

WOULD HAVE TO TREAT
3 MILES - 6 MI UPPER RAMP
~~3,000 - 6,000~~ LEVEE

STORMS

~~EACH SIDE~~ TOTAL

- MUDDY SOFT CONDITIONS
- NEED TO GO HIGHER THAN ROUTINGS INDICATE - RELIEF

ROAD GRADER COULD BE USED TO PUSH UP ONE SIDE OF CREST

DALLAS FLOODWAY PFM #2 O.T. EROSION
~ 282,000 CFS

ESTIMATES: LEVEL 1 E 0.75, 0.4, 0.3, 0.6, 0.7, 0.7, 0.5, 0.4, 0.25, 0.4, 0.8, 0.5, 0.6, 0.4, 0.5, 0.4,

LEVEL 2 E 0.9, 0.6, 0.6, 0.8, 0.9, 0.9, 0.8, 0.6, 0.5, 0.7, 0.95, 0.75, 0.8, 0.6, 0.9, 0.8,

LEVEL 1 W 0.3, 0.1, 0.2, 0.4, 0.4, 0.8, 0.2, 0.3, 0.1, 0.3, 0.6, 0.6, 0.4, 0.2, 0.3, 0.6,

LEVEL 2 W 0.7, 0.5, 0.5, 0.6, 0.65, 0.95, 0.4, 0.6, 0.5, 0.6, 0.8, 0.7, 0.6, 0.5, 0.5, 0.8,

LOW

MED

HIGH

0.25

0.5

0.8

LEVEL 1 E

0.5

0.8

0.95

LEVEL 2 E

0.1

0.3

0.8

LEVEL 1 W

0.4

0.6

0.95

LEVEL 2 W

RATIONALE:

WEST SIDE EASIER TO MITIGATE THAN EAST
LESS LENGTH AND HEIGHT REQUIRED - LEVEL 2
REQUIRES CONSIDERABLY MORE EFFORT.

CONSIDERABLE UNCERTAINTY IN TIME AVAILABLE
AND METHOD THAT WOULD BE USED.

GENERAL ASSUMPTION - LEVEL 2 TREATMENT
IS ROUGHLY DOUBLE LEVEL 1 TREATMENT
BOTH LENGTH & HEIGHT

DALLAS FLOODWAY PFM #2
O.T. EROSION BREACH LEVEE

(42)

O.T. EROSION BREACH LEVEE

Node 1 - Intervention fails

THRESHOLD TO $\sim 282,000$ cfs ($> 282,000$)

MORE LIKELY

LESS LIKELY

- WOULD NEED TO RAISE E. SIDE ABOUT 1' MORE THAN W. SIDE
- 1-DAY ADVANCE WARNING POSSIBLE FOR LOCAL STORM
- MAY BE DIFFICULT TO JUDGE WHETHER LEVEE OVERTOPS
- WOULD HAVE TO TREAT 3 MILES - (6 MI. UPPER RANG) LEVEE ~~3,000 - 6,000~~ EACH SIDE TOTAL
- MUDDY SOFT CONDITIONS
- NEED TO GO HIGHER THAN ROUTINGS INDICATE - RELIEF
- MATERIAL & EQUIPMENT AVAILABLE
- ~~STORMS~~ DON'T NEED TO RAISE MUCH (0.6-1.6' ~~RAISE~~) ~~TO~~ (DOUBLE)
- HAVE KNOWLEDGE OF LOW SPOTS
- COULD BE LONGER LEAD TIMES FOR GENERAL STORMS
- ROAD GRADER COULD BE USED TO PUSH UP ONE SIDE OF CREST

- 1-DAY ADVANCE WARNING POSSIBLE FOR LOCAL STORM

- MAY BE DIFFICULT TO JUDGE WHETHER LEVEE OVERTOPS

- WOULD HAVE TO TREAT 3 MILES - 16 MI UPPER RANG ~~4,000 - 6,000~~ LEVEE

~~EACH SIDE~~ TOTAL

- MUDDY SOFT CONDITIONS
- NEED TO GO HIGHER THAN ROUTINGS INDICATE - RELIEF

- NEED TO GO HIGHER THAN ROUTINGS INDICATE - RELIEF

- MATERIAL & EQUIPMENT AVAILABLE
- ~~STAFF~~ DON'T NEED TO RAISE MUCH (0.6-1.6' ~~RAISE~~) ~~TO~~ (POUBLE?)
- HAVE KNOWLEDGE OF LOW SPOTS
- COULD BE LONGER LEAD TIMES FOR GENERAL STORMS
- ROAD GRADER COULD BE USED TO PUSH UP ONE SIDE OF CREST

- ~~STAY HERE~~ DON'T NEED TO RAISE MUCH (0.6-1.6' ~~mm~~) ~~TO~~ (POUBLE?)

- HAVE KNOWLEDGE OF LOW SPOTS

- COULD BE LONGER LEAD TIMES FOR GENERAL STORMS

- ROAD GRADER COULD BE USED TO PUSH UP ONE SIDE OF CREST

DALLAS FLOODWAY PFM #2 O.T. EROSION
~ 282,000 cfs

$\sim 282,000$ cfs

ESTIMATES: LEVEL 1 E 0.75, 0.4, 0.3, 0.6, 0.7, 0.7, 0.5,
0.4, 0.25, 0.4, 0.8, 0.5, 0.6, 0.4, 0.5, 0.4,

LEVEL 2 E 0.9, 0.6, 0.6, 0.8, 0.9, 0.9, 0.8, 0.6, 0.5, 0.7, 0.95,
0.75, 0.8, 0.6, 0.9, 0.8,

LEVEL 1 W 0.3, 0.1, 0.2, 0.4, 0.4, 0.8, 0.2, 0.3, 0.1, 0.3, 0.6,
0.6, 0.4, 0.2, 0.3, 0.6,

LEVEL 2 W 0.7 0.5 0.5 0.1 0.1 0.5 0.5

DALLAS
NODE 3

NODE

MORE

• MULT
WILL

- JOHN
COVER

• COLLEGE

- DESIGN
- NEAR

"Nick"

-COUL
FROD

AT S

• DER
AT

Exo

- WIN
- COU

DALLA
NODE

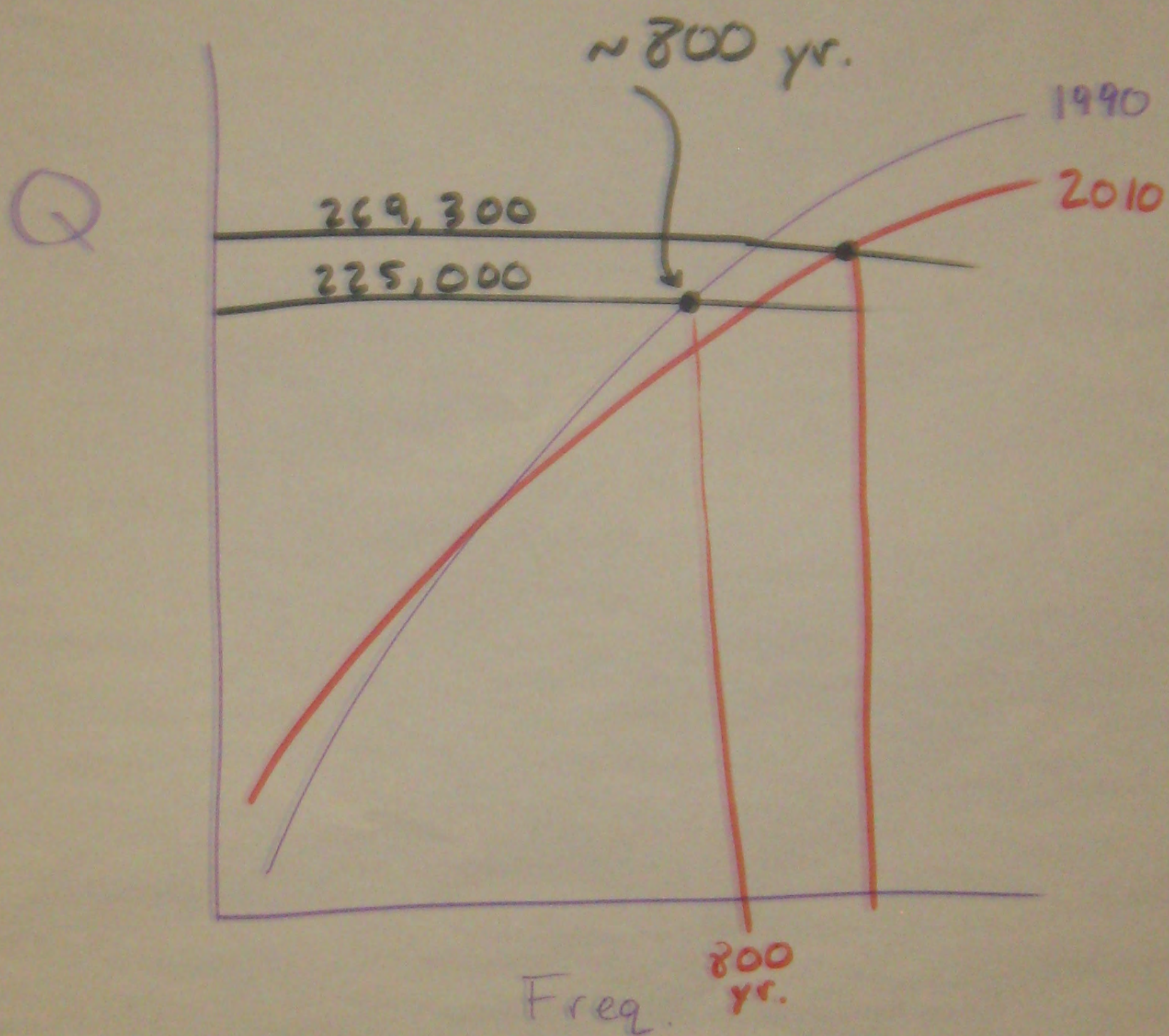
NODE

MORE

• DEBRI

LEVEE

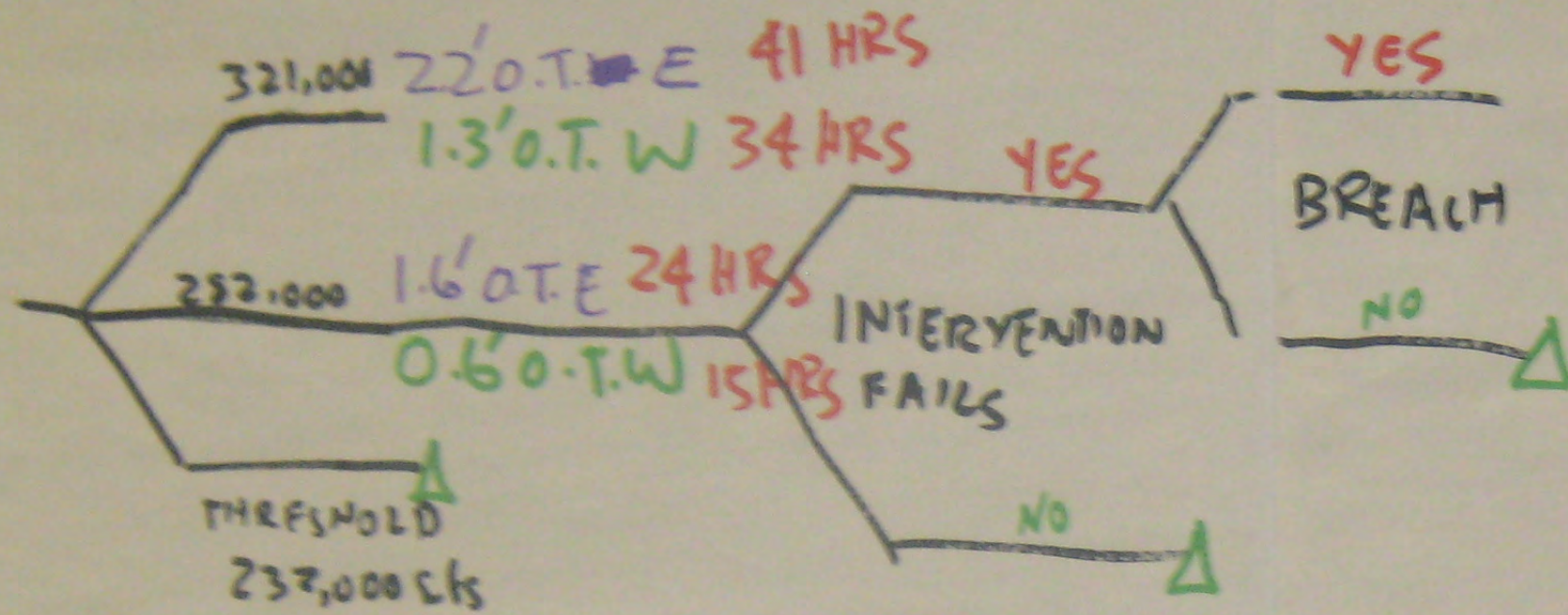
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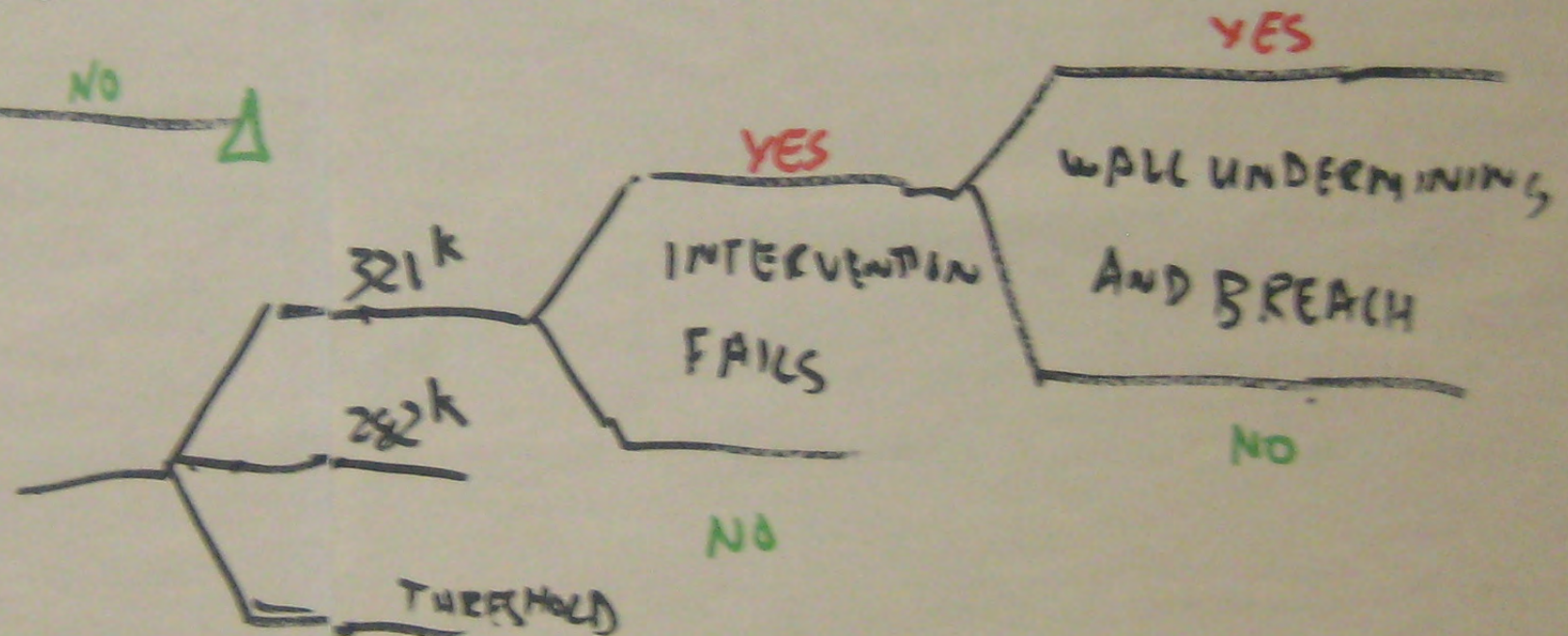
DALLAS FLOODWAY - PFM #2 - OVERTOPPING, LEVEE EROSION BREACH



2007 HYDROGRAPH



PFM #3 FLOODWALL O.T. EROSION BREACH



DALLAS FLOODWAY PFM 13B VAR 2 (4A)

LOSE CREST FROM ADDITIONAL SLUMPING

MORE LIKELYLESS LIKELYCOHESION ALLOWS VERT
CUTS TO STAND FOR A
WHILEESTIMATES: 0.1, 0.05, 0.07, 0.05, 0.01, 0.1,
0.1, 0.05, 0.05, 0.1, 0.1, 0.05, 0.1

LOW	MED	HIGH
0.01	0.07	0.1

RATIONALE: NO SIGNIFICANT REASON TO
EXPECT VERTICAL SCARPS WON'T BE
STABLE FOR DURATION OF FLOOD - ~~INSURANCE~~

DALLAS FLOODWAY PFM 13B -
VARIATION 2

LOSE CREST FROM ADDITIONAL SLUMPING

MORE LIKELYLESS LIKELY

VERTICAL SCARPS WON'T BE
STABLE FOR DURATION OF FLOOD - ~~NEVER~~

DALLAS FLOODWAY PFM 13B - VARIATION 2

40

79

LOSE CREST FROM ADDITIONAL SLUMPING

MORE LIKELY

LESS LIKELY

- WOULD LIKELY HAVE CONTINUING RAIN WHEN FLOOD CRESTS

- SCARPS EXPOSED * FOR RAIN TO ENTER

- ~~SOME~~ SOME SECTIONS OF NARROWER CREST POSSIBLE W/ SLOPE SIDE

- STEEP SCARPS EXPOSED

- UNLOADED CREST AND LOADED TOE W/ PREVIOUS SLUMPS - GLOBAL INSTABILITY UNLIKELY

- WILL TAKE SOME TIME FOR PROGRESSIVE SLUMPING, IF IT OCCURS

- WIDE CREST ~ 16' WOULD HAVE TO BE LOST

- HAS NOT BEEN OBSERVED TO OCCUR - TYPICALLY CREST REMAINS INTACT WHEN SLIDES OCCUR BOTH FACES

- SHORT DURATION HYDROGRAPH LIMITS TIME WHERE CREST COULD BE LOST

DALLAS FLOODWAY PFM #13B
VARIATION 2

PROB LAND SIDE & RIVER SIDE SLIDE
AT SAME TIME

MORE LIKELY

~4 TIMES SLIDES
HAVE OCCURRED BOTH
FACES NEAR SAME
LOCATION

• HAS OCCURRED ON
OTHER LEVEES

LESS LIKELY

• SLIDES INITIATE AT
TENSION CRACK TYPICALLY
ON SLOPE & NOT AT CREST

• PROBABILITY LOWER ON
LAND SIDE THAN RIVER
SIDE BASED ON PERFORMANCE

→ EXPANDING ON STATISTICS
FOR 1 FACE -
 $P \sim 0.01$ FOR 2 FACES

DALLAS FLOODWAY PFM 13 B

(37)

NOPE 3 - EMBANKMENT SATURATES

MORE LIKELY

LESS LIKELY

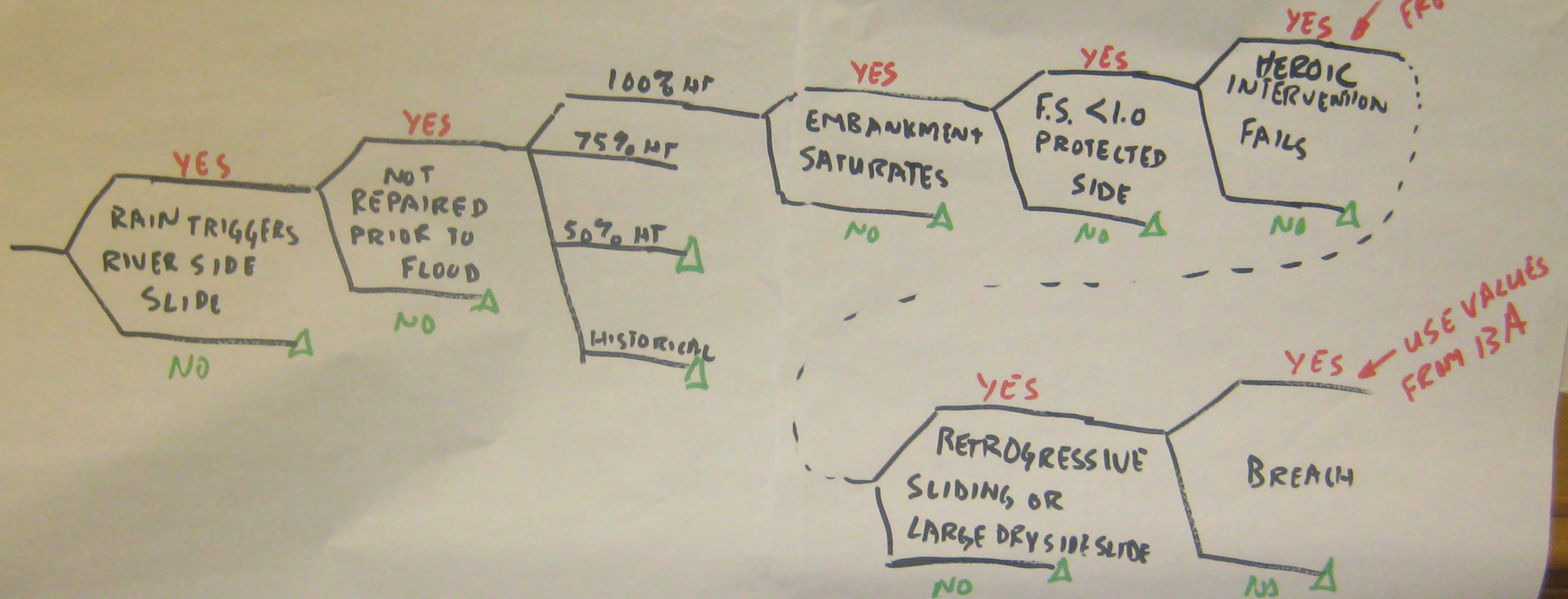
AFTER ANALYSIS - NO REASONABLY VIABLE
WAY TO SATURATE ENTIRE EMBANKMENT.
HIGH PERMEABILITY - DRAINS OUT
LOW PERMEABILITY - DOESN'T WET

~~ESTIMATES 0.01, 0.05, 0.1, 0.1, 0.05, 0.01,
0.05, 0.6, 0.1, 0.15, 0.1, 0.1, 0.1, 0.05~~

LOW	MED	HIGH
~~0.01~~	~~0.1~~	~~0.6~~

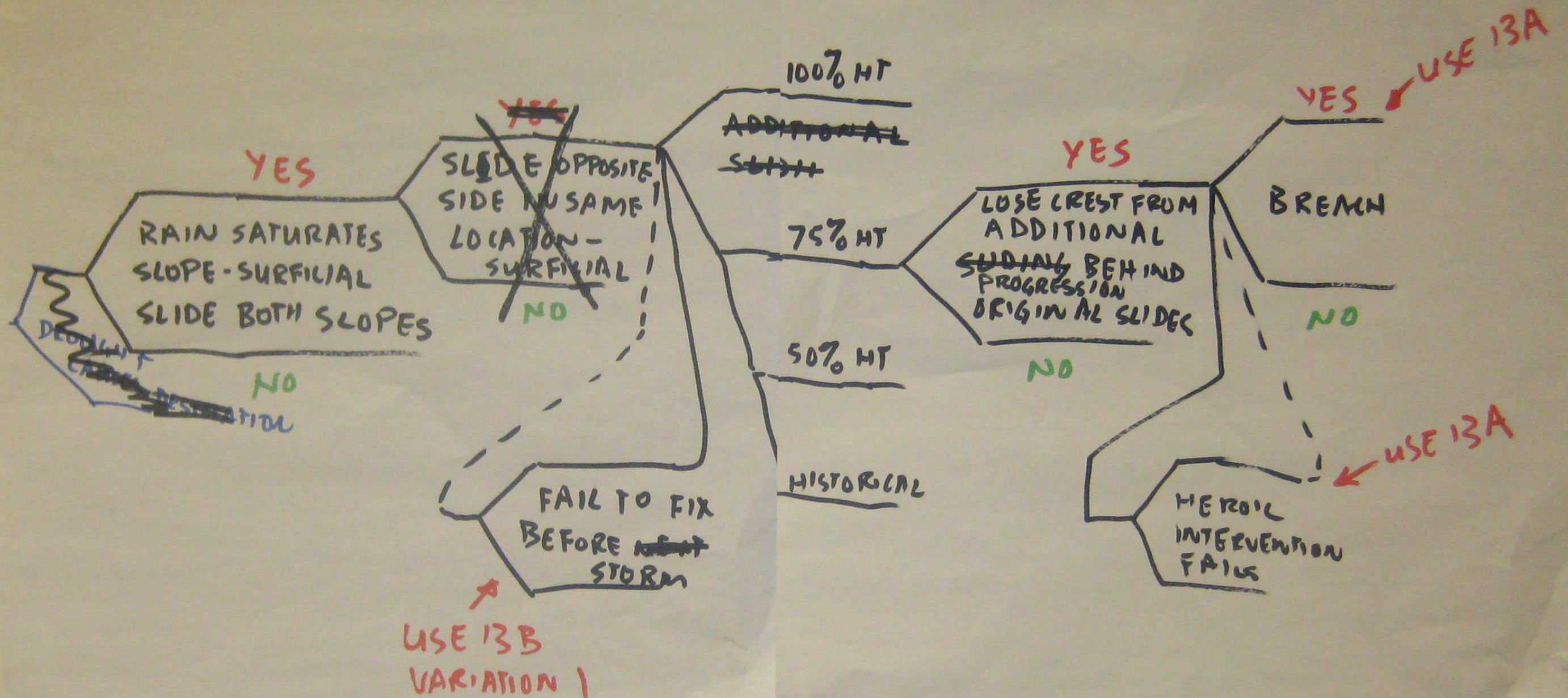
~~RATIONALE: HIGH PERMEABILITIES NEEDED
TO GET SATURATION SEEM UNLIKELY GIVEN
GOOD PERFORMANCE AND TENDENCY FOR CRACKS TO
CLOSE - BUT UNCERTAINTY WITH CONDITION
OF 1930'S EMBANKMENT MATERIAL~~

DALLAS FLOODWAY - DFM 13A - GLOBAL INSTABILITY - PROGRESSIVE SLIDING



DALLAS FLOODWAY - POTENTIAL FAILURE MODE 13-B - GLOBAL INSTABILITY
PROGRESSIVE SLIDES

VARIATION 2



DALLAS FLOODWAY PFM 13B

(37)

NODE 3 - EMBANKMENT SATURATES

MORE LIKELY

LESS LIKELY

ESTIMATES

0.01, 0.05, 0.1, 0.1, 0.05, 0.01,
0.05, 0.6, 0.1, 0.15, 0.1, 0.1, 0.1, 0.05

LOW

MED

HIGH

0.01

0.1

0.6

RATIONALE: HIGH PERMEABILITIES NEEDED
TO GET SATURATION SEEM UNLIKELY GIVEN
GOOD PERFORMANCE AND TENDENCY FOR CRACKS TO
CLOSE - BUT UNCERTAINTY WITH CONDITION
OF 1930'S EMBANKMENT MATERIAL

DALLAS FLOODWAY PFM 13B

(36)

NODE 3 - EMBANKMENT SATURATES

MORE LIKELY

- ENVIRONMENT WHERE CH MATERIAL PRONE TO DESICCATION
- 1930'S EMBANKMENT EXPOSED PRIOR TO 1950'S CONSTRUCTION
- COULD SATURATE DISLOPE TO DEPTH OF OPEN CRACKS ON PROTECTED SIDE

LESS LIKELY

- SEEPAGE ANALYSES INDICATE EMBANKMENT WON'T SATURATE WITH UNDISTURBED CH K VALUES
- CRACKS TEND TO CLOSE ON WETTING
- CRACKS TEND TO CLOSE ON LOADING FROM OVERLYING 1950'S EMBANKMENT CONSTRUCTION
- BAD 1930'S & 1950'S MATERIAL WOULD NEED TO OCCUR AT SAME LOCATION
- UNLIKELY CRACKS WOULD BE FILLED W/ HIGH PERM MATERIAL.

AFFECT

MAY BE POSSIBLE

- BIG STORM SYSTEM PROBABLY
NEEDED ~~FOLLOWING DROUGHT~~

NODE 2 PFM 13B - SLIDE NOT REPAIRED (35)

ESTIMATE: 0.5, 0.7, 0.5, 0.4, 0.8, 0.3,
0.6, 0.5, 0.8, 0.4, 0.3, 0.3, 0.3, 0.2,
0.6, 0.7

LOW	MED	HIGH
0.2	0.5	0.8

RATIONALC - SIGNIFICANT UNCERTAINTY
THAT IS DIFFICULT TO RESOLVE

DALLAS FLOODWAY PFM 13B

(34)

NODE 2 - RIVER SIDE SLIDE NOT
REPAIRED PRIOR TO LARGE FLOOD
MORE LIKELY LESS LIKELY

- | | |
|--|---|
| <ul style="list-style-type: none">• COULD START LOW AND PROGRESS TOWARD CREST• WARNING W/TROPICAL ~~ESTIMATES~~ STORMS• TYPICALLY 1 TO 2 MONTHS TO REPAIR• 2007 ~~WAS AN~~ ^{WERE} UNREPAIRED
✓ SLIDE WHEN FLOOD OCCURRED
RIVER SIDE• DOUBLE PEAK HYDRO-
GRAPHS MAY ~~REFLECT LOCAL~~
~~RAIN~~ TIME TO REPAIR
AFFECT• BIG STORM SYSTEM PROBABLY
NEEDED ~~FOLLOWING DROUGHT~~ | <ul style="list-style-type: none">~~BIG STORM SYSTEM~~• WOULD NEED TO FOLLOW DROUGHT• ACTUAL REPAIR TIME IS A FEW DAYS
ADVANCE NOTICE OF STORM WOULD ALLOW TIME FOR REPAIR• LOCAL STORMS CAN HAPPEN QUICKLY• TEMPORARY FIX MAY BE POSSIBLE |
|--|---|

NODE 2 PFM 13B - SLIDE NOT REPAIRED

(35)

ESTIMATES: 0.5, 0.7, 0.5, 0.4, 0.8, 0.3,

DALLAS FLOODWAY PFM 13B -
 GLOBAL INSTABILITY - PROGRESSIVE SLIDING
 NODE 1 - RIVER SIDE SLIDE

(33)

MORE LIKELY

LESS LIKELY

MOST HISTORICAL
 SLIDES ON RIVER
 SIDE. $\sim 2/3$
 10 OUT OF 50 YRS - NO SLIDES
~~11% CHANCE OF SLIDES~~
~~IN ANY GIVEN YEAR~~
 CAN HAVE MULTIPLE
 SLIDES IN A GIVEN YEAR
 ~ 310 SLIDES IN 50 YRS

- TYPICALLY OCCUR
 IN HIGH PITCH
 EMBANKMENT.
- ~~SIG~~ SIGNIFICANT PORTIONS
 OF EMB 1 ON 3 RIVER
 SIDE SLOPES
- COULD START LOW & PROGRESS TOWARD UPEST

MAJORITY OF SLIDES
 BOTTOM $2/3$ OF EMB,
~~SOUCH BETWEEN EMB~~
~~AND~~
 R_u ANALYSIS SHOWS
 $11\% P(FS < 1.0)$

AT ANY GIVEN
 TIME 11% CHANCE
 OF SLIDE

HNIB STATISTIC
 USED FOR THIS
 NODE

(SLOPE MODIFICATIONS
 & SLIDE REPAIRS REDUCE
 LIKELY HND)