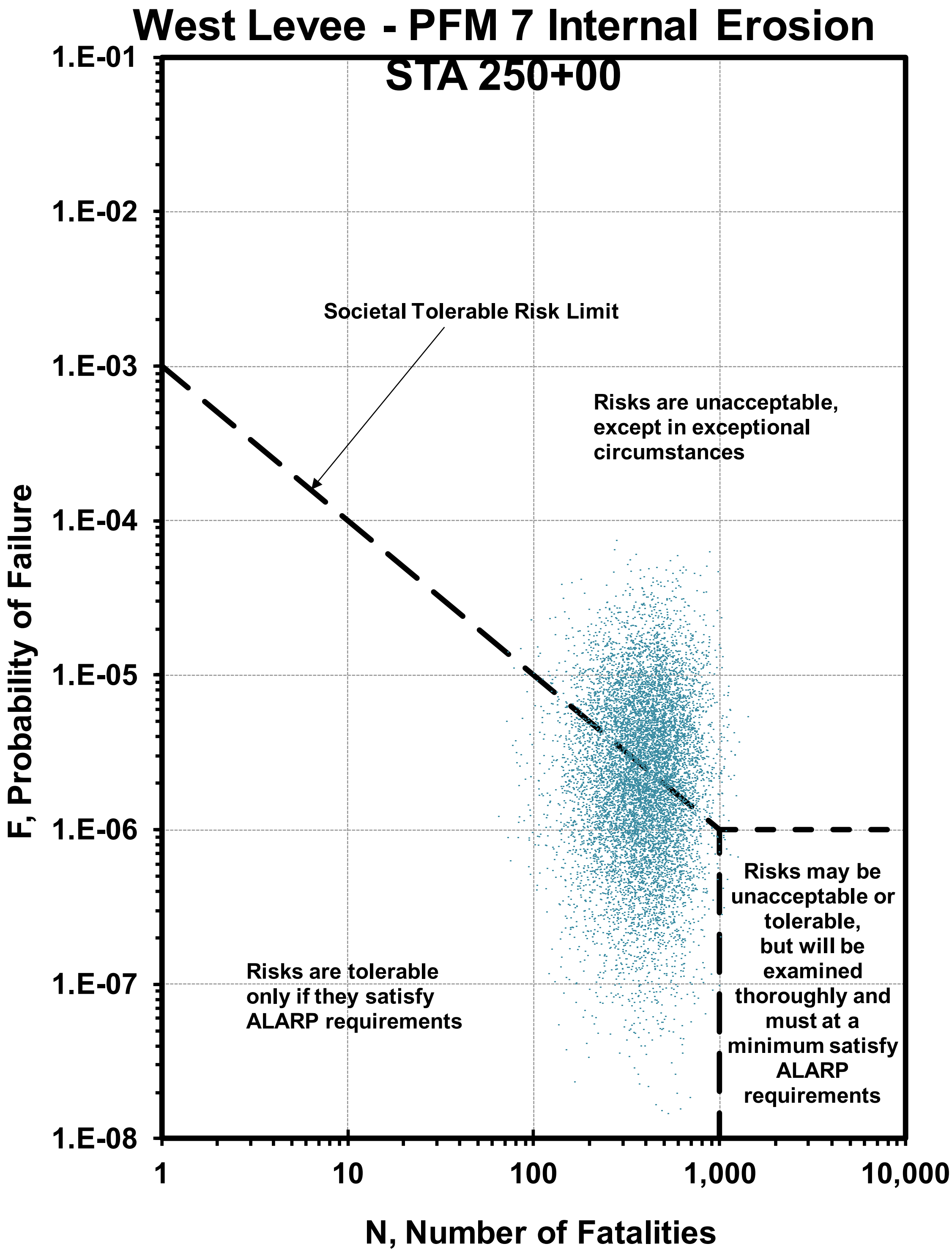
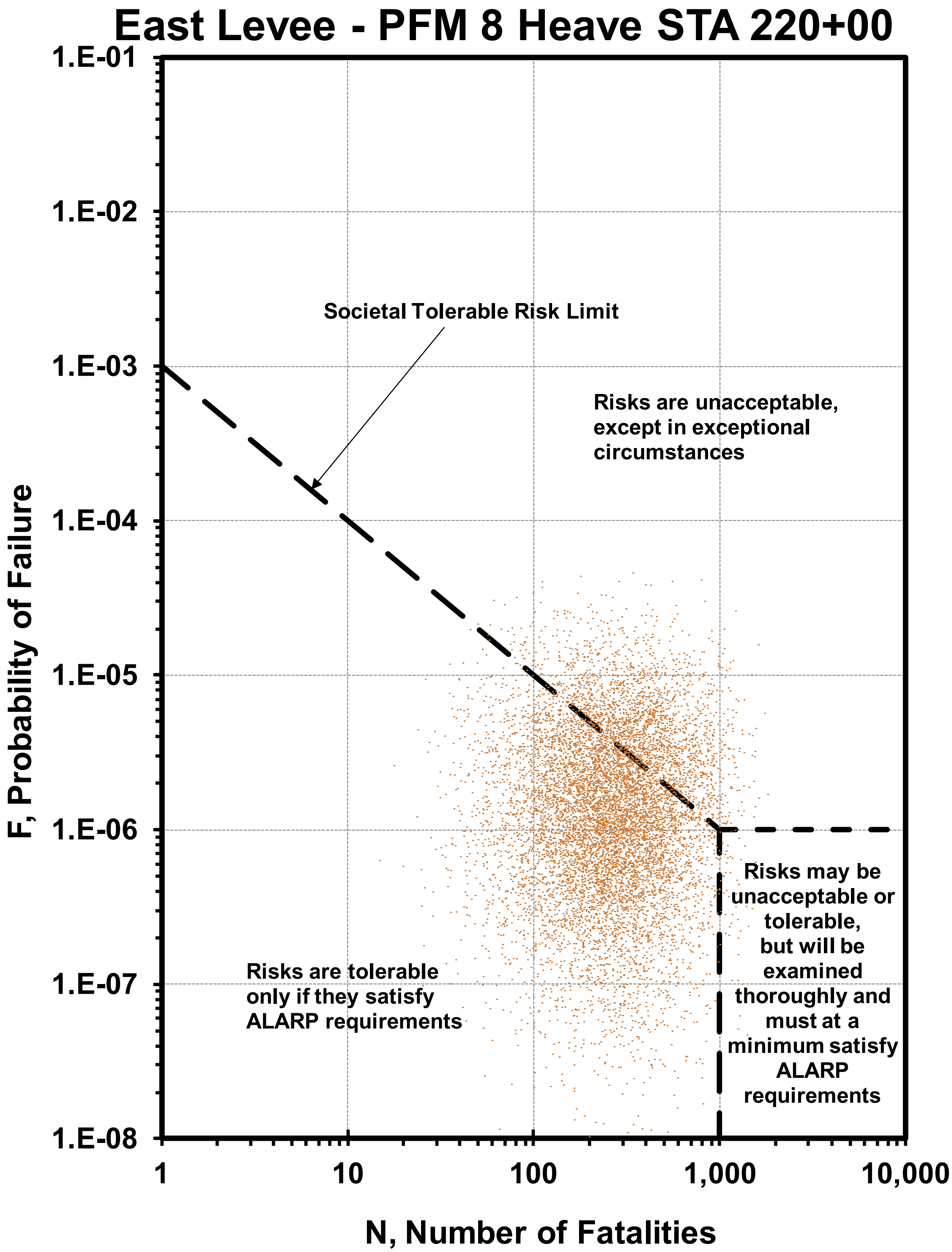
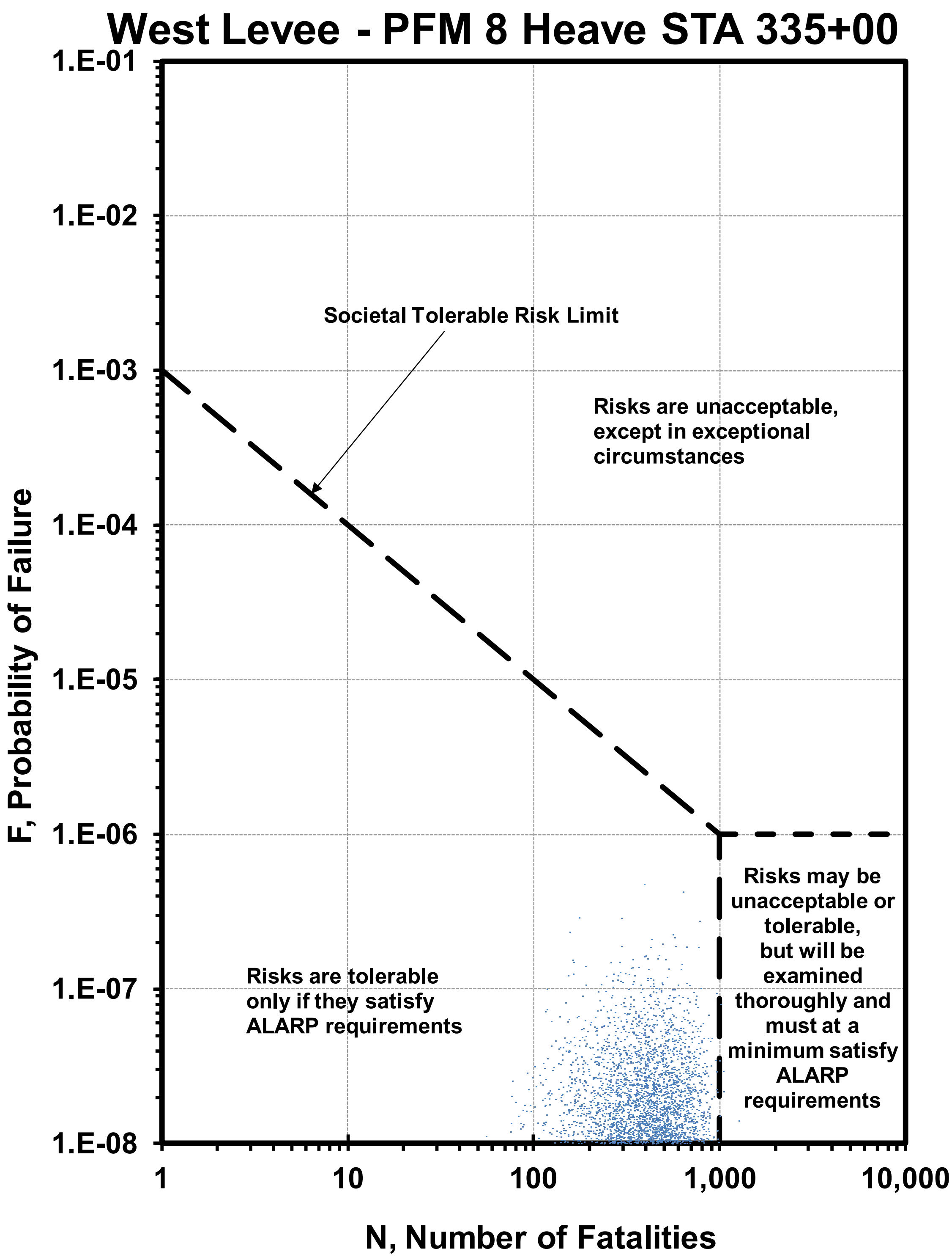

West Levee - PFM 7 Internal Erosion
STA 250+00
1.E-01
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
1.E-08
F, Probability of Failure
Societal Tolerable Risk Limit
Risks are unacceptable, except in exceptional circumstances
Risks may be unacceptable or tolerable, but will be examined thoroughly and must at a minimum satisfy ALARP requirements
Risks are tolerable only if they satisfy ALARP requirements
1
10
100
1,000
10,000
N, Number of Fatalities


East Levee - PFM 8 Heave STA 220+00
1.E-01
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
1.E-08
F, Probability of Failure
1
10
100
1,000
10,000
N, Number of Fatalities
Societal Tolerable Risk Limit
Risks are unacceptable, except in exceptional circumstances
Risks are tolerable only if they satisfy ALARP requirements
Risks may be unacceptable or tolerable, but will be examined thoroughly and must at a minimum satisfy ALARP requirements


West Levee - PFM 8 Heave STA 335+00
1.E-01
1.E-02
1.E-03
1.E-04
1.E-05
1.E-06
1.E-07
1.E-08
F, Probability of Failure
Societal Tolerable Risk Limit
Risks are unacceptable, except in exceptional circumstances
Risks may be unacceptable or tolerable, but will be examined thoroughly and must at a minimum satisfy ALARP requirements
Risks are tolerable only if they satisfy ALARP requirements
1
10
100
1,000
10,000
N, Number of Fatalities

Appendix G – Participants

Potential Failure Mode Assessment – November 2011

Name	Organization
Gregg Scott	RMC – Risk Cadre
Nate Snorteland	RMC – Risk Cadre
Corby Lewis	MVP – Risk Cadre
Jeff McClenathan	RMC – Risk Cadre
Randy Mead	SWT – Risk Cadre
Michael Navin	MVS – Risk Cadre
Jeff Schaefer	RMC – Risk Cadre
Jim Wright	RMC – Risk Cadre
Tu Nguyen	POA
Andy Hill	RMC
Maria Wegner-Johnson	HQUSACE
Monte Pearson	ERDC
Lucas Walshire	ERDC
Brendan Yuill	ERDC
Sarwenaj Ashraf	SWF
Al Branch	SWF
David Wilson	SWF
Craig Loftin	SWF
Barney Davis	RMC
Greg Ajemian	City of Dallas
Liz Fernandez	City of Dallas
Kelly High	City of Dallas
Dhruv Pandya	City of Dallas
Wael Alkasawneh	HNTB
Jorge Alba	HNTB
Brad Barth	HNTB
Scott Breen	HNTB
Darin Maciolek	HNTB

Risk Assessment – Week 1 – December 2011

Name	Organization
Gregg Scott	RMC – Risk Cadre
Nate Snorteland	RMC – Risk Cadre
Corby Lewis	MVP – Risk Cadre
Jeff McClenathan	RMC – Risk Cadre
Randy Mead	SWT – Risk Cadre
Michael Navin	MVS – Risk Cadre
Jeff Schaefer	RMC – Risk Cadre
Jim Wright	RMC – Risk Cadre

Name	Organization
Nick Lutz	LRL – Risk Cadre
Tu Nguyen	POA
Andy Hill	RMC
Maria Wegner-Johnson	HQUSACE
Monte Pearson	ERDC
Lucas Walshire	ERDC
Brendan Yuill	ERDC
Sarwenaj Ashraf	SWF
Craig Loftin	SWF
Larry Donovan	SWF
Jodie Foster	SWF
Julie Gibbs	SWF
Barney Davis	RMC
Greg Ajemian	City of Dallas
Liz Fernandez	City of Dallas
Kelly High	City of Dallas
Dhruv Pandya	City of Dallas
Dorcy Clark	City of Dallas
Wael Alkasawneh	HNTB
Jorge Alba	HNTB
Brad Barth	HNTB
Scott Breen	HNTB
Darin Maciolek	HNTB
Lesley Schwaye	HNTB

Risk Assessment – Week 2 – January 2012

Name	Organization
Gregg Scott	RMC – Risk Cadre
Nate Snorteland	RMC – Risk Cadre
Corby Lewis	MVP – Risk Cadre
Jeff McClenathan	RMC – Risk Cadre
Randy Mead	SWT – Risk Cadre
Michael Navin	MVS – Risk Cadre
Jeff Schaefer	RMC – Risk Cadre
Jim Wright	RMC – Risk Cadre
Nick Lutz	LRL – Risk Cadre
Tu Nguyen	POA
Andy Hill	RMC
Maria Wegner-Johnson	HQUSACE
Lucas Walshire	ERDC
Brendan Yuill	ERDC
Sarwenaj Ashraf	SWF
Les Perrin	SWF – 1 day
Craig McCluskey	SWF – 1 day
Ken Klaus	ERDC

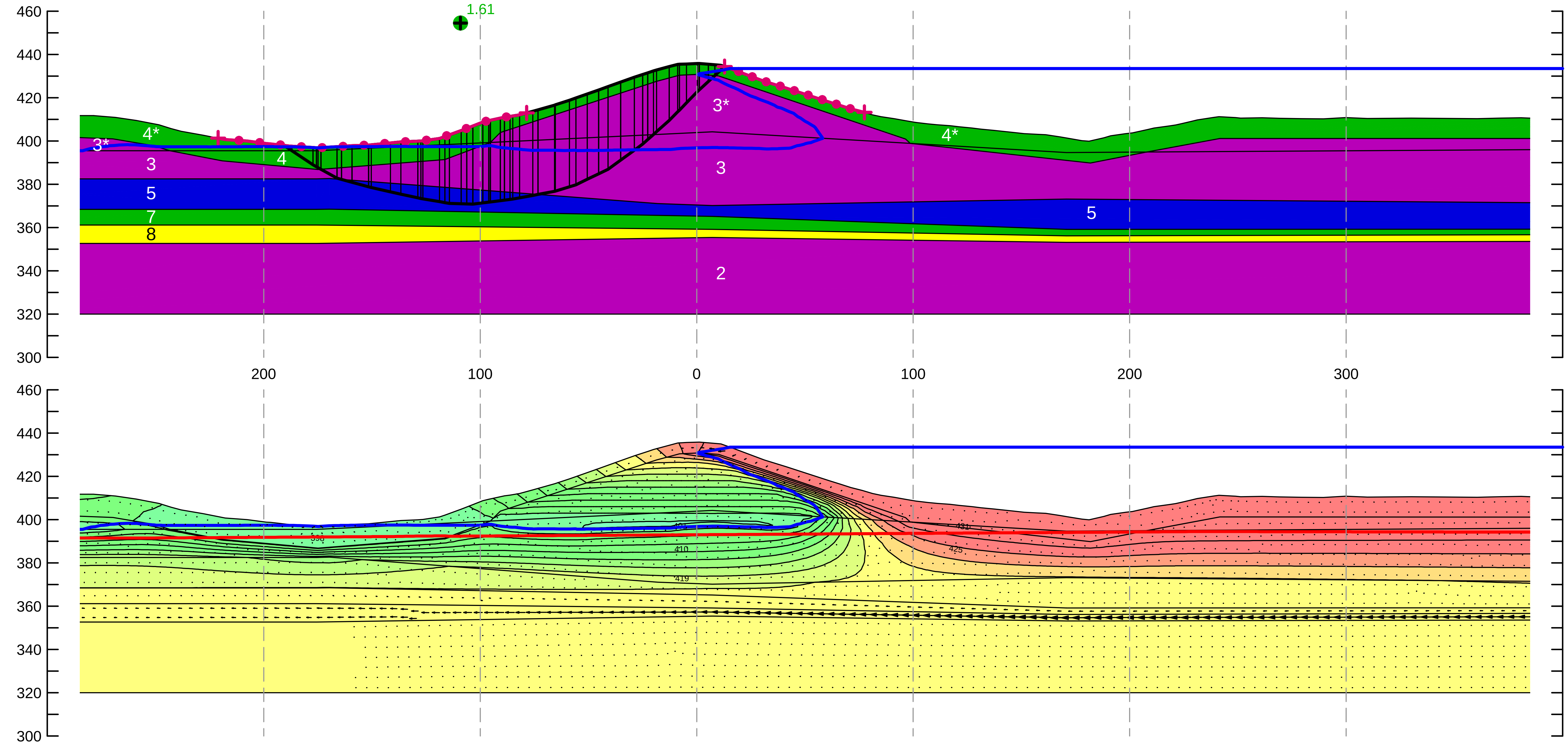
Name	Organization
Craig Loftin	SWF
Larry Donovan	SWF
Jodie Foster	SWF
Julie Gibbs	SWF
Barney Davis	RMC
Greg Ajemian	City of Dallas
Liz Fernandez	City of Dallas
Kelly High	City of Dallas
Dhruv Pandya	City of Dallas
Dorcy Clark	City of Dallas
Wael Alkasawneh	HNTB
Jorge Alba	HNTB
Brad Barth	HNTB
Scott Breen	HNTB
Darin Maciolek	HNTB
Lesley Schwaye	HNTB

Appendix H – References

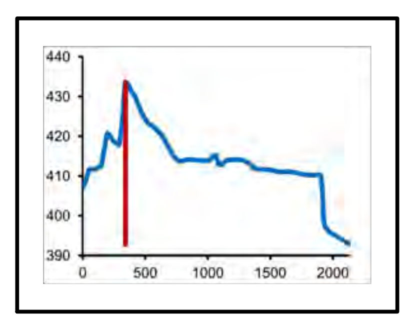
Below is a partial list of references used during the risk assessment. In totality, there were thousands of pages of documents that were reviewed, but because they were in draft or pre-draft stages, they are not listed here.

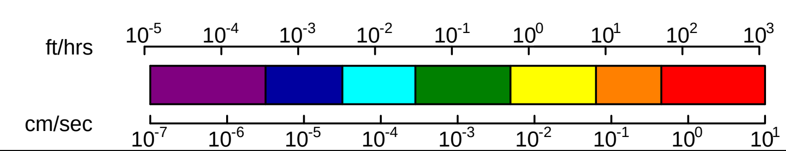
1. DRAFT Dallas Floodway System 100-Year Levee Remediation Section 408 Submittal Package Prepared By: HNTB Corporation Dallas, Texas August 16, 2010
2. ERDC/GSL TECHNICAL REPORT 11 - DRAFT PRELIMINARY GEOMORPHIC SITE INVESTIGATION OF THE TRINITY RIVER FLOODWAY DALLAS, TEXAS By Carla Roig-Silva, Ashley R. Manning, Benjamin D. Haugen, Richard S. Olsen, Joseph B. Dunbar, Danny W. Harrelson and Monte L. Pearson DEPARTMENT OF THE ARMY Engineer Research and Development Center Geotechnical and Structures Laboratory 3909 Halls Ferry Road Vicksburg, Mississippi 39180-0631
3. LEVEE REMEDIATION PLAN DRAFT Prepared By: HNTB Corporation Dallas, Texas Dallas Floodway System February 8, 2010
4. PRELIMINARY ANALYSIS AND DESIGN CHECK OF THE LEVEE SYSTEMS FOR THE 100-YEAR FLOOD EVENT AND CURRENT STANDARD PROJECT FLOOD (SPF) LEVEL REPORT December 07, 2009
5. Trinity River, Dallas, TX, Floodway System: Fully-Softened Shear Strength Testing Program Isaac J. Stephens, Richard S. Olsen, Ashley R. Manning Berg, Gustavo Galan-Comas, Monte L. Pearson, Landris T. Lee, and Levi R. Coffing, Jr. August 2011
6. Periodic Inspection Report, Dallas Floodway Project, Trinity River, Dallas, Dallas County, Texas, Report No. 9. December 2007.
7. Utility Adjustments and Relocations Design Report Prepared for City of Dallas Trinity Lakes Project September 2008.
8. Best Practices in Dam Safety Risk Analysis, Version 2.2, April 2011. U.S. Department of the Interior, Bureau of Reclamation and the U.S. Army Corps of Engineers.

Appendix I – Plates



#	Description	Strength Parameters		Hydraulic Conductivity			Color
		φ'	c' (psf)	cm/sec	ft/sec	ft/hrs	
1	Limestone	40	4500	3.05E-8	1.00E-9	3.60E-6	Violet
2	Shale	30	1500	3.05E-8	1.00E-9	3.60E-6	Violet
3	CH	See Figures 3 & 4		3.05E-6	1.00E-7	3.60E-4	Violet
4	CH FSS	See Figure 7		3.05E-4	1.00E-5	3.60E-2	Green
5	CL	See Figures 5 & 6		1.52E-5	5.00E-7	1.80E-3	Idigo
6	SC	30	0	3.05E-5	1.00E-6	3.60E-3	Idigo
7	SM	32	0	4.57E-3	1.50E-4	5.40E-1	Green
8	GC	35	0	3.05E-2	1.00E-3	3.60E+0	Yellow
9	SW-SC/SW-SM	30	0	3.05E-2	1.00E-3	3.60E+0	Yellow
10	SP	32	0	3.96E-2	1.30E-3	4.68E+0	Yellow
11	GP/GW	32	0	3.05E-1	1.00E-2	3.60E+1	Orange





May 1990 Hydrograph @ 0 hrs

May 1990 Hydrograph @ 342 hrs

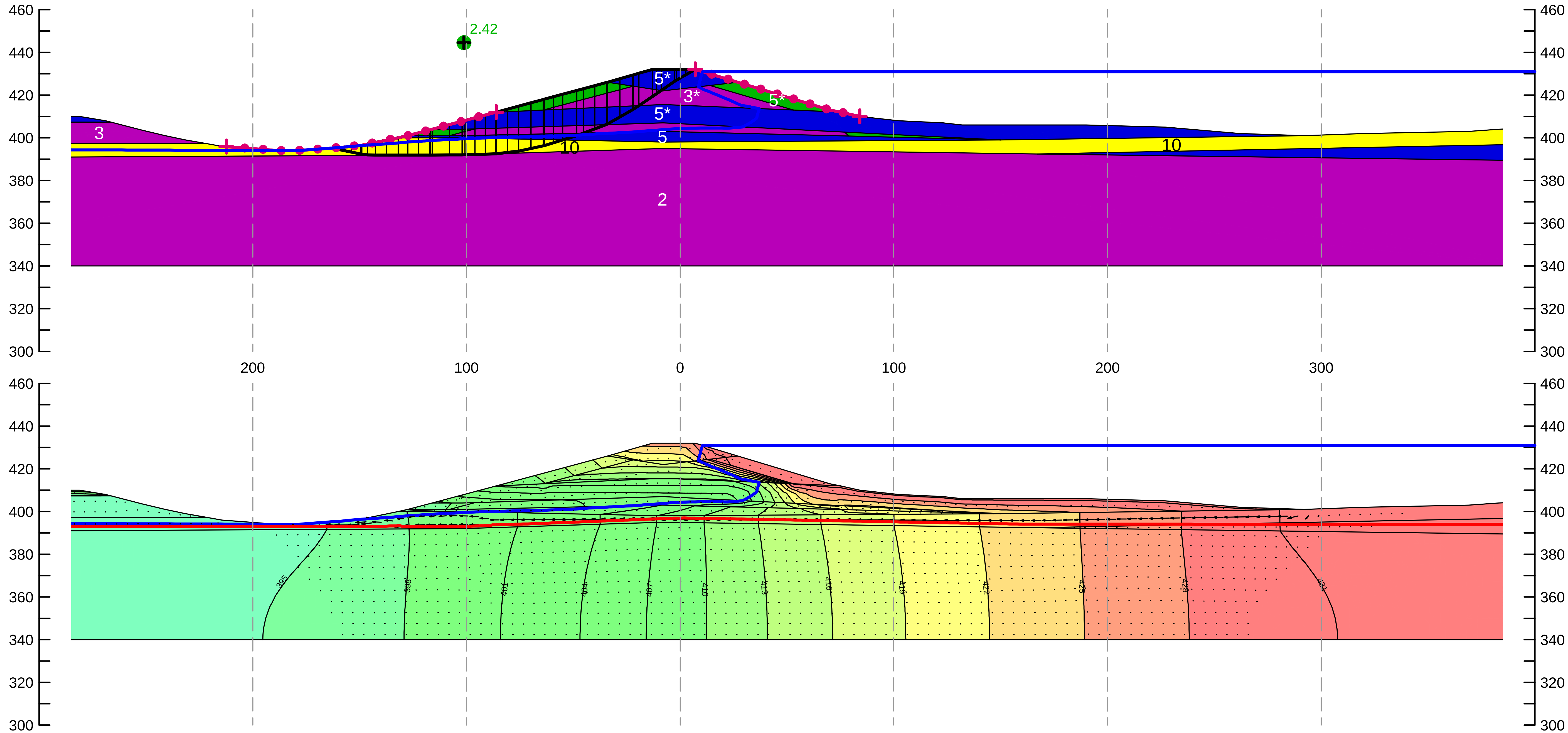
* Denotes FILL

WEST LEVEE STA 335+00

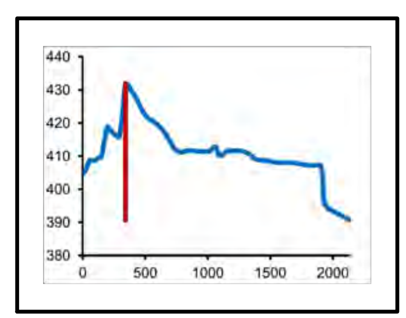
DALLAS FLOODWAY

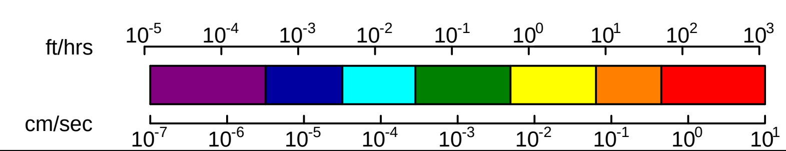
PLATE

8



#	Description	Strength Parameters φ'	c' (psf)	Hydraulic Conductivity cm/sec	ft/sec	ft/hrs	Color
1	Limestone	40	4500	3.05E-8	1.00E-9	3.60E-6	Violet
2	Shale	32	1000	3.05E-8	1.00E-9	3.60E-6	Violet
3	CH	See Figures 3 & 4		3.05E-6	1.00E-7	3.60E-4	Violet
4	CH FSS	See Figure 7		3.05E-4	1.00E-5	3.60E-2	Green
5	CL	See Figures 5 & 6		1.52E-5	5.00E-7	1.80E-3	Idigo
6	SC	30	0	3.05E-5	1.00E-6	3.60E-3	Idigo
7	SM	30	0	4.57E-3	1.50E-4	5.40E-1	Green
8	GC	35	0	3.05E-2	1.00E-3	3.60E+0	Yellow
9	SW-SC/SW-SM	30	0	3.05E-2	1.00E-3	3.60E+0	Yellow
10	SP	32	0	3.96E-2	1.30E-3	4.68E+0	Yellow
11	GP/GW	32	0	3.05E-1	1.00E-2	3.60E+1	Orange



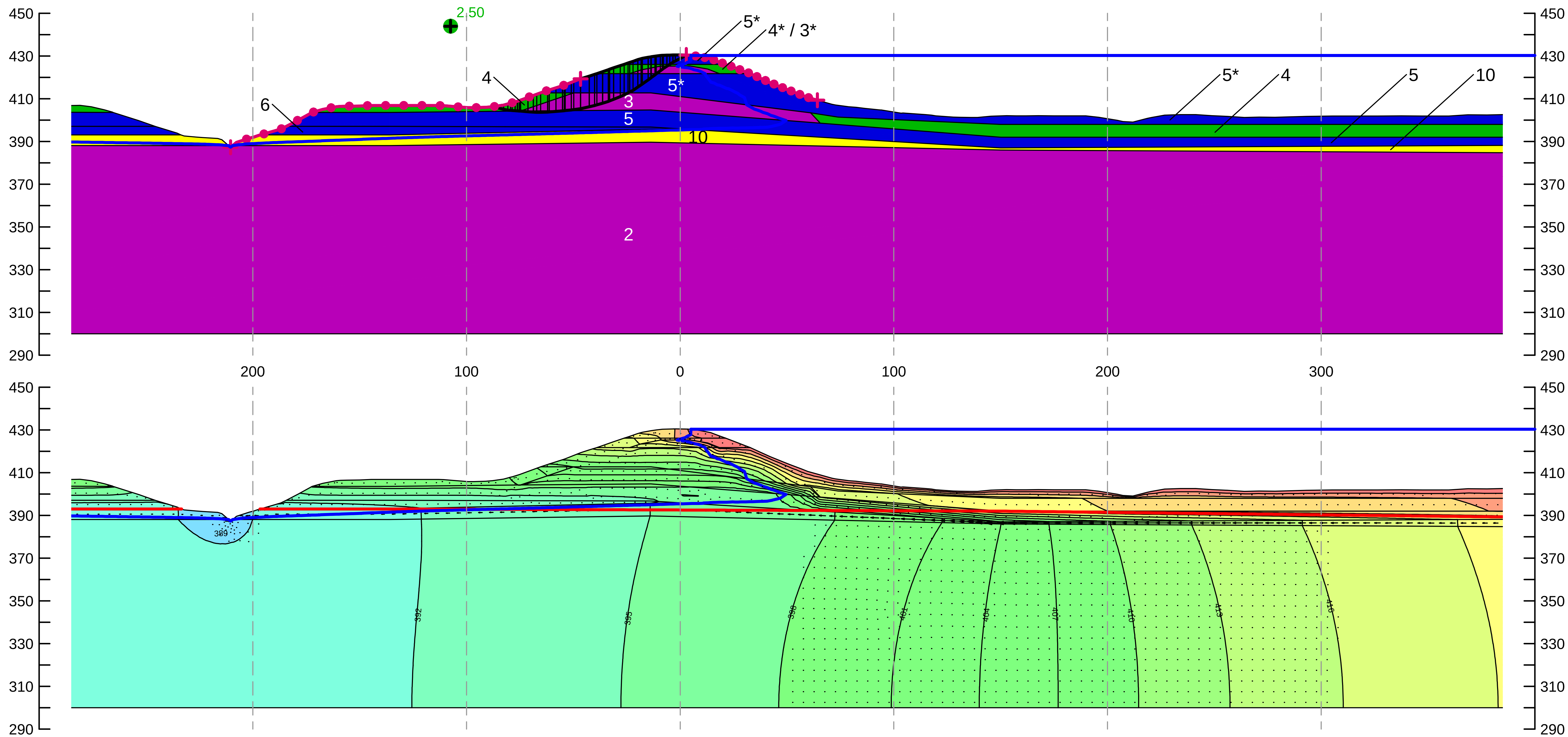


May 1990 Hydrograph @ 0 hrs
May 1990 Hydrograph @ 342 hrs
* Denotes FILL

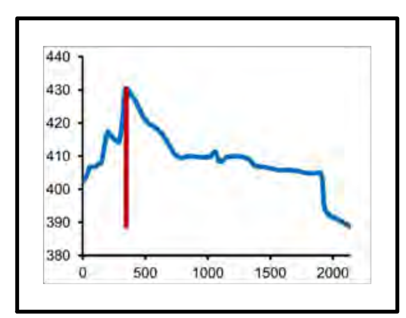
WEST LEVEE STA 250+00

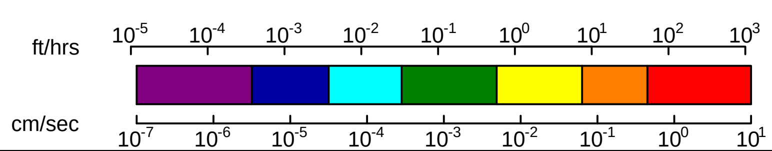
DALLAS FLOODWAY

PLATE 7



#	Description	Strength Parameters		Hydraulic Conductivity			Color
		φ'	c' (psf)	cm/sec	ft/sec	ft/hrs	
1	Limestone	40	4500	3.05E-8	1.00E-9	3.60E-6	Violet
2	Shale	30	1000	3.05E-8	1.00E-9	3.60E-6	Violet
3	CH	See Figures 3 & 4		3.05E-6	1.00E-7	3.60E-4	Violet
4	CH FSS	See Figure 7		3.05E-4	1.00E-5	3.60E-2	Green
5	CL	See Figures 5 & 6		1.52E-5	5.00E-7	1.80E-3	Idigo
6	SC	30	0	3.05E-5	1.00E-6	3.60E-3	Idigo
7	SM	30	0	4.57E-3	1.50E-4	5.40E-1	Green
8	GC	35	0	3.05E-2	1.00E-3	3.60E+0	Yellow
9	SW-SC/SW-SM	30	0	3.05E-2	1.00E-3	3.60E+0	Yellow
10	SP	32	0	3.96E-2	1.30E-3	4.68E+0	Yellow
11	GP/GW	32	0	3.05E-1	1.00E-2	3.60E+1	Orange





May 1990 Hydrograph @ 0 hrs

May 1990 Hydrograph @ 348 hrs

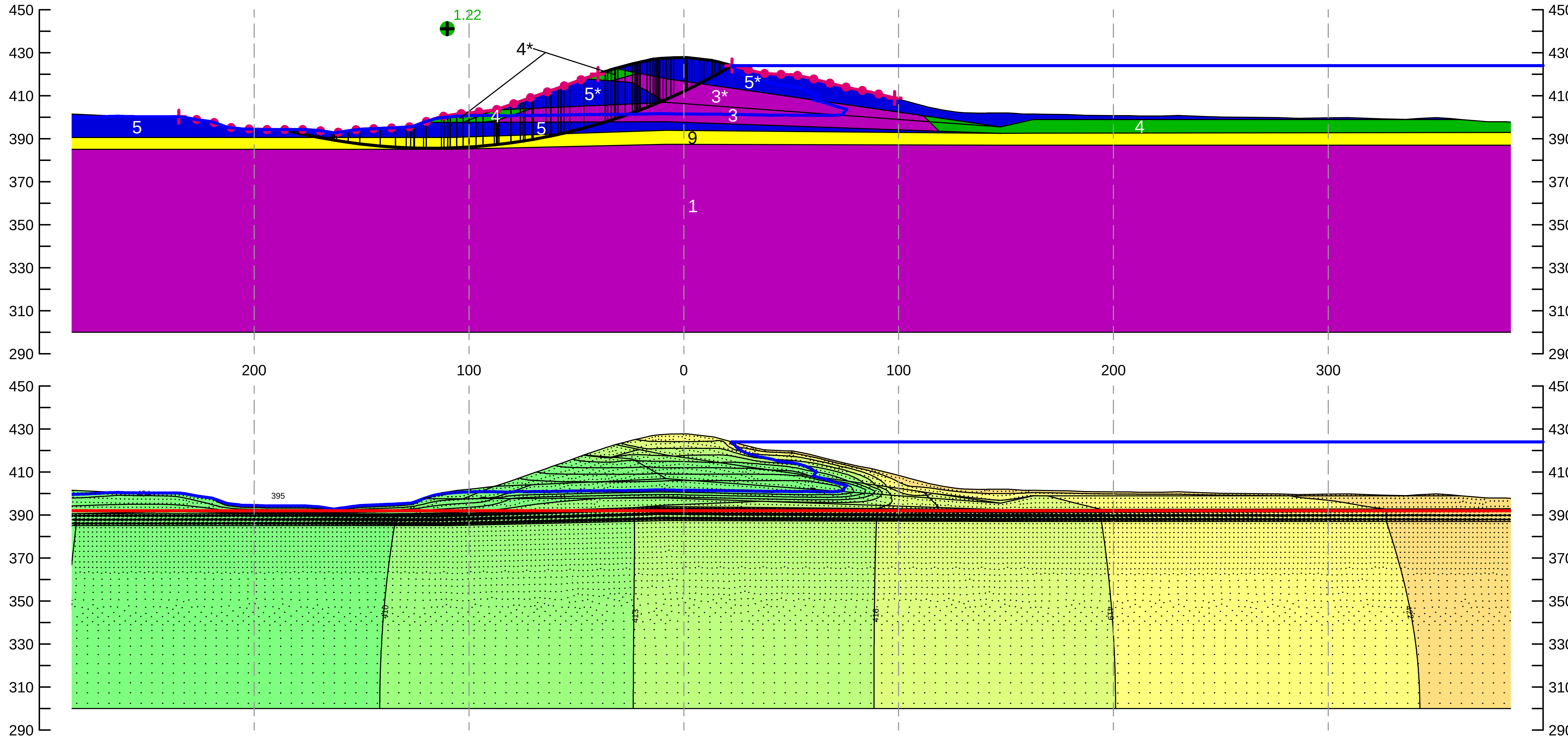
* Denotes FILL

WEST LEVEE STA 188+00

DALLAS FLOODWAY

PLATE

6



#	Description	Strength Parameters		Hydraulic Conductivity			Color
		φ'	c' (psf)	cm/sec	ft/sec	ft/hrs	
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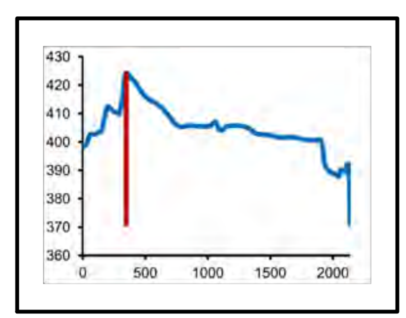
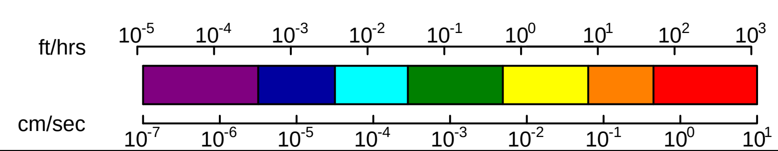
2	Shale	30	1000	3.05E-8	1.00E-9	3.60E-6	Violet
3	CH	See Figures 3 & 4		3.05E-6	1.00E-7	3.60E-4	Violet
4	CH FSS	See Figure 7		3.05E-4	1.00E-5	3.60E-2	Green
5	CL	See Figures 5 & 6		1.52E-5	5.00E-7	1.80E-3	Idigo
6	SC	30	0	3.05E-5	1.00E-6	3.60E-3	Idigo
7	SM	30	0	4.57E-3	1.50E-4	5.40E-1	Green
8	GC	35	0	3.05E-2	1.00E-3	3.60E+0	Yellow
9	SW-SC/SW-SM	30	0	3.05E-2	1.00E-3	3.60E+0	Yellow
10	SP	32	0	3.96E-2	1.30E-3	4.68E+0	Yellow
11	GP/GW	32	0	3.05E-1	1.00E-2	3.60E+1	Orange





May 1990 Hydrograph @ 0 hrs

May 1990 Hydrograph @ 348 hrs

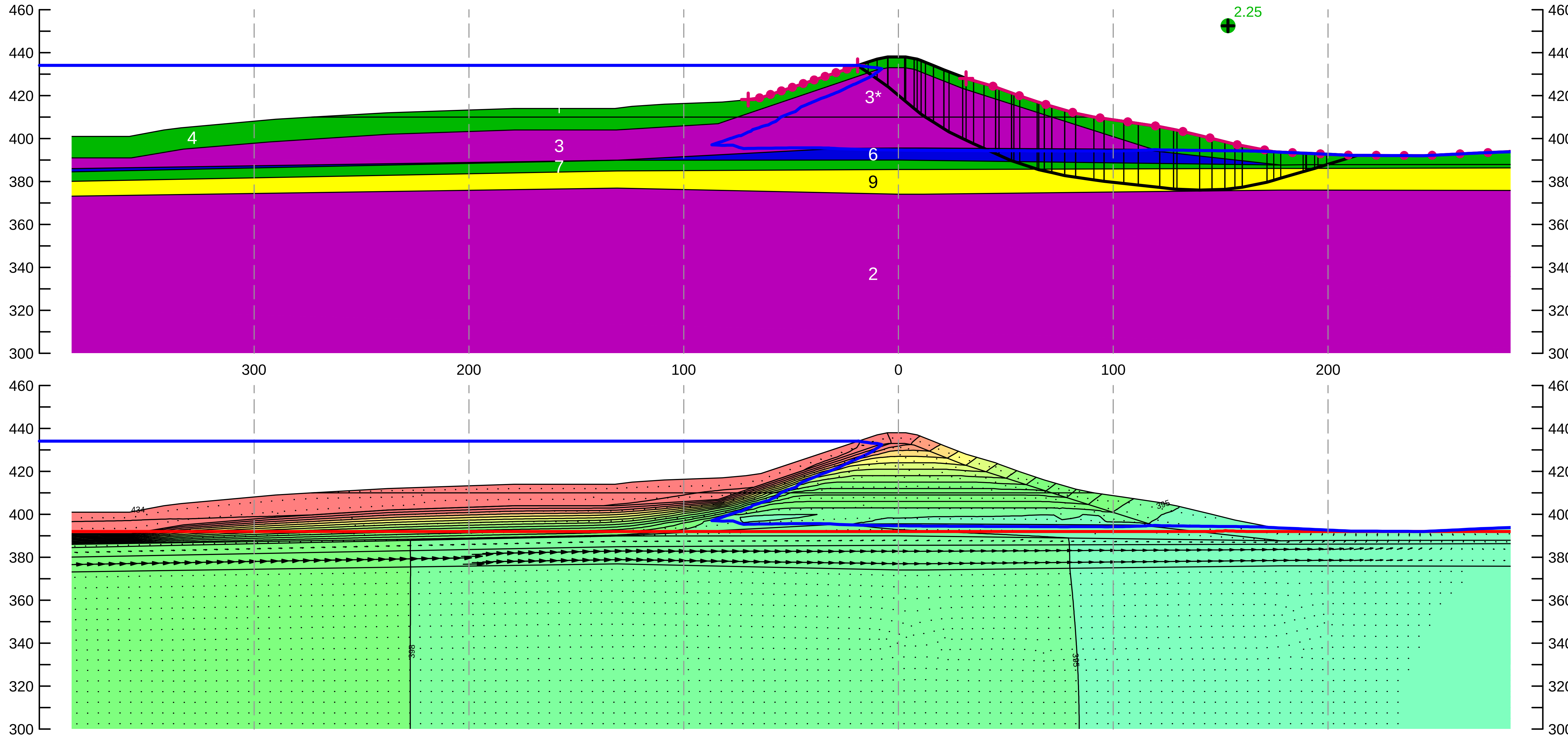
* Denotes FILL

WEST LEVEE STA 10+00

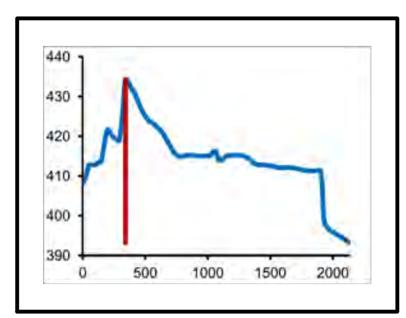
DALLAS FLOODWAY

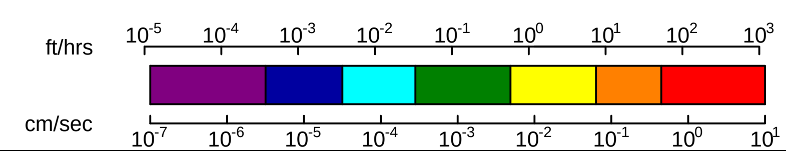
PLATE

5



#	Description	Strength Parameters		Hydraulic Conductivity			Color
		φ'	c' (psf)	cm/sec	ft/sec	ft/hrs	
1	Limestone	40	4500	3.05E-8	1.00E-9	3.60E-6	Violet
2	Shale	30	1000	3.05E-8	1.00E-9	3.60E-6	Violet
3	CH	See Figures 3 & 4		3.05E-6	1.00E-7	3.60E-4	Violet
4	CH FSS	See Figure 7		3.05E-4	1.00E-5	3.60E-2	Green
5	CL	See Figures 5 & 6		1.52E-5	5.00E-7	1.80E-3	Idigo
6	SC	30	0	3.05E-5	1.00E-6	3.60E-3	Idigo
7	SM	30	0	4.57E-3	1.50E-4	5.40E-1	Green
8	GC	35	0	3.05E-2	1.00E-3	3.60E+0	Yellow
9	SW-SC/SW-SM	30	0	3.05E-2	1.00E-3	3.60E+0	Yellow
10	SP	32	0	3.96E-2	1.30E-3	4.68E+0	Yellow
11	GP/GW	32	0	3.05E-1	1.00E-2	3.60E+1	Orange





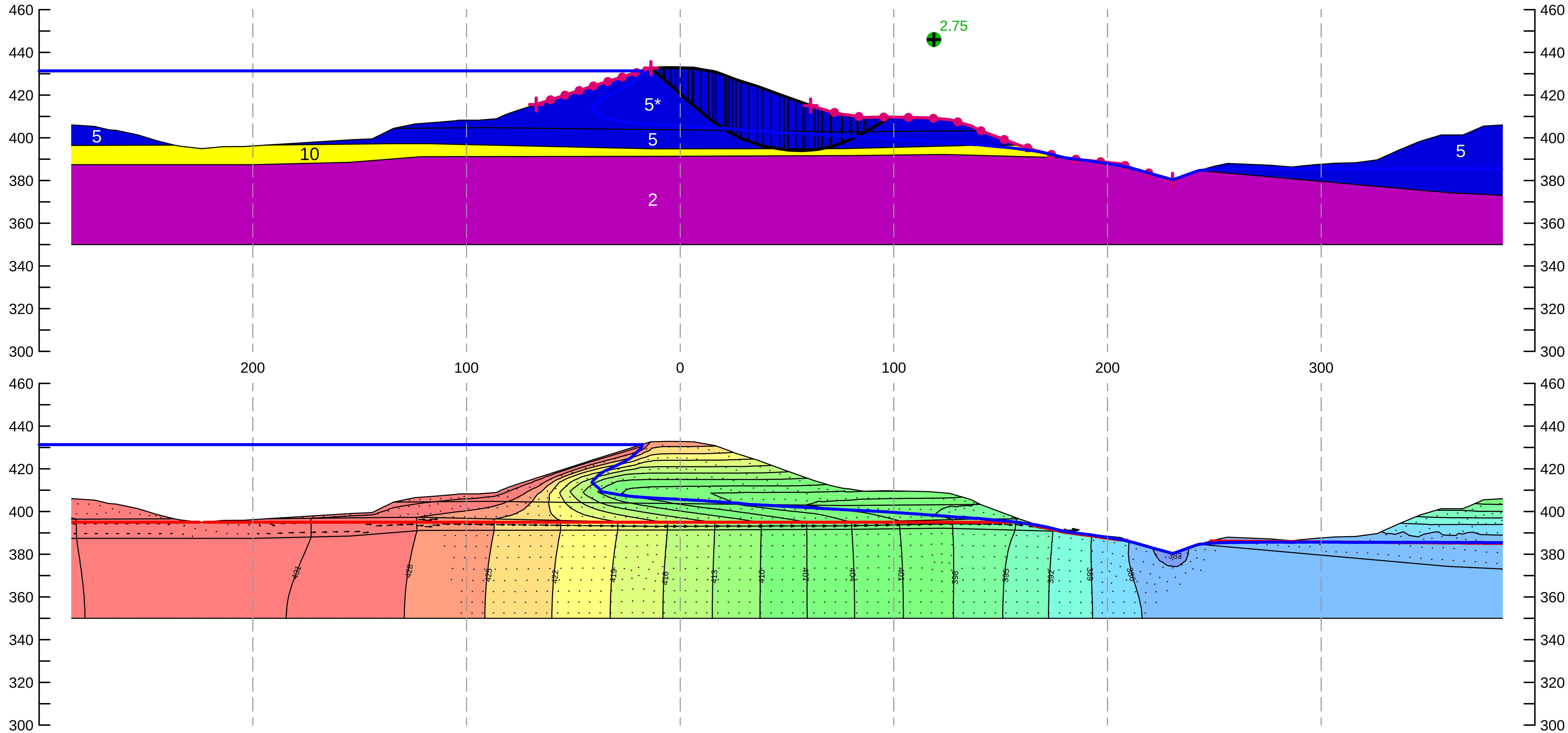
May 1990 Hydrograph @ 0 hrs
May 1990 Hydrograph @ 342 hrs
* Denotes FILL

EAST LEVEE STA 410+00

DALLAS FLOODWAY

PLATE

4



#	Description	Strength Parameters		Hydraulic Conductivity			Color
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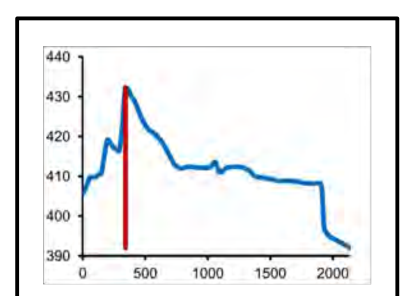
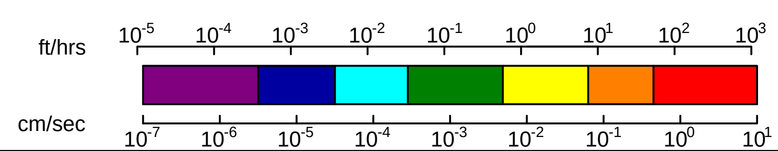
1	Limestone	40	4500	3.05E-8	1.00E-9	3.60E-6	Violet
2	Shale	30	1000	3.05E-8	1.00E-9	3.60E-6	Violet
3	CH	See Figures 3 & 4		3.05E-6	1.00E-7	3.60E-4	Violet
4	CH FSS	See Figure 7		3.05E-4	1.00E-5	3.60E-2	Green
5	CL	See Figures 5 & 6		1.52E-5	5.00E-7	1.80E-3	Idigo
6	SC	30	0	3.05E-5	1.00E-6	3.60E-3	Idigo
7	SM	30	0	4.57E-3	1.50E-4	5.40E-1	Green
8	GC	35	0	3.05E-2	1.00E-3	3.60E+0	Yellow
9	SW-SC/SW-SM	30	0	3.05E-2	1.00E-3	3.60E+0	Yellow
10	SP	32	0	3.96E-2	1.30E-3	4.68E+0	Yellow
11	GP/GW	32	0	3.05E-1	1.00E-2	3.60E+1	Orange





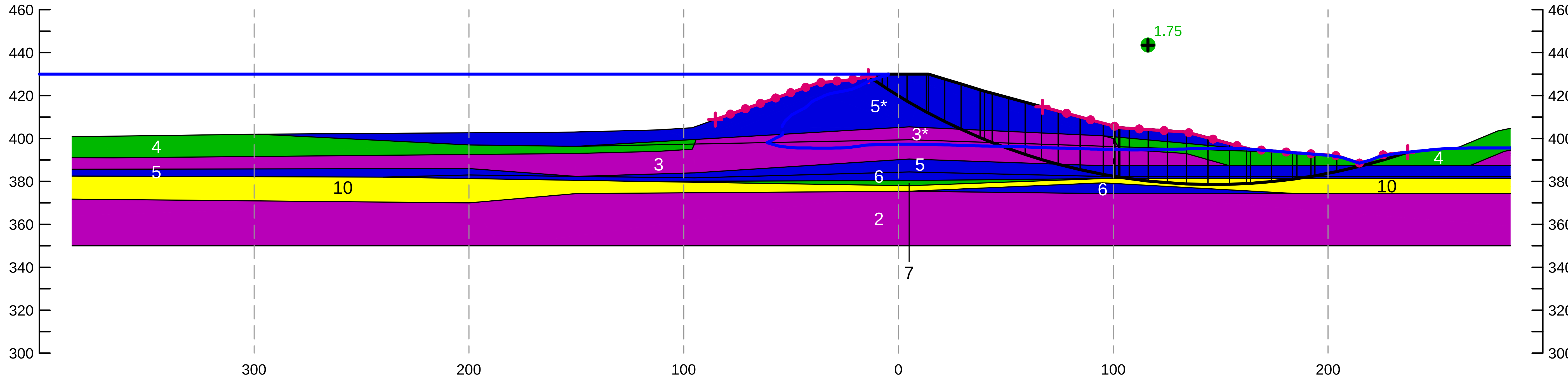
May 1990 Hydrograph @ 0 hrs
May 1990 Hydrograph @ 342 hrs
* Denotes FILL

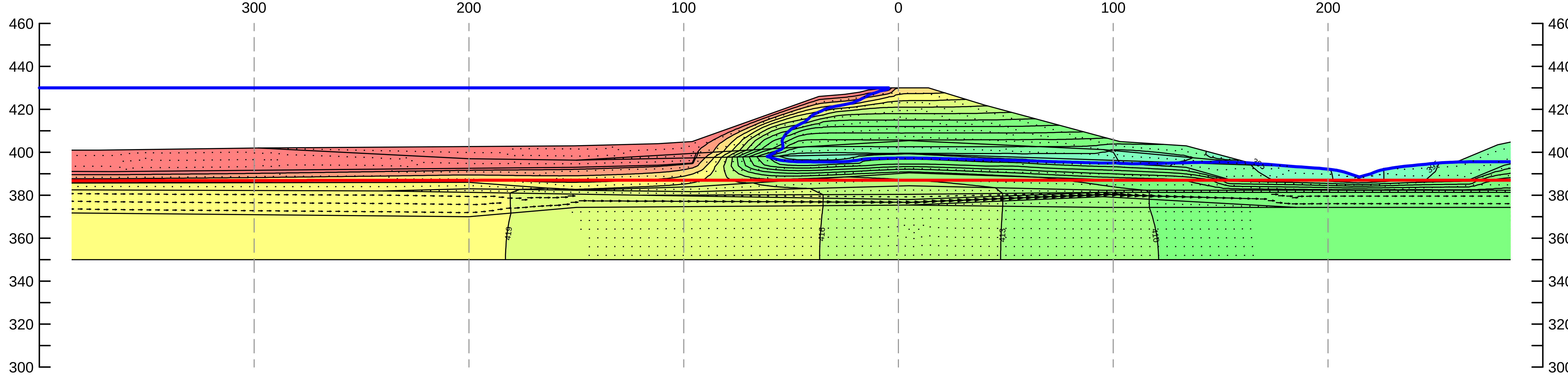
EAST LEVEE STA 311+00

DALLAS FLOODWAY

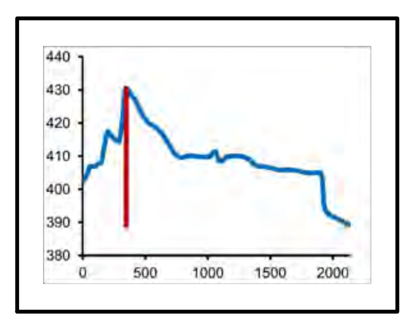
PLATE

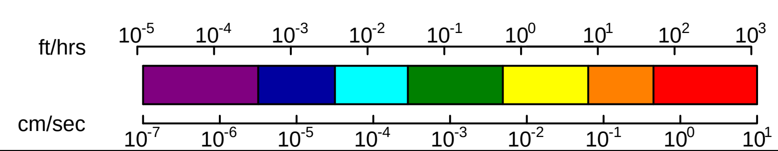
3





#	Description	Strength Parameters φ'	c' (psf)	Hydraulic Conductivity cm/sec	ft/sec	ft/hrs	Color
1	Limestone	40	4500	3.05E-8	1.00E-9	3.60E-6	Violet
2	Shale	30	1000	3.05E-8	1.00E-9	3.60E-6	Violet
3	CH	See Figures 3 & 4		3.05E-6	1.00E-7	3.60E-4	Violet
4	CH FSS	See Figure 7		3.05E-4	1.00E-5	3.60E-2	Green
5	CL	See Figures 5 & 6		1.52E-5	5.00E-7	1.80E-3	Idigo
6	SC	30	0	3.05E-5	1.00E-6	3.60E-3	Idigo
7	SM	32	0	4.57E-3	1.50E-4	5.40E-1	Green
8	GC	35	0	3.05E-2	1.00E-3	3.60E+0	Yellow
9	SW-SC/SW-SM	30	0	3.05E-2	1.00E-3	3.60E+0	Yellow
10	SP	32	0	3.96E-2	1.30E-3	4.68E+0	Yellow
11	GP/GW	32	0	3.05E-1	1.00E-2	3.60E+1	Orange





May 1990 Hydrograph @ 0 hrs

May 1990 Hydrograph @ 348 hrs

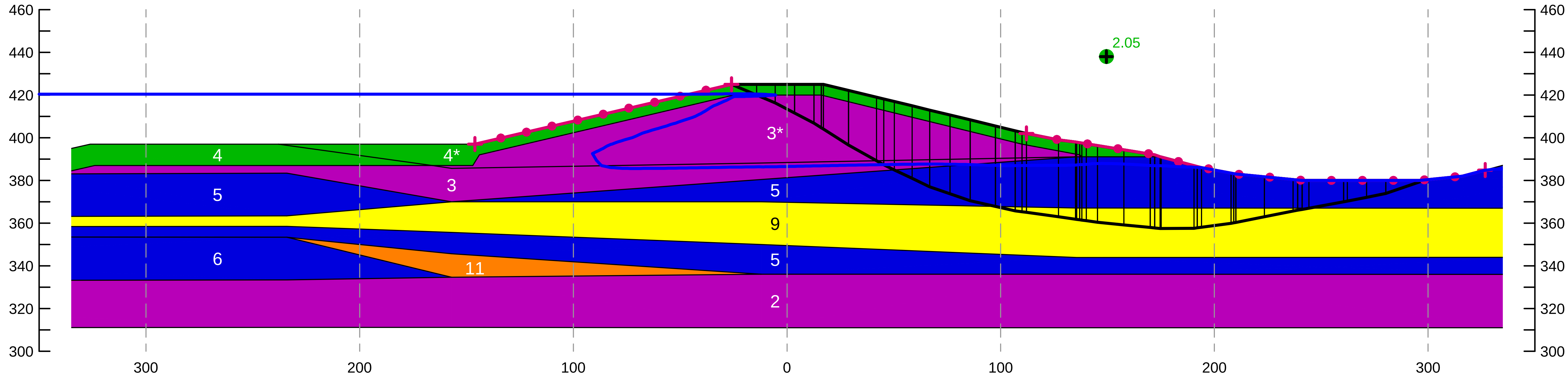
* Denotes FILL

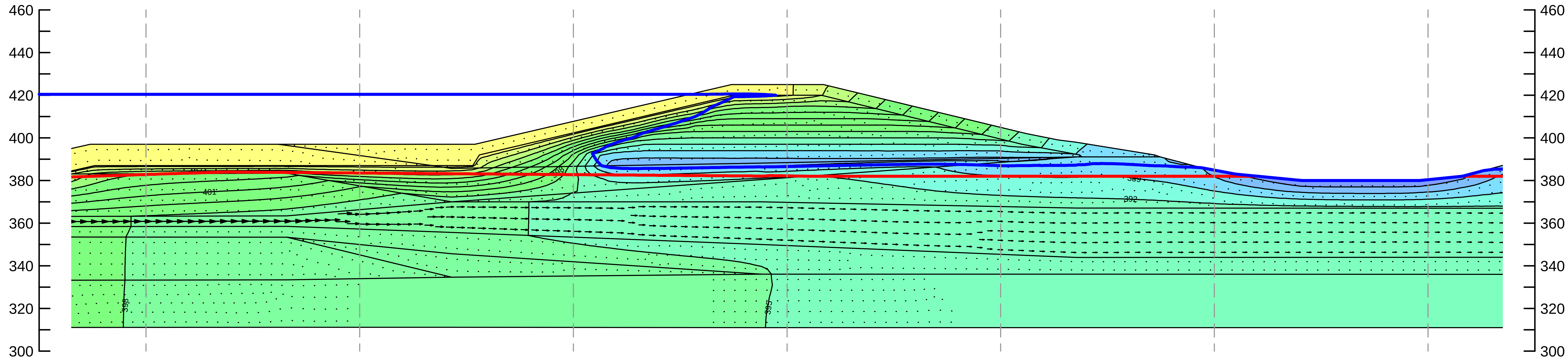
EAST LEVEE STA 220+00

DALLAS FLOODWAY

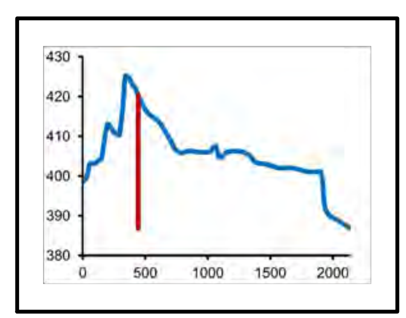
PLATE

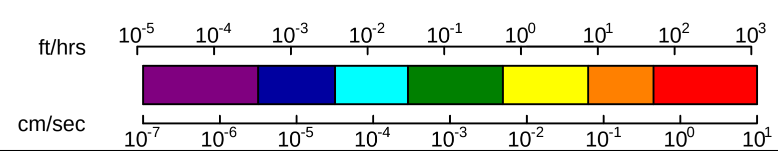
2





#	Description	Strength Parameters		Hydraulic Conductivity			Color
		φ'	c' (psf)	cm/sec	ft/sec	ft/hrs	
1	Limestone	40	4500	3.05E-8	1.00E-9	3.60E-6	Violet
2	Shale	30	1000	3.05E-8	1.00E-9	3.60E-6	Violet
3	CH	See Figures 3 & 4		3.05E-6	1.00E-7	3.60E-4	Violet
4	CH FSS	See Figure 7		3.05E-4	1.00E-5	3.60E-2	Green
5	CL	See Figures 5 & 6		1.52E-5	5.00E-7	1.80E-3	Idigo
6	SC	30	0	3.05E-5	1.00E-6	3.60E-3	Idigo
7	SM	30	0	4.57E-3	1.50E-4	5.40E-1	Green
8	GC	35	0	3.05E-2	1.00E-3	3.60E+0	Yellow
9	SW-SC/SW-SM	30	0	3.05E-2	1.00E-3	3.60E+0	Yellow
10	SP	32	0	3.96E-2	1.30E-3	4.68E+0	Yellow
11	GP/GW	32	0	3.05E-1	1.00E-2	3.60E+1	Orange





May 1990 Hydrograph @ 0 hrs

May 1990 Hydrograph @ 443 hrs

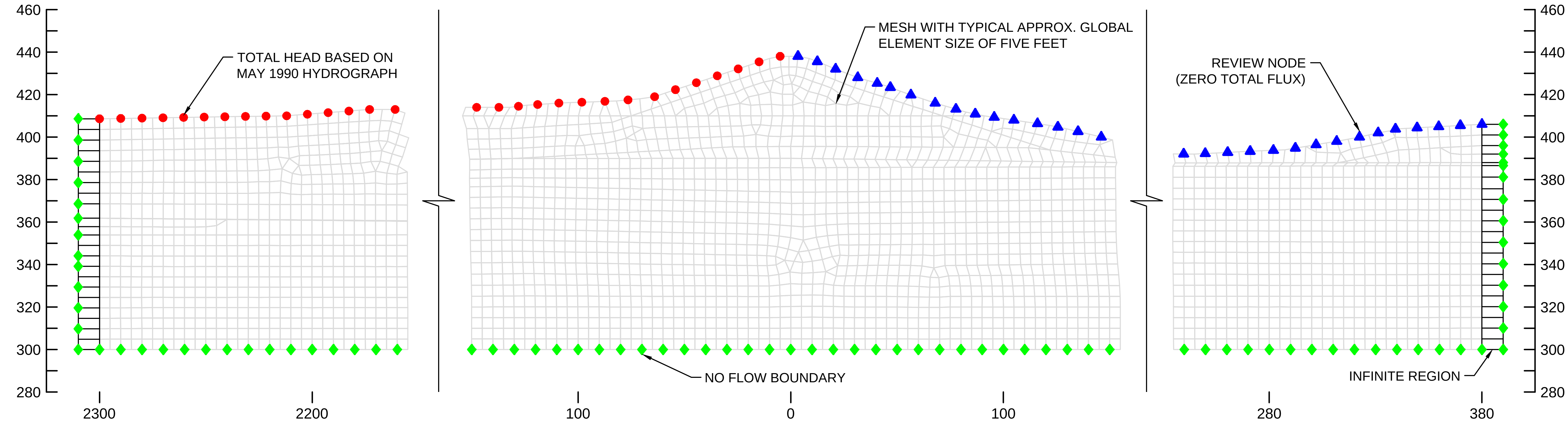
* Denotes FILL

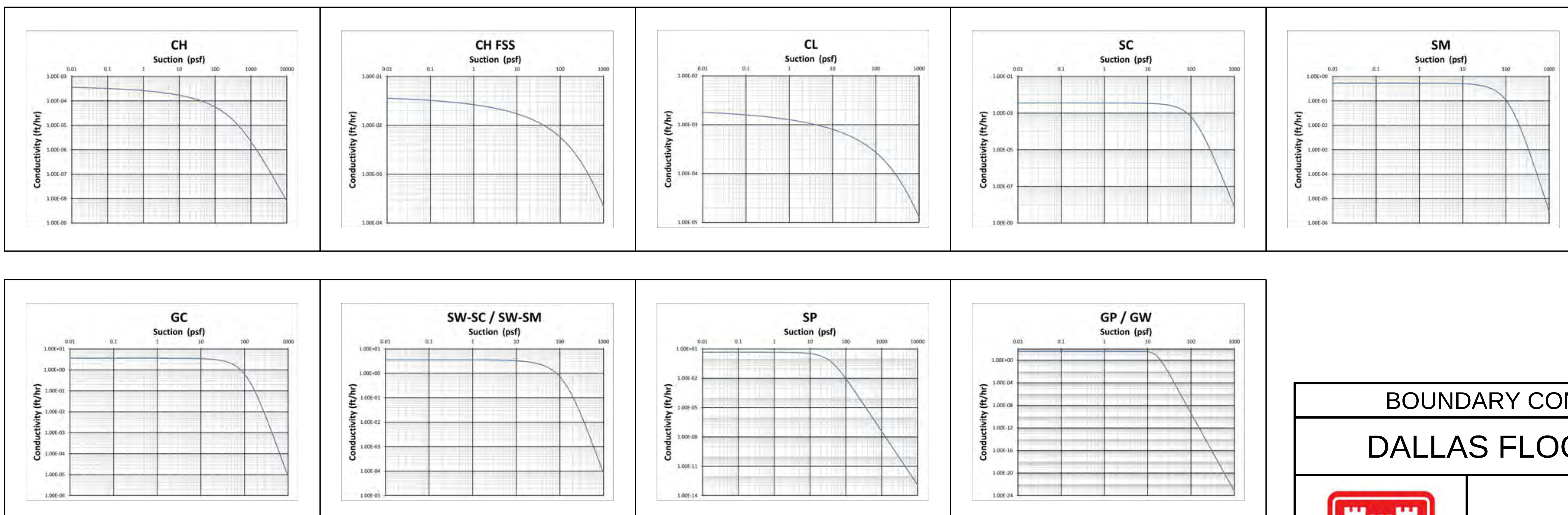
EAST LEVEE STA 74+00

DALLAS FLOODWAY

PLATE

1





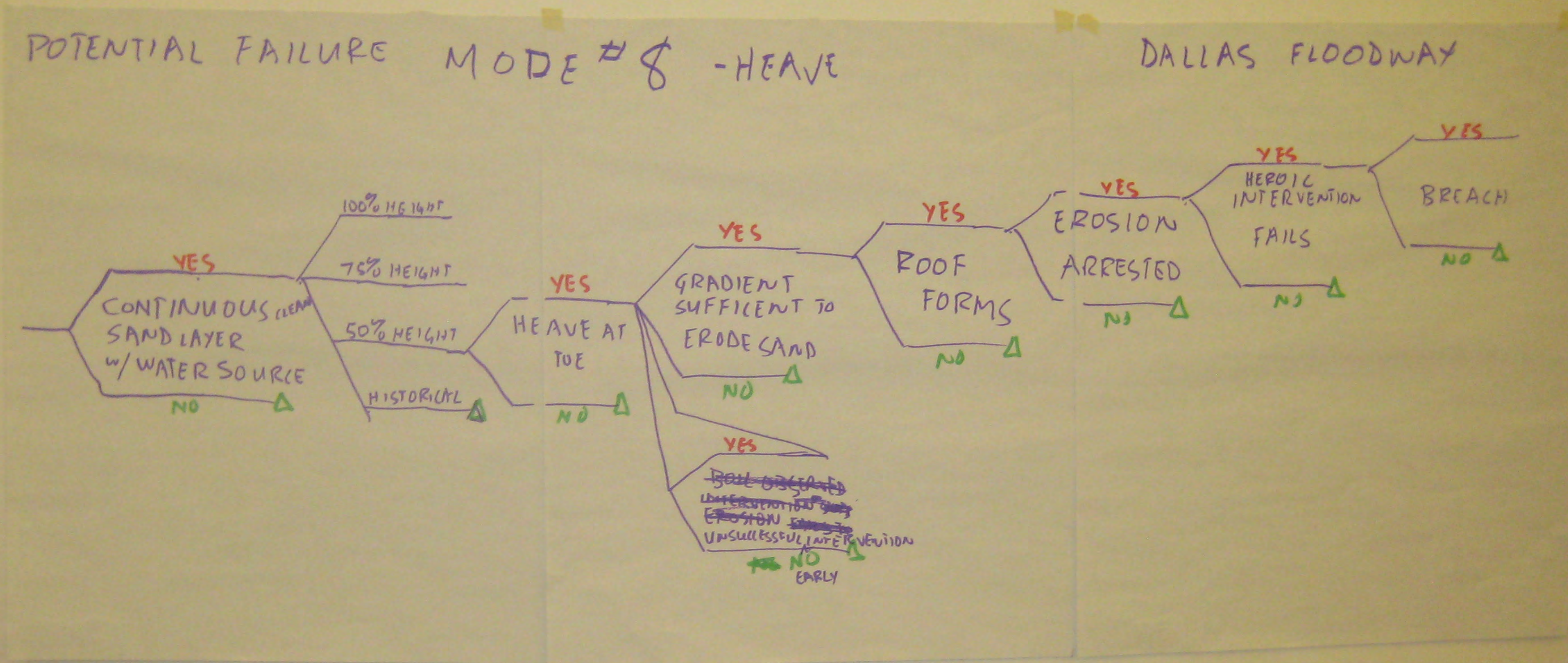
BOUNDARY CONDITION

DALLAS FLOODWAY

PLATE

0

Appendix J – Original Flip Charts


POTENTIAL FAILURE MODE #8 -HEAVE
DALLAS FLOODWAY
CONTINUOUS CLEAN SAND LAYER w/ WATER SOURCE
YES
NO
100% HEIGHT
75% HEIGHT
50% HEIGHT
HISTORICAL
HEAVE AT TOE
YES
NO
GRADIENT SUFFICENT TO ERODE SAND
YES
NO
YES
UNSUCCESSFUL INTERVENTION
NO
EARLY
ROOF FORMS
YES
NO
EROSION ARRESTED
YES
NO
HEROIC INTERVENTION FAILS
YES
NO
BREACH
YES
NO

DALLAS FLOODWAY - LENGTH EFFECTS

4

REACH	PFM: INTERNAL EROSION	HEAVE	GLOBAL INSTABILITY	PROGRESSIVE INSTABILITY
1		74E	74E	IMPROVEMENTS
2				
3		220E	220E	
4	OVER ~200 FT 311E	~~(410E?)~~		
5				X
6		(3 TO 29 ~~300~~ W?) NEED TO RUN	(3 TO 29 W?)	IMPROVEMENTS
7	250W (~~184W~~ BETTER)			
8		335W	NO FS<1.0 ~~(335W?)~~	X
9	~~(460W?)~~ ~~CLAY~~ SIMILAR TO 250W 433W LONGER SEEPAGE PATH THAN 311E			

DALLAS FLOODWAY PFM 13a -
GLOBAL INSTABILITY 7&E

NODE - CL FDN LAYER D/S w/ $k << 10^{-7}$ cm/s
JUST ~~B~~ LANDSIDE OF DESICCATED CH

MORE LIKELY	LESS LIKELY
• WERE TESTS IN CL - DATA SET WHERE K WAS THIS LOW	• 10^{-7} cm/s NEAR LOWER BOUND OF K DATA SET FOR CL ~~[illegible]~~ (LAB TESTS)
0.1, 0.05, 0.1, 0.1, 0.1, 0.1, 0.15, 0.1, 0.2, 0.05, 0.1, 0.1, 0.1	• WOULD HAVE TO HAVE A CONTINUOUS CLAY LAYER w/ THIS LOW K VALUE
ESTIMATES: ~~0.1, 0.05, 0.05, 0.07, 0.1, 0.5, 0.5, 0.1, 0.5, 0.05, 0.1, 0.01, 0.1~~	• PROBABLE THAT LOWEST K-VALUES WERE FROM COMPACTED EMBANKMENT CL
	• LOGS INDICATE SAND IN CL LAYER
	• LAB K VALUES TYPICALLY ~~PZ. RESPONSE~~ ORDER MAG LESS THAN FIELD
	• NEED LOW K LANDSIDE HIGH K CLAY

LOW	MEDIAN	HIGH
~~0.01~~	~~0.1~~	~~0.5~~
0.05	0.1	0.2

RATIONALE: HIGH EST.

LOW EST - THIS VALUE OF K ~ 10^{TH} PERCENTILE OF TEST VALUES, PROBABLY EMBANKMENT

DALLAS FLOODWAY PFM 13a ②

GLOBAL INSTABILITY 74E

FULLY DESICCATED CLAY RIVERSIDE CONNECTS TO BASAL SAND

MORE LIKELY	LESS LIKELY
• SANDY MATERIAL IN CLAY COULD INCREASE K	• PZ. RESPONSE STA 81 INDICATES EITHER PERM OF CLAY CLOSER TO BEST EST. OR NO DIRECT CONNECTION BETWEEN CLAY & SAND
• PZ STA 81 SHOW RESPONSE TO RIVER IN BASAL SAND	• MODEL SHOWS CONNECTION TO SAND @ 25' DEPTH AT A SMALL LATERALLY DISCONTINUOUS SAND LAYER – BASAL SAND IS DEEPER BELOW ADDITIONAL CLAY LAYER
• THERE ARE LOCATIONS WHER CH IS CLOSE TO BASAL SAND LW-33B, BN-10, LW-331 CPT	
• FT. WORTH EMBANK LEVEES, SHOW CLAYS W/MOISTURE BELOW SHRINKAGE LIMIT TO 25' DEPTH	

ESTIMATES: 0.1, 0.01, 0.01, 0.01, 0.01, 0.05, 0.1, 0.01 0.05, $\boxed{0.8}$, 0.05, $\boxed{0.005}$, 0.01

RATIONALE: LOW = BORDERLINE CH, DEPTH TO SAND, HIGHER WATERTABLE

HIGH – FT. WORTH EXPERIENCE

L	MED	H
0.005	0.01	0.8

DALLAS FLOODWAY
PFM 13a-GLOBAL INSTABILITY 74E

(1)

NODE - FULLY DESICCATED / FDN CH THAT CONNECTS TO BASAL SAND / HIGH K

MORE LIKELY	LESS LIKELY
• SOME POSSIBLE ISSUES W/CPT CALIBRATION	• DESICCATION WOULD HAVE TO EXTEND TO DEPTH OF 25' 40' DEEP TO CONNECT TO SP LAYER
• DESICCATION INCREASES VERT K WHICH WOULD CONNECT TO SAND	• BASELINE PZ LEVEL (GROUNDWATER) EL. 383 -
• MEASURED CRACKS TO 6' DEPTH W/TAPE MEASURE - COULD GO DEEPER THAN MEASURED	• CONTACT CH/SP AT EL. 370 TO EL 355
• DROUGHT COULD LOWER WATER TABLE BELOW PERIOD OF RECORD FOR PZ.	- LOGS SHOW FDN. CLAY LAYER LL ~ 60%, MARGINAL FOR CH - TOP LAYER LL-37%
• ~~FT. WORTH MOISTURE < S.L. TO 22'~~	• CPT INDICATES SILTY MATERIAL/LAYERS WITHIN CLAY LAYER
• SLICKENSIDES MAY INCREASE K	~~14-16% SAND~~

DALLAS FLOODWAY - LENGTH EFFECTS

REACH	PFM: INTERNAL EROSION	HEAVE	GLOBAL INSTABILITY	PROGRESSI[VE] INSTABI[LITY]
1		74E	74E	IMPROVEM[ENT]
2				
3		220E	220E	
4	OVER ~200 FT 311E	~~(410E?)~~		
5				X
6		(3+029 ~~3..~~w?) NEED TO RUN	(3 TO 29 W?)	IMPROVEMEN[T]
7	250W (158W BETTER)			
8		335W	NO FS<1.0 ~~(335W?)~~	X
9	~~(460W?)~~ ~~CLAY~~ SIMILAR TO 250W 433W LONGER SEEPAGE PATH THAN 311E			

GLOBAL INSTABILITY 6

- MOSTLY DEPENDENT ON PORE PRESSURES WHICH ARE NOT LIKELY TO BE HIGH DUE TO TRANSIENT NATURE OF LOADING

ROGRESSIVE INSTABILITY

- DRIVEN BY RAINFALL SATURATION OF DESICCATED ZONE
- ONLY AN ISSUE FOR VERY HIGH RIVER STAGES
- UNLIKELY TO LOSE CREST
- Had to have coincident slides on river and land side

HEAVE / BLOWOUT OF CLAY CONFINING LAYER AN BACKWARD EROSION

60 / -

- PORE PRESSURES COULD BE HIGH ENOUGH TO INITIATE AND PRODUCE BOILS

  BUT UNLIKELY TO PROGRESS TO RIVER FOR SIMILAR REASONS AS PREVIOUS PFM

  EVEN LONGER SEEPAGE PATH LIKELY

BACKWARD EROSION OF SAND LAYER

59

- NOT LIKELY TO PROGRESS DUE TO LONG SEEPAGE PATH = LOW GRADIENT

- CONTINUOUS, CLEAN SAND LAYER CONNECTED TO RIVER AND LANDSIDE DITCH – ~~[illegible]~~ UNLIKELY

- UNIFORMITY COEFFICIENT OF SAND NOT CONDUCIVE TO LOW CRITICAL GRADIENT