6 | 327737.3 |
| Delta WS (ft) | 0.94 | Top Width (ft) | 3041.99 | 3023.71 |
| BR Open Area (sq ft) | 916.90 | Frctn Loss (ft) | 0.08 | 0.00 |
| BR Open Vel (ft/s) | 4.81 | C & E Loss (ft) | 0.00 | 0.22 |
| Coef of Q | | Shear Total (lb/sq ft) | 0.34 | 0.34 |
| Br Sel Method | Energy only | Power Total (lb/ft s) | 0.74 | 0.74 |



Contraction Scour For Main Channel

24R

** ** *

Enter the flow in the upstream channel, cfs

2279.29

Calculate

Enter the average depth in the upstream main channel, ft

10.52

Print

Enter the flow in the contracted channel, cfs

3700

Reset

Enter the bottom width of the upstream main channel, ft

1

Exit

Enter the bottom width of the main channel in the contracted section, ft

1

Scour Depth (due to contraction), ft 5.41

Scour Depth (due to contraction), m 1.65

$$5.41 + 3.73 = 9.14' \text{ TOTAL SCOUR}$$

ESTIMATED 24R SCOUR ELEVATION

$$358.72 - 9.14 \hat{=} \underline{\underline{349.6'}}$$



Contraction Scour For Main Channel

** ** *

Enter the flow in the upstream channel, cfs

2006.72

Calculate

Enter the average depth in the upstream main channel, ft

13.71

Print

Enter the flow in the contracted channel, cfs

7230

Reset

Enter the bottom width of the upstream main channel, ft

1

Exit

Enter the bottom width of the main channel in the contracted section, ft

1

Scour Depth (due to contraction), ft 27.41

Scour Depth (due to contraction), m 8.36

$$27.41 + 4.42 = 31.83' \text{ TOTAL SCOUR}$$

ESTIMATED 10YR SCOUR ELEVATION

$$358.72 - 31.83 \approx \underline{\underline{326.9'}}$$

10YR

DESIGN



Contraction Scour For Main Channel

** ** *

Enter the flow in the upstream channel, cfs

1919.64

Calculate

Enter the average depth in the upstream main channel, ft

16.16

Print

Enter the flow in the contracted channel, cfs

7076.50

Reset

Enter the bottom width of the upstream main channel, ft

1

Exit

Enter the bottom width of the main channel in the contracted section, ft

1

Scour Depth (due to contraction), ft 33.27

Scour Depth (due to contraction), m 10.14

50 YR

MAX

$$33.27 + 3.82 = 37.09' \text{ TOTAL SCOUR}$$

ESTIMATED 50YR SCOUR ELEVATION

$$358.72 - 37.09 \approx \underline{\underline{321.6'}}$$



Contraction Scour For Main Channel

1004R

** ** *

Enter the flow in the upstream channel, cfs

2008.03

Calculate

Enter the average depth in the upstream main channel, ft

16.78

Print

Enter the flow in the contracted channel, cfs

6320.7

Reset

Enter the bottom width of the upstream main channel, ft

1

Exit

Enter the bottom width of the main channel in the contracted section, ft

1

Scour Depth (due to contraction), ft 28.05

Scour Depth (due to contraction), m 8.55

$$28.05 + 2.09 = 30.14' \text{ TOTAL SCOUR}$$

ESTIMATED 1004R SCOUR ELEVATION

$$358.72 - 30.14 \approx \underline{\underline{328.6'}}$$



Contraction Scour For Main Channel

500YR

** ** *

Enter the flow in the upstream channel, cfs

2591.74

Calculate

Enter the average depth in the upstream main channel, ft

16.95

Print

Enter the flow in the contracted channel, cfs

8399.59

Reset

Enter the bottom width of the upstream main channel, ft

1

Exit

Enter the bottom width of the main channel in the contracted section, ft

1

Scour Depth (due to contraction), ft 29.48

Scour Depth (due to contraction), m 8.99

$$29.48 + 2.36 = 31.84' \text{ TOTAL SCOUR}$$

ESTIMATED 500 YR SCOUR ELEVATION

$$358.72 - 31.84 \hat{=} \underline{\underline{326.9'}}$$



PIER SCOUR

2 YR

** ** *

Enter the depth of flow at pier, ft

9.60

Enter the velocity thru bridge at pier, (ft/s)

7.51

Enter Pier Width (a), ft

1.17

Enter pier length (L), ft

28



Enter angle of attack (the angle in the above figure = 0°)

0

Correction Factors

K1 (e) Square nose K1 = 1.1

K2 1

K3 (a) for live bed scour K3 = 1.0

Pier Scour Depth, ft 3.73

Pier Scour Depth, m 1.14

Calculate

Print

Reset

Exit



PIER SCOUR

104R

** ** *

Enter the depth of flow at pier, ft

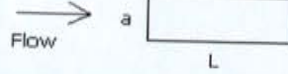
11.79

Enter the velocity thru bridge at pier, (ft/s)

10.44

Enter Pier Width (a), ft

1.17



Enter pier length (L), ft

28

Enter angle of attack (the angle in the above figure = 0)

0

Correction Factors

K1 (e) Square nose K1 = 1.1

K2 1

K3 (a) for live bed scour K3 = 1.0

Pier Scour Depth, ft 4.42

Pier Scour Depth, m 1.35

Calculate

Print

Reset

Exit



PIER SCOUR

** ** *

504R

Enter the depth of flow at pier, ft

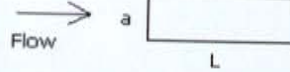
14.22

Enter the velocity thru bridge at pier, (ft/s)

7.02

Enter Pier Width (a), ft

1.17



Enter pier length (L), ft

28

Enter angle of attack (the angle in the above figure = 0°)

0

Correction Factors

K1 (e) Square nose K1 = 1.1

K2 1

K3 (a) for live bed scour K3 = 1.0

Pier Scour Depth, ft 3.82

Pier Scour Depth, m 1.16

Calculate

Print

Reset

Exit



PIER SCOUR

** ** *

1004R

Enter the depth of flow at pier, ft

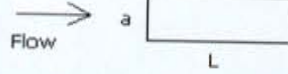
16.86

Enter the velocity thru bridge at pier, (ft/s)

1.64

Enter Pier Width (a), ft

1.17



Enter pier length (L), ft

28

Enter angle of attack (the angle in the above figure = 0)

0

Correction Factors

K1 (e) Square nose K1 = 1.1

K2 1

K3 (a) for live bed scour K3 = 1.0

Pier Scour Depth, ft 2.09

Pier Scour Depth, m 0.64

Calculate

Print

Reset

Exit



PIER SCOUR

5004R

** ** *

Enter the depth of flow at pier, ft

16.88

Enter the velocity thru bridge at pier, (ft/s)

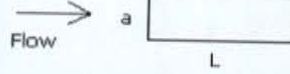
2.16

Enter Pier Width (a), ft

1.17

Enter pier length (L), ft

28



Enter angle of attack (the angle in the above figure = 0°)

0

Correction Factors

K1 (e) Square nose K1 = 1.1

K2 1

K3 (a) for live bed scour K3 = 1.0

Pier Scour Depth, ft 2.36

Pier Scour Depth, m 0.72

Calculate

Print

Reset

Exit



HEC-RAS Plan: Ex3 River: Porters Creek Reach: 1

| Reach | River Sta | Profile | Q Left (cfs) | Q Channel (cfs) | Q Right (cfs) | W.S. Elev (ft) | Min Ch El (ft) | Max Chl Dpth (ft) | Top Width (ft) | Vel Left (ft/s) | Vel Cntrl (ft/s) | Vel Right (ft/s) | Hydr Depth L (ft) | Hydr Depth C (ft) | Hydr Depth R (ft) |
|-------|-----------|---------|--------------|-----------------|---------------|----------------|----------------|-------------------|----------------|-----------------|------------------|------------------|-------------------|-------------------|-------------------|
| 1 | 642 | 2 YR | 139.34 | 1722.03 | 1838.63 | 370.65 | 359.04 | 11.61 | 2411.21 | 0.36 | 2.38 | 0.41 | 1.40 | 11.58 | 2.16 |
| 1 | 642 | 10 YR | 885.78 | 1191.87 | 5152.54 | 375.81 | 359.04 | 16.77 | 3468.97 | 0.22 | 1.14 | 0.31 | 4.10 | 16.74 | 6.75 |
| 1 | 642 | 50 YR | 1320.89 | 1748.19 | 7631.12 | 375.87 | 359.04 | 16.83 | 3475.53 | 0.33 | 1.66 | 0.46 | 4.14 | 16.80 | 6.81 |
| 1 | 642 | 100 YR | 1545.54 | 1932.25 | 8722.21 | 376.11 | 359.04 | 17.07 | 3499.33 | 0.36 | 1.81 | 0.51 | 4.29 | 17.04 | 7.05 |
| 1 | 642 | 500 YR | 2131.85 | 2415.95 | 11552.20 | 376.56 | 359.04 | 17.52 | 3543.03 | 0.45 | 2.21 | 0.63 | 4.57 | 17.49 | 7.48 |
| 1 | 328 | 2 YR | 298.36 | 3147.16 | 254.48 | 368.50 | 358.76 | 9.74 | 73.11 | 3.16 | 11.17 | 3.16 | 4.10 | 9.09 | 4.22 |
| 1 | 328 | 10 YR | 913.44 | 2274.52 | 4042.04 | 375.68 | 358.76 | 16.92 | 3294.14 | 0.57 | 4.51 | 0.65 | 2.05 | 16.27 | 2.51 |
| 1 | 328 | 50 YR | 1302.32 | 3556.63 | 5841.05 | 375.53 | 358.76 | 16.77 | 3271.91 | 0.87 | 7.12 | 0.99 | 1.94 | 16.12 | 2.38 |
| 1 | 328 | 100 YR | 1583.76 | 3678.04 | 6938.20 | 375.79 | 358.76 | 17.03 | 3311.92 | 0.93 | 7.24 | 1.07 | 2.14 | 16.38 | 2.61 |
| 1 | 328 | 500 YR | 2267.21 | 4210.87 | 9621.93 | 376.19 | 358.76 | 17.43 | 3375.38 | 1.12 | 8.10 | 1.28 | 2.44 | 16.78 | 2.99 |
| 1 | 323 | 2 YR | 297.77 | 3148.22 | 254.02 | 368.47 | 358.75 | 9.72 | 73.02 | 3.16 | 11.19 | 3.17 | 4.09 | 9.07 | 4.21 |
| 1 | 323 | 10 YR | 917.76 | 2272.48 | 4039.76 | 375.67 | 358.75 | 16.92 | 3294.60 | 0.57 | 4.50 | 0.65 | 2.06 | 16.27 | 2.51 |
| 1 | 323 | 50 YR | 1307.73 | 3557.86 | 5834.41 | 375.53 | 358.75 | 16.78 | 3271.89 | 0.87 | 7.12 | 0.99 | 1.95 | 16.13 | 2.38 |
| 1 | 323 | 100 YR | 1589.73 | 3679.22 | 6931.05 | 375.78 | 358.75 | 17.03 | 3311.87 | 0.93 | 7.24 | 1.07 | 2.14 | 16.38 | 2.61 |
| 1 | 323 | 500 YR | 2274.14 | 4213.88 | 9611.98 | 376.18 | 358.75 | 17.43 | 3375.06 | 1.12 | 8.10 | 1.28 | 2.44 | 16.78 | 2.98 |
| 1 | 322 | Bridge | | | | | | | | | | | | | |
| 1 | 299 | 2 YR | 266.14 | 3204.89 | 228.97 | 367.56 | 358.70 | 8.86 | 68.63 | 3.53 | 12.59 | 3.55 | 3.67 | 8.21 | 3.78 |
| 1 | 299 | 10 YR | 818.26 | 5729.69 | 682.05 | 371.99 | 358.70 | 13.29 | 227.94 | 4.22 | 14.63 | 4.20 | 5.87 | 12.64 | 5.99 |
| 1 | 299 | 50 YR | 1400.85 | 4814.06 | 4485.10 | 374.73 | 358.70 | 16.03 | 3141.38 | 1.48 | 10.10 | 1.14 | 1.36 | 15.38 | 1.64 |
| 1 | 299 | 100 YR | 1461.83 | 4303.42 | 6434.76 | 375.37 | 358.70 | 16.67 | 3249.61 | 1.03 | 8.67 | 1.17 | 1.86 | 16.02 | 2.24 |
| 1 | 299 | 500 YR | 2121.67 | 4923.00 | 9055.34 | 375.73 | 358.70 | 17.03 | 3306.43 | 1.25 | 9.70 | 1.42 | 2.14 | 16.38 | 2.58 |
| 1 | 294 | 2 YR | 265.73 | 3205.64 | 228.63 | 367.53 | 358.68 | 8.85 | 68.58 | 3.54 | 12.61 | 3.55 | 3.66 | 8.20 | 3.77 |
| 1 | 294 | 10 YR | 698.25 | 5943.72 | 588.03 | 370.10 | 358.68 | 11.42 | 81.66 | 5.09 | 17.80 | 5.08 | 4.94 | 10.77 | 5.06 |
| 1 | 294 | 50 YR | 1408.29 | 4849.42 | 4442.29 | 374.70 | 358.68 | 16.02 | 3138.92 | 1.49 | 10.17 | 1.14 | 1.36 | 15.37 | 1.62 |
| 1 | 294 | 100 YR | 1308.15 | 4996.26 | 5895.60 | 375.01 | 358.68 | 16.33 | 3195.91 | 1.12 | 10.28 | 1.27 | 1.60 | 15.68 | 1.91 |
| 1 | 294 | 500 YR | 1940.02 | 5706.64 | 8453.34 | 375.35 | 358.68 | 16.67 | 3248.03 | 1.37 | 11.49 | 1.55 | 1.86 | 16.02 | 2.23 |
| 1 | 0 | 2 YR | 159.17 | 2939.52 | 601.31 | 367.47 | 357.64 | 9.83 | 1008.86 | 2.15 | 7.69 | 0.91 | 4.41 | 9.33 | 0.69 |
| 1 | 0 | 10 YR | 238.55 | 3703.56 | 3287.89 | 368.86 | 357.64 | 11.22 | 2118.70 | 2.04 | 8.43 | 1.16 | 0.68 | 10.72 | 1.49 |
| 1 | 0 | 50 YR | 374.51 | 4134.47 | 6191.02 | 369.59 | 357.64 | 11.95 | 2318.15 | 1.40 | 8.81 | 1.46 | 0.93 | 11.45 | 2.14 |
| 1 | 0 | 100 YR | 459.03 | 4298.31 | 7442.66 | 369.85 | 357.64 | 12.21 | 2464.80 | 1.26 | 8.95 | 1.56 | 0.90 | 11.71 | 2.37 |
| 1 | 0 | 500 YR | 803.52 | 4668.05 | 10628.44 | 370.45 | 357.64 | 12.81 | 2595.80 | 1.28 | 9.25 | 1.77 | 1.34 | 12.31 | 2.88 |

EXISTING
&
NATURAL
SCOUR
(FOR COMPARISON)



HEC-RAS Plan: NWSE3 River: Porters Creek Reach: 1

| Reach | River Sta | Profile | Q Left (cfs) | Q Channel (cfs) | Q Right (cfs) | W.S. Elev (ft) | Min Ch El (ft) | Max Chl Dpth (ft) | Top Width (ft) | Vel Left (ft/s) | Vel Chnl (ft/s) | Vel Right (ft/s) | Hydr Depth L (ft) | Hydr Depth C (ft) | Hydr Depth R (ft) |
|-------|-----------|---------|-----------------|--------------------|------------------|-------------------|-------------------|----------------------|-------------------|--------------------|--------------------|---------------------|----------------------|----------------------|----------------------|
| 1 | 642 | 2 YR | 126.25 | 1815.43 | 1758.32 | 370.43 | 359.04 | 11.39 | 2263.31 | 0.38 | 2.56 | 0.44 | 1.24 | 11.36 | 2.08 |
| 1 | 642 | 10 YR | 785.40 | 1364.93 | 5079.66 | 374.87 | 359.04 | 15.83 | 3376.36 | 0.25 | 1.38 | 0.36 | 3.51 | 15.80 | 5.84 |
| 1 | 642 | 50 YR | 1292.70 | 1792.78 | 7614.51 | 375.69 | 359.04 | 16.65 | 3456.93 | 0.34 | 1.73 | 0.47 | 4.03 | 16.62 | 6.63 |
| 1 | 642 | 100 YR | 1507.59 | 1990.52 | 8701.90 | 375.88 | 359.04 | 16.84 | 3476.56 | 0.37 | 1.89 | 0.52 | 4.15 | 16.81 | 6.82 |
| 1 | 642 | 500 YR | 2079.92 | 2490.17 | 11529.90 | 376.31 | 359.04 | 17.27 | 3518.14 | 0.47 | 2.31 | 0.65 | 4.41 | 17.24 | 7.23 |
| 1 | 328 | 2 YR | 275.73 | 3187.70 | 236.57 | 367.88 | 358.76 | 9.12 | 69.95 | 3.42 | 12.14 | 3.42 | 3.79 | 8.47 | 3.91 |
| 1 | 328 | 10 YR | 775.82 | 5805.33 | 648.85 | 371.37 | 358.76 | 12.61 | 87.72 | 4.50 | 15.65 | 4.49 | 5.53 | 11.96 | 5.66 |
| 1 | 328 | 50 YR | 1112.10 | 4323.73 | 5264.17 | 375.07 | 358.76 | 16.31 | 3193.14 | 0.96 | 8.90 | 1.11 | 1.58 | 15.66 | 1.95 |
| 1 | 328 | 100 YR | 1375.85 | 4487.28 | 6336.87 | 375.29 | 358.76 | 16.53 | 3233.08 | 1.05 | 9.12 | 1.20 | 1.75 | 15.88 | 2.15 |
| 1 | 328 | 500 YR | 2016.02 | 5133.86 | 8950.12 | 375.64 | 358.76 | 16.88 | 3288.60 | 1.27 | 10.20 | 1.46 | 2.02 | 16.23 | 2.48 |
| 1 | 323 | 2 YR | 274.84 | 3189.29 | 235.87 | 367.84 | 358.75 | 9.09 | 69.83 | 3.43 | 12.18 | 3.44 | 3.78 | 8.44 | 3.90 |
| 1 | 323 | 10 YR | 773.62 | 5809.25 | 647.13 | 371.33 | 358.75 | 12.58 | 87.54 | 4.52 | 15.71 | 4.50 | 5.52 | 11.93 | 5.64 |
| 1 | 323 | 50 YR | 1016.31 | 4756.26 | 4927.44 | 374.86 | 358.75 | 16.11 | 3166.78 | 1.01 | 9.92 | 1.16 | 1.41 | 15.46 | 1.75 |
| 1 | 323 | 100 YR | 1370.89 | 4534.78 | 6294.33 | 375.26 | 358.75 | 16.51 | 3229.34 | 1.05 | 9.22 | 1.21 | 1.74 | 15.86 | 2.12 |
| 1 | 323 | 500 YR | 2015.61 | 5168.00 | 8916.39 | 375.62 | 358.75 | 16.87 | 3286.01 | 1.28 | 10.28 | 1.46 | 2.02 | 16.22 | 2.46 |
| 1 | 299 | 2 YR | 266.12 | 3204.93 | 228.95 | 367.56 | 358.70 | 8.86 | 68.63 | 3.53 | 12.59 | 3.55 | 3.66 | 8.21 | 3.78 |
| 1 | 299 | 10 YR | 742.64 | 5864.49 | 622.87 | 370.80 | 358.70 | 12.10 | 85.10 | 4.74 | 16.53 | 4.73 | 5.28 | 11.45 | 5.40 |
| 1 | 299 | 50 YR | 1407.36 | 4731.49 | 4561.15 | 374.77 | 358.70 | 16.07 | 3151.90 | 1.44 | 9.90 | 1.13 | 1.38 | 15.42 | 1.67 |
| 1 | 299 | 100 YR | 1368.23 | 4685.85 | 6145.93 | 375.17 | 358.70 | 16.47 | 3218.19 | 1.08 | 9.56 | 1.23 | 1.70 | 15.82 | 2.05 |
| 1 | 299 | 500 YR | 2013.49 | 5342.96 | 8743.53 | 375.52 | 358.70 | 16.82 | 3273.21 | 1.31 | 10.66 | 1.49 | 1.98 | 16.17 | 2.38 |
| 1 | 294 | 2 YR | 265.73 | 3205.64 | 228.63 | 367.53 | 358.68 | 8.85 | 68.58 | 3.54 | 12.61 | 3.55 | 3.66 | 8.20 | 3.77 |
| 1 | 294 | 10 YR | 698.25 | 5943.72 | 588.03 | 370.10 | 358.68 | 11.42 | 81.66 | 5.09 | 17.80 | 5.08 | 4.94 | 10.77 | 5.06 |
| 1 | 294 | 50 YR | 1408.29 | 4849.42 | 4442.29 | 374.70 | 358.68 | 16.02 | 3138.92 | 1.49 | 10.17 | 1.14 | 1.36 | 15.37 | 1.62 |
| 1 | 294 | 100 YR | 1308.15 | 4996.26 | 5885.60 | 375.01 | 358.68 | 16.33 | 3195.91 | 1.12 | 10.28 | 1.27 | 1.60 | 15.68 | 1.91 |
| 1 | 294 | 500 YR | 1940.02 | 5706.64 | 8453.34 | 375.35 | 358.68 | 16.67 | 3248.03 | 1.37 | 11.49 | 1.55 | 1.86 | 16.02 | 2.23 |
| 1 | 0 | 2 YR | 159.17 | 2939.52 | 601.31 | 367.47 | 357.64 | 9.83 | 1008.86 | 2.15 | 7.69 | 0.91 | 4.41 | 9.33 | 0.69 |
| 1 | 0 | 10 YR | 238.55 | 3703.56 | 3287.89 | 368.86 | 357.64 | 11.22 | 2118.70 | 2.04 | 8.43 | 1.16 | 0.68 | 10.72 | 1.49 |
| 1 | 0 | 50 YR | 374.51 | 4134.47 | 6191.02 | 369.59 | 357.64 | 11.95 | 2318.15 | 1.40 | 8.81 | 1.46 | 0.93 | 11.45 | 2.14 |
| 1 | 0 | 100 YR | 459.03 | 4298.31 | 7442.66 | 369.85 | 357.64 | 12.21 | 2464.80 | 1.26 | 8.95 | 1.56 | 0.90 | 11.71 | 2.37 |
| 1 | 0 | 500 YR | 803.52 | 4668.05 | 10628.44 | 370.45 | 357.64 | 12.81 | 2595.60 | 1.28 | 9.26 | 1.77 | 1.34 | 12.31 | 2.88 |



PeaVine.rep

HEC-RAS Version 3.1.1 May 2003
 U.S. Army Corp of Engineers
 Hydrologic Engineering Center
 609 Second Street, Suite D
 Davis, California 95616-4687
 (916) 756-1104

```

X   X   XXXXXX   XXXX   XXXX   XX   XXXX
X   X   X   X   X   X   X   X   X
X   X   X   X   X   X   X   X   X
XXXXXXXX XXXX   X   XXX XXXX XXXXXX XXXX
X   X   X   X   X   X   X   X   X
X   X   X   X   X   X   X   X   X
X   X   XXXXXX   XXXX   X   X   X   X   XXXXX
    
```

PROJECT DATA

Project Title: Pea Vine over Porters
 Project File : PeaVine.prj
 Run Date and Time: 11/7/2006 10:59:42 AM

Project in English units

PLAN DATA

Plan Title: Prop3
 Plan File : C:\HEC\RAS\PeaVine Rd over Porters Creek\PeaVine.p08

Geometry Title: Proposed3
 Geometry File : C:\HEC\RAS\PeaVine Rd over Porters Creek\PeaVine.g08

Flow Title : Porters Creek
 Flow File : C:\HEC\RAS\PeaVine Rd over Porters Creek\PeaVine.f01

Plan Summary Information:

Number of: Cross Sections = 15 Multiple Openings = 0
 Culverts = 0 Inline Structures = 0
 Bridges = 1 Lateral Structures = 0

Computational Information

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

Computation Options

Critical depth computed at all cross sections
 Conveyance Calculation Method: At breaks in n values only
 Friction Slope Method: Average Conveyance
 Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Porters Creek
 Flow File : C:\HEC\RAS\PeaVine Rd over Porters Creek\PeaVine.f01

Flow Data (cfs)

| River | Reach | RS | 2 YR | 10 YR | 50 YR | 100 |
|---------------|-------|-----|------|-------|-------|-----|
| Porters Creek | 1 | 642 | 3700 | 7230 | 10700 | |
| | 16100 | | | | | |

Boundary Conditions

River Reach Profile Upstream



PeaVine.rep

| | | | | | | |
|---------------|---|--------|--------|-------------|--------|-------------|
| Porters Creek | 1 | 2 YR | Normal | S = 0.00167 | Normal | S = 0.00167 |
| Porters Creek | 1 | 10 YR | Normal | S = 0.00167 | Normal | S = 0.00167 |
| Porters Creek | 1 | 50 YR | Normal | S = 0.00167 | Normal | S = 0.00167 |
| Porters Creek | 1 | 100 YR | Normal | S = 0.00167 | Normal | S = 0.00167 |
| Porters Creek | 1 | 500 YR | Normal | S = 0.00167 | Normal | S = 0.00167 |

GEOMETRY DATA

Geometry Title: Proposed3
 Geometry File : C:\HEC\RAS\PeaVine Rd over Porters Creek\PeaVine.g08

CROSS SECTION

RIVER: Porters Creek
 REACH: 1 RS: 642

INPUT

Description: Upstream Cross Section

| | | | | | | | | | |
|------------------------|--------|---------|--------|------|--------|------|--------|------|--------|
| Station Elevation Data | | num= 50 | | | | | | | |
| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
| -1270 | 378.94 | -751 | 373.04 | -442 | 370.74 | -386 | 370.64 | -377 | 369.24 |
| -331 | 369.84 | -283 | 369.34 | -172 | 369.24 | -120 | 370.94 | -62 | 373.14 |
| -55 | 373.04 | -31 | 360.12 | -29 | 359.04 | 0 | 359.04 | 30 | 359.04 |
| 31.5 | 360.13 | 47 | 371.44 | 72 | 373.34 | 80 | 370.94 | 90 | 369.94 |
| 145 | 370.64 | 201 | 369.94 | 262 | 369.94 | 321 | 370.74 | 439 | 370.54 |
| 492 | 369.84 | 551 | 370.04 | 580 | 369.14 | 605 | 369.94 | 820 | 367.74 |
| 832 | 365.14 | 849 | 367.94 | 868 | 367.74 | 907 | 364.94 | 950 | 367.84 |
| 1168 | 367.64 | 1205 | 371.74 | 1237 | 372.74 | 1281 | 373.14 | 1320 | 372.94 |
| 1379 | 368.94 | 1422 | 366.94 | 1455 | 366.94 | 1662 | 368.24 | 1981 | 367.54 |
| 2167 | 367.94 | 2212 | 368.94 | 2336 | 370.04 | 2448 | 373.34 | 2505 | 378.64 |

| | | | | | |
|--------------------|-------|--------|-------|------|-------|
| Manning's n Values | | num= 3 | | | |
| Sta | n Val | Sta | n Val | Sta | n Val |
| -1270 | .07 | -31 | .035 | 31.5 | .07 |

| | | | | | | | | | |
|-----------|------|-------|----------|-------|---------|-------|-------|--------|--------|
| Bank Sta: | Left | Right | Lengths: | Left | Channel | Right | Coeff | Contr. | Expan. |
| | -31 | 31.5 | | 44.86 | 44.86 | 44.86 | | .1 | .3 |

CROSS SECTION

RIVER: Porters Creek
 REACH: 1 RS: 328

INPUT

Description: Proposed Inlet

| | | | | | | | | | |
|------------------------|--------|---------|--------|--------|--------|--------|--------|--------|--------|
| Station Elevation Data | | num= 39 | | | | | | | |
| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
| -1090 | 378.94 | -702 | 374.56 | -500 | 373.16 | -415 | 373.62 | -365 | 373.82 |
| -236 | 373.26 | -57 | 374.86 | -55.56 | 372.79 | -55.56 | 369.77 | -47.28 | 369.77 |
| -34.46 | 363.58 | -27.21 | 363.58 | -20 | 361.76 | -16 | 360.06 | 0 | 358.76 |
| 15 | 360.06 | 26.07 | 363.71 | 33.32 | 363.71 | 45.73 | 369.71 | 54.01 | 369.71 |
| 55 | 374.66 | 237 | 373.86 | 287 | 373.76 | 337 | 374.31 | 387 | 374.21 |
| 461 | 373.86 | 638 | 374.06 | 905 | 373.44 | 1205 | 371.44 | 1305 | 372.44 |
| 1455 | 373.14 | 1512 | 373.14 | 1608 | 372.04 | 1720 | 372.14 | 1995 | 373.64 |
| 2039 | 373.74 | 2190 | 372.34 | 2269 | 372.44 | 2685 | 378.44 | | |

| | | | | | |
|--------------------|-------|--------|-------|-----|-------|
| Manning's n Values | | num= 3 | | | |
| Sta | n Val | Sta | n Val | Sta | n Val |
| -1090 | .07 | -57 | .035 | 55 | .07 |

| | | | | | | | | | |
|-----------|------|-------|----------|------|---------|-------|-------|--------|--------|
| Bank Sta: | Left | Right | Lengths: | Left | Channel | Right | Coeff | Contr. | Expan. |
| | -57 | 55 | | 34 | 34 | 34 | | .3 | .5 |

| | | | | |
|------------------|--------|--------|-----------|--|
| Ineffective Flow | num= 2 | | | |
| Sta L | Sta R | Elev | Permanent | |
| -1090 | -65.44 | 373.29 | F | |
| 59.1 | 2685 | 371.33 | F | |

BRIDGE

RIVER: Porters Creek
 REACH: 1 RS: 327

INPUT

Description: 116', 3 span, Type I I-Beam Bridge

Distance from Upstream XS = 1
 Deck/Roadway width = 32
 weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

| num= 19 | | | | | | | | | | | |
|---------|---------|---------|--|--------|---------|---------|--|--------|---------|---------|--|
| Sta | Hi Cord | Lo Cord | | Sta | Hi Cord | Lo Cord | | Sta | Hi Cord | Lo Cord | |
| -702 | 374.44 | 0 | | -500 | 373.04 | 0 | | -415 | 373.5 | 0 | |
| -365 | 373.7 | 0 | | -313 | 373.9 | 0 | | -263 | 374.37 | 0 | |
| -113 | 375.78 | 0 | | -55.56 | 376.16 | 0 | | -55.56 | 376.16 | 372.65 | |
| -13 | 376.24 | 372.73 | | 54.01 | 376.23 | 372.72 | | 54.01 | 376.23 | 0 | |
| 87 | 375.91 | 0 | | 237 | 374.69 | 0 | | 287 | 374.28 | 0 | |
| 337 | 374.19 | 0 | | 387 | 374.09 | 0 | | 461 | 373.74 | 0 | |
| 638 | 373.94 | 0 | | | | | | | | | |

Upstream Bridge Cross Section Data

| Station Elevation Data num= 39 | | | | | | | | | |
|--------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
| -1090 | 378.94 | -702 | 374.56 | -500 | 373.16 | -415 | 373.62 | -365 | 373.82 |
| -236 | 373.26 | -57 | 374.86 | -55.56 | 372.79 | -55.56 | 369.77 | -47.28 | 369.77 |
| -34.46 | 363.58 | -27.21 | 363.58 | -20 | 361.76 | -16 | 360.06 | 0 | 358.76 |
| 15 | 360.06 | 26.07 | 363.71 | 33.32 | 363.71 | 45.73 | 369.71 | 54.01 | 369.71 |
| 55 | 374.66 | 237 | 373.86 | 287 | 373.76 | 337 | 374.31 | 387 | 374.21 |
| 461 | 373.86 | 638 | 374.06 | 905 | 373.44 | 1205 | 371.44 | 1305 | 372.44 |
| 1455 | 373.14 | 1512 | 373.14 | 1608 | 372.04 | 1720 | 372.14 | 1995 | 373.64 |
| 2039 | 373.74 | 2190 | 372.34 | 2269 | 372.44 | 2685 | 378.44 | | |

Manning's n Values

| num= 3 | | | | | |
|--------|-------|-----|-------|-----|-------|
| Sta | n Val | Sta | n Val | Sta | n Val |
| -1090 | .07 | -57 | .035 | 55 | .07 |

Bank Sta: Left Right Coeff Contr. Expan.

| | | | |
|-----|----|----|----|
| -57 | 55 | .3 | .5 |
|-----|----|----|----|

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Permanent |
|-------|--------|--------|-----------|
| -1090 | -65.44 | 373.29 | F |
| 59.1 | 2685 | 371.33 | F |

Downstream Deck/Roadway Coordinates

| num= 19 | | | | | | | | | | | |
|---------|---------|---------|--|--------|---------|---------|--|--------|---------|---------|--|
| Sta | Hi Cord | Lo Cord | | Sta | Hi Cord | Lo Cord | | Sta | Hi Cord | Lo Cord | |
| -702 | 374.44 | 0 | | -500 | 373.04 | 0 | | -415 | 373.5 | 0 | |
| -365 | 373.7 | 0 | | -313 | 373.9 | 0 | | -263 | 374.37 | 0 | |
| -113 | 375.78 | 0 | | -55.56 | 376.16 | 0 | | -55.56 | 376.16 | 372.65 | |
| -13 | 376.24 | 372.73 | | 54.01 | 376.23 | 372.72 | | 54.01 | 376.23 | 0 | |
| 87 | 375.91 | 0 | | 237 | 374.69 | 0 | | 287 | 374.28 | 0 | |
| 337 | 374.19 | 0 | | 387 | 374.09 | 0 | | 461 | 373.74 | 0 | |
| 638 | 373.94 | 0 | | | | | | | | | |

Downstream Bridge Cross Section Data

| Station Elevation Data num= 39 | | | | | | | | | |
|--------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
| -1090 | 378.86 | -702 | 374.48 | -500 | 373.08 | -415 | 373.54 | -365 | 373.74 |
| -236 | 373.18 | -57 | 374.78 | -55.56 | 372.71 | -55.56 | 369.69 | -47.28 | 369.69 |
| -34.46 | 363.5 | -27.21 | 363.5 | -20 | 361.68 | -16 | 359.98 | 0 | 358.68 |
| 15 | 359.98 | 26.07 | 363.63 | 33.32 | 363.63 | 45.73 | 369.63 | 54.01 | 369.63 |
| 55 | 374.58 | 237 | 373.78 | 287 | 373.68 | 337 | 374.23 | 387 | 374.13 |
| 461 | 373.78 | 638 | 373.98 | 905 | 373.36 | 1205 | 371.36 | 1305 | 372.36 |
| 1455 | 373.06 | 1512 | 373.06 | 1608 | 371.96 | 1720 | 372.06 | 1995 | 373.56 |
| 2039 | 373.66 | 2190 | 372.26 | 2269 | 372.36 | 2685 | 378.36 | | |

Manning's n Values

| num= 3 | | | | | |
|--------|-------|-----|-------|-----|-------|
| Sta | n Val | Sta | n Val | Sta | n Val |
| -1090 | .07 | -57 | .035 | 55 | .07 |

Bank Sta: Left Right Coeff Contr. Expan.

| | | | |
|-----|----|----|----|
| -57 | 55 | .3 | .5 |
|-----|----|----|----|

Ineffective Flow num= 2

| Sta L | Sta R | Elev | Permanent |
|-------|-------|--------|-----------|
| -1090 | -59.7 | 372.94 | F |
| 60.85 | 2685 | 371.16 | F |

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =

Weir crest shape = Broad Crested Peavine.rep

Number of Piers = 2

Pier Data
 Pier Station Upstream= -20 Downstream= -20
 Upstream num= 2
 width Elev width Elev
 3 355 3 374
 Downstream num= 2
 width Elev width Elev
 3 355 3 374

Pier Data
 Pier Station Upstream= 18.67 Downstream= 18.67
 Upstream num= 2
 width Elev width Elev
 3 355 3 374
 Downstream num= 2
 width Elev width Elev
 3 355 3 374

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Pressure and weir flow

Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord =

Additional Bridge Parameters

Add Friction component to Momentum
 Do not add weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Porters Creek

REACH: 1 RS: 294

INPUT

Description: Proposed Outlet

| Station Elevation Data | | num= 39 | | Sta Elev | | Sta Elev | | Sta Elev | | Sta Elev | |
|------------------------|--------|---------|--------|----------|--------|----------|--------|----------|--------|----------|------|
| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
| -1090 | 378.86 | -702 | 374.48 | -500 | 373.08 | -415 | 373.54 | -365 | 373.74 | | |
| -236 | 373.18 | -57 | 374.78 | -55.56 | 372.71 | -55.56 | 369.69 | -47.28 | 369.69 | | |
| -34.46 | 363.5 | -27.21 | 363.5 | -20 | 361.68 | -16 | 359.98 | 0 | 358.68 | | |
| 15 | 359.98 | 26.07 | 363.63 | 33.32 | 363.63 | 45.73 | 369.63 | 54.01 | 369.63 | | |
| 55 | 374.58 | 237 | 373.78 | 287 | 373.68 | 337 | 374.23 | 387 | 374.13 | | |
| 461 | 373.78 | 638 | 373.98 | 905 | 373.36 | 1205 | 371.36 | 1305 | 372.36 | | |
| 1455 | 373.06 | 1512 | 373.06 | 1608 | 371.96 | 1720 | 372.06 | 1995 | 373.56 | | |
| 2039 | 373.66 | 2190 | 372.26 | 2269 | 372.36 | 2685 | 378.36 | | | | |

Manning's n Values

| Sta | n Val | Sta | n Val | Sta | n Val |
|-------|-------|-----|-------|-----|-------|
| -1090 | .07 | -57 | .035 | 55 | .07 |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff | Contr. | Expan. |
|------------------|-------|--------|-----------|--------------|-------|-------|--------|--------|
| | -57 | 55 | | 49 | 49 | | .3 | .5 |
| Ineffective Flow | | | num= | 2 | | | | |
| Sta L | Sta R | Elev | Permanent | | | | | |
| -1090 | -59.7 | 372.94 | F | | | | | |
| 60.85 | 2685 | 371.16 | F | | | | | |

CROSS SECTION

RIVER: Porters Creek

REACH: 1 RS: 0

INPUT

Description: Downstream Cross Section

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| Station Elevation Data | | num= 46 | | Sta | | Elev | | Sta | | Elev | |
|------------------------|--------|---------|--------|------|--------|------|--------|------|--------|------|------|
| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
| -1112 | 379.14 | -982 | 375.44 | -870 | 374.74 | -841 | 375.64 | -831 | 371.64 | | |
| -822 | 375.64 | -722 | 372.64 | -502 | 369.84 | -454 | 369.64 | -340 | 369.54 | | |
| -290 | 368.64 | -257 | 368.84 | -155 | 368.64 | -52 | 372.34 | -47 | 372.34 | | |
| -21 | 358.64 | 0 | 357.64 | 20 | 358.64 | 51 | 372.94 | 55 | 372.64 | | |
| 62 | 372.64 | 105 | 369.64 | 164 | 368.44 | 223 | 367.84 | 396 | 368.64 | | |
| 564 | 367.14 | 618 | 367.44 | 672 | 366.84 | 729 | 367.64 | 835 | 367.84 | | |
| 890 | 367.14 | 1060 | 368.44 | 1167 | 367.44 | 1203 | 366.34 | 1306 | 367.84 | | |
| 1829 | 366.14 | 1840 | 367.64 | 1860 | 367.64 | 1875 | 366.14 | 1970 | 365.84 | | |
| 2032 | 369.14 | 2190 | 370.84 | 2248 | 372.74 | 2300 | 373.64 | 2364 | 377.84 | | |
| 2405 | 383.14 | | | | | | | | | | |

| Manning's n values | | num= 3 | | Sta | | n Val | |
|--------------------|-------|--------|-------|-----|-------|-------|-------|
| Sta | n Val | Sta | n Val | Sta | n Val | Sta | n Val |
| -1112 | .07 | -21 | .035 | 20 | .07 | | |

| Bank Sta: | Left | Right | Lengths: | Left Channel | Right | Coeff Contr. | Expan. |
|-----------|------|-------|----------|--------------|-------|--------------|--------|
| | -21 | 20 | | 0 | 0 | .1 | .3 |

SUMMARY OF MANNING'S N VALUES

River: Porters Creek

| Reach | River Sta. | n1 | n2 | n3 |
|-------|------------|--------|------|-----|
| 1 | 642 | .07 | .035 | .07 |
| 1 | 328 | .07 | .035 | .07 |
| 1 | 327 | Bridge | | |
| 1 | 294 | .07 | .035 | .07 |
| 1 | 0 | .07 | .035 | .07 |

SUMMARY OF REACH LENGTHS

River: Porters Creek

| Reach | River Sta. | Left | Channel | Right |
|-------|------------|--------|---------|-------|
| 1 | 642 | 44.86 | 44.86 | 44.86 |
| 1 | 328 | 34 | 34 | 34 |
| 1 | 327 | Bridge | | |
| 1 | 294 | 49 | 49 | 49 |
| 1 | 0 | 0 | 0 | 0 |

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Porters Creek

| Reach | River Sta. | Contr. | Expan. |
|-------|------------|--------|--------|
| 1 | 642 | .1 | .3 |
| 1 | 328 | .3 | .5 |
| 1 | 327 | Bridge | |
| 1 | 294 | .3 | .5 |
| 1 | 0 | .1 | .3 |

PeaVine.rep

HEC-RAS Version 3.1.1 May 2003
 U.S. Army Corp of Engineers
 Hydrologic Engineering Center
 609 Second Street, Suite D
 Davis, California 95616-4687
 (916) 756-1104

```

X   X XXXXXX   XXXX   XXXX   XX   XXXX
X   X X        X   X   X   X X   X
X   X X        X   X   X   X X   X
XXXXXXXX XXXX   X   XXX XXXX   XXXXXX XXXX
X   X X        X   X   X   X X   X
X   X X        X   X   X   X X   X
X   X XXXXXX   XXXX   X   X   X   X   X
    
```

PROJECT DATA
 Project Title: Pea Vine over Porters
 Project File : PeaVine.prj
 Run Date and Time: 11/7/2006 11:00:46 AM
 Project in English units

PLAN DATA
 Plan Title: Ex3
 Plan File : C:\HEC\RAS\PeaVine Rd over Porters Creek\PeaVine.p07
 Geometry Title: Existing3
 Geometry File : C:\HEC\RAS\PeaVine Rd over Porters Creek\PeaVine.g07
 Flow Title : Porters Creek
 Flow File : C:\HEC\RAS\PeaVine Rd over Porters Creek\PeaVine.f01

Plan Summary Information:
 Number of: Cross Sections = 17 Multiple Openings = 0
 Culverts = 0 Inline Structures = 0
 Bridges = 1 Lateral Structures = 0

Computational Information
 water surface calculation tolerance = 0.01
 Critical depth calculaton tolerance = 0.01
 Maximum number of interations = 20
 Maximum difference tolerance = 0.3
 Flow tolerance factor = 0.001

Computation Options
 Critical depth computed at all cross sections
 Conveyance Calculation Method: At breaks in n values only
 Friction Slope Method: Average Conveyance
 Computational Flow Regime: Mixed Flow

FLOW DATA
 Flow Title: Porters Creek
 Flow File : C:\HEC\RAS\PeaVine Rd over Porters Creek\PeaVine.f01

Flow Data (cfs)

| River | Reach | RS | 2 YR | 10 YR | 50 YR | 100 |
|---------------|-------|-----|------|-------|-------|-----|
| Porters Creek | 1 | 642 | 3700 | 7230 | | |
| 12200 | 16100 | | | | | |

Boundary Conditions
 River Reach Profile Upstream



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| | | | | | | |
|---------------|---|--------|--------|-------------|--------|-------------|
| Porters Creek | 1 | 2 YR | Normal | S = 0.00167 | Normal | S = 0.00167 |
| Porters Creek | 1 | 10 YR | Normal | S = 0.00167 | Normal | S = 0.00167 |
| Porters Creek | 1 | 50 YR | Normal | S = 0.00167 | Normal | S = 0.00167 |
| Porters Creek | 1 | 100 YR | Normal | S = 0.00167 | Normal | S = 0.00167 |
| Porters Creek | 1 | 500 YR | Normal | S = 0.00167 | Normal | S = 0.00167 |

GEOMETRY DATA

Geometry Title: Existing3
 Geometry File : C:\HEC\RAS\PeaVine Rd over Porters Creek\PeaVine.g07

CROSS SECTION

RIVER: Porters Creek
 REACH: 1 RS: 642

INPUT

Description: Upstream Cross Section

| | | | | | | | |
|------------------------|--------|---------|--------|------|--------|------|--------|
| Station Elevation Data | | num= 50 | | | | | |
| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
| -1270 | 378.94 | -751 | 373.04 | -442 | 370.74 | -386 | 370.64 |
| -331 | 369.84 | -283 | 369.34 | -172 | 369.24 | -120 | 370.94 |
| -55 | 373.04 | -31 | 360.12 | -29 | 359.04 | 0 | 359.04 |
| 31.5 | 360.13 | 47 | 371.44 | 72 | 373.34 | 80 | 370.94 |
| 145 | 370.64 | 201 | 369.94 | 262 | 369.94 | 321 | 370.74 |
| 492 | 369.84 | 551 | 370.04 | 580 | 369.14 | 605 | 369.94 |
| 832 | 365.14 | 849 | 367.94 | 868 | 367.74 | 907 | 364.94 |
| 1168 | 367.64 | 1205 | 371.74 | 1237 | 372.74 | 1281 | 373.14 |
| 1379 | 368.94 | 1422 | 366.94 | 1455 | 366.94 | 1662 | 368.24 |
| 2167 | 367.94 | 2212 | 368.94 | 2336 | 370.04 | 2448 | 373.34 |
| | | | | | | 2505 | 378.64 |

| | | | | | |
|--------------------|-------|--------|-------|------|-------|
| Manning's n Values | | num= 3 | | | |
| Sta | n Val | Sta | n Val | Sta | n Val |
| -1270 | .07 | -31 | .035 | 31.5 | .07 |

| | | | | | | | | | |
|-----------|------|-------|----------|-------|---------|-------|-------|--------|--------|
| Bank Sta: | Left | Right | Lengths: | Left | Channel | Right | Coeff | Contr. | Expan. |
| | -31 | 31.5 | | 44.86 | 44.86 | 44.86 | | .1 | .3 |

CROSS SECTION

RIVER: Porters Creek
 REACH: 1 RS: 328

INPUT

Description: Proposed Inlet

| | | | | | | | |
|------------------------|--------|---------|--------|------|--------|------|--------|
| Station Elevation Data | | num= 30 | | | | | |
| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
| -1090 | 378.94 | -702 | 374.56 | -500 | 373.16 | -415 | 373.62 |
| -236 | 373.26 | -57 | 374.86 | -20 | 361.76 | -16 | 360.06 |
| 15 | 360.06 | 48 | 374.66 | 237 | 373.86 | 287 | 373.76 |
| 387 | 374.21 | 461 | 373.86 | 638 | 374.06 | 905 | 373.44 |
| 1305 | 372.44 | 1455 | 373.14 | 1512 | 373.14 | 1608 | 372.04 |
| 1995 | 373.64 | 2039 | 373.74 | 2190 | 372.34 | 2269 | 372.44 |
| | | | | | | 2685 | 378.44 |

| | | | | | |
|--------------------|-------|--------|-------|-----|-------|
| Manning's n Values | | num= 3 | | | |
| Sta | n Val | Sta | n Val | Sta | n Val |
| -1090 | .07 | -16 | .035 | 15 | .07 |

| | | | | | | | | | |
|-----------|------|-------|----------|------|---------|-------|-------|--------|--------|
| Bank Sta: | Left | Right | Lengths: | Left | Channel | Right | Coeff | Contr. | Expan. |
| | -16 | 15 | | 5 | 5 | 5 | | .1 | .3 |

CROSS SECTION

RIVER: Porters Creek
 REACH: 1 RS: 323

INPUT

Description: Existing Inlet

| | | | | | | | |
|------------------------|--------|---------|--------|------|--------|------|--------|
| Station Elevation Data | | num= 30 | | | | | |
| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
| -1090 | 378.94 | -702 | 374.55 | -500 | 373.15 | -415 | 373.61 |
| -236 | 373.25 | -57 | 374.85 | -20 | 361.75 | -16 | 360.05 |
| | | | | | | 0 | 358.75 |

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| | | | | | | | | | |
|------|--------|------|--------|------|--------|------|--------|------|--------|
| 15 | 360.05 | 48 | 374.65 | 237 | 373.85 | 287 | 373.75 | 337 | 374.3 |
| 387 | 374.2 | 461 | 373.85 | 638 | 374.05 | 905 | 373.44 | 1205 | 371.44 |
| 1305 | 372.44 | 1455 | 373.14 | 1512 | 373.14 | 1608 | 372.04 | 1720 | 372.14 |
| 1995 | 373.64 | 2039 | 373.74 | 2190 | 372.34 | 2269 | 372.44 | 2685 | 378.44 |

Manning's n Values

| | | | | | |
|-------|-------|-----|-------|-----|-------|
| num= | 3 | | | | |
| Sta | n Val | Sta | n Val | Sta | n Val |
| -1090 | .07 | -16 | .035 | 15 | .07 |

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

| | | | | | | |
|-----|----|----|----|----|----|----|
| -16 | 15 | 24 | 24 | 24 | .3 | .5 |
|-----|----|----|----|----|----|----|

Ineffective Flow num= 2

| | | | |
|-------|--------|--------|-----------|
| Sta L | Sta R | Elev | Permanent |
| -1090 | -53.96 | 373.12 | F |
| 43.63 | 2685 | 372.16 | F |

BRIDGE

RIVER: Porters Creek
 REACH: 1 RS: 322

INPUT

Description: Existing Bridge
 Distance from Upstream XS = 1
 Deck/Roadway width = 22
 weir Coefficient = 2.6

Upstream Deck/Roadway Coordinates

| | | | | | | | | |
|------|---------|---------|-----|---------|---------|-----|---------|---------|
| num= | 4 | | | | | | | |
| Sta | Hi Cord | Lo Cord | Sta | Hi Cord | Lo Cord | Sta | Hi Cord | Lo Cord |
| -57 | 374.85 | 0 | -57 | 374.85 | 371.66 | 48 | 374.65 | 371.46 |
| 48 | 374.65 | 0 | | | | | | |

Upstream Bridge Cross Section Data

| | | | | | | | | | |
|------------------------|--------|------|--------|------|--------|------|--------|------|--------|
| Station Elevation Data | num= | 30 | | | | | | | |
| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
| -1090 | 378.94 | -702 | 374.55 | -500 | 373.15 | -415 | 373.61 | -365 | 373.81 |
| -236 | 373.25 | -57 | 374.85 | -20 | 361.75 | -16 | 360.05 | 0 | 358.75 |
| 15 | 360.05 | 48 | 374.65 | 237 | 373.85 | 287 | 373.75 | 337 | 374.3 |
| 387 | 374.2 | 461 | 373.85 | 638 | 374.05 | 905 | 373.44 | 1205 | 371.44 |
| 1305 | 372.44 | 1455 | 373.14 | 1512 | 373.14 | 1608 | 372.04 | 1720 | 372.14 |
| 1995 | 373.64 | 2039 | 373.74 | 2190 | 372.34 | 2269 | 372.44 | 2685 | 378.44 |

Manning's n Values

| | | | | | |
|-------|-------|-----|-------|-----|-------|
| num= | 3 | | | | |
| Sta | n Val | Sta | n Val | Sta | n Val |
| -1090 | .07 | -16 | .035 | 15 | .07 |

Bank Sta: Left Right Coeff Contr. Expan.

| | | | |
|-----|----|----|----|
| -16 | 15 | .3 | .5 |
|-----|----|----|----|

Ineffective Flow num= 2

| | | | |
|-------|--------|--------|-----------|
| Sta L | Sta R | Elev | Permanent |
| -1090 | -53.96 | 373.12 | F |
| 43.63 | 2685 | 372.16 | F |

Downstream Deck/Roadway Coordinates

| | | | | | | | | |
|------|---------|---------|-----|---------|---------|-----|---------|---------|
| num= | 4 | | | | | | | |
| Sta | Hi Cord | Lo Cord | Sta | Hi Cord | Lo Cord | Sta | Hi Cord | Lo Cord |
| -57 | 374.8 | 0 | -57 | 374.8 | 371.66 | 48 | 374.6 | 371.46 |
| 48 | 374.6 | 0 | | | | | | |

Downstream Bridge Cross Section Data

| | | | | | | | | | |
|------------------------|--------|------|--------|------|--------|------|--------|------|--------|
| Station Elevation Data | num= | 30 | | | | | | | |
| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
| -1090 | 378.94 | -702 | 374.5 | -500 | 373.1 | -415 | 373.56 | -365 | 373.76 |
| -236 | 373.2 | -57 | 374.8 | -20 | 361.7 | -16 | 360 | 0 | 358.7 |
| 15 | 360 | 48 | 374.6 | 237 | 373.8 | 287 | 373.7 | 337 | 374.25 |
| 387 | 374.15 | 461 | 373.8 | 638 | 374 | 905 | 373.44 | 1205 | 371.44 |
| 1305 | 372.44 | 1455 | 373.14 | 1512 | 373.14 | 1608 | 372.04 | 1720 | 372.14 |
| 1995 | 373.64 | 2039 | 373.74 | 2190 | 372.34 | 2269 | 372.44 | 2685 | 378.44 |

Manning's n Values

| | | | | | |
|-------|-------|-----|-------|-----|-------|
| num= | 3 | | | | |
| Sta | n Val | Sta | n Val | Sta | n Val |
| -1090 | .07 | -16 | .035 | 15 | .07 |

Bank Sta: Left Right Coeff Contr. Expan.

| | | | |
|-----|----|----|----|
| -16 | 15 | .3 | .5 |
|-----|----|----|----|

Ineffective Flow num= 2

| | | | |
|-------|--------|--------|-----------|
| Sta L | Sta R | Elev | Permanent |
| -1090 | -53.96 | 373.12 | F |

43.63 2685 372.01 F

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Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 weir crest shape = Broad Crested

Number of Piers = 4

Pier Data
 Pier Station Upstream= -37 Downstream= -37
 Upstream num= 2
 width Elev width Elev
 1.2 0 1.2 374
 Downstream num= 2
 width Elev width Elev
 1.2 0 1.2 374

Pier Data
 Pier Station Upstream= -18.8 Downstream= -18.8
 Upstream num= 2
 width Elev width Elev
 1.2 0 1.2 374
 Downstream num= 2
 width Elev width Elev
 1.2 0 1.2 374

Pier Data
 Pier Station Upstream= 9.7 Downstream= 9.7
 Upstream num= 2
 width Elev width Elev
 1.2 0 1.2 374
 Downstream num= 2
 width Elev width Elev
 1.2 0 1.2 374

Pier Data
 Pier Station Upstream= 29.7 Downstream= 29.7
 Upstream num= 2
 width Elev width Elev
 1.2 0 1.2 374
 Downstream num= 2
 width Elev width Elev
 1.2 0 1.2 374

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data

Energy

Selected Low Flow Methods = Highest Energy Answer

High Flow Method

Pressure and weir flow
 Submerged Inlet Cd =
 Submerged Inlet + Outlet Cd = .8
 Max Low Cord =

Additional Bridge Parameters

Add Friction component to Momentum
 Do not add weight component to Momentum
 Class B flow critical depth computations use critical depth
 inside the bridge at the upstream end
 Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Porters Creek

REACH: 1

RS: 299

INPUT

Description: Existing Outlet

| Station Elevation Data | | num= 30 | | | | | | | |
|------------------------|--------|---------|-------|------|-------|------|--------|------|--------|
| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
| -1090 | 378.94 | -702 | 374.5 | -500 | 373.1 | -415 | 373.56 | -365 | 373.76 |
| -236 | 373.2 | -57 | 374.8 | -20 | 361.7 | -16 | 360 | 0 | 358.7 |

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|------|--------|------|--------|------|--------|------|--------|------|--------|
| 15 | 360 | 48 | 374.6 | 237 | 373.8 | 287 | 373.7 | 337 | 374.25 |
| 387 | 374.15 | 461 | 373.8 | 638 | 374 | 905 | 373.44 | 1205 | 371.44 |
| 1305 | 372.44 | 1455 | 373.14 | 1512 | 373.14 | 1608 | 372.04 | 1720 | 372.14 |
| 1995 | 373.64 | 2039 | 373.74 | 2190 | 372.34 | 2269 | 372.44 | 2685 | 378.44 |

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Manning's n values
 Sta n Val Sta n Val Sta n Val
 -1090 .07 -16 .035 15 .07

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -16 15 5 5 5 .3 .5
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 -1090 -53.96 373.23 F
 43.63 2685 372.01 F

CROSS SECTION

RIVER: Porters Creek
 REACH: 1 RS: 294

INPUT

Description: Proposed Outlet

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|-------|--------|------|--------|------|--------|------|--------|------|--------|
| -1090 | 378.94 | -702 | 374.48 | -500 | 373.08 | -415 | 373.54 | -365 | 373.74 |
| -236 | 373.18 | -57 | 374.78 | -20 | 361.68 | -16 | 359.98 | 0 | 358.68 |
| 15 | 359.98 | 48 | 374.58 | 237 | 373.78 | 287 | 373.68 | 337 | 374.23 |
| 387 | 374.13 | 461 | 373.78 | 638 | 373.98 | 905 | 373.44 | 1205 | 371.44 |
| 1305 | 372.44 | 1455 | 373.14 | 1512 | 373.14 | 1608 | 372.04 | 1720 | 372.14 |
| 1995 | 373.64 | 2039 | 373.74 | 2190 | 372.34 | 2269 | 372.44 | 2685 | 378.44 |

Manning's n values
 Sta n Val Sta n Val Sta n Val
 -1090 .07 -16 .035 15 .07

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -16 15 49 49 49 .1 .3

CROSS SECTION

RIVER: Porters Creek
 REACH: 1 RS: 0

INPUT

Description: Downstream Cross Section

| Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev | Sta | Elev |
|-------|--------|------|--------|------|--------|------|--------|------|--------|
| -1112 | 379.14 | -982 | 375.44 | -870 | 374.74 | -841 | 375.64 | -831 | 371.64 |
| -822 | 375.64 | -722 | 372.64 | -502 | 369.84 | -454 | 369.64 | -340 | 369.54 |
| -290 | 368.64 | -257 | 368.84 | -155 | 368.64 | -52 | 372.34 | -47 | 372.34 |
| -21 | 358.64 | 0 | 357.64 | 20 | 358.64 | 51 | 372.94 | 55 | 372.64 |
| 62 | 372.64 | 105 | 369.64 | 164 | 368.44 | 223 | 367.84 | 396 | 368.64 |
| 564 | 367.14 | 618 | 367.44 | 672 | 366.84 | 729 | 367.64 | 835 | 367.84 |
| 890 | 367.14 | 1060 | 368.44 | 1167 | 367.44 | 1203 | 366.34 | 1306 | 367.84 |
| 1829 | 366.14 | 1840 | 367.64 | 1860 | 367.64 | 1875 | 366.14 | 1970 | 365.84 |
| 2032 | 369.14 | 2190 | 370.84 | 2248 | 372.74 | 2300 | 373.64 | 2364 | 377.84 |
| 2405 | 383.14 | | | | | | | | |

Manning's n values
 Sta n Val Sta n Val Sta n Val
 -1112 .07 -21 .035 20 .07

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 -21 20 0 0 0 .1 .3

SUMMARY OF MANNING'S N VALUES

River: Porters Creek

| Reach | River Sta. | n1 | n2 | n3 |
|-------|------------|-----|------|-----|
| 1 | 642 | .07 | .035 | .07 |
| 1 | 328 | .07 | .035 | .07 |
| 1 | 323 | .07 | .035 | .07 |

| | | | | |
|---|-----|--------|-------------|-----|
| 1 | 322 | Bridge | PeaVine.rep | |
| 1 | 299 | | | |
| 1 | 294 | .07 | .035 | .07 |
| 1 | 0 | .07 | .035 | .07 |

SUMMARY OF REACH LENGTHS

River: Porters Creek

| Reach | River Sta. | Left | Channel | Right |
|-------|------------|--------|---------|-------|
| 1 | 642 | 44.86 | 44.86 | 44.86 |
| 1 | 328 | 5 | 5 | 5 |
| 1 | 323 | 24 | 24 | 24 |
| 1 | 322 | Bridge | | |
| 1 | 299 | 5 | 5 | 5 |
| 1 | 294 | 49 | 49 | 49 |
| 1 | 0 | 0 | 0 | 0 |

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Porters Creek

| Reach | River Sta. | Contr. | Expan. |
|-------|------------|--------|--------|
| 1 | 642 | .1 | .3 |
| 1 | 328 | .1 | .3 |
| 1 | 323 | .3 | .5 |
| 1 | 322 | Bridge | |
| 1 | 299 | .3 | .5 |
| 1 | 294 | .1 | .3 |
| 1 | 0 | .1 | .3 |

SAMPLE



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
DIVISION OF STRUCTURES
SUITE 1100, JAMES K. POLK BUILDING
NASHVILLE, TENNESSEE 37243-0339

GERALD F. NICELY
COMMISSIONER

PHIL BREDESEN
GOVERNOR

October 29, 2007

Mayor Rex A. Lynch
County Mayor
100 N. Main Street, Courthouse Rm 208
Clinton, TN 37716

Subject: PE # 73017-1216-14
Fed. Project # HPP-NHE-95(4)
State Route 95 over East Fork
Popular Creek
From Westover Dr.
To SR-62
Roane-Anderson County

Dear Mayor:

The subject project under design in our office will include the widening of the existing 78 ft, 90 ° skew, single span concrete deck girder bridge over East Fork Poplar Creek.

Our records show that Anderson County is participating in the National Flood Insurance Program in which this project is identified as a flood hazard area.

Please acknowledge receipt of this transmittal and advise if you have established local planning ordinances other than the standard regulations under the NFIP.

Please note that the proposed structure caused no adverse impact in bridge backwater over existing conditions and does not affect the regulatory floodway width. No revision in flood maps will be necessary. Enclosed is an Engineering "No-Rise" Certification form for your files. The supporting documentation for this project is available upon request.

Sincerely,

Gene Yao

(for)

Edward P. Wasserman
Engineering Director, Structures Division

Enclosure

JKZ:gjy

cc: Mr. Mohammad Waliullah
Federal Emergency Management Agency
3003 Chamblee-Tucker Rd. Atlanta, GA 30341-4148

SAMPLE



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
DIVISION OF STRUCTURES
SUITE 1100, JAMES K. POLK BUILDING
NASHVILLE, TENNESSEE 37243-0339

GERALD F. NICELY
COMMISSIONER

PHIL BREDESEN
GOVERNOR

Project No. 73017-1216-14

Anderson County, Tennessee

ENGINEERING "NO-RISE" CERTIFICATION

This is to certify that I am a duly qualified engineer licensed to practice in the State of Tennessee and authorized to act in behalf of the Department of Transportation, Division of Structures.

It is to further certify that the proposed plans and design data support the fact that the bridge widening project for State Route 95 Bridge and Approaches over East Fork Popular Creek will not adversely impact the 100 year flood elevations, floodway elevations and floodway widths on East Fork Popular Creek at R.M. 11.5 at published sections in the Flood Insurance Study for Anderson County, TN dated January 17, 2007 and will not create any increase to the 100-year elevations, floodway elevations and floodway widths at unpublished cross-sections in the vicinity of the proposed development.

| | | |
|--|-------------------------|--------------------------|
| <i>J. K. Zirkle</i> Jon K. Zirkle, P.E. Civil Engineering Manager, Structures Suite 1200 James K. Polk Building Nashville, Tennessee 37243-0339 | <i>10/12/07</i> Date | } Your Name + Address |
|--|-------------------------|--------------------------|