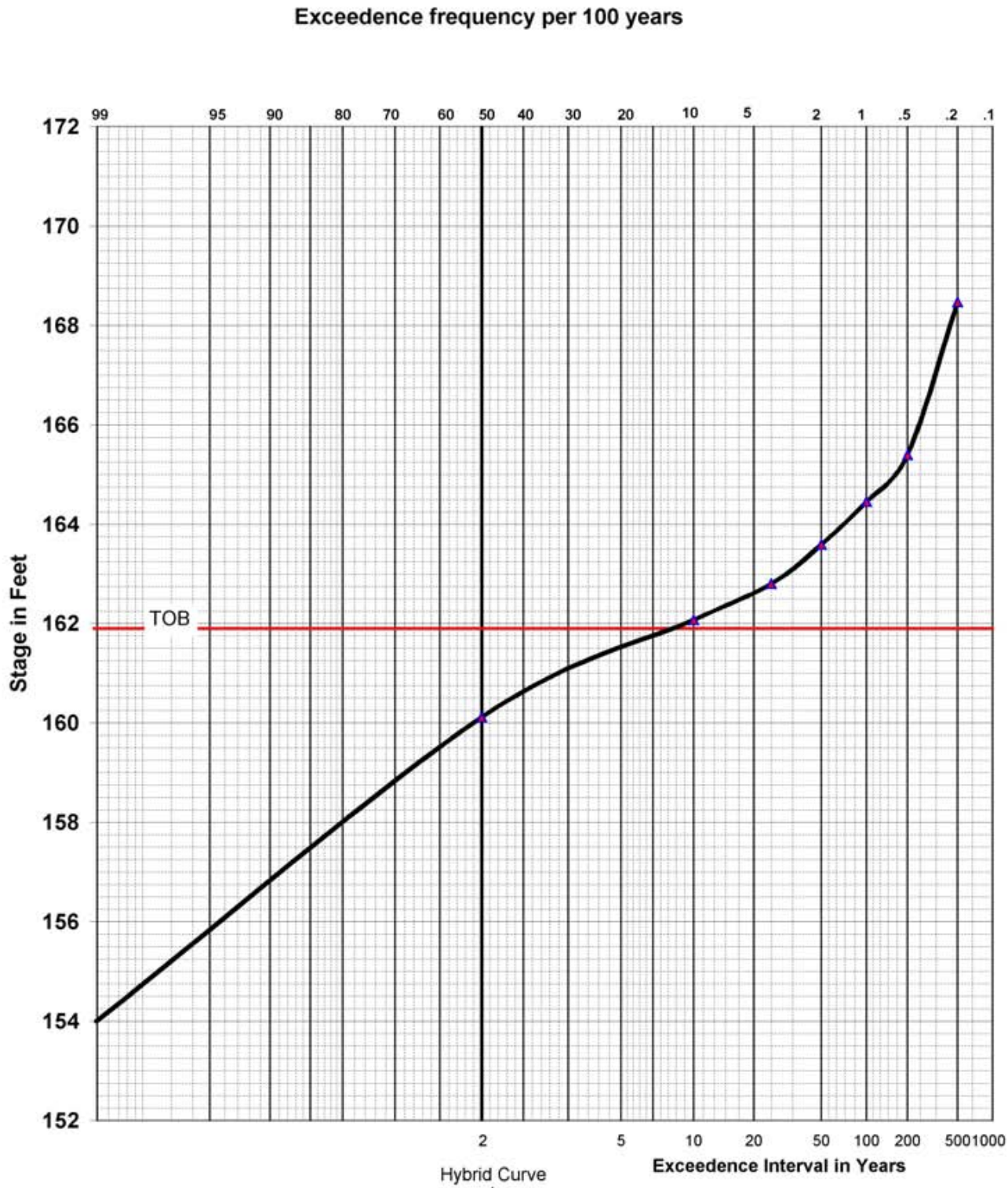
ATTACHMENT D.1

Without-Project Stage versus Frequency Curves

SACRAMENTO RIVER BASIN

December 2002



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 206.25

Left Bank

Top of Levee/Bank 161.9

LFP NA

Hybrid Curve

Yr	Stage
1.01	154
2	160.12
10	162.07
25	162.8
50	163.59
100	164.45
200	165.39
500	168.47

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

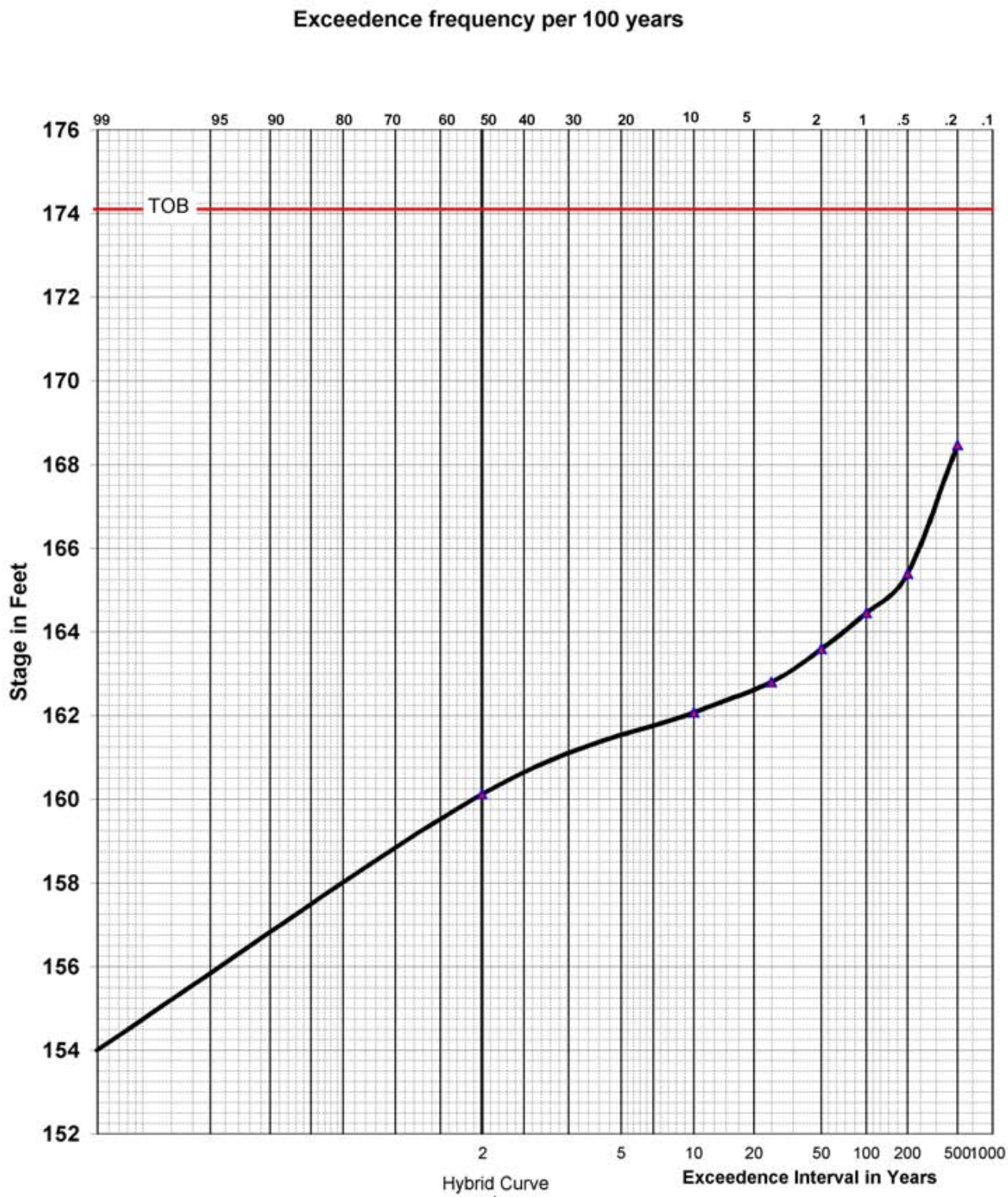
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC01

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-1**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 206.25

Right Bank

Top of Levee/Bank 174.1

LFP NA

Hybrid Curve

Yr	Stage
1.01	154
2	160.12
10	162.07
25	162.8
50	163.59
100	164.45
200	165.39
500	168.47

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

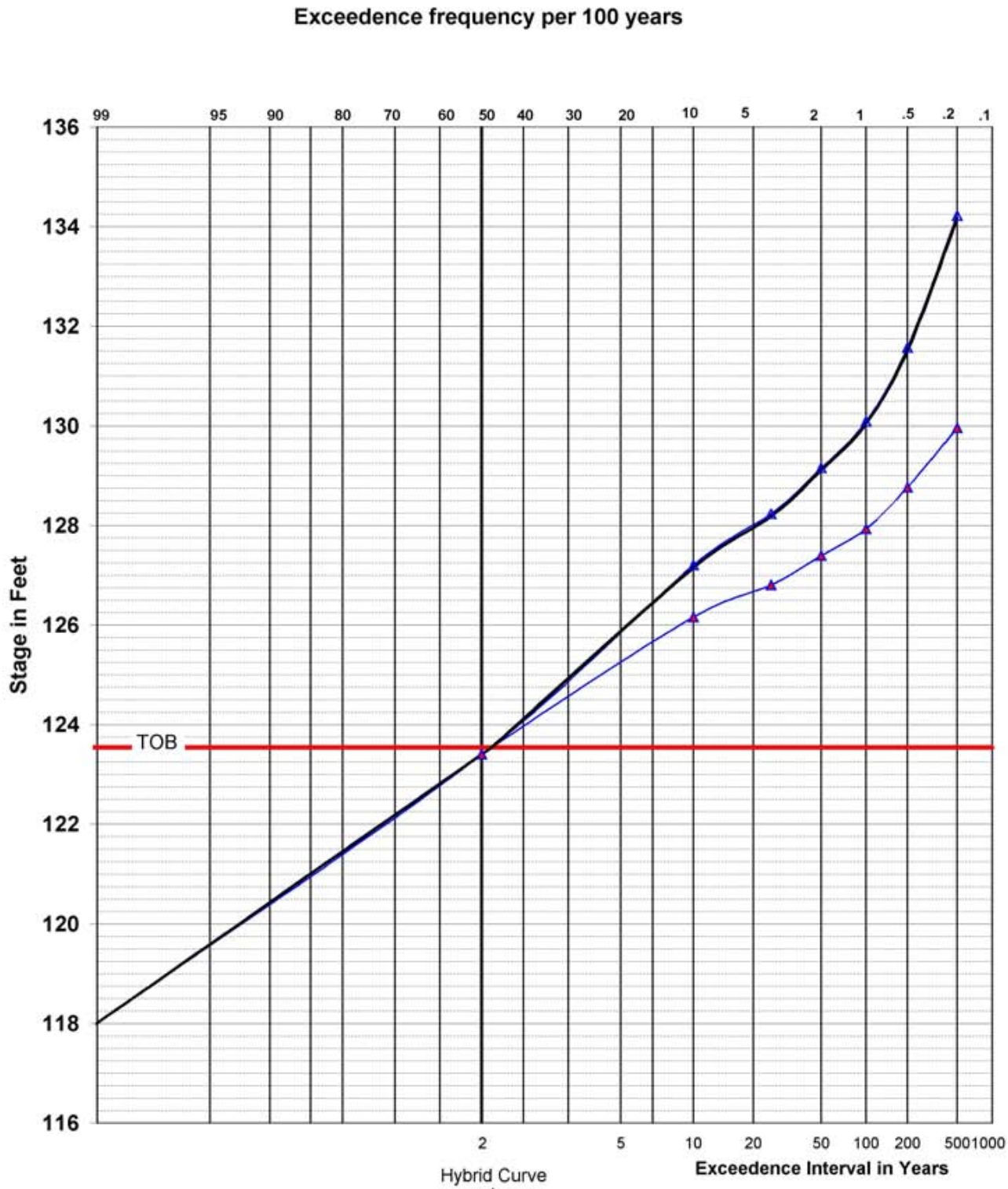
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC02

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-2**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 189.25

Right Bank

Top of Levee/Bank 123.54

LFP NA

Hybrid Curve

Yr	Stage
1.01	118
2	123.4
2.1	123.54
10	127.15
25	128.18
50	129.11
100	130.04
200	131.52
500	134.17

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

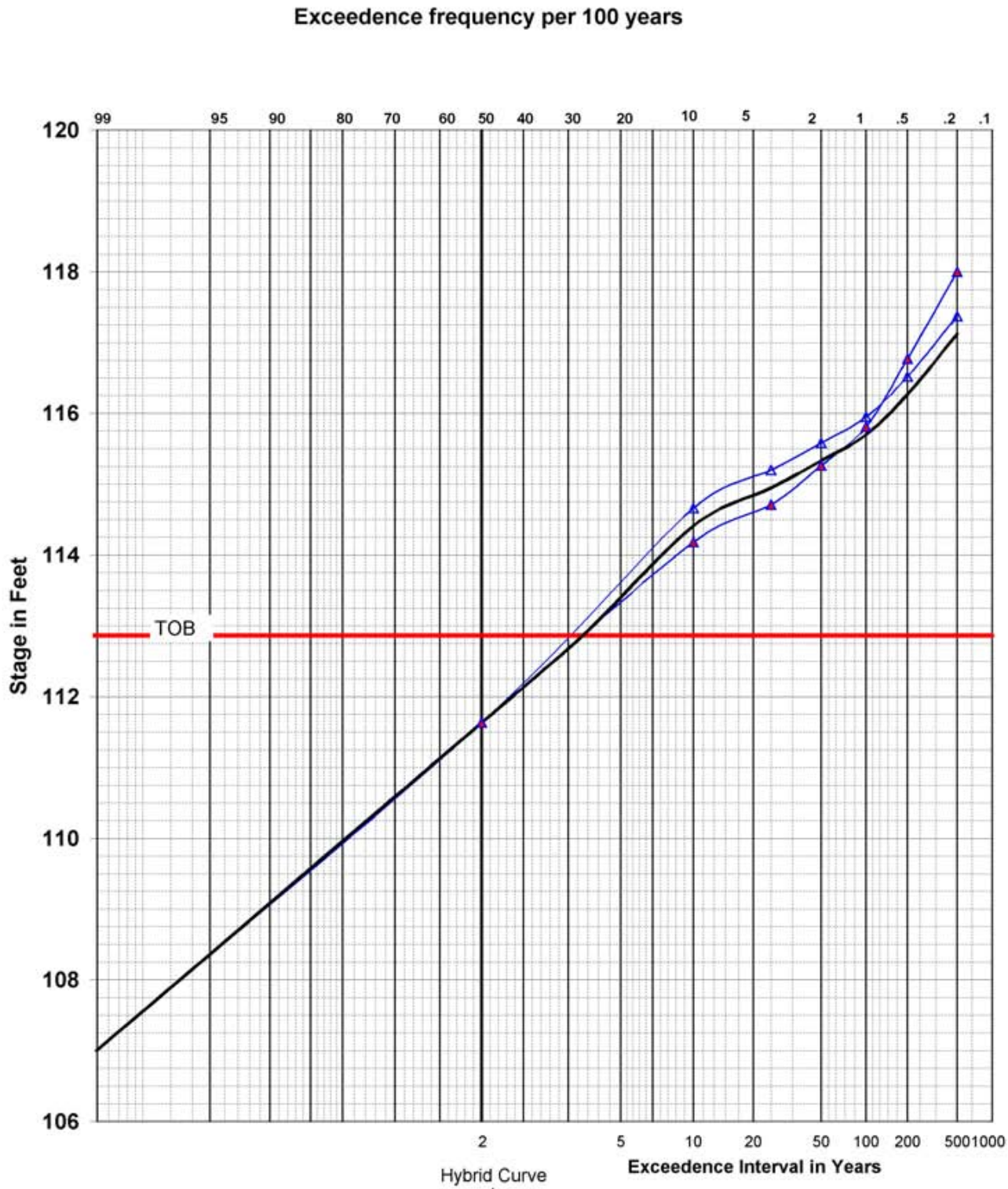
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREAS SAC03 SAC04

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-3**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 183.50

Left Bank

Top of Levee/Bank 112.86

LFP NA

Hybrid Curve

Yr	Stage
1.01	107
2	111.63
3.7	112.86
10	114.41
25	114.95
50	115.33
100	115.7
200	116.27
500	117.12

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

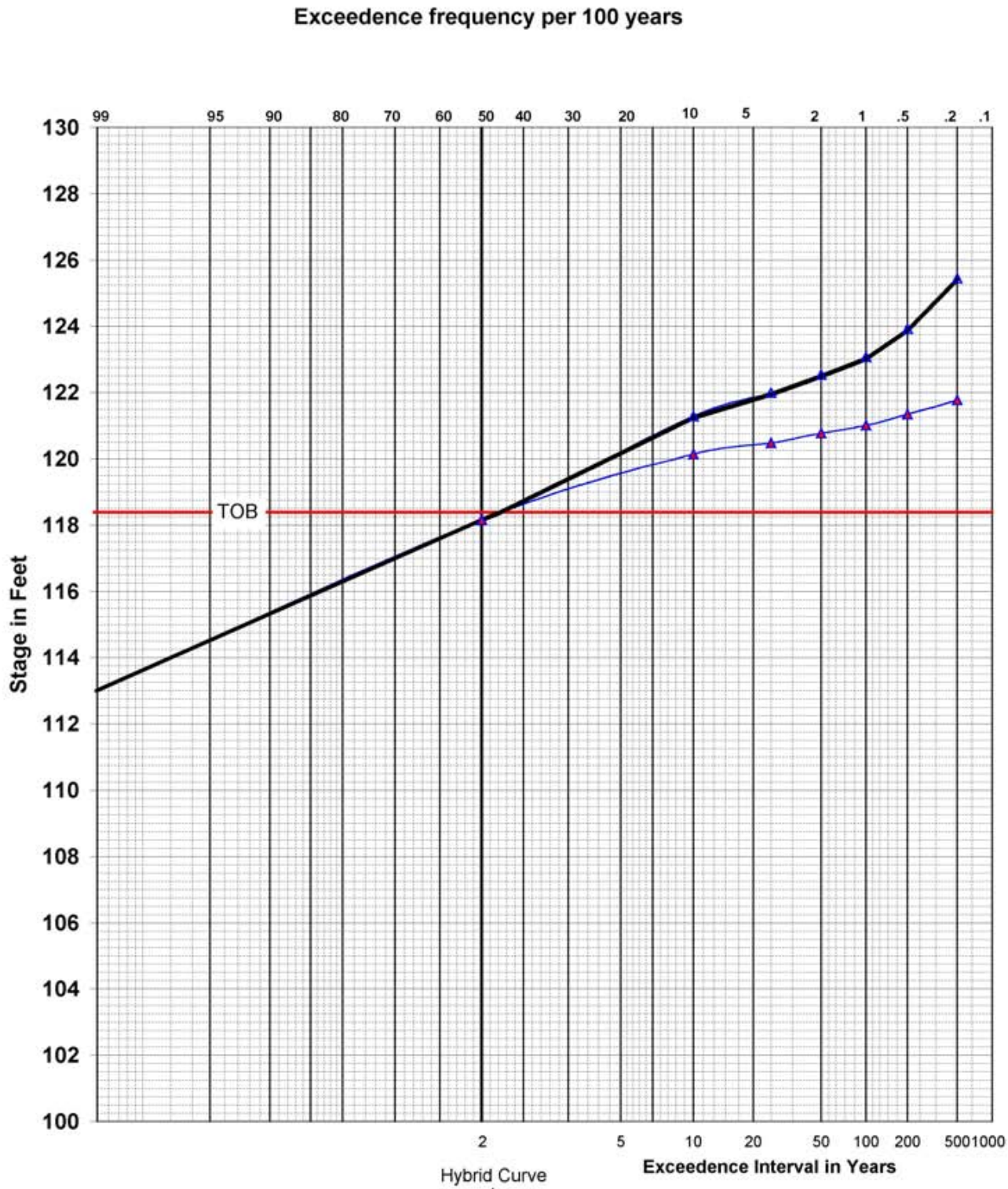
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREAS SAC05 SAC06

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-4**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 186.25

Right Bank

Top of Levee/Bank 118.39

LFP NA

Hybrid Curve

Yr	Stage
1.01	113
2	118.16
2.2	118.39
10	121.24
25	121.94
50	122.49
100	123.02
200	123.87
500	125.4

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

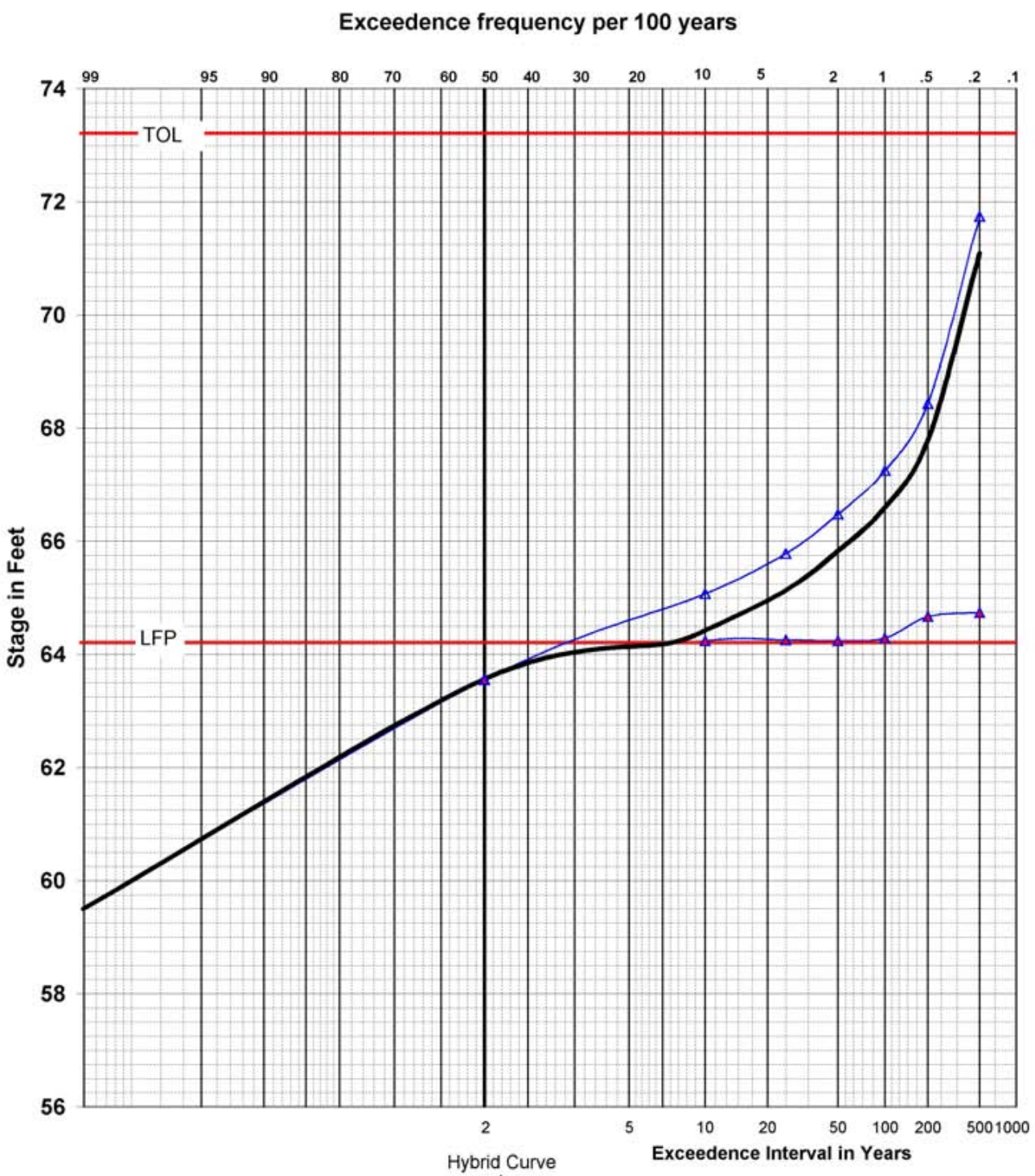
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC07

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-5**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 144.50

Right Bank

Top of Levee/Bank 73.205

LFP 64.205

Hybrid Curve

Yr	Stage
1.01	59.5
2	63.56
7.2	64.205
10	64.42
25	65.13
50	65.83
100	66.6
200	67.78
500	71.09

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

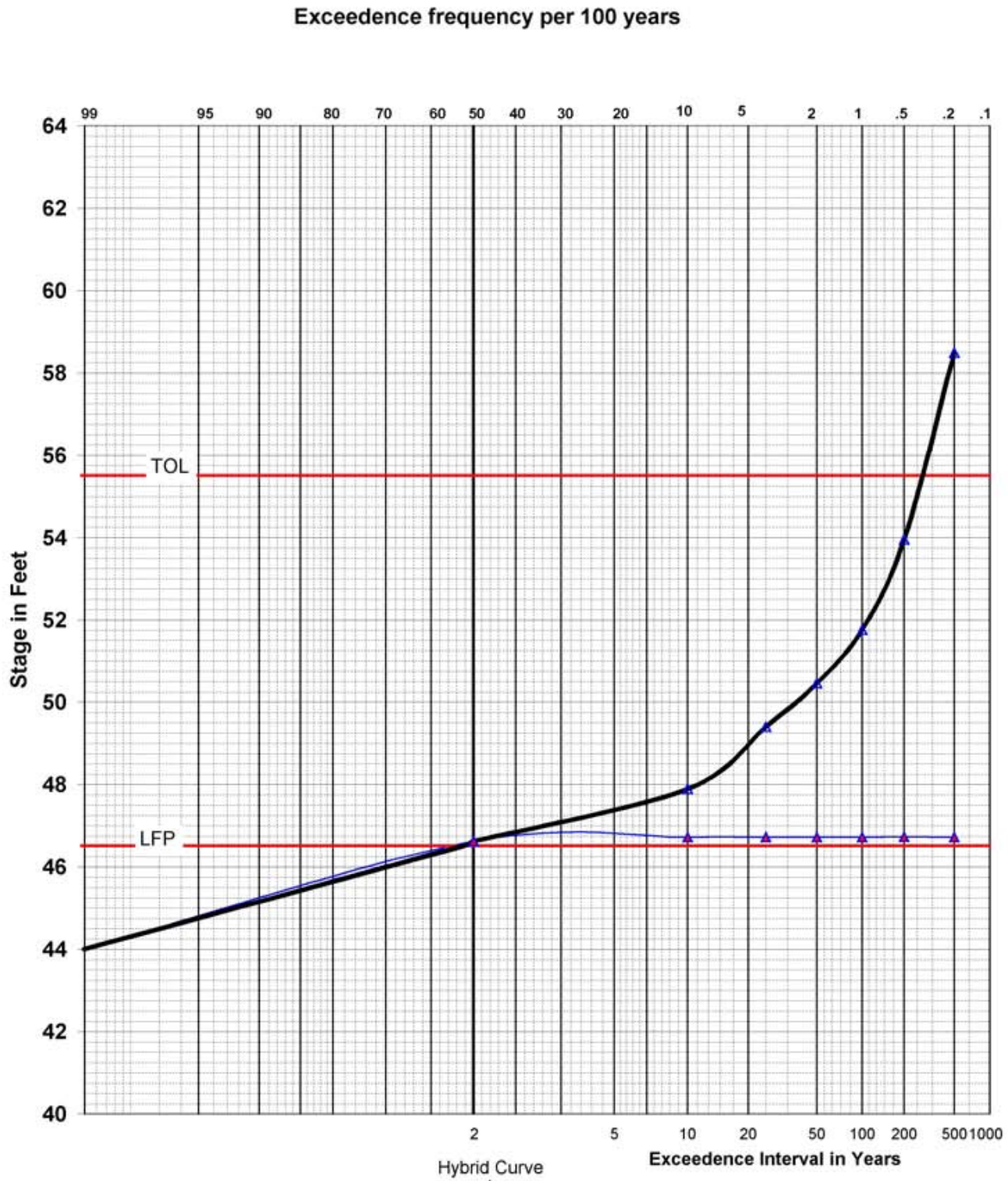
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC08

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-6**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 119.75

Right Bank

Top of Levee/Bank	55.51
LFP	46.51

Hybrid Curve

Yr	Stage
1.01	44
1.9	46.505
2	46.62
10	47.89
25	49.4
50	50.46
100	51.76
200	53.95
500	58.49

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

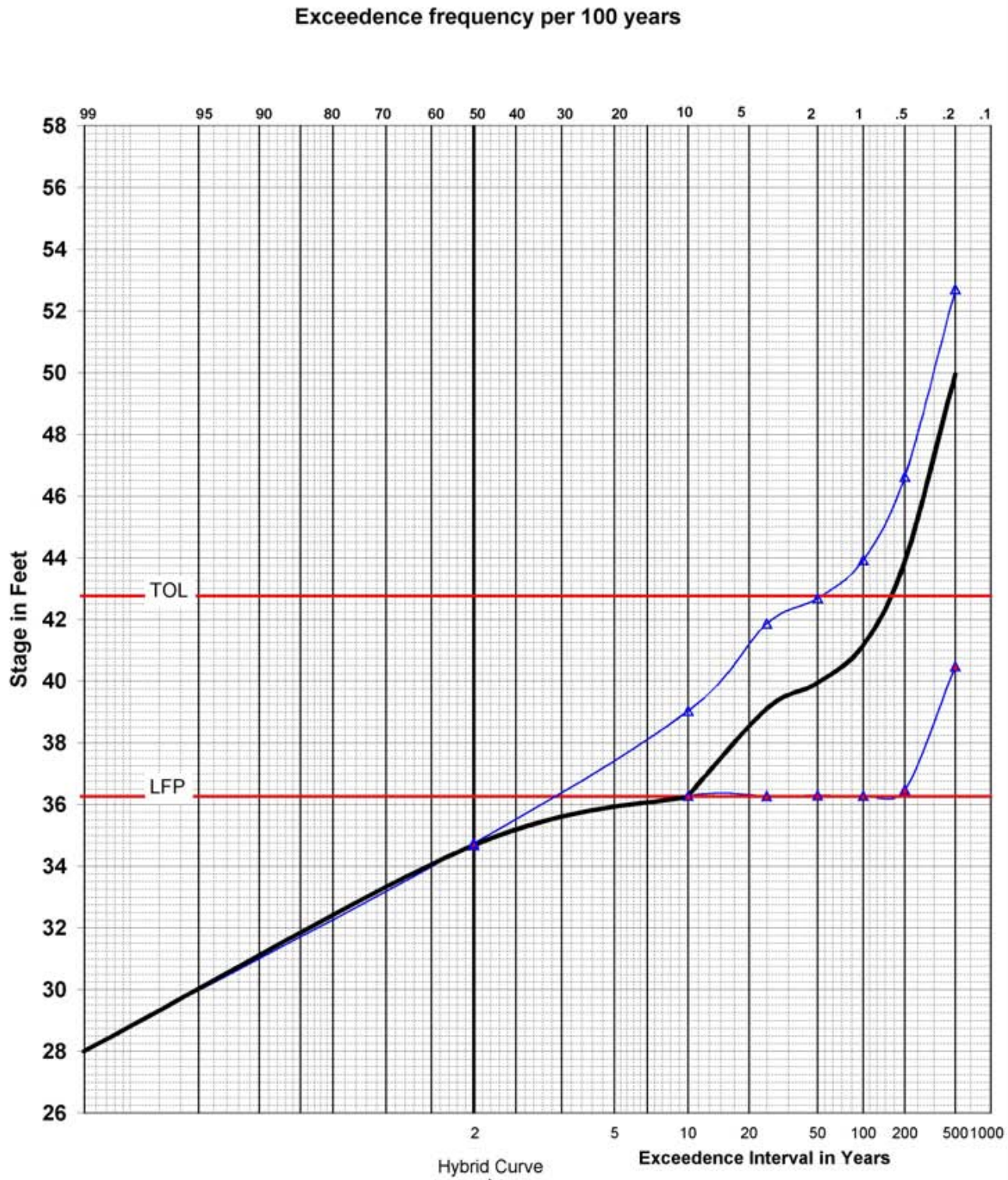
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREAS SAC09 SAC10

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-7**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 92.00

Left Bank

Top of Levee/Bank	42.76
LFP	36.26

Hybrid Curve

Yr	Stage
1.01	28
2	34.68
9.99	36.26
10	36.28
25	39.11
50	39.94
100	41.17
200	43.88
500	49.95

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

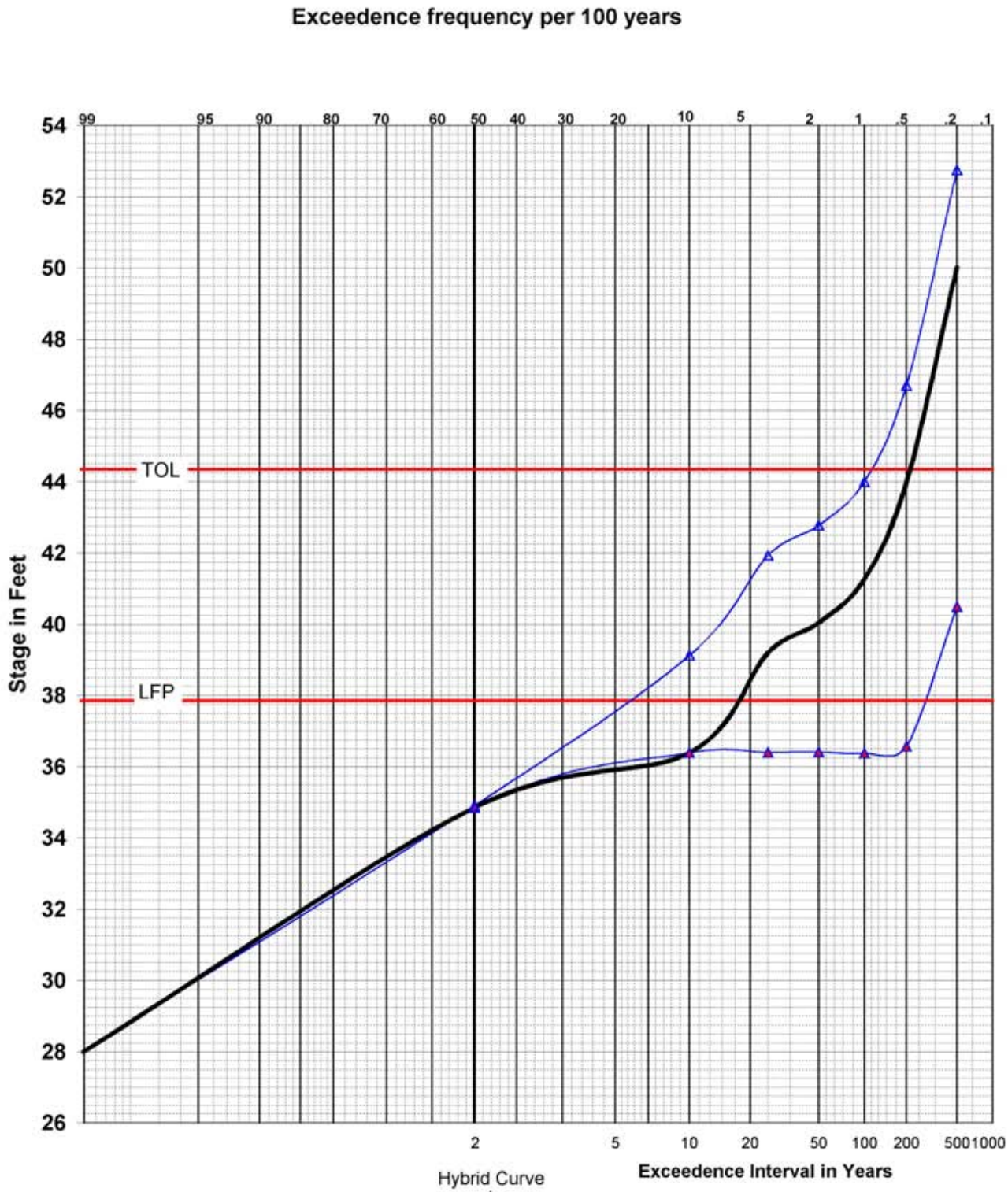
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC11

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-8**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 92.50
Right Bank

Top of Levee/Bank	44.35
LFP	37.85

Hybrid Curve

Yr	Stage
1.01	28
2	34.85
10	36.39
25	39.2
50	40.04
100	41.27
200	43.97
500	50.02

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

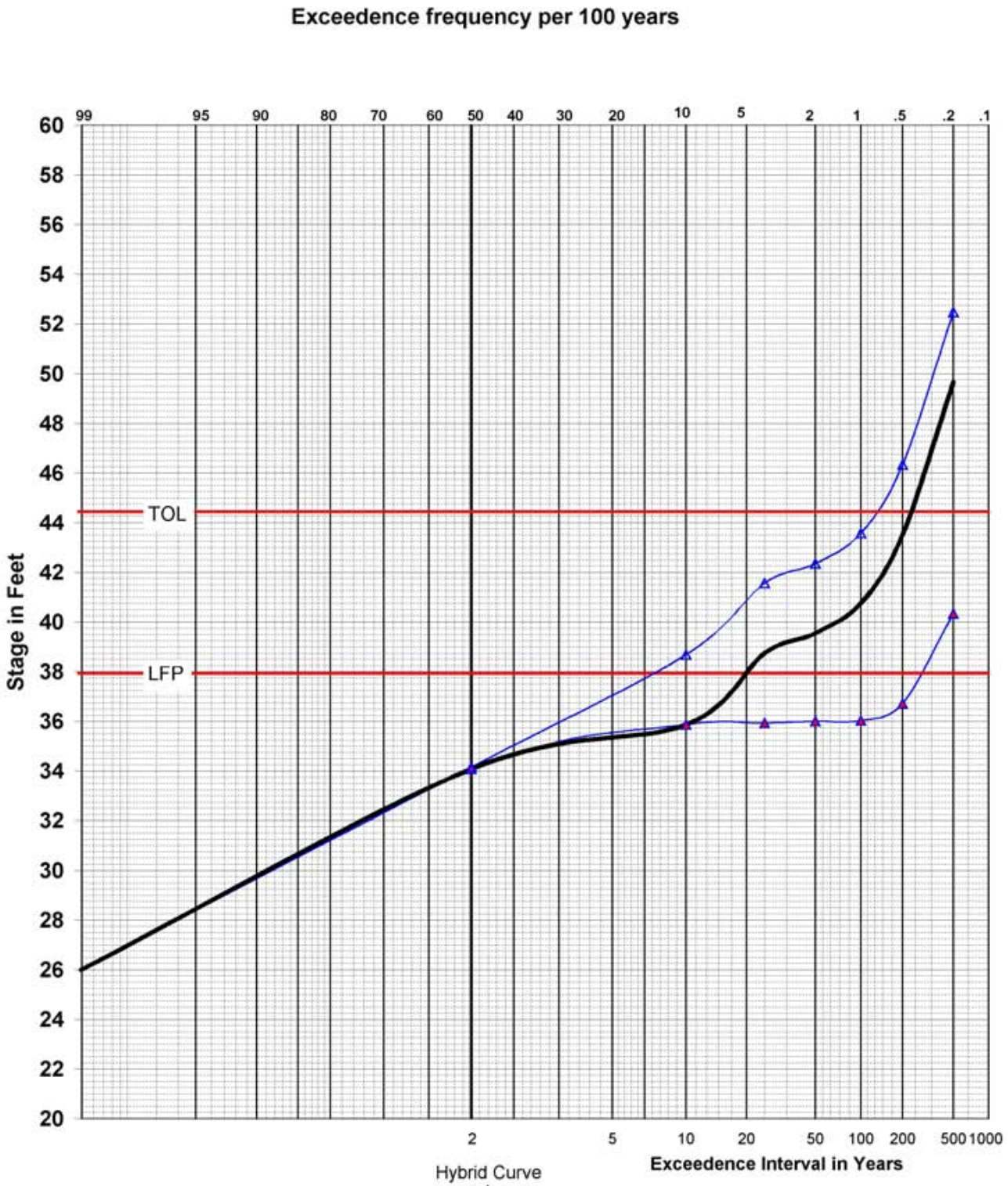
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC12

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-9**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 90.00
Right Bank

Top of Levee/Bank	44.43
LFP	37.93

Hybrid Curve

Yr	Stage
1.01	26
2	34.08
10	35.87
25	38.75
50	39.54
100	40.76
200	43.52
500	49.66

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

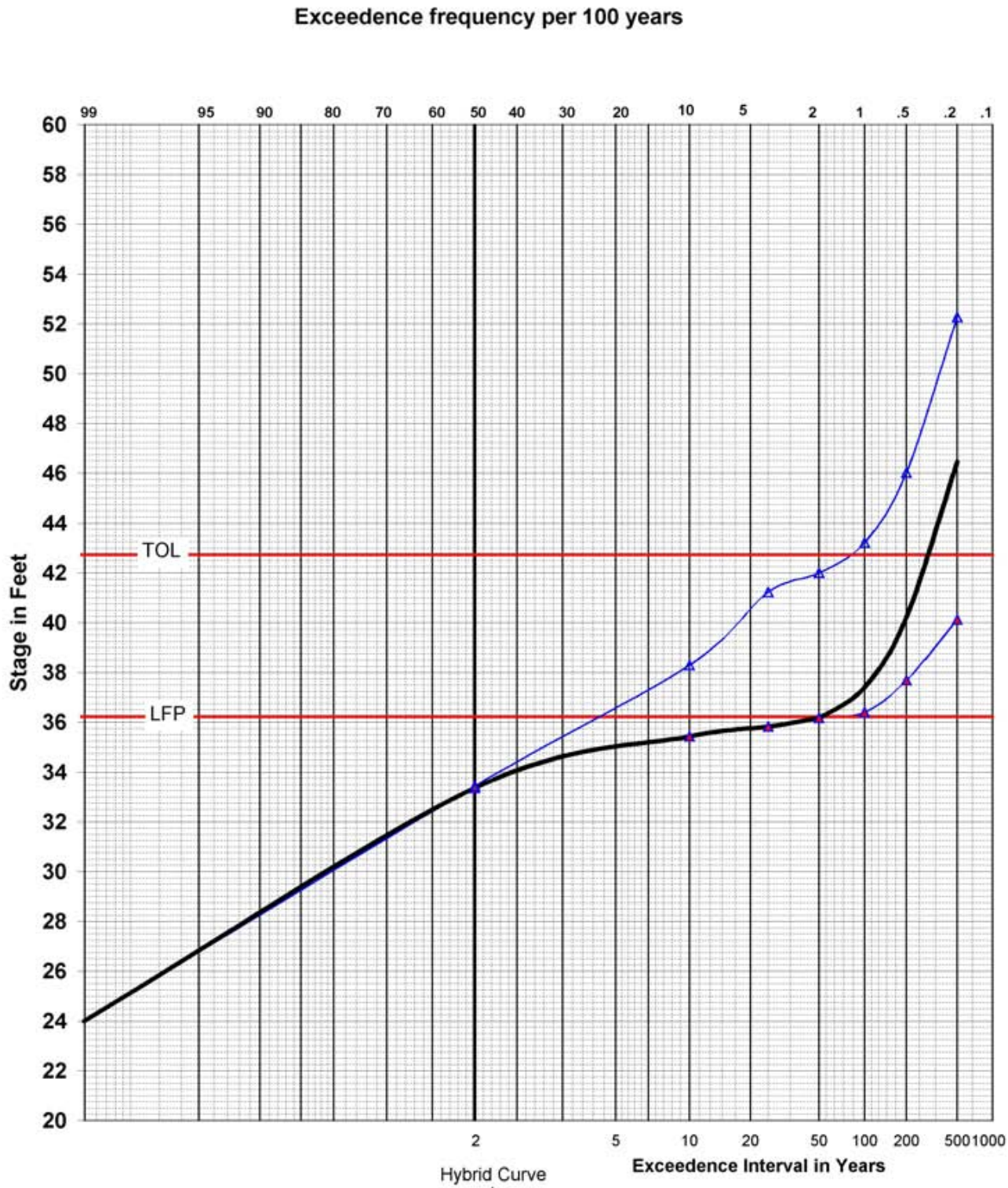
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC13

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-10**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 87.00

Right Bank

Top of Levee/Bank	42.72
LFP	36.22

Hybrid Curve

Yr	Stage
1.01	24
2	33.36
10	35.43
25	35.82
50	36.18
52	36.22
100	37.4
200	40.21
500	46.46

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

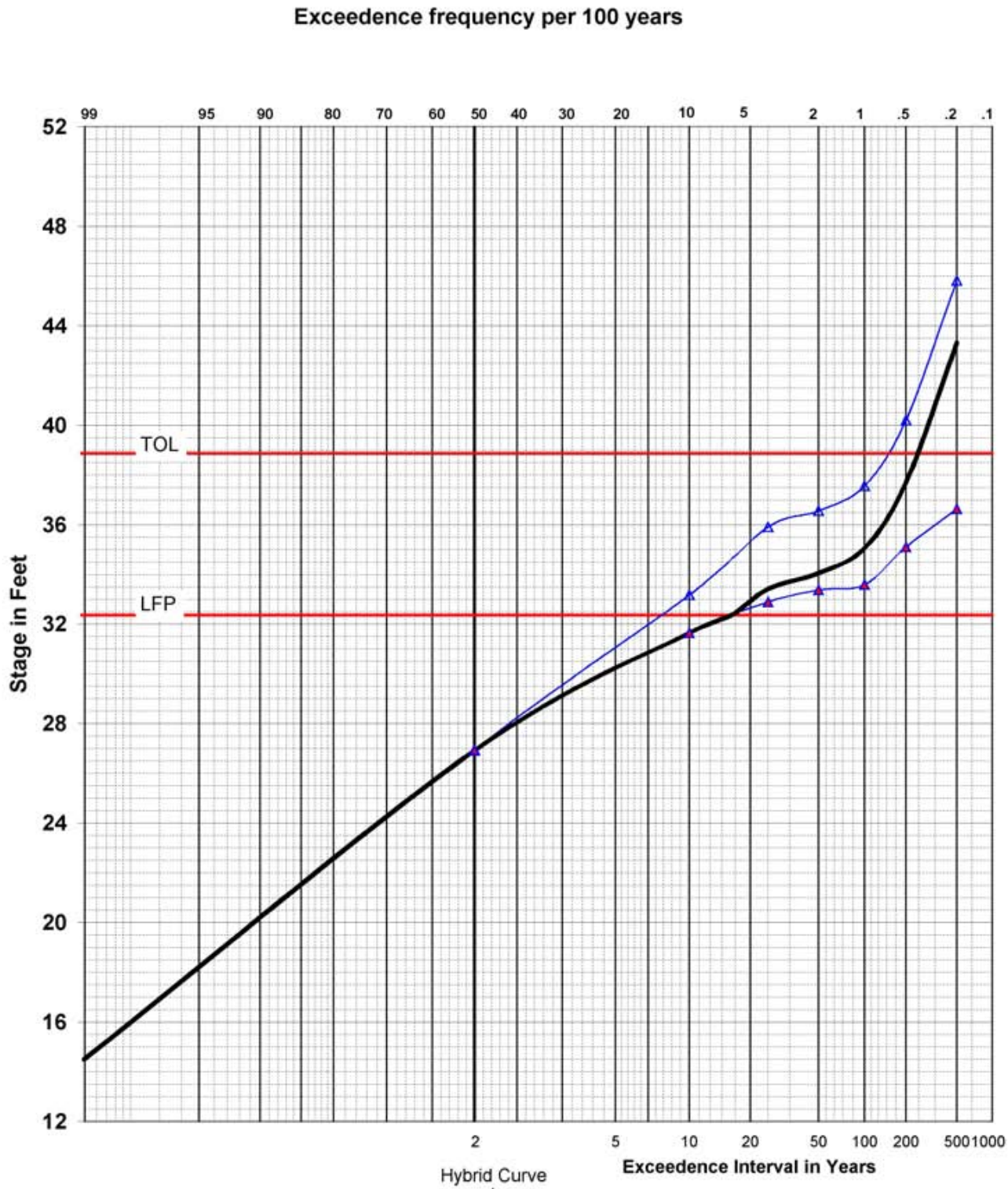
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC14

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-11**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

KLRC mile 3.02

Right Bank

Top of Levee/Bank	38.86
LFP	32.36

Hybrid Curve

Yr	Stage
1.01	14.5
2	26.91
10	31.65
16	32.36
25	33.41
50	34.06
100	35.06
200	37.69
500	43.32

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

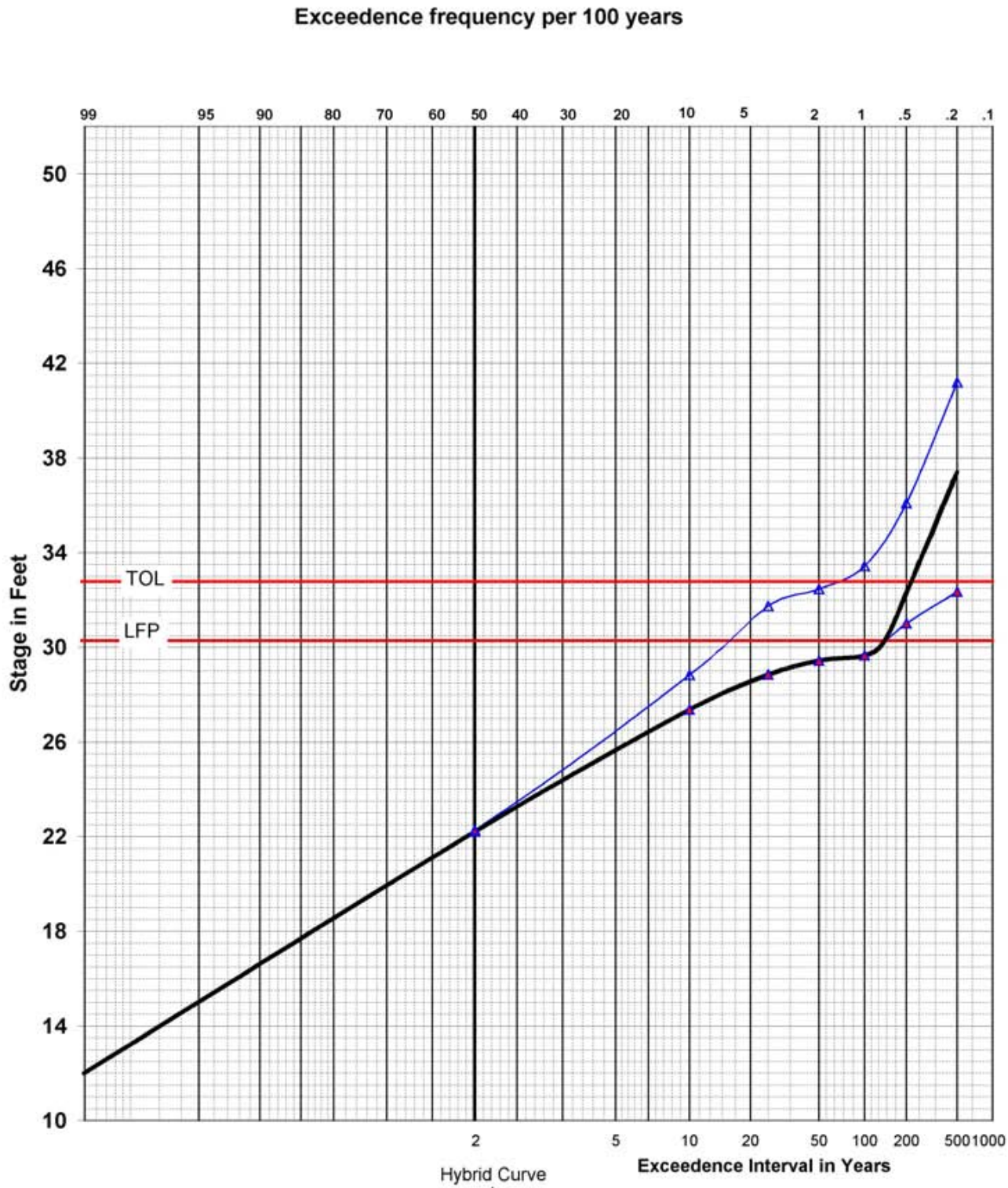
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC15

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-12**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Yolo Bypass mile 48.84
Right Bank

Top of Levee/Bank	32.78
LFP	30.28

Hybrid Curve

Yr	Stage
1.01	12
2	22.2
10	27.37
25	28.85
50	29.43
100	29.65
138	30.28
200	32.29
500	37.4

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

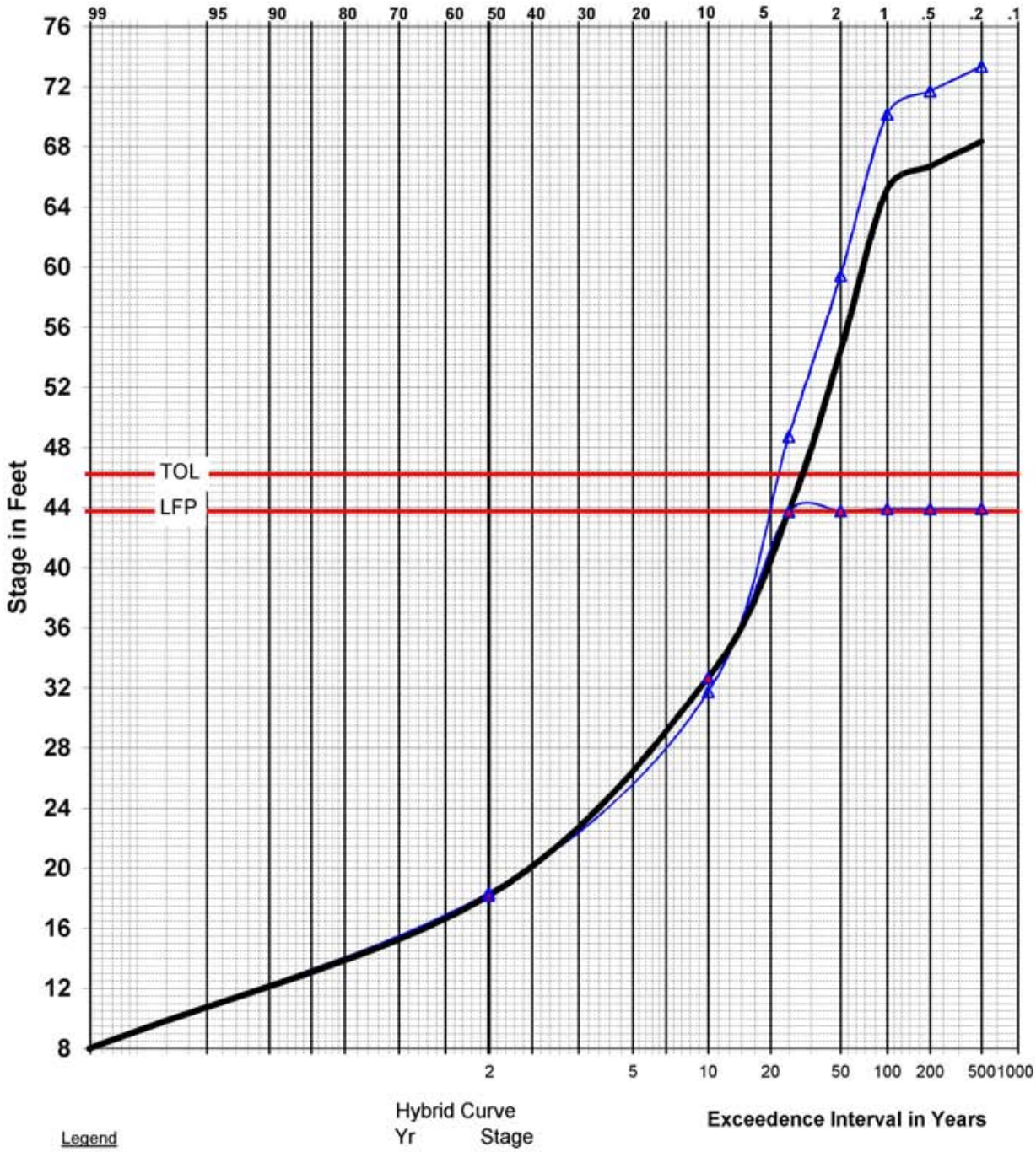
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC16

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-13**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Hybrid Curve

Yr	Stage
1.01	8
2	18.17
10	32.68
25	43.7
50	54.42
100	65.15
200	66.69
500	68.34

COMPREHENSIVE STUDY

Phase II Economics

STAGE FREQUENCY CURVE

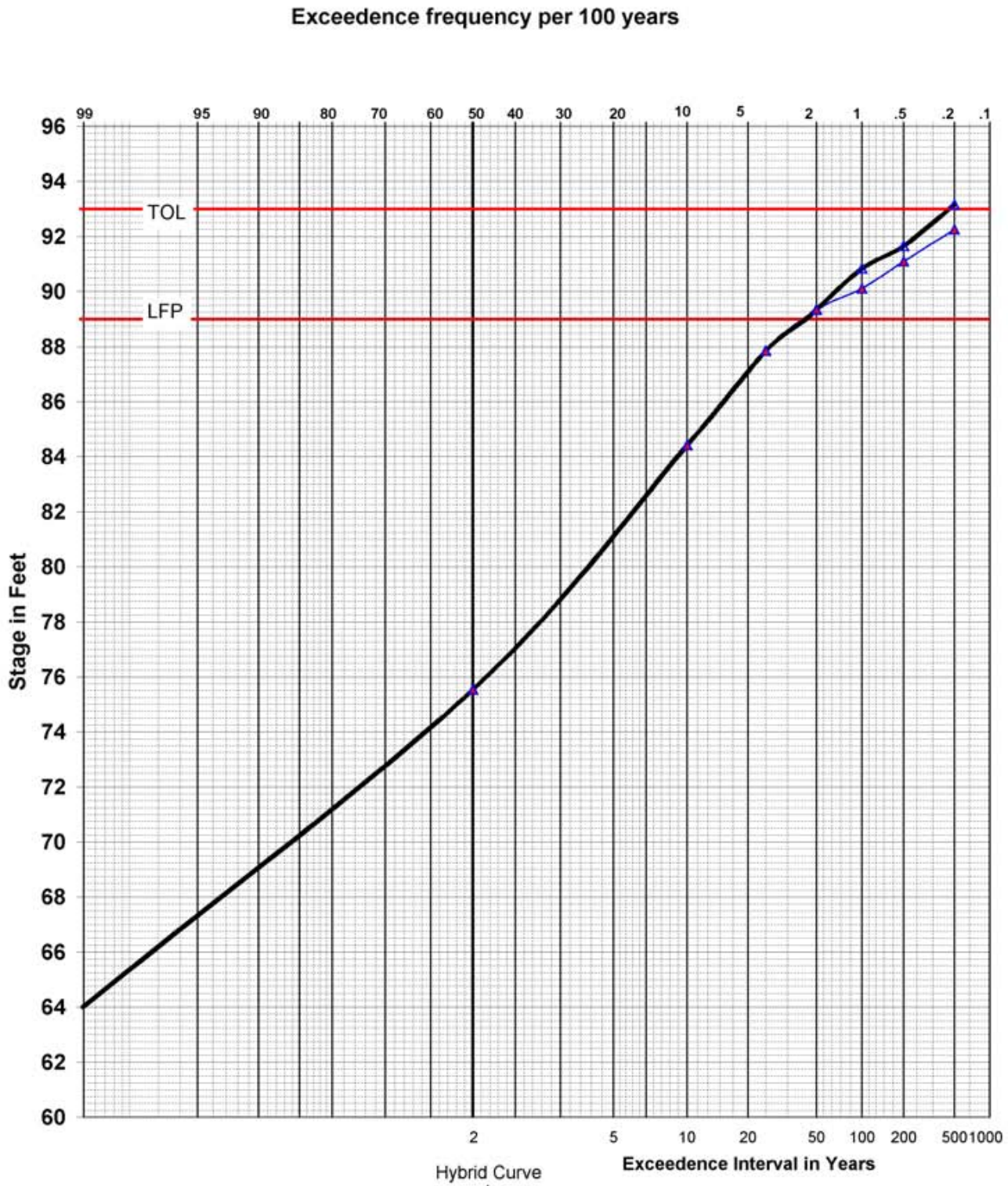
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC17

Corps of Engineers, Sacramento District

October 2002 PLATE D.1-14



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Yuba River mile 7.00

Right Bank

Top of Levee/Bank	92.99
LFP	88.99

Hybrid Curve

Yr	Stage
1.01	64
2	75.54
10	84.42
25	87.84
43	88.99
50	89.35
100	90.83
200	91.66
500	93.16

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

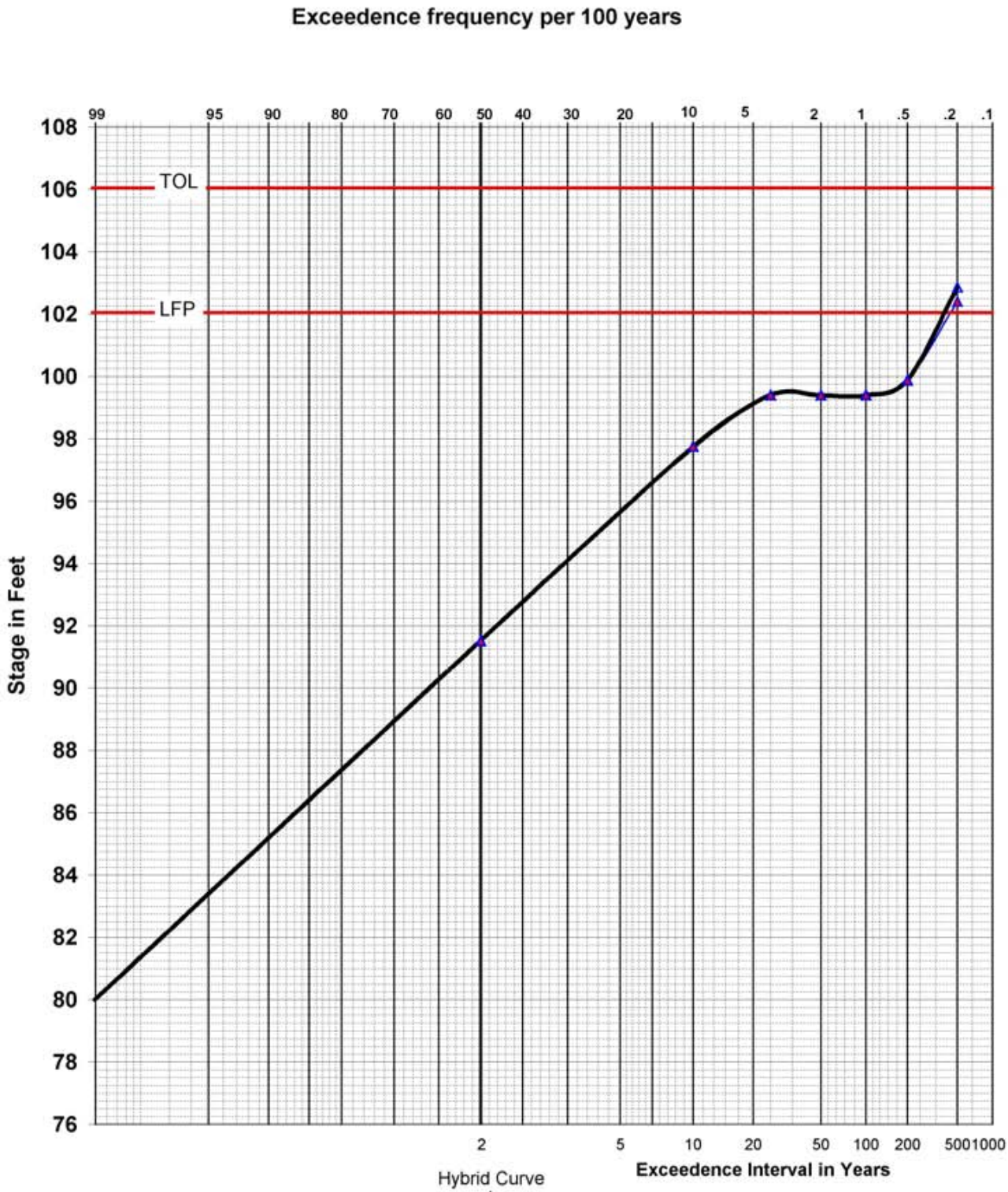
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC18

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-15**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Feather River mile 51.09

Right Bank

Top of Levee/Bank	106.05
LFP	102.05

Hybrid Curve

Yr	Stage
1.01	80
2	91.52
10	97.74
25	99.4
50	99.39
100	99.39
200	99.89
500	102.86

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

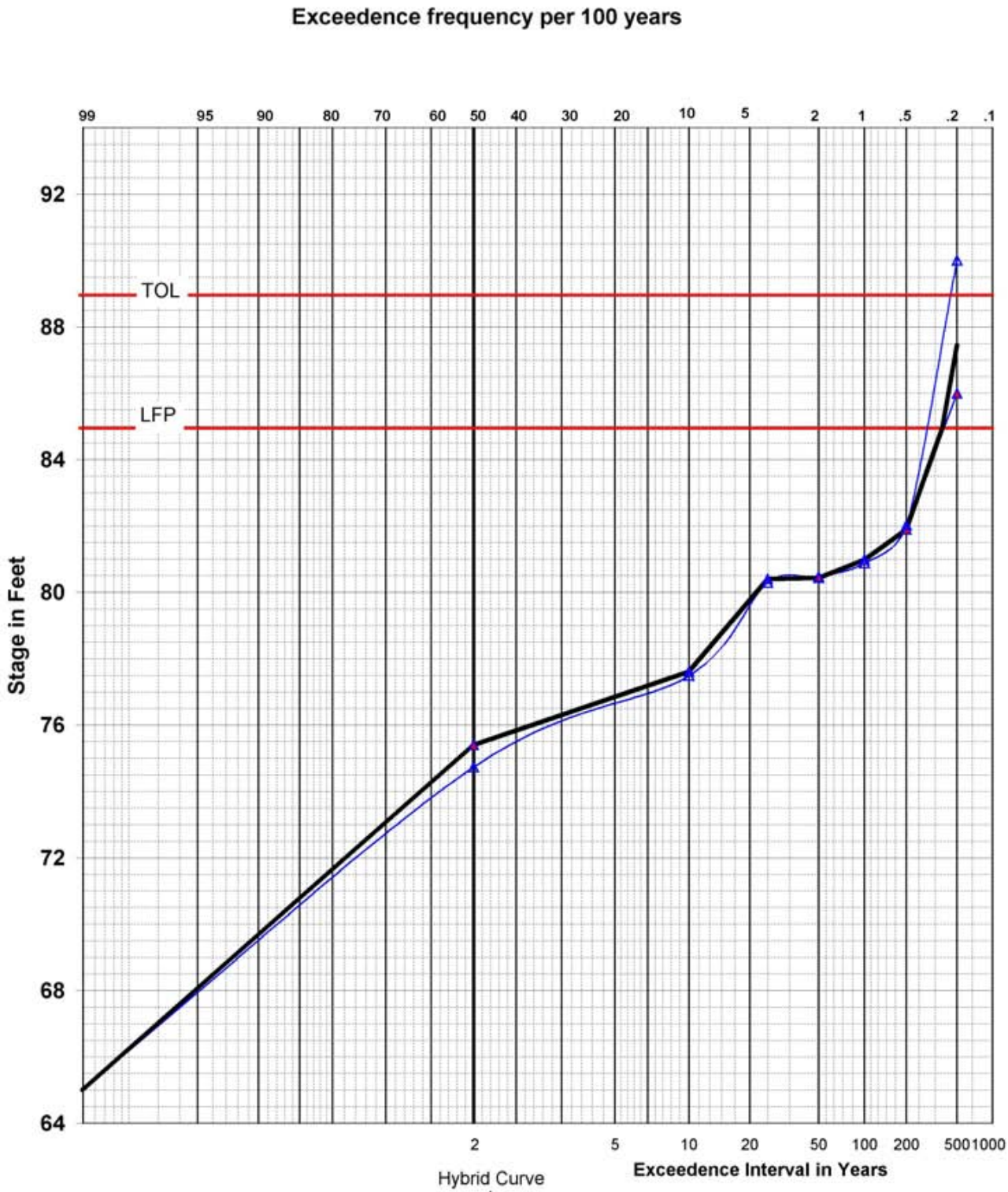
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREAS SAC19 SAC20

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-16**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Feather River mile 42.70

Right Bank

Top of Levee/Bank	88.95
LFP	84.95

Hybrid Curve

Yr	Stage
1.01	65
2	75.4
10	77.61
25	80.4
50	80.43
100	80.98
200	81.89
380	84.95
500	87.45

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

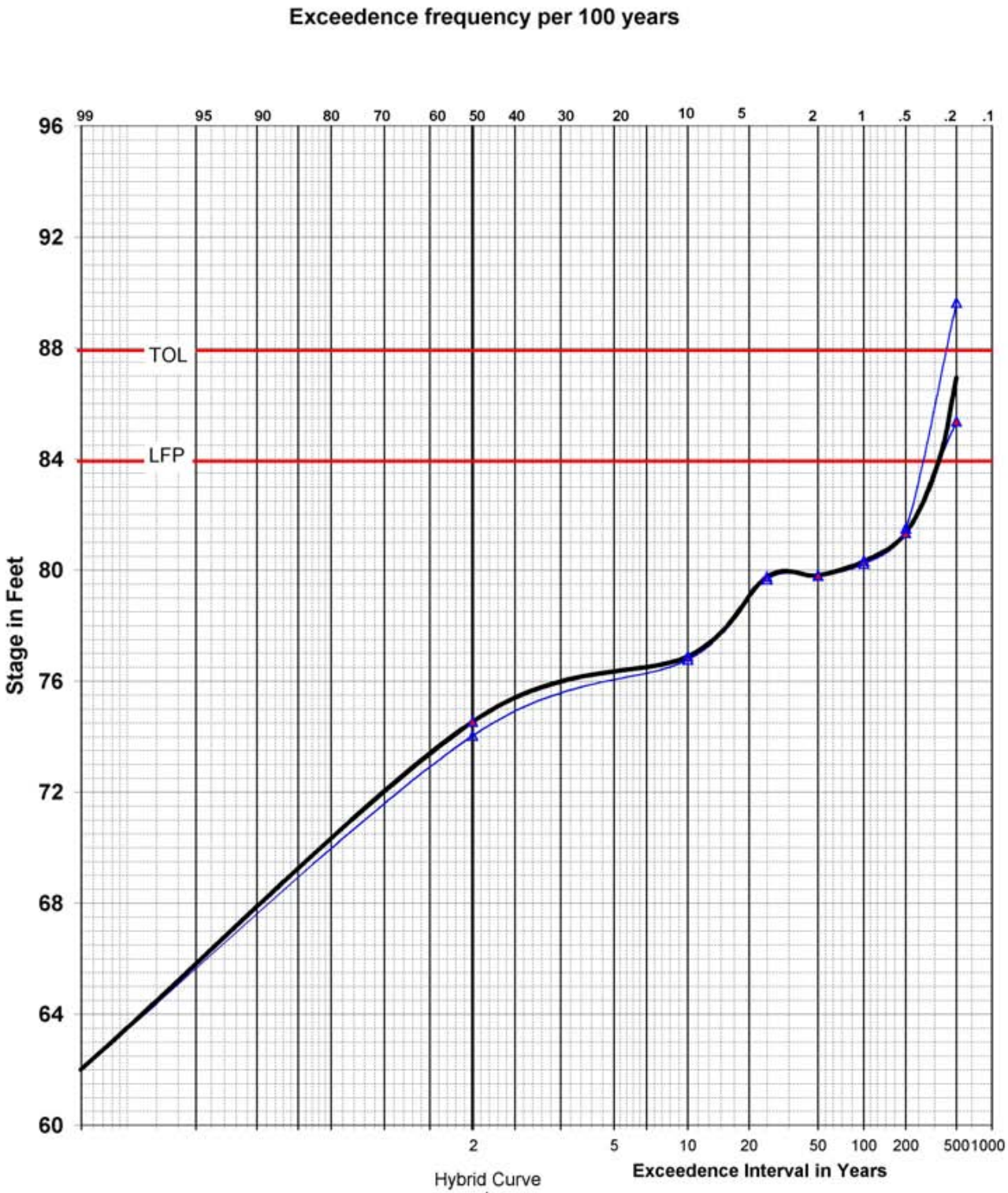
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREAS SAC21 SAC22

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-17**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Feather River mile 42.24

Left Bank

Top of Levee/Bank	87.91
LFP	83.91

Hybrid Curve

Yr	Stage
1.01	62
2	74.54
10	76.89
25	79.76
50	79.81
100	80.33
200	81.34
360	83.91
500	86.94

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

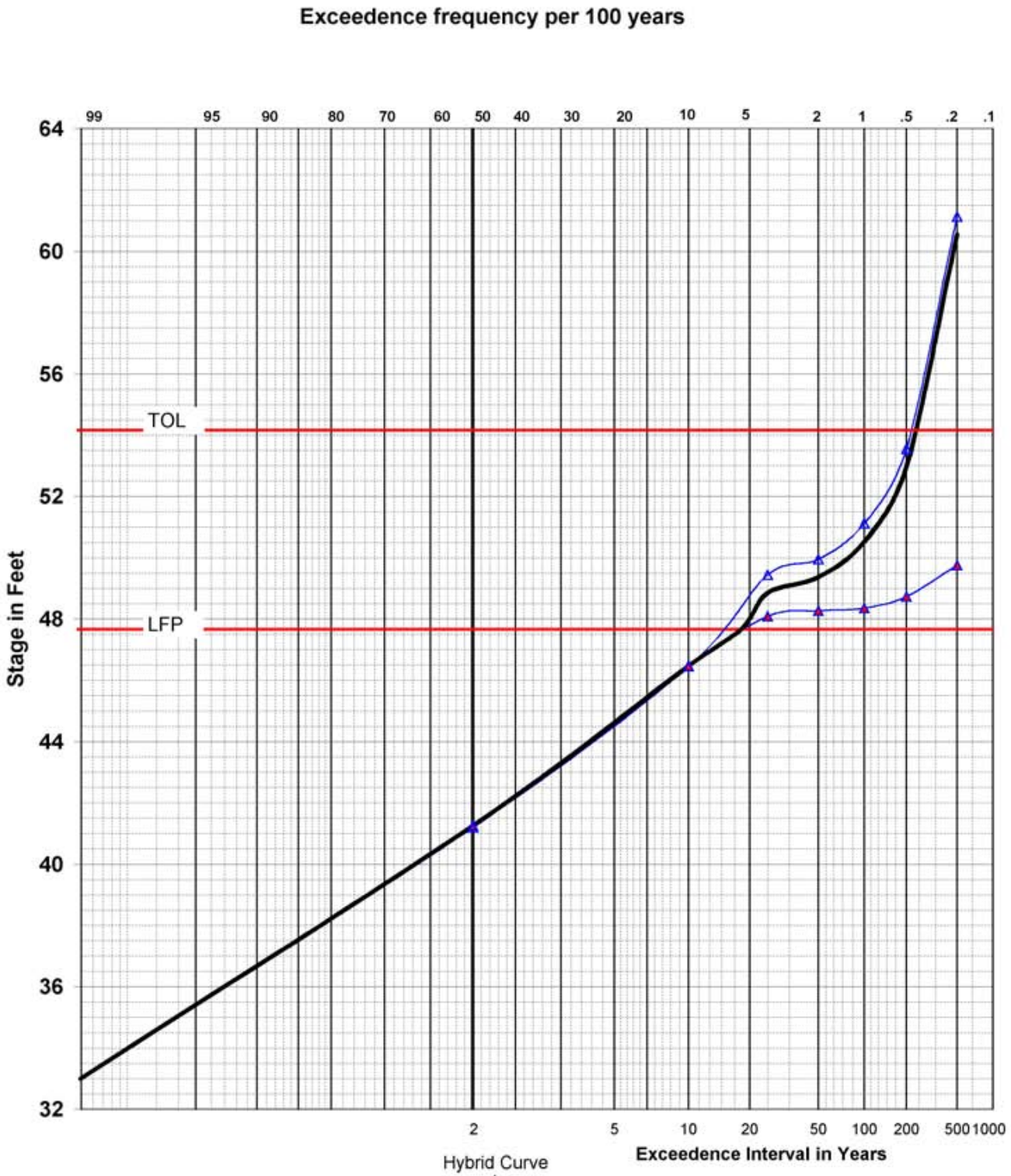
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC23

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-18**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Feather River Mile 9.00
Right Bank

Top of Levee/Bank	54.16
LFP	47.66

Hybrid Curve

Yr	Stage
1.01	33
2	41.26
10	46.47
18	47.66
25	48.85
50	49.36
100	50.52
200	52.96
500	60.54

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

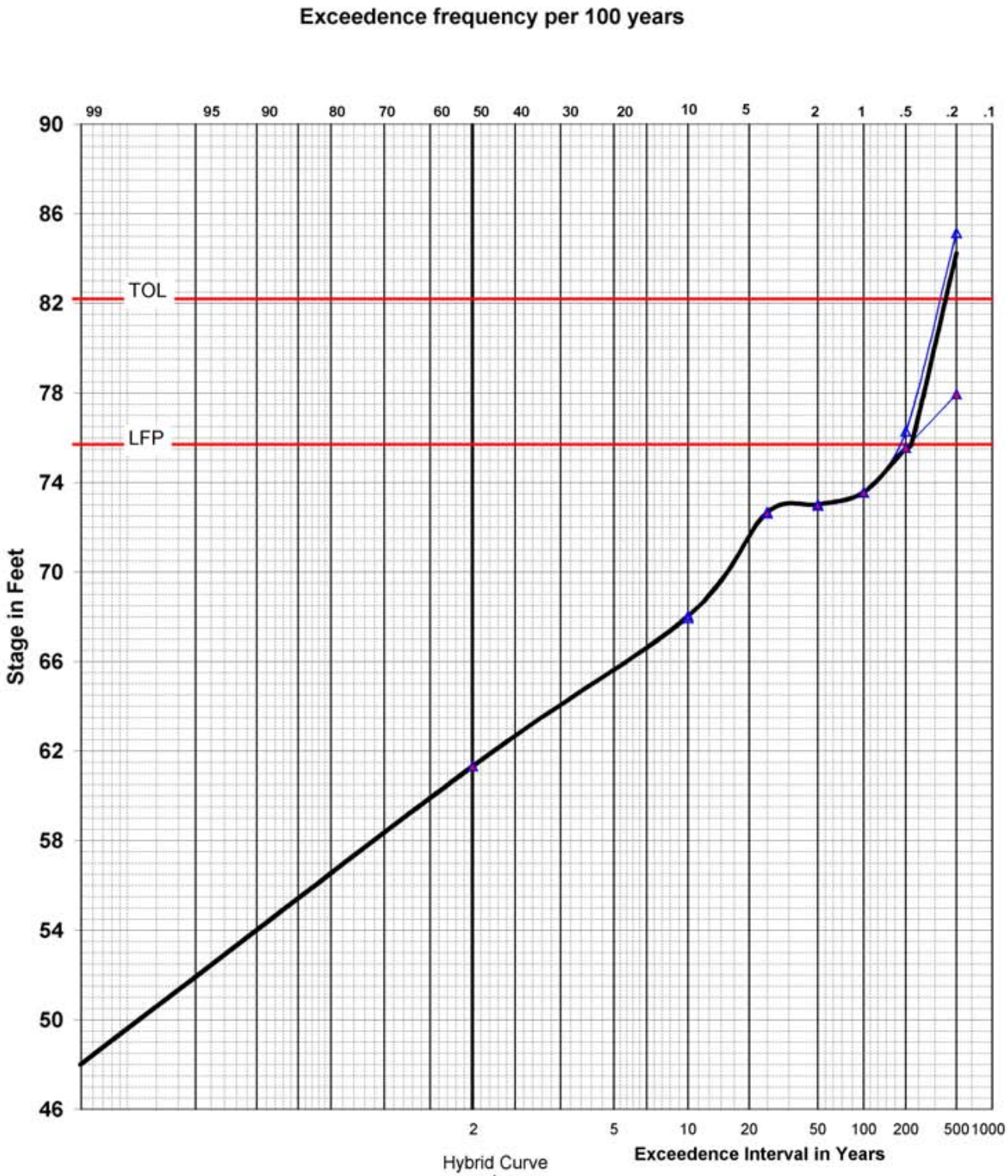
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC24

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-19**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Feather River mile 29.00

Right Bank

Top of Levee/Bank	82.19
LFP	75.69

Hybrid Curve

Yr	Stage
1.01	48
2	61.33
10	68.04
25	72.67
50	73.01
100	73.57
200	75.55
220	75.69
500	84.23

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

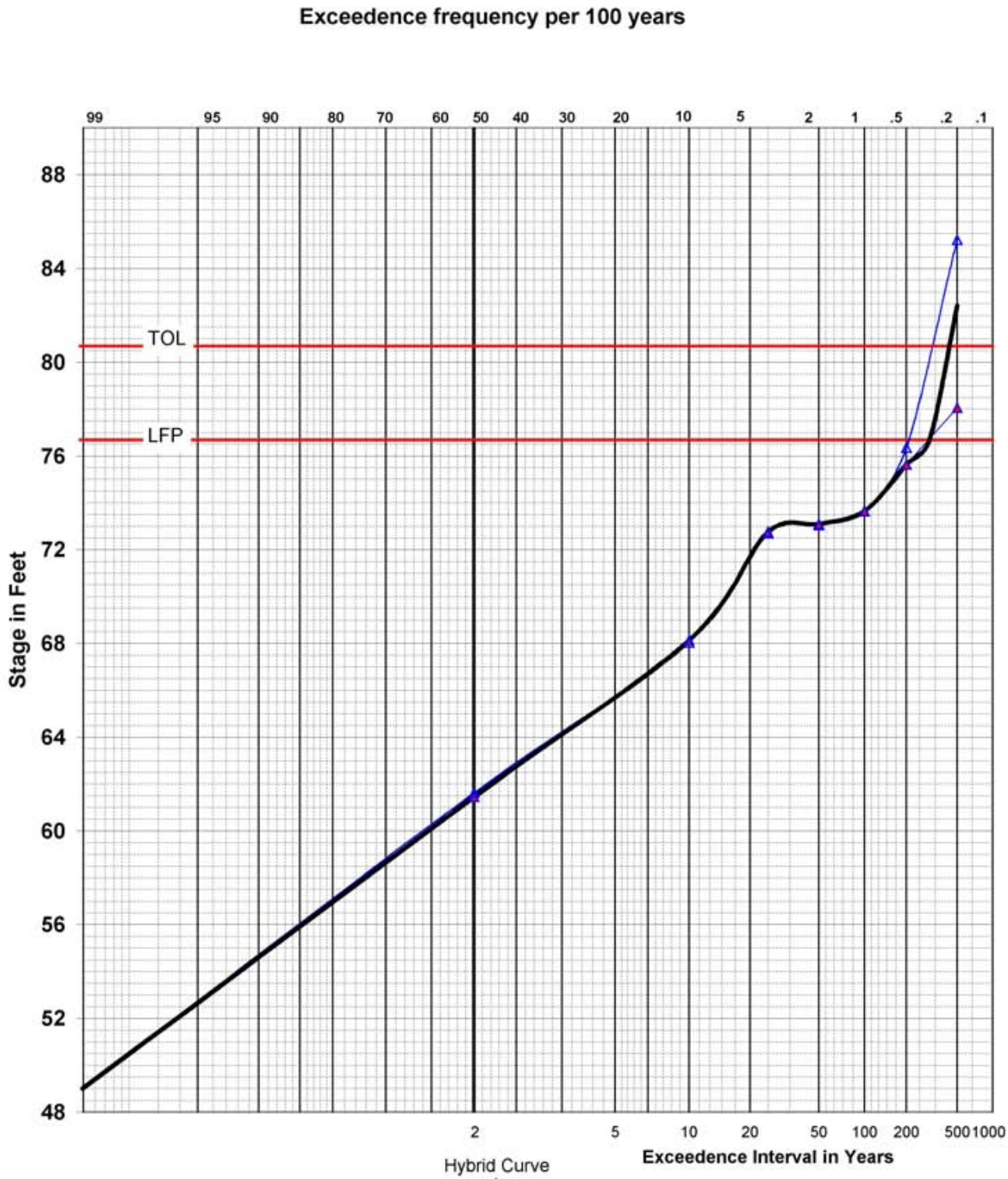
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC25

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-20**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Jack Slough mile 1.90

Left Bank

Top of Levee/Bank	80.68
LFP	76.68

Hybrid Curve

Yr	Stage
1.01	49
2	61.44
10	68.13
25	72.76
50	73.09
100	73.65
200	75.62
300	76.68
500	82.41

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

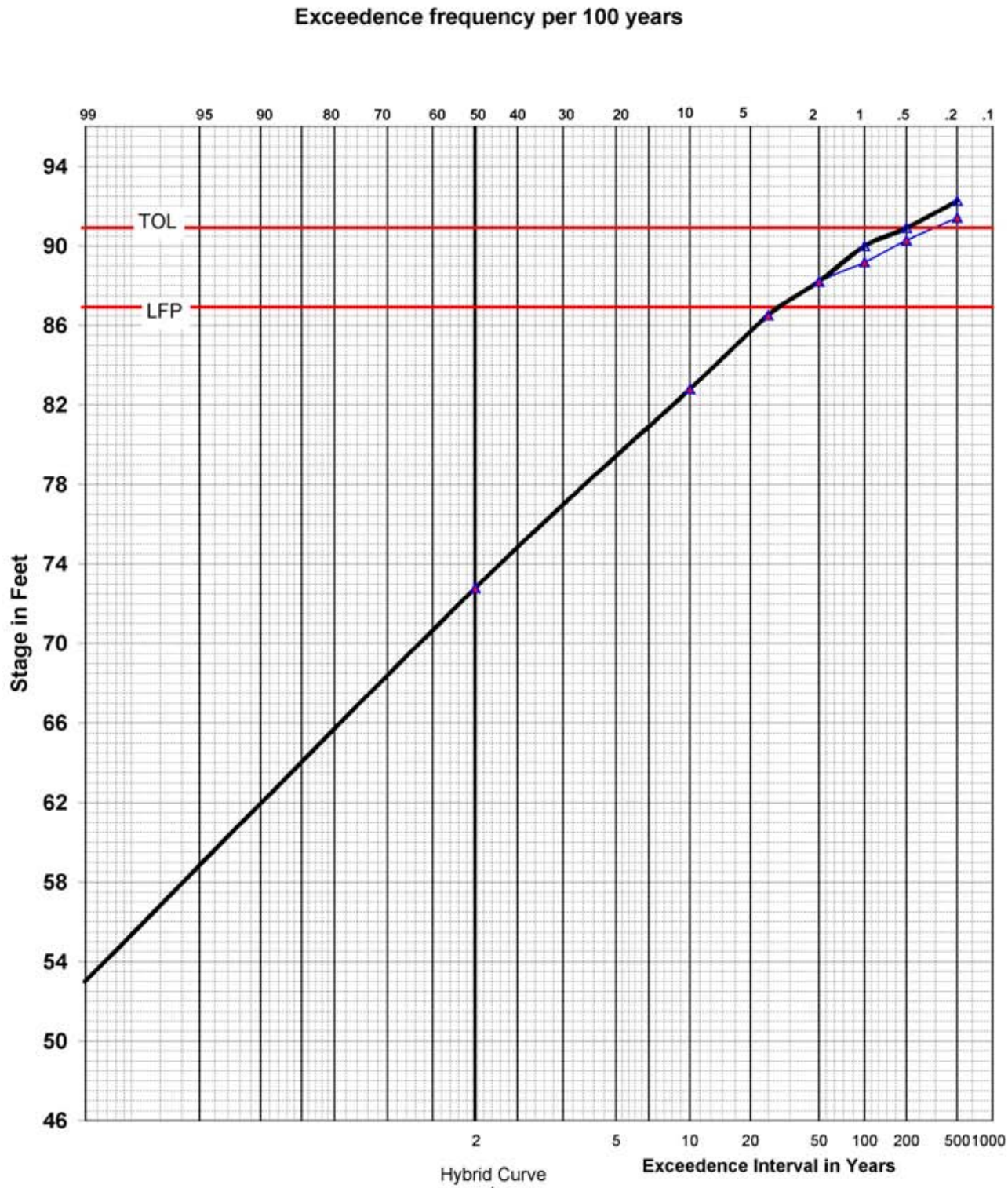
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC26

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-21**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Yuba River mile 6.50

Left Bank

	AVG	@ IP
Top of Levee/Bank	90.9	91.2
LFP	86.9	87.2

Hybrid Curve

Yr	Stage
1.01	53
2	72.79
10	82.8
25	86.5
50	88.21
100	89.99
200	90.91
500	92.26

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

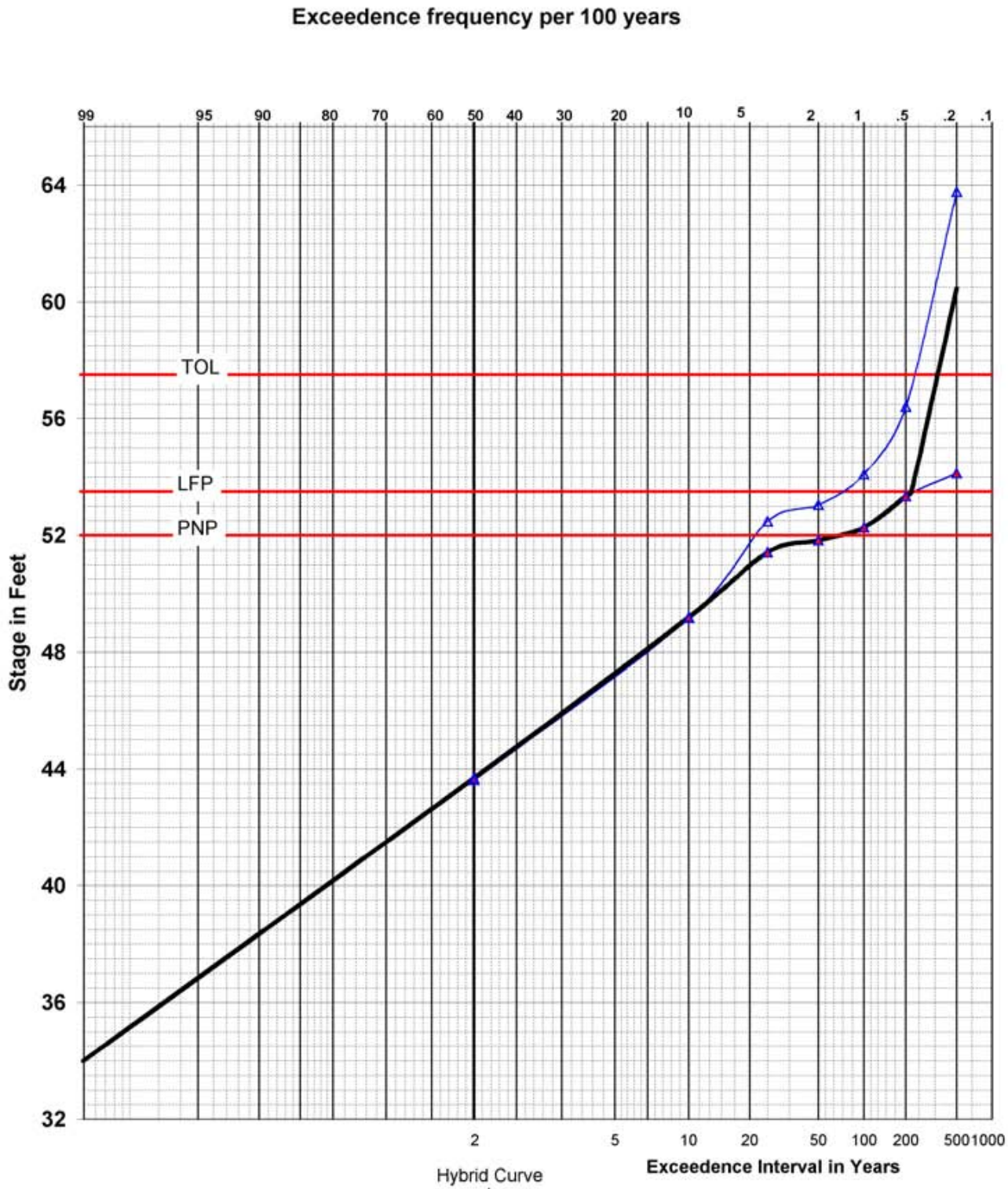
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC27

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-22**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Bear River RM 1.75
Right Bank

Top of Levee/Bank	57.5
LFP	53.5

Hybrid Curve

Yr	Stage
1.01	34
2	43.69
10	49.2
25	51.42
50	51.84
100	52.27
200	53.34
500	60.46

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

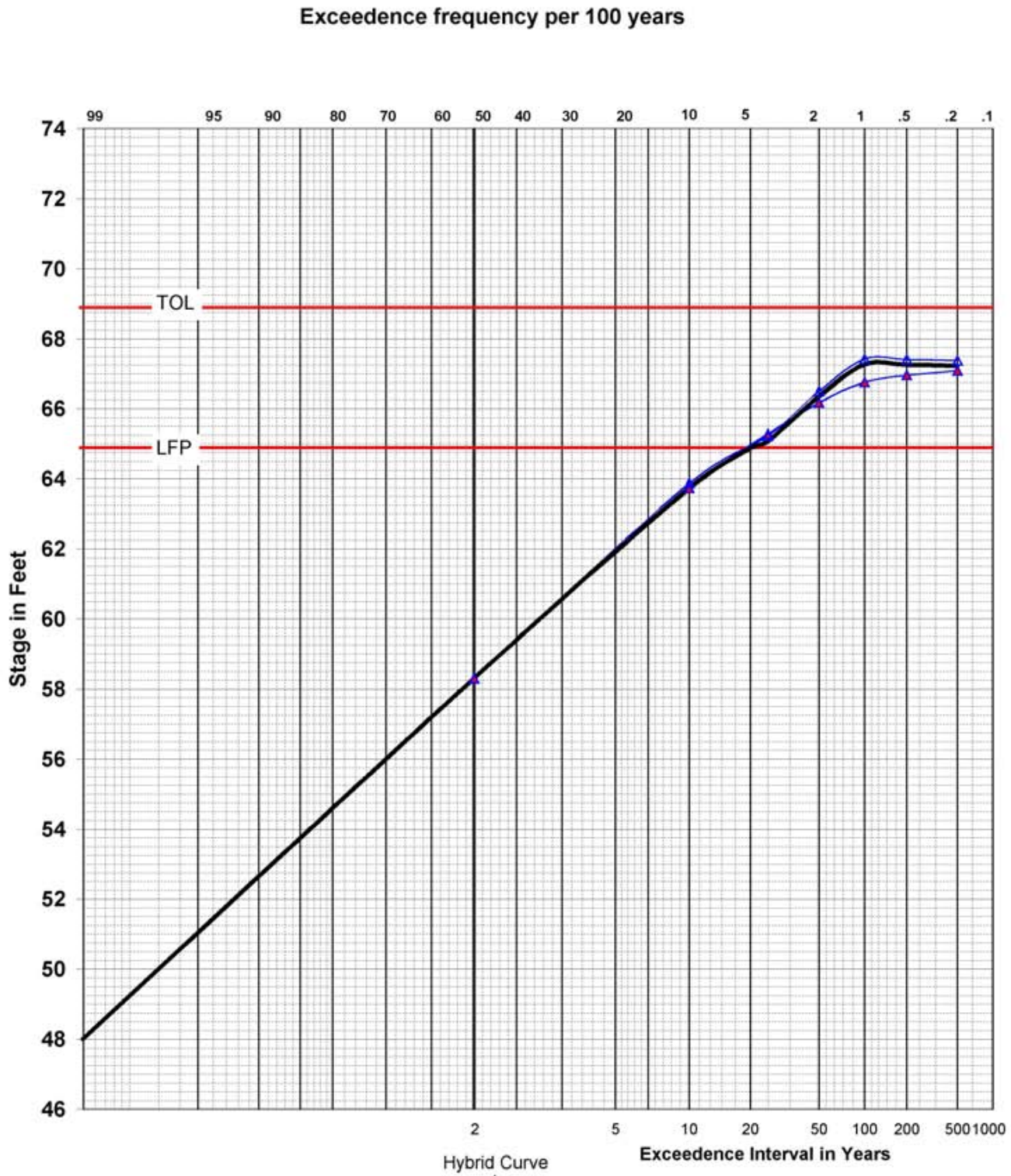
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC28

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-23**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 119.75

Right Bank

Top of Levee/Bank	68.89
LFP	64.89

Hybrid Curve

Yr	Stage
1.01	48
2	58.31
10	63.74
20	64.88
25	65.08
50	66.36
100	67.27
200	67.26
500	67.23

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

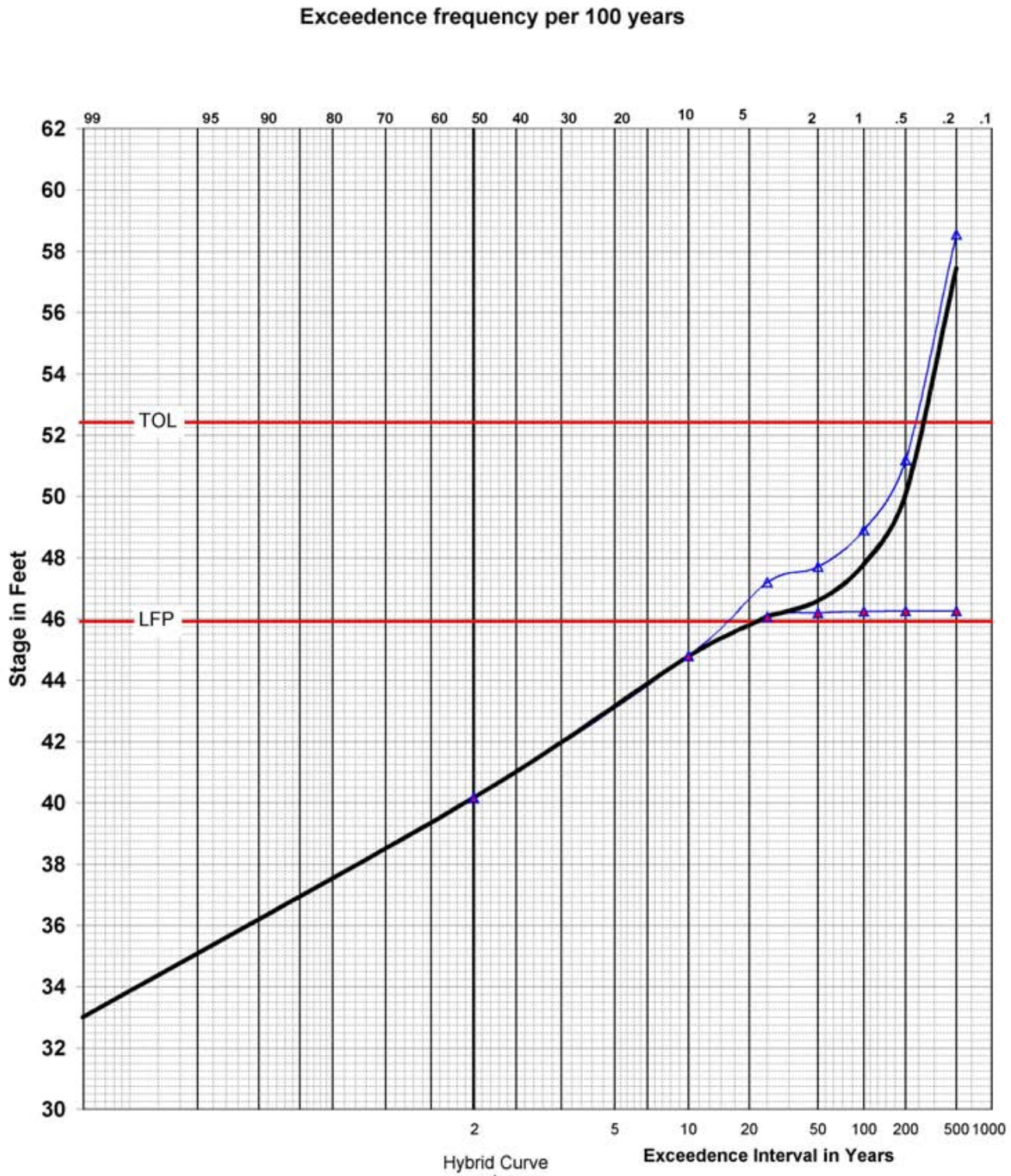
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC29

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-24**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Feather River mile 7.17

Right Bank

	AVG	@ IP
Top of Levee/Bank	52.41	51.35
LFP	45.91	44.85

Hybrid Curve

Yr	Stage
1.01	33
2	40.17
10	44.78
25	46.09
50	46.6
100	47.79
200	50.08
500	57.45

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

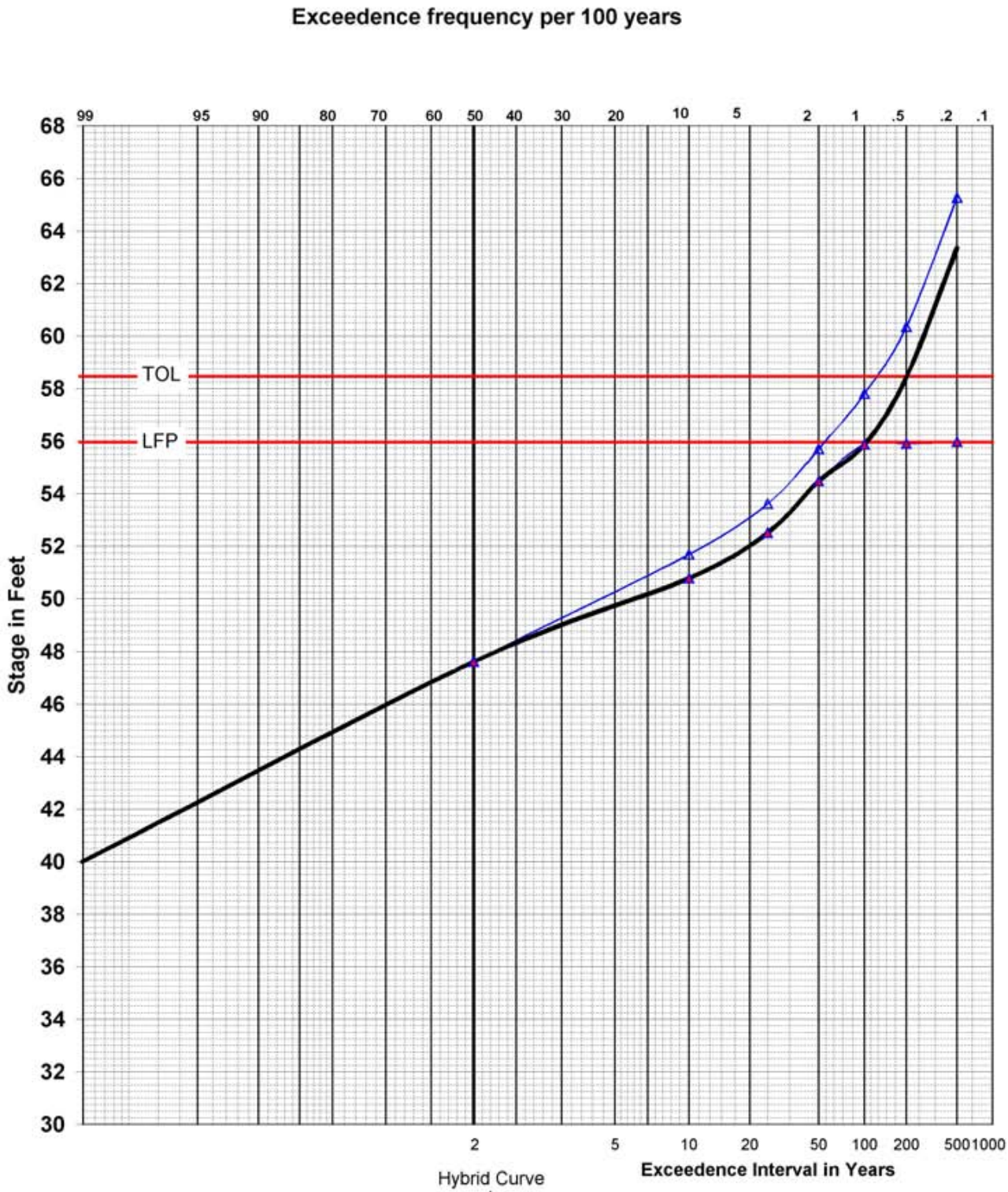
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC30

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-25**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sutter Bypass mile 88.23
Left Bank

Top of Levee/Bank	58.46
LFP	55.96

Hybrid Curve

Yr	Stage
1.01	40
2	47.6
10	50.79
25	52.51
50	54.48
100	55.88
200	58.43
500	63.35

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

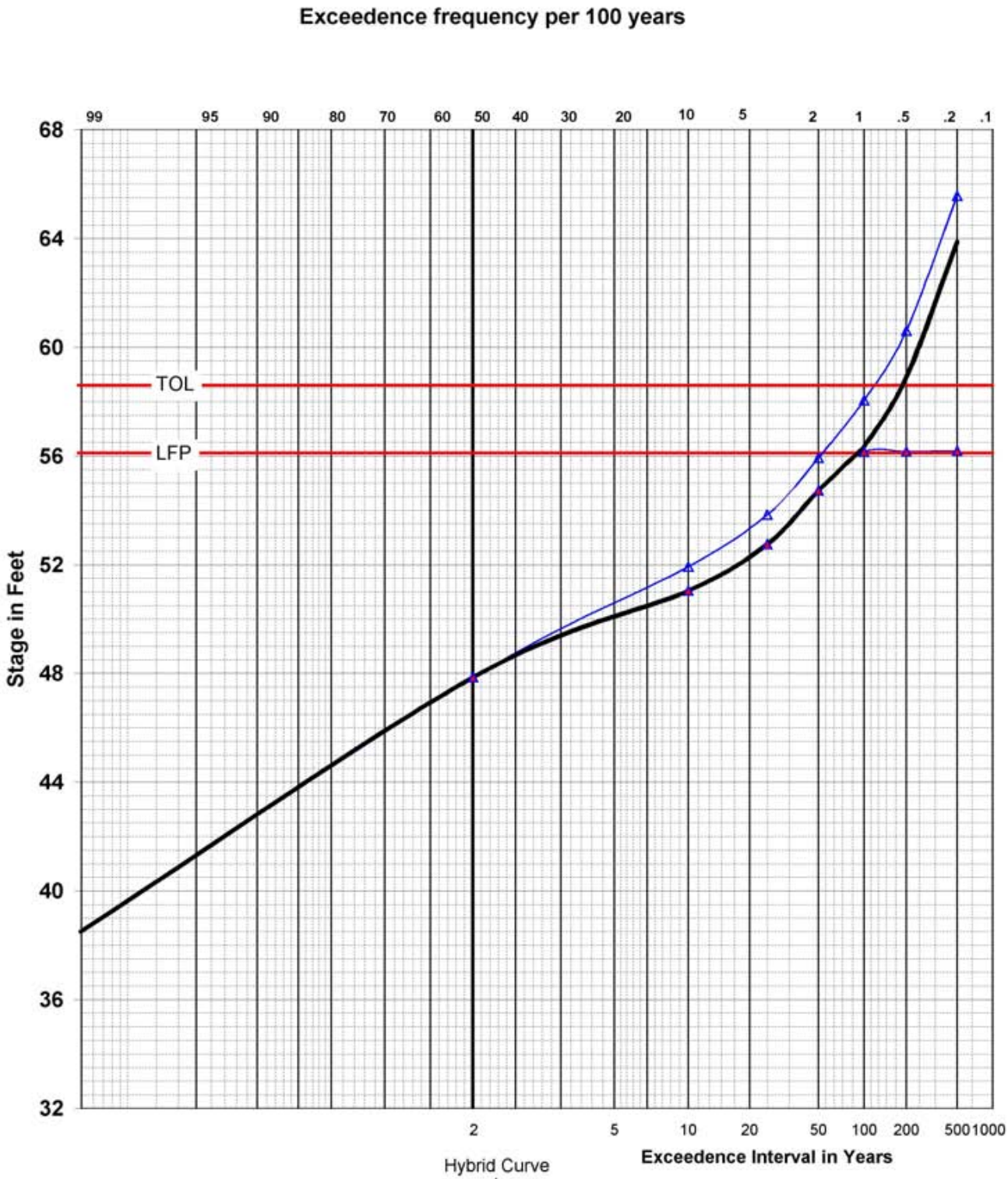
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC31

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-26**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sutter Bypass mile 88.60
Right Bank

Top of Levee/Bank	58.6
LFP	56.1

Hybrid Curve

Yr	Stage
1.01	38.5
2	47.86
10	51.04
25	52.75
50	54.73
90	56.1
100	56.34
200	58.9
500	63.87

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

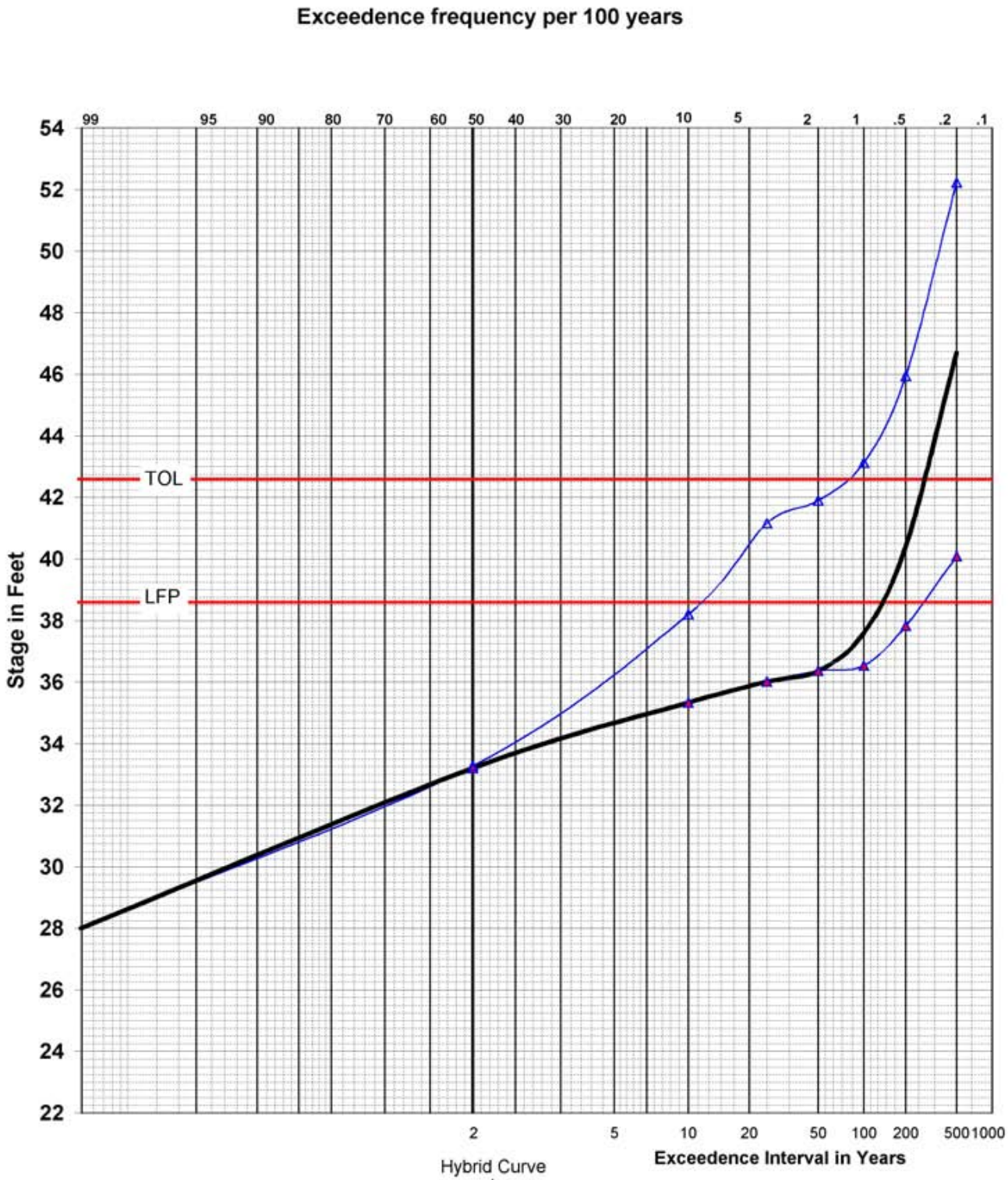
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREAS SAC32 SAC33

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-27**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 86.50

Left Bank

Top of Levee/Bank	42.59
LFP	38.59

Hybrid Curve

Yr	Stage
1.01	28
2	33.2
10	35.33
25	36.01
50	36.37
100	37.59
200	40.41
500	46.69

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

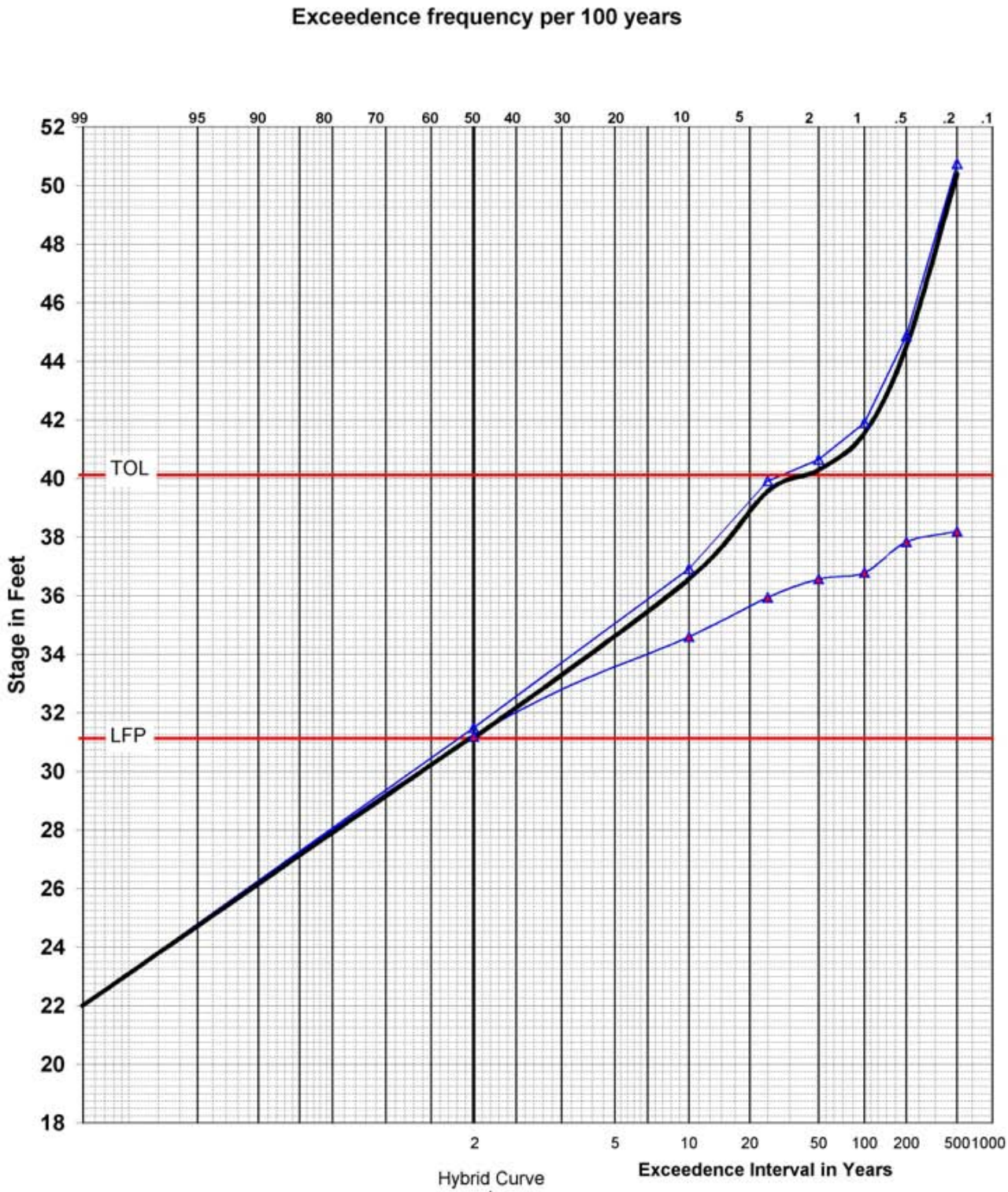
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC34

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-28**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 76.75

Right Bank

Top of Levee/Bank	40.12
LFP	31.12

Hybrid Curve

Yr	Stage
1.01	22
1.96	31.12
2	31.13
10	36.57
25	39.56
50	40.3
100	41.55
200	44.51
500	50.4

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

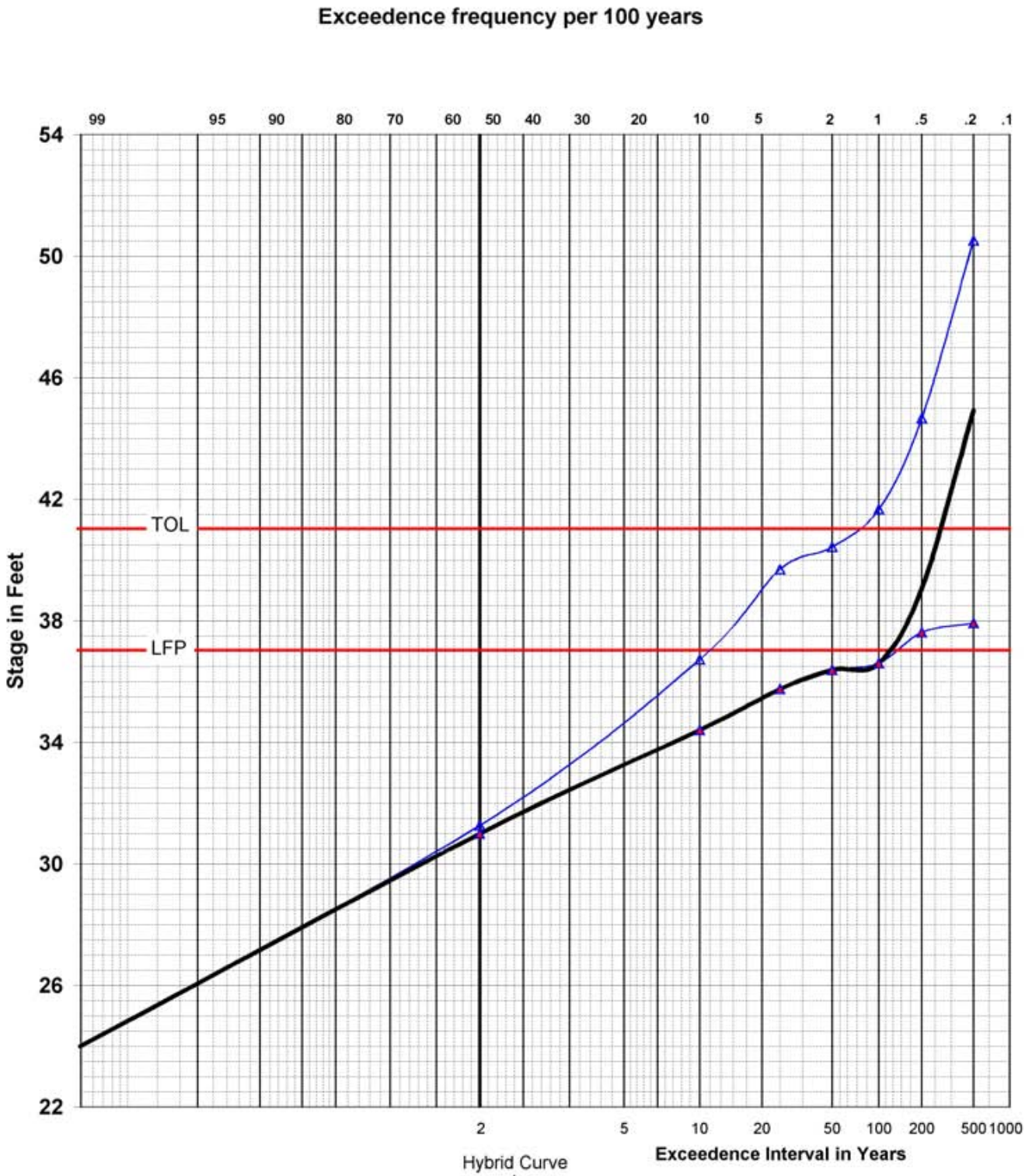
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC35

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-29**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River RM 76.25

Left Bank

Top of Levee/Bank 41.035

LFP 37.035

Hybrid Curve

Yr	Stage
1.01	24
2	31
10	34.4
25	35.75
50	36.38
100	36.6
140	37.035
200	39.06
500	44.92

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

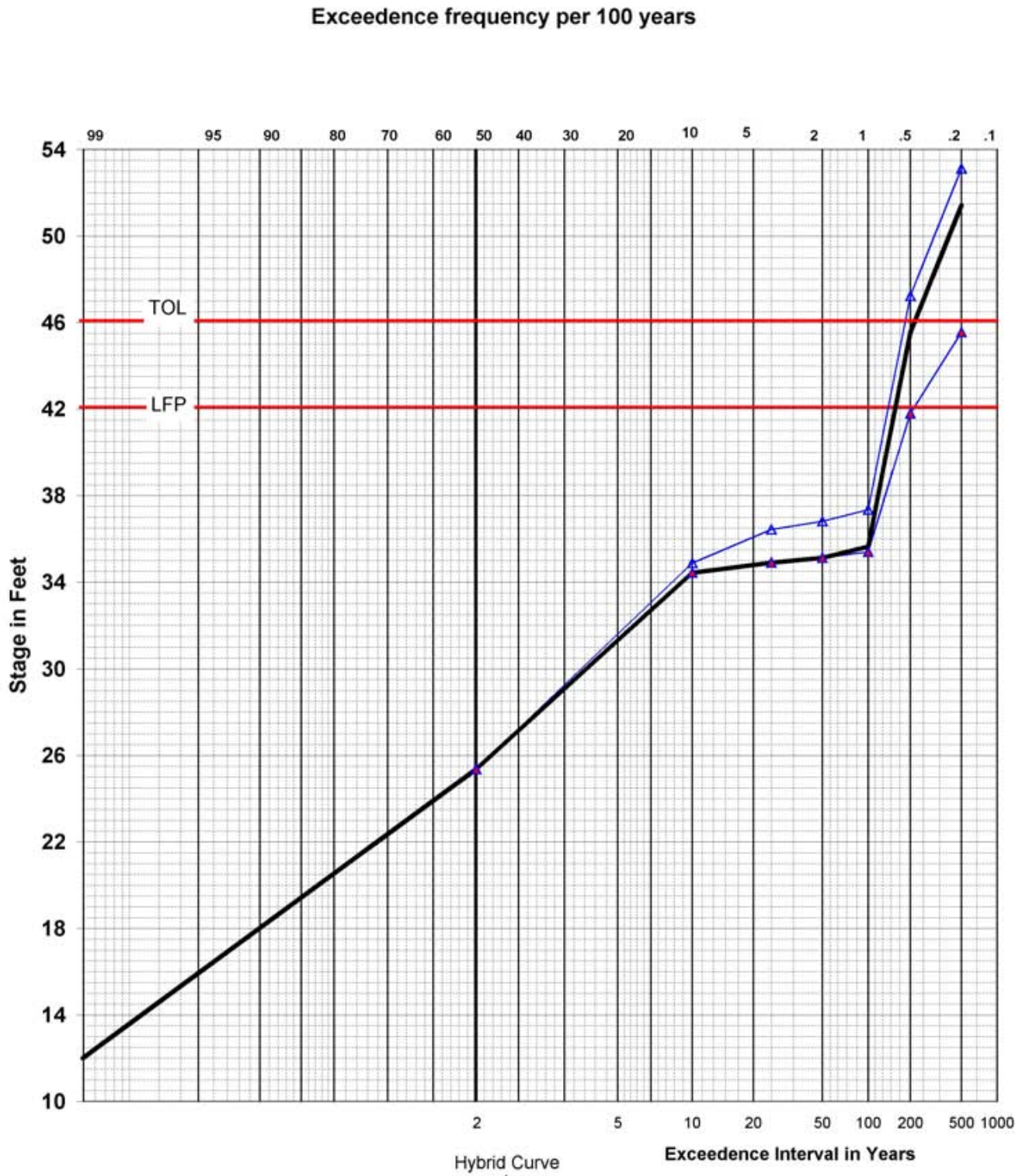
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC36

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-30**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

American River mile 3.75

Right Bank

Top of Levee/Bank 46.09

LFP 42.09

Hybrid Curve

Yr	Stage
1.01	12
2	25.35
10	34.44
25	34.91
50	35.12
100	35.65
200	45.53
500	51.42

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

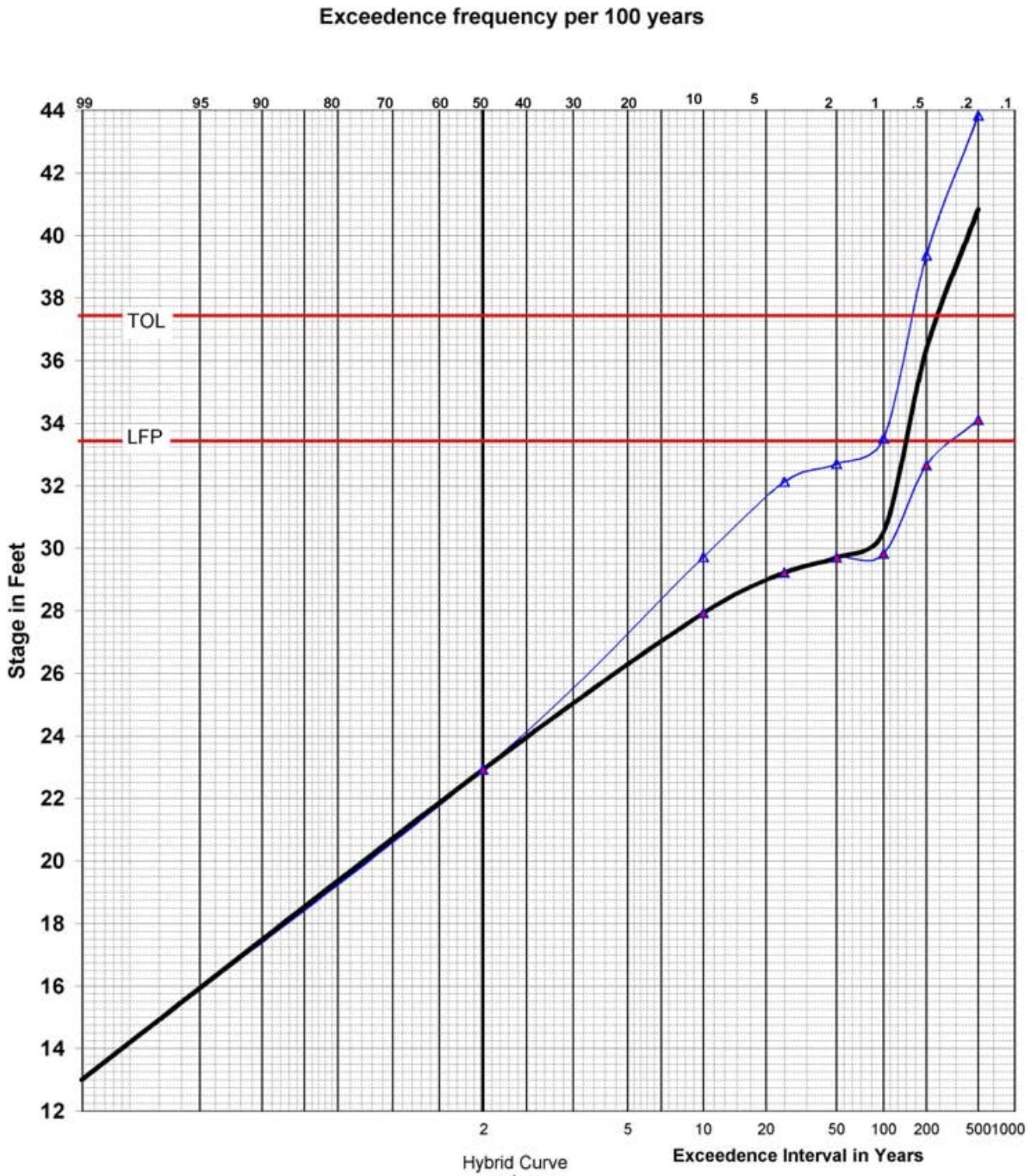
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC37

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-31**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 59.75

Right Bank

Top of Levee/Bank	37.43
LFP	33.43

Hybrid Curve

Yr	Stage
1.01	13
2	22.92
10	27.93
25	29.22
50	29.71
100	30.52
165	27.75
200	36.37
500	40.84

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

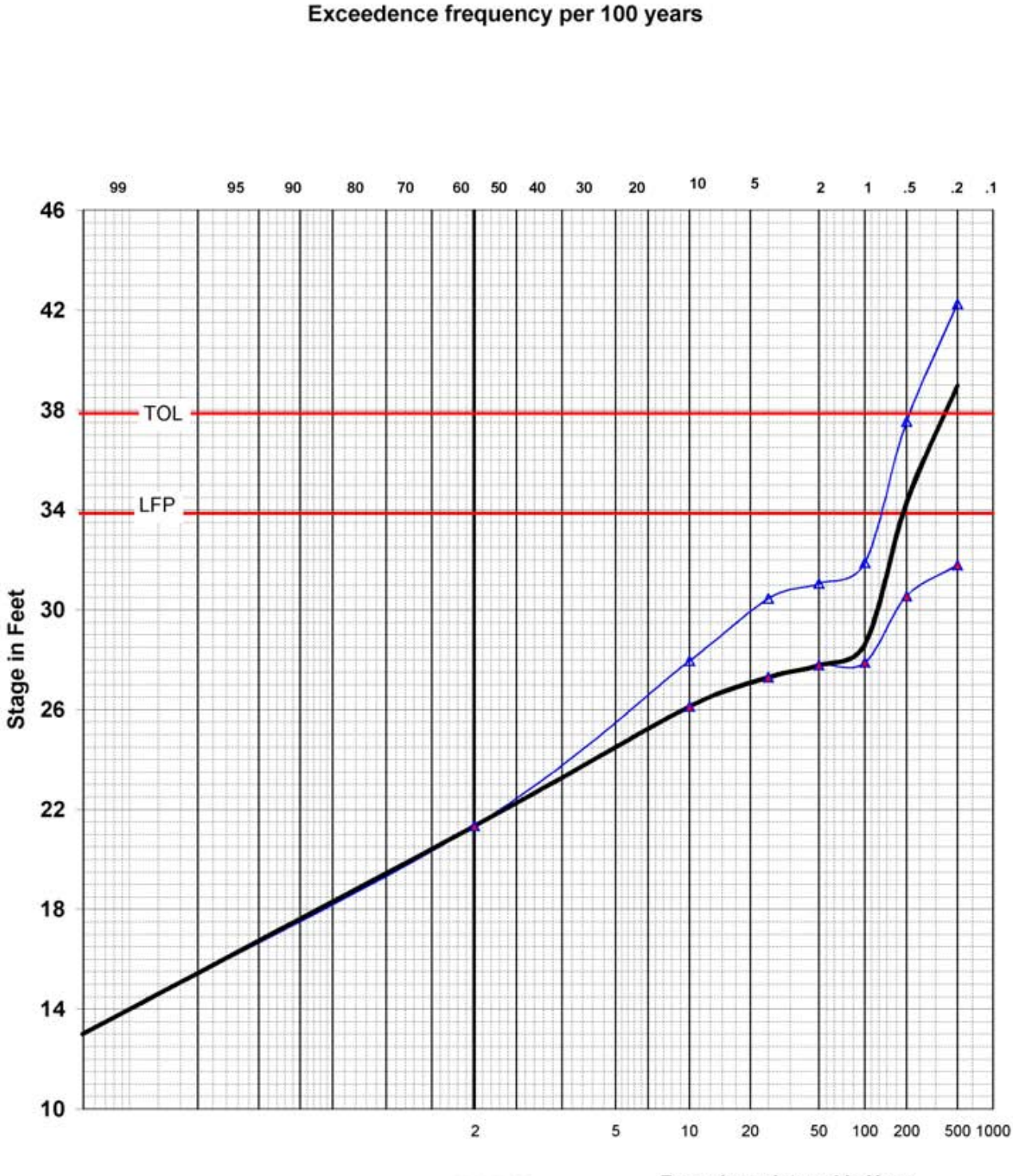
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC38

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-32**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 55.50

Right Bank

Top of Levee/Bank	37.85
LFP	33.85

Hybrid Curve

Yr	Stage
1.01	13
2	21.33
10	26.12
25	27.28
50	27.78
100	28.61
200	34.28
500	38.98

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

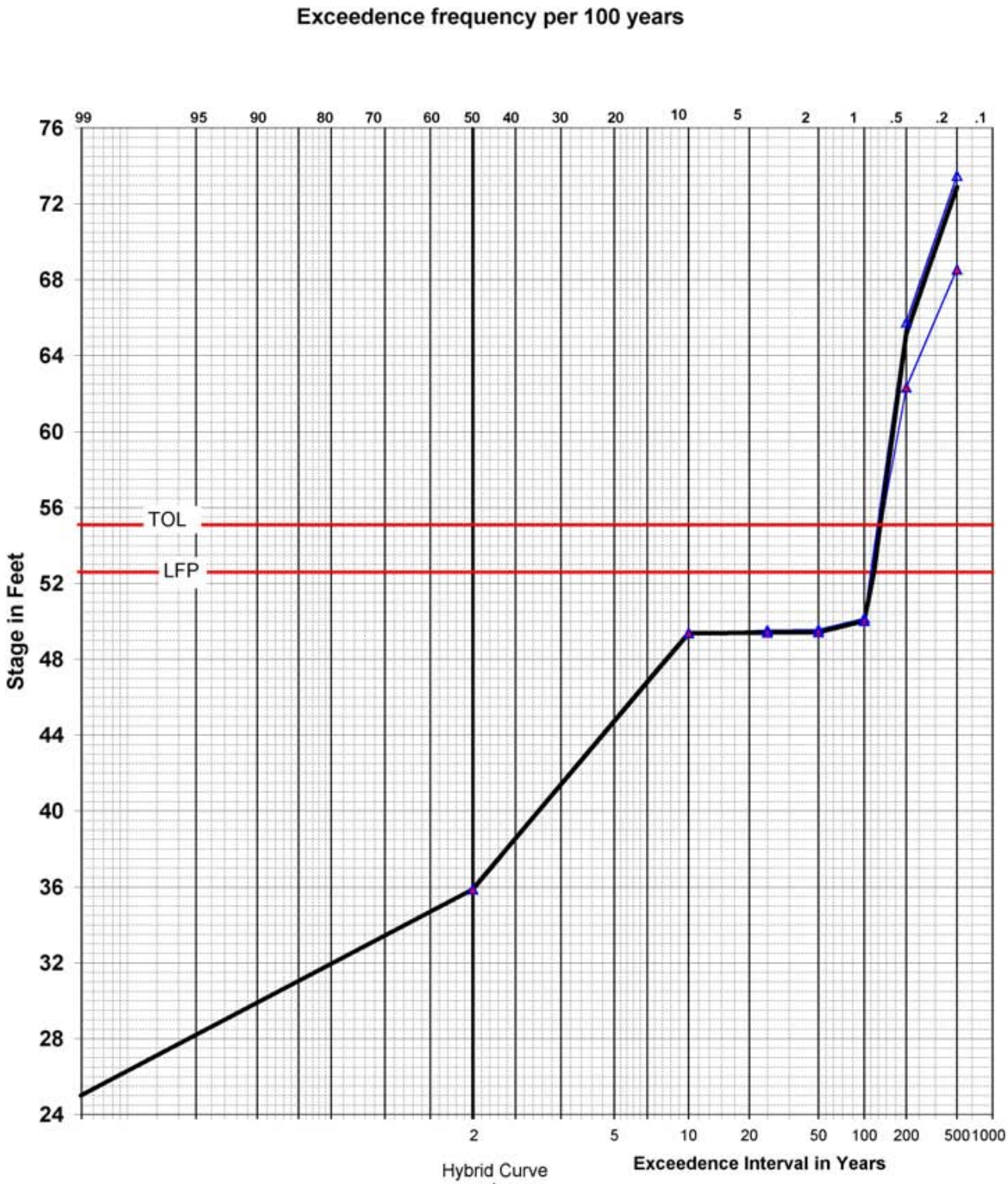
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC39

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-33**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

American River mile 11.00
Left Bank

Top of Levee/Bank	55.09
LFP	52.59

Hybrid Curve

Yr	Stage
1.01	25
2	35.87
10	49.36
25	49.4
50	49.42
100	50.02
117	52.59
200	65.16
500	72.89

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

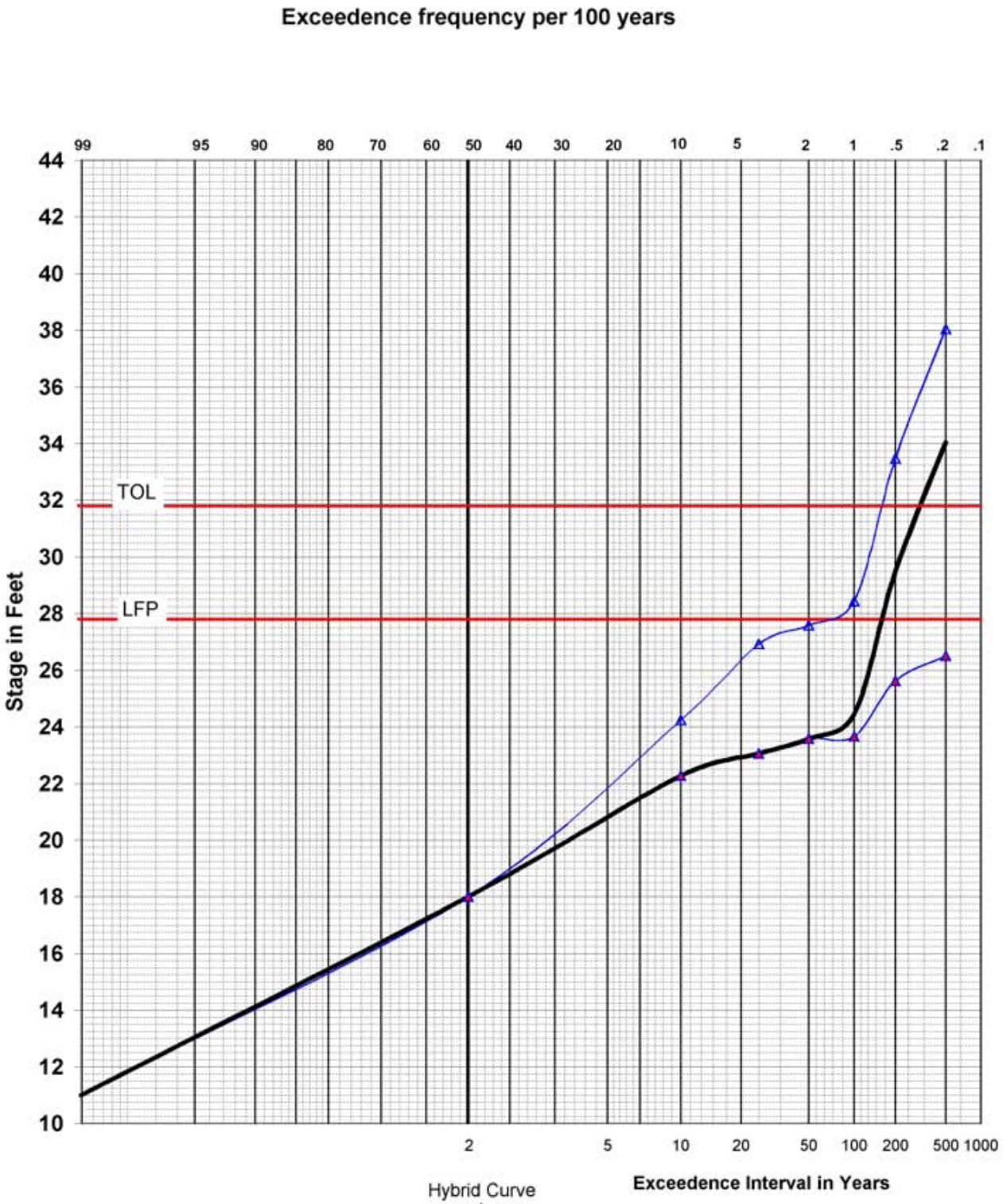
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC40

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-34**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 46.50

Right Bank

Top of Levee/Bank	31.8
LFP	27.8

Hybrid Curve

Yr	Stage
1.01	11
2	18
10	22.28
25	23.06
50	23.58
100	24.44
200	29.48
500	34.04

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

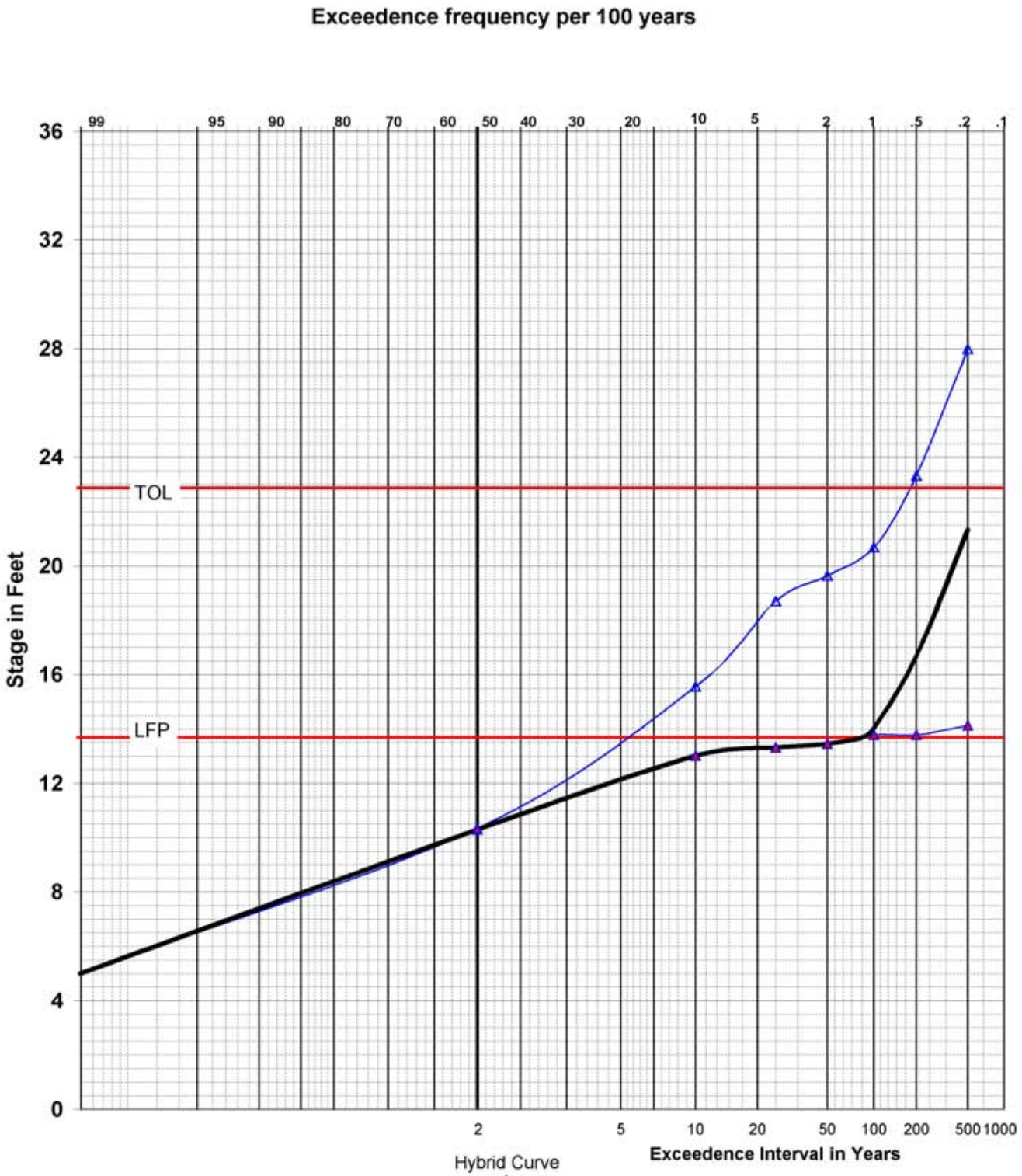
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC41

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-35**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sutter Slough mile 25.23
Right Bank

Top of Levee/Bank	22.86
LFP	13.69

Hybrid Curve

Yr	Stage
1.01	5
2	10.29
10	13.01
25	13.31
50	13.45
100	14.03
200	16.67
500	21.33

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

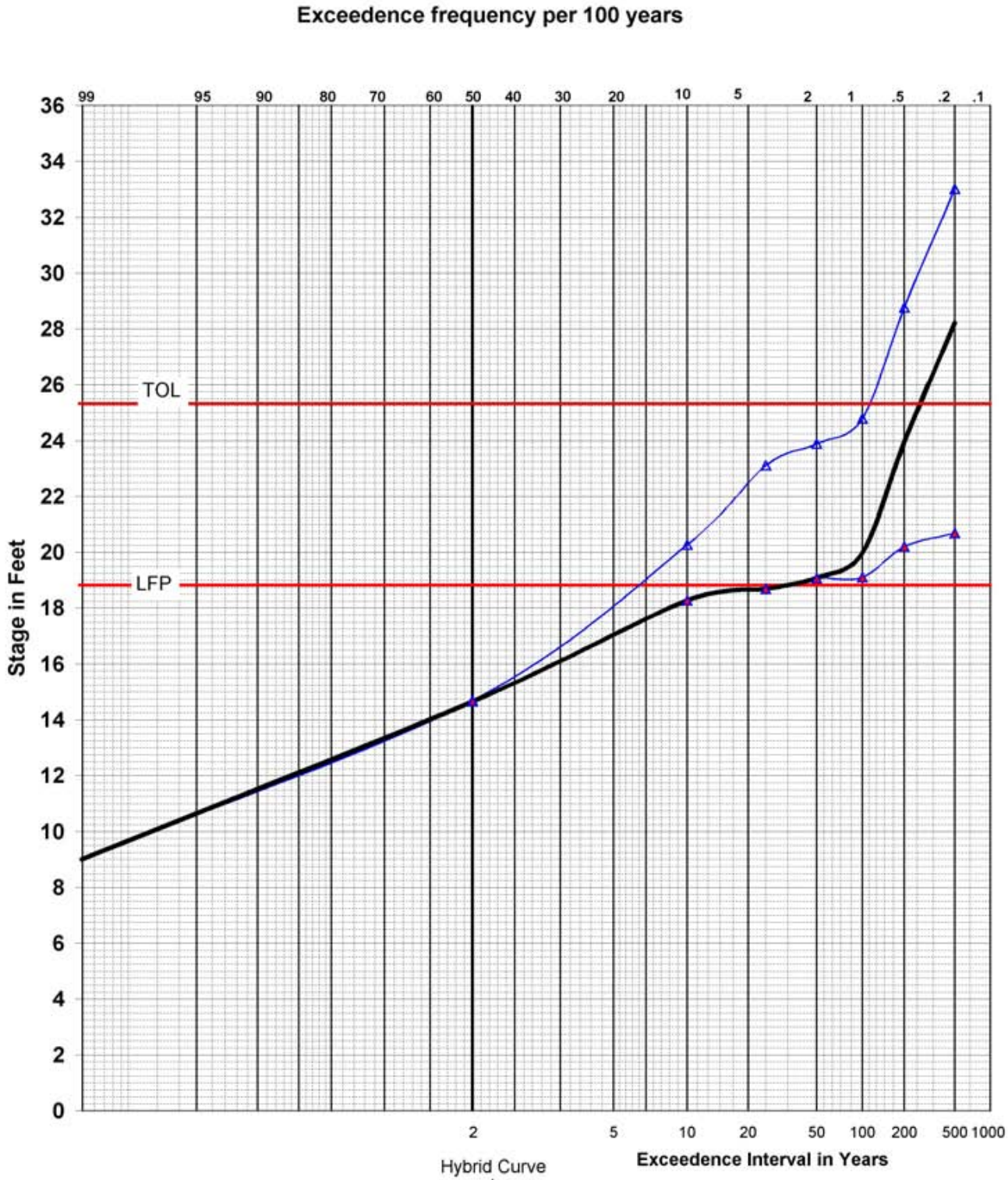
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREAS SAC42 SAC43

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-36**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 37.50
Left Bank

Top of Levee/Bank	25.32
LFP	18.82

Hybrid Curve

Yr	Stage
1.01	9
2	14.66
10	18.27
25	18.69
33	18.82
50	19.09
100	19.98
200	23.96
500	28.21

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

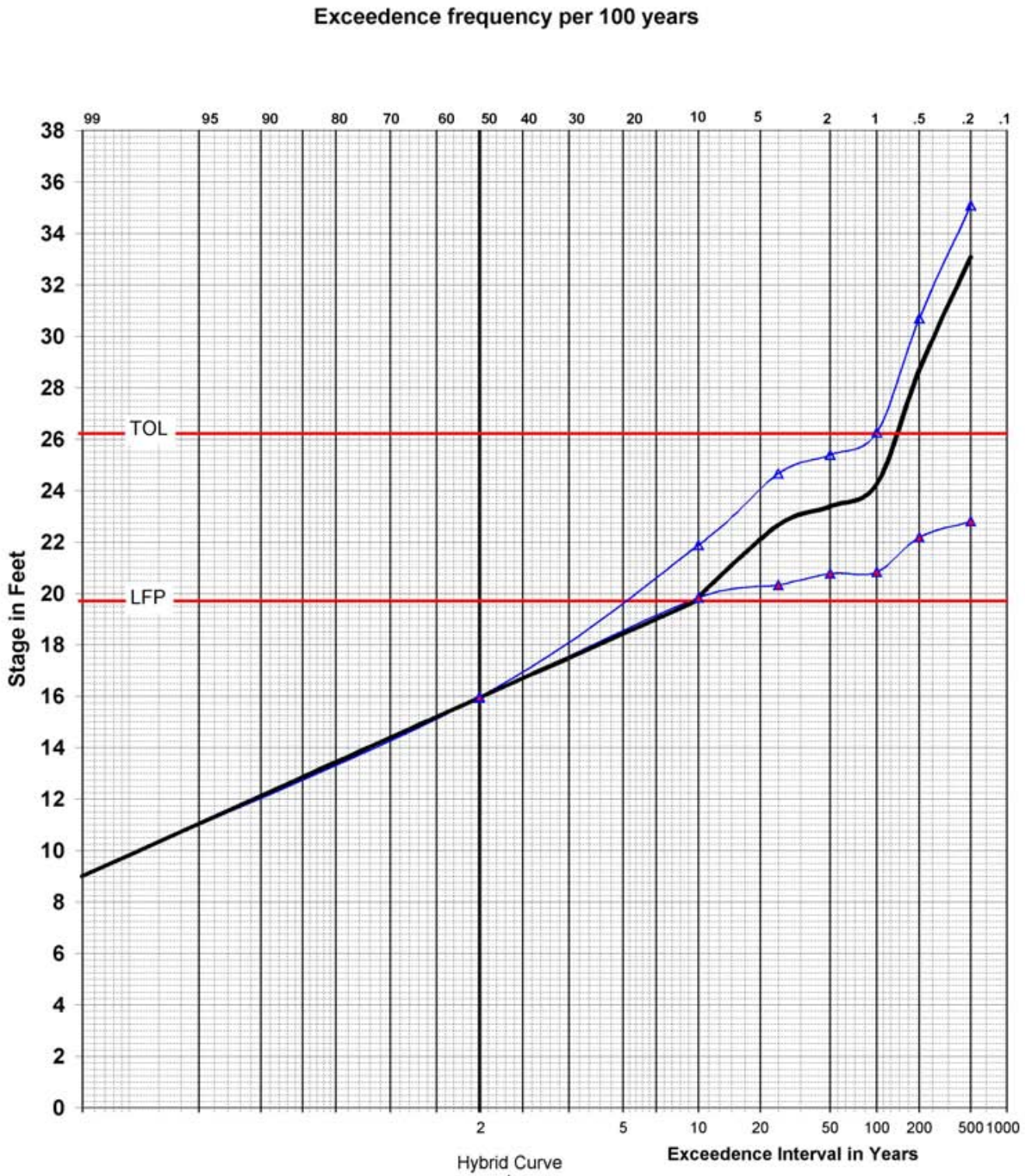
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREAS SAC44 SAC45

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-37**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 41.00

Right Bank

Top of Levee/Bank	26.21
LFP	19.71

Hybrid Curve

Yr	Stage
1.01	9
2	15.95
9.8	19.71
10	19.88
25	22.66
50	23.39
100	24.26
200	28.69
500	33.08

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

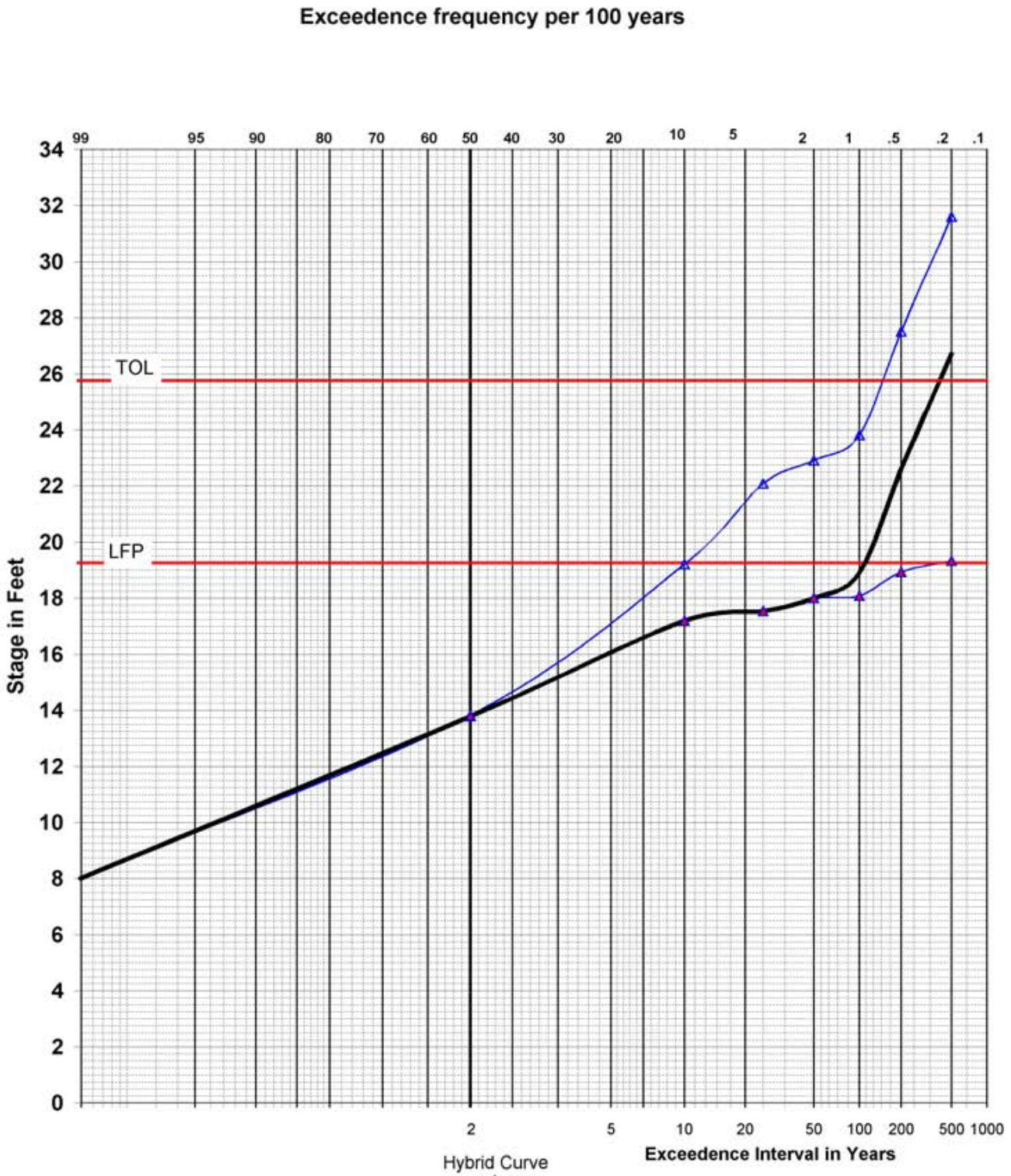
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC46

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-38**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 36.50
Left Bank

Top of Levee/Bank	25.76
LFP	19.26

Hybrid Curve

Yr	Stage
1.01	8
2	13.79
10	17.19
25	17.54
50	18.01
100	18.91
200	22.61
500	26.71

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

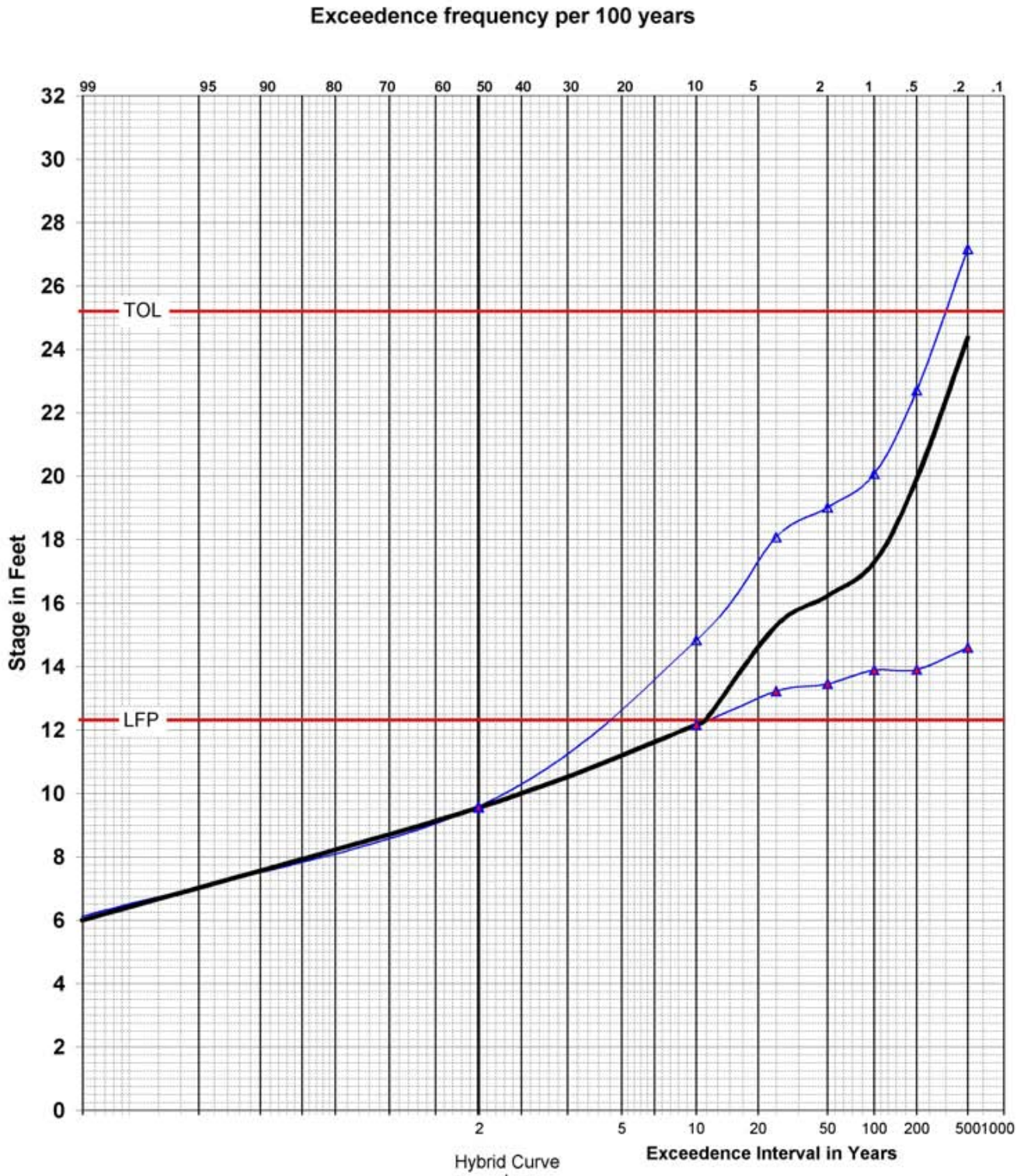
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREAS SAC47 SAC48

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-39**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sutter Slough mile 23.73
Left Bank

Top of Levee/Bank 25.2
LFP 12.31

Hybrid Curve

Yr	Stage
1.01	6
2	9.55
10	12.16
11	12.31
25	15.29
50	16.23
100	17.29
200	19.92
500	24.38

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

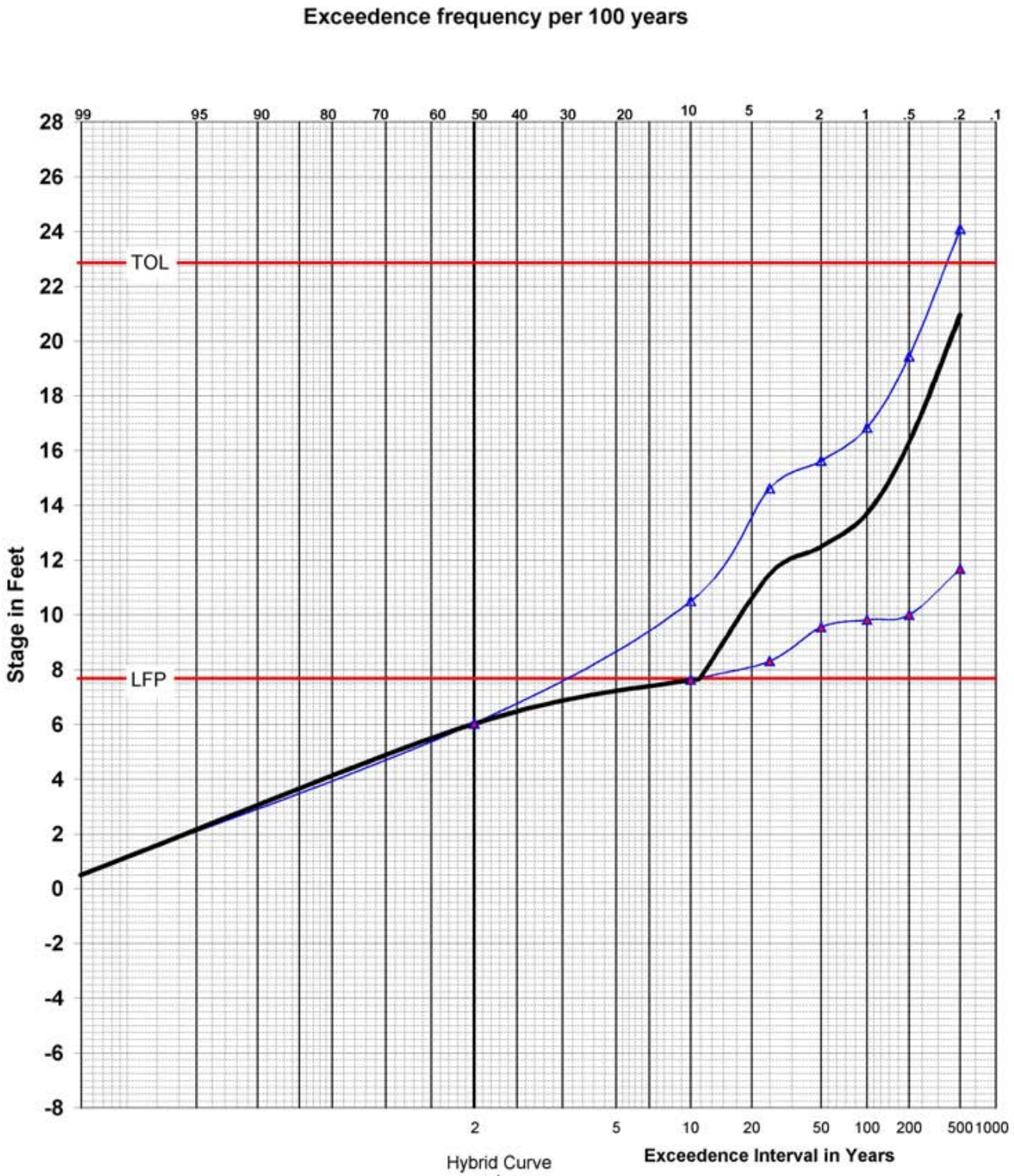
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC49

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-40**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 14.75

Right Bank

Top of Levee/Bank 22.85

LFP 7.67

Hybrid Curve

Yr	Stage
1.01	0.5
2	6.03
10	7.63
11	7.67
25	11.48
50	12.49
100	13.71
200	16.3
500	20.96

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

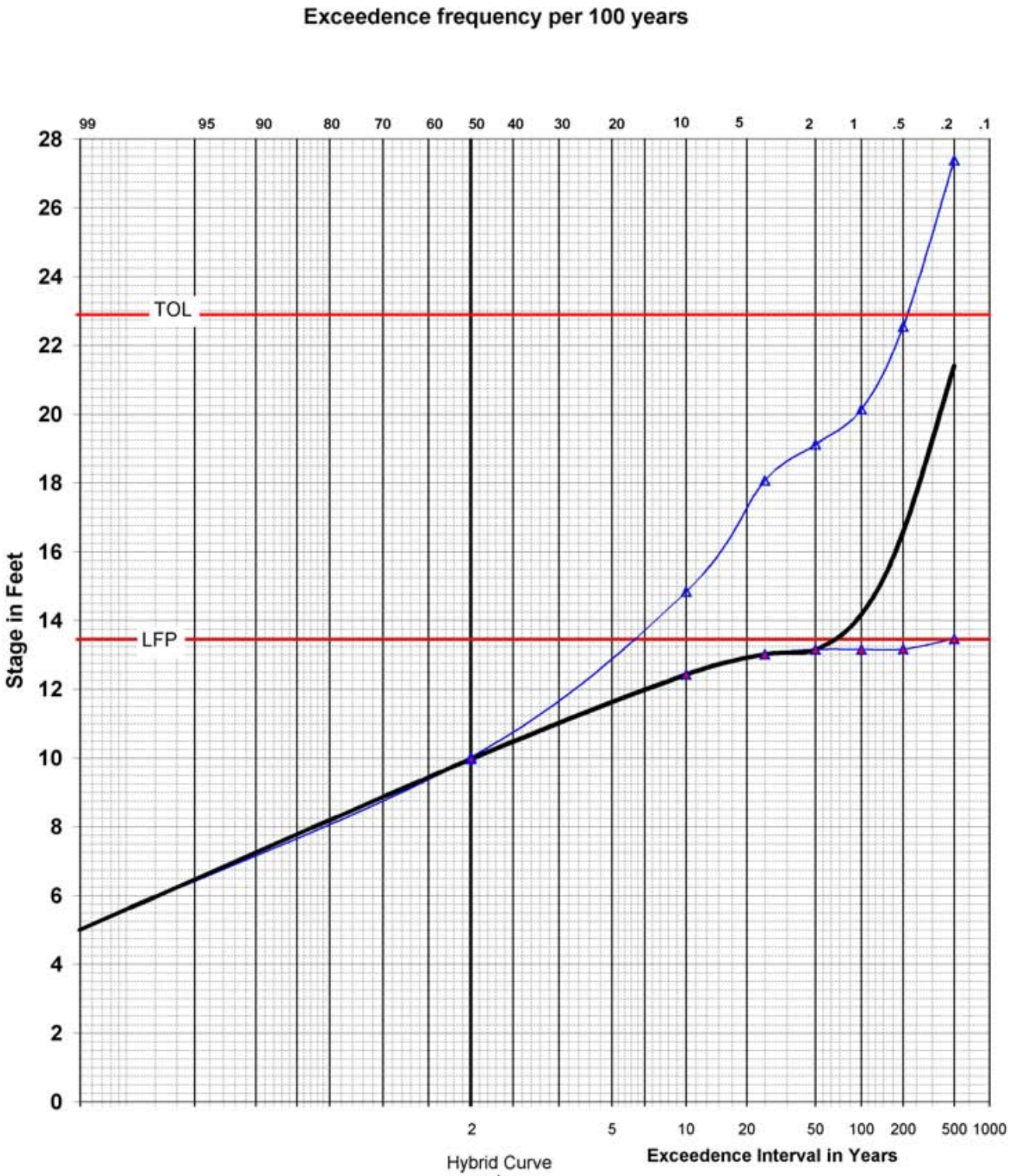
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC50

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-41**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sacramento River mile 28.25

Left Bank

Top of Levee/Bank 22.89

LFP 13.45

Hybrid Curve

Yr	Stage
1.01	5
2	9.97
10	12.43
25	13.01
50	13.15
100	14.17
200	16.57
500	21.41

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

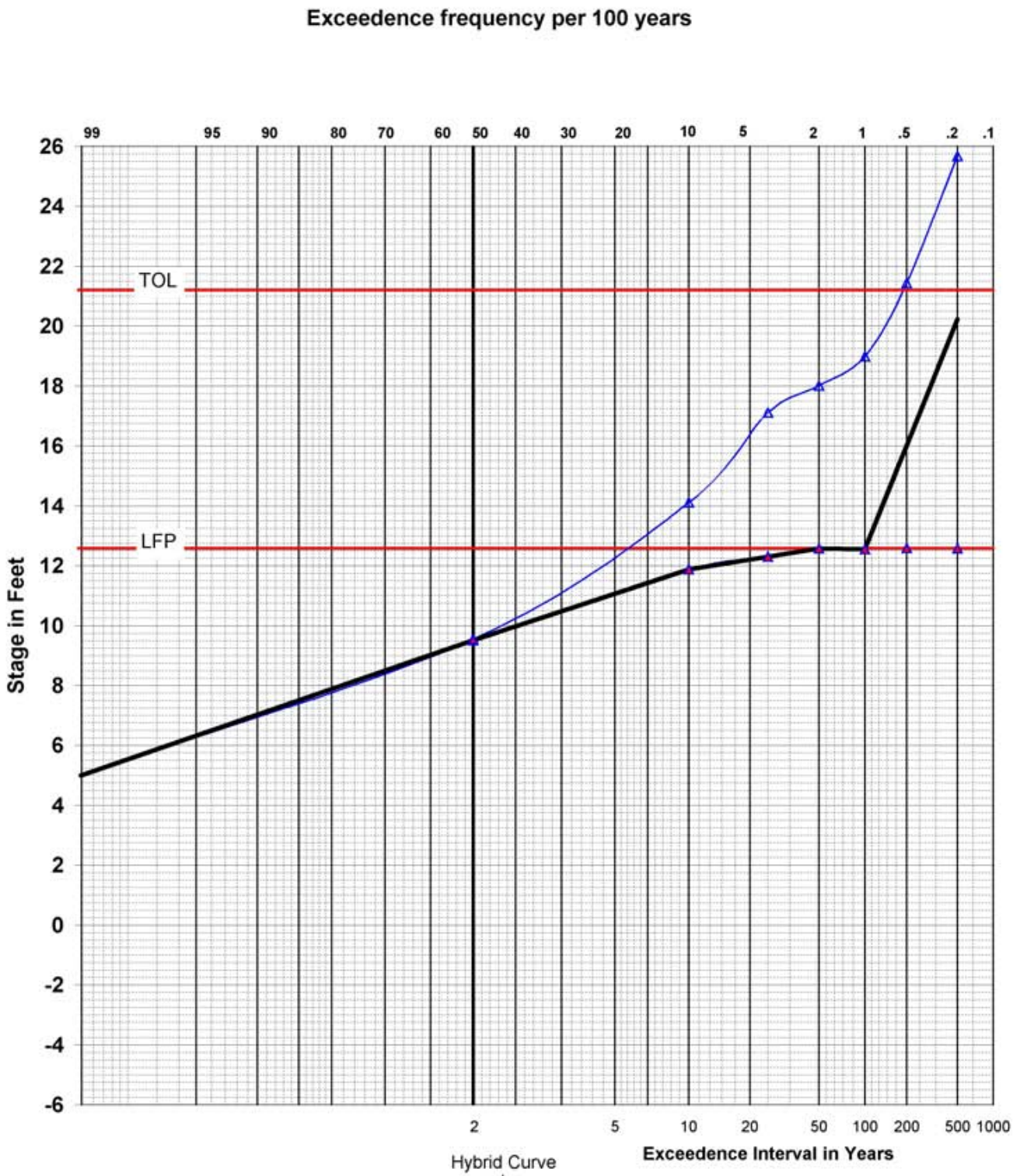
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC51

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-42**



Hybrid Curve

Yr	Stage
1.01	5
2	9.51
10	11.87
25	12.3
50	12.57
100	12.55
200	16
500	20.23

Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Georgiana Slough mile 12.36
Left Bank

Top of Levee/Bank 21.2
LFP 12.58

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

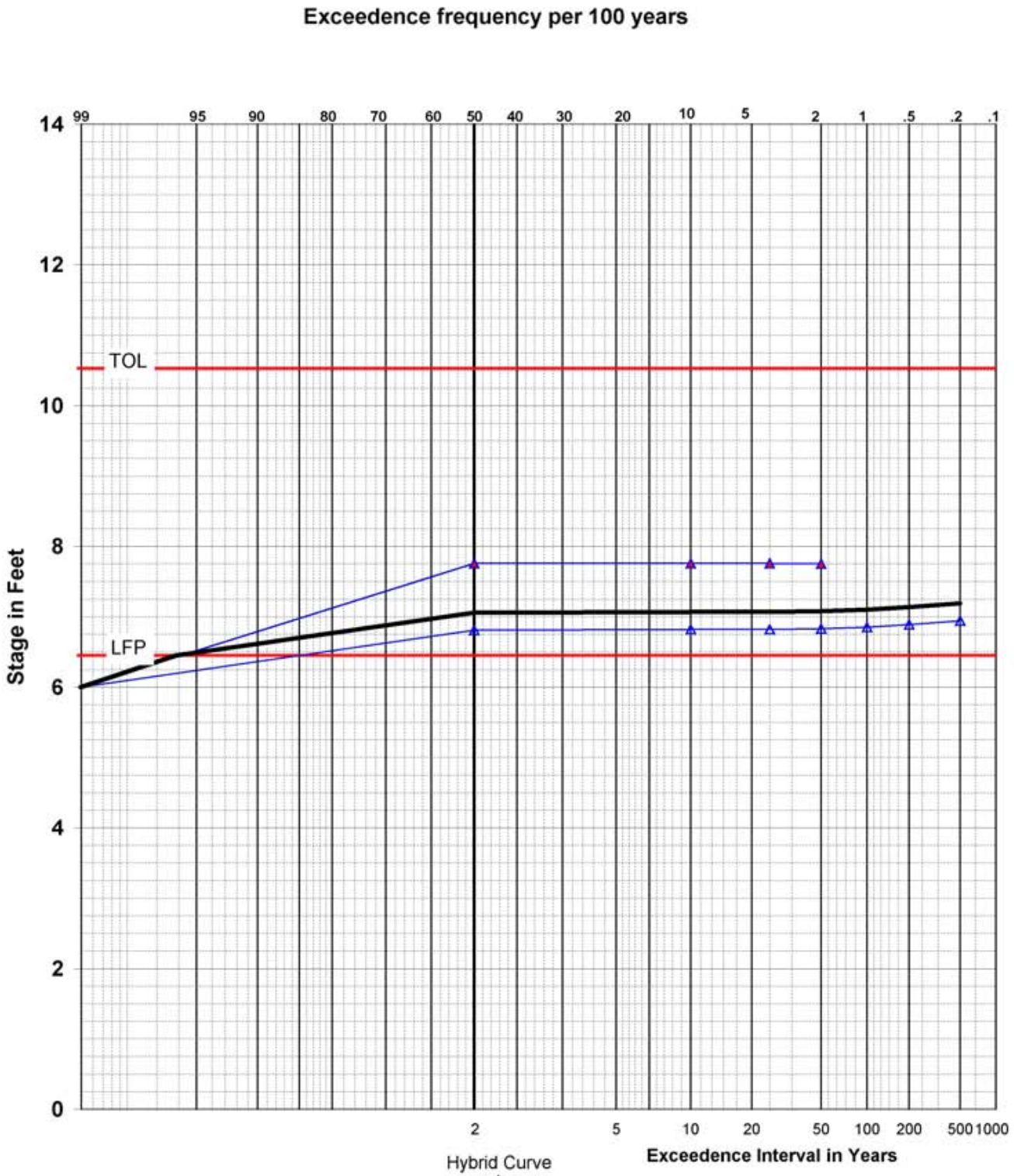
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC52

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-43**



Hybrid Curve

Yr	Stage
1.01	6
2	7.06
10	7.07
25	7.07
50	7.08
100	7.1
200	7.14
500	7.19

Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Georgiana Slough mile 0.25
Left Bank

Top of Levee/Bank 10.53
LFP 6.45

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

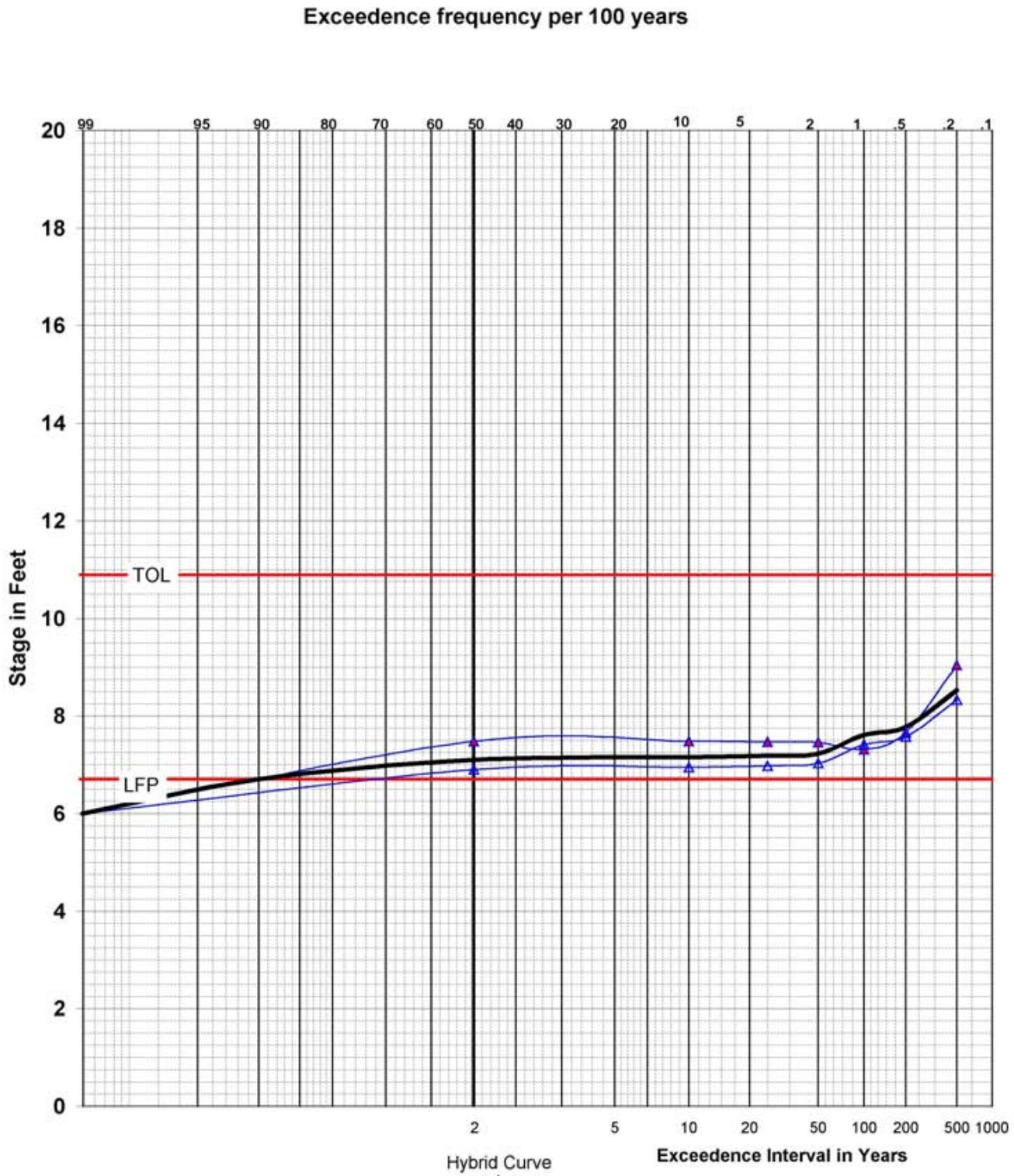
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC53

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-44**



Hybrid Curve

Yr	Stage
1.01	6
2	7.1
10	7.15
25	7.18
50	7.23
100	7.61
200	7.77
500	8.53

Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Georgiana Slough mile 0.75
Right Bank

Top of Levee/Bank 10.89
LFP 6.7

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

RISK BASED ANALYSIS

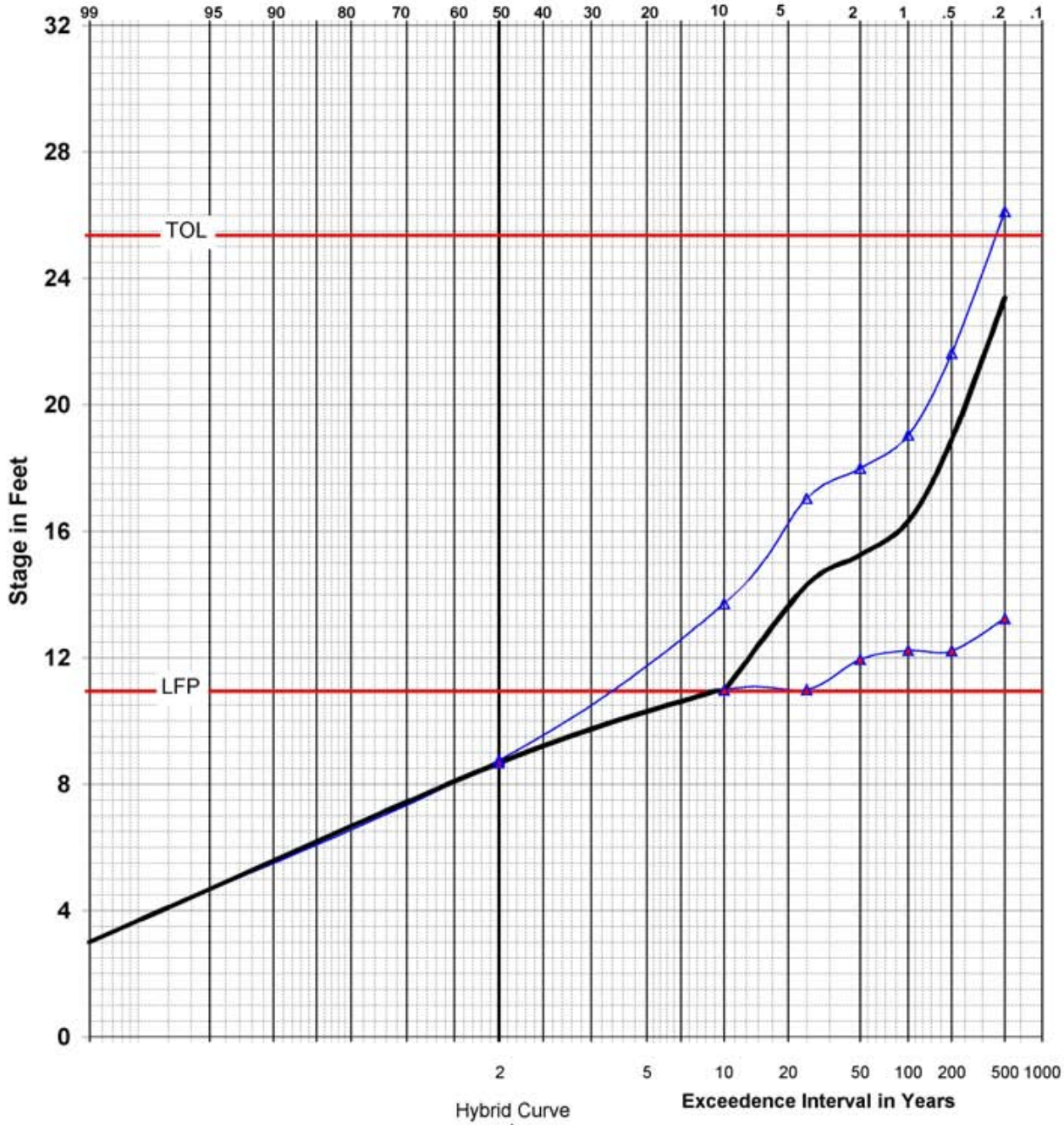
SACRAMENTO RIVER

DAMAGE AREA SAC54

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-45**

Exceedence frequency per 100 years



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Sutter Slough mile 22.23
Right Bank

Top of Levee/Bank	25.35
LFP	10.93

Hybrid Curve

Yr	Stage
1.01	3
2	8.67
9	10.93
10	10.97
25	14.3
50	15.25
100	16.31
200	18.9
500	23.38

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

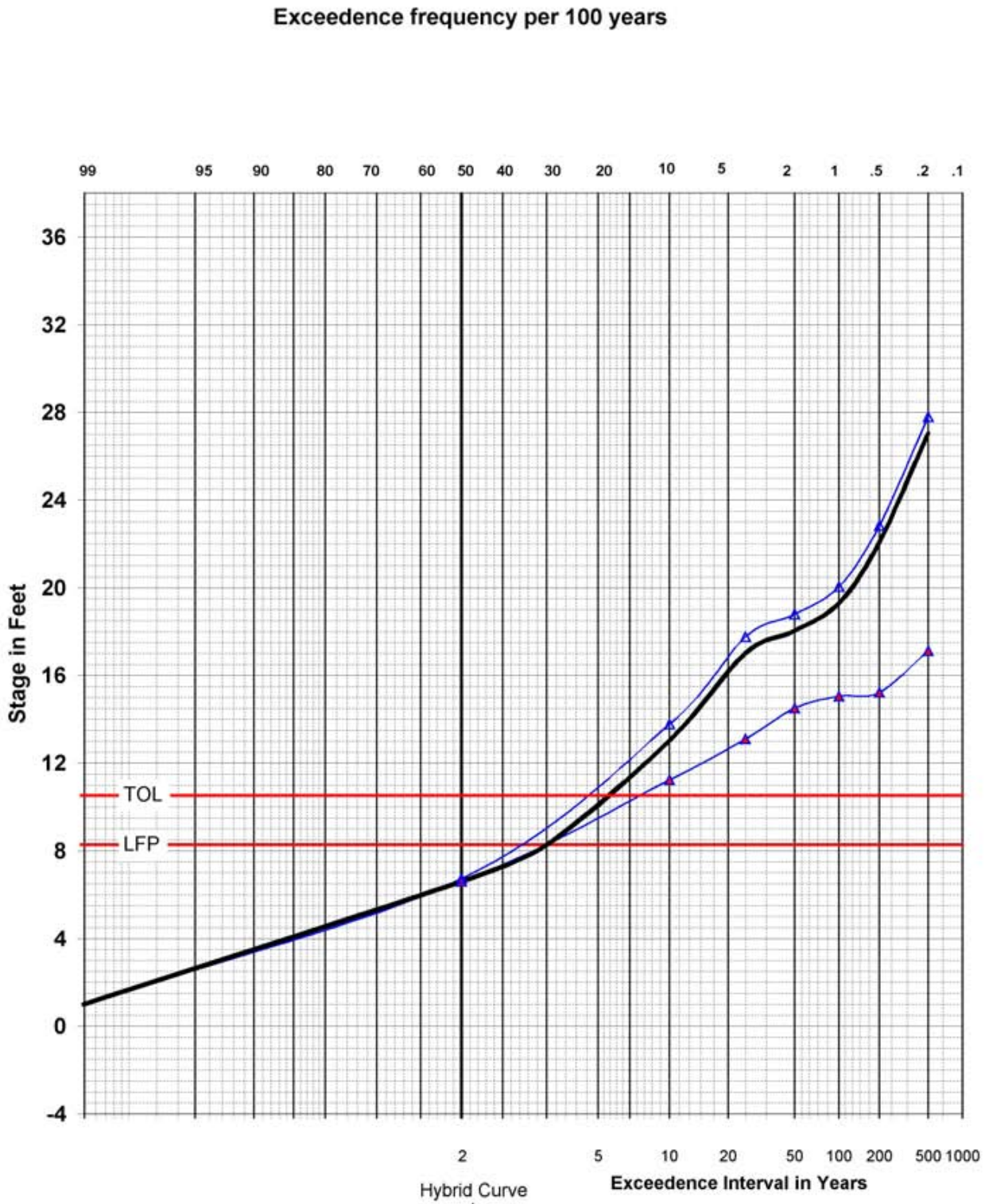
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC55

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-46**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Miner Slough mile 19.11
Right Bank

Top of Levee/Bank 10.52
LFP 8.27

Hybrid Curve

Yr	Stage
1.01	1
2	6.61
3.33	8.27
10	13.03
25	17.02
50	18.04
100	19.29
200	22.08
500	27.04

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

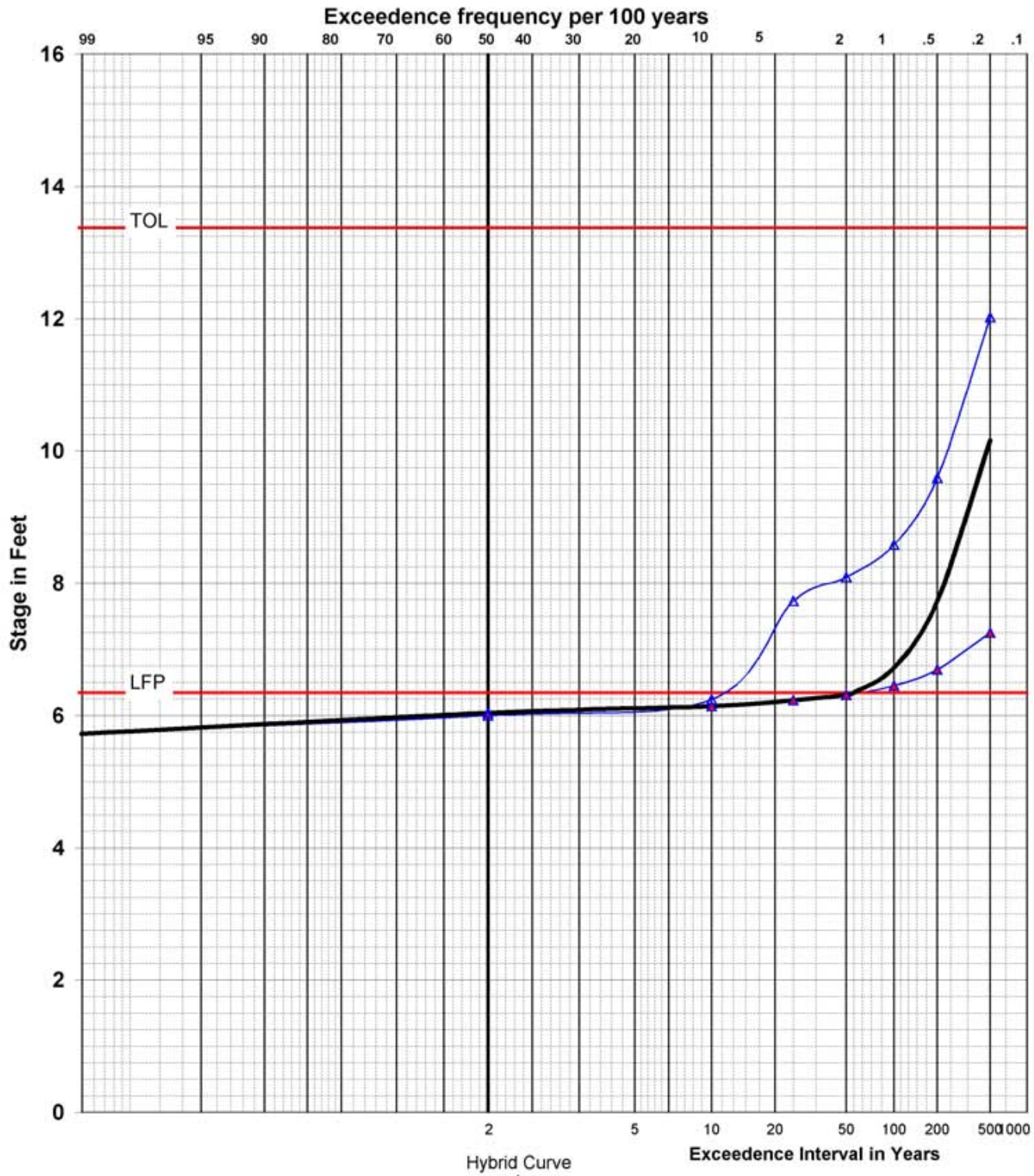
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC56

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-47**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Three Mile Slough mile 2.23

Left Bank

Top of Levee/Bank	13.37
LFP	6.34

Hybrid Curve

Yr	Stage
1.01	5.72
2	6.04
10	6.14
25	6.23
50	6.31
55	6.34
100	6.72
200	7.73
500	10.16

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

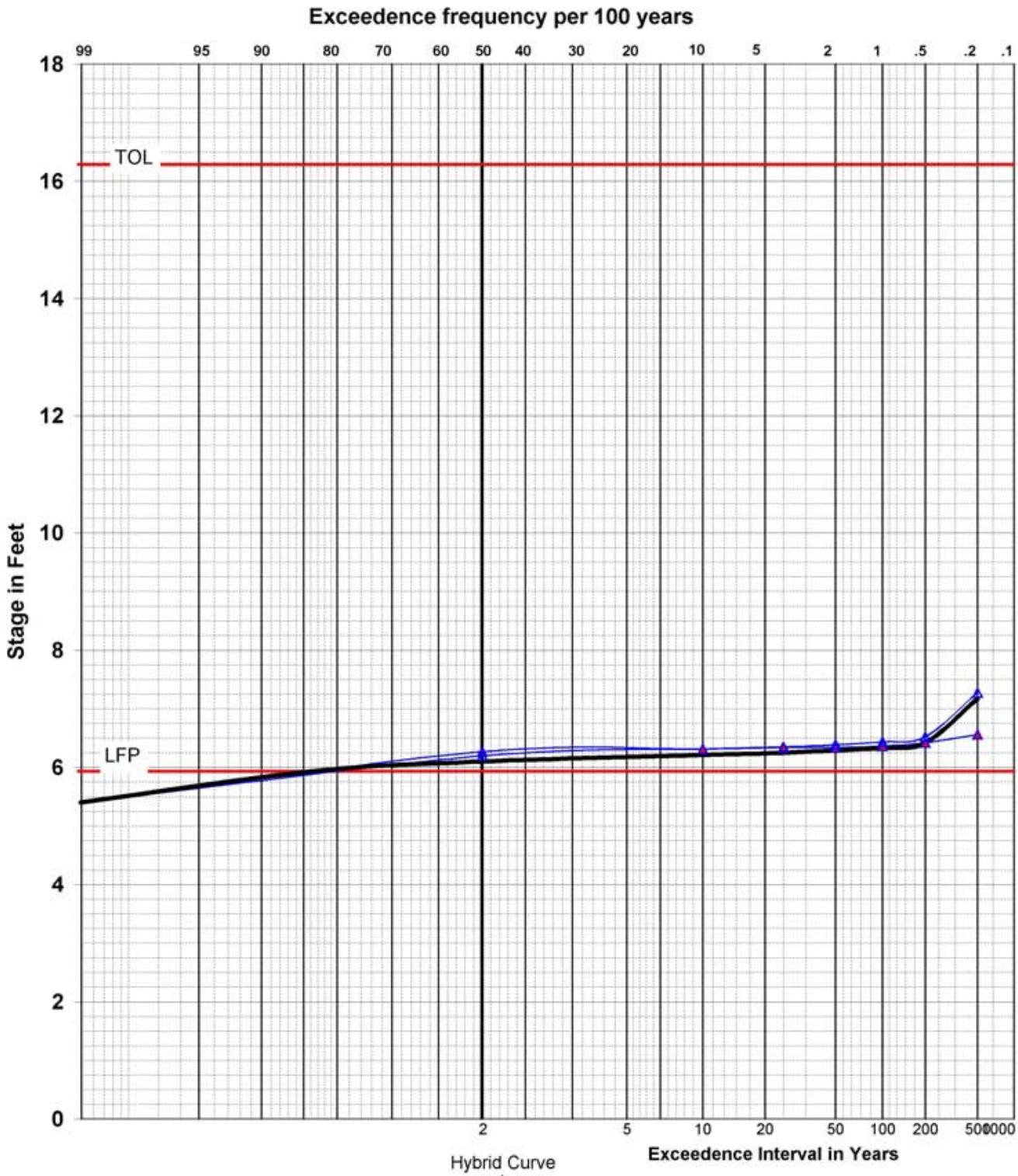
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC57

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-48**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Three Mile Slough mile 0.75
Right Bank

Top of Levee/Bank 16.29
LFP 5.93

Hybrid Curve

Yr	Stage
1.01	5.4
2	6.1
10	6.21
25	6.25
50	6.29
100	6.33
200	6.42
500	7.17

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

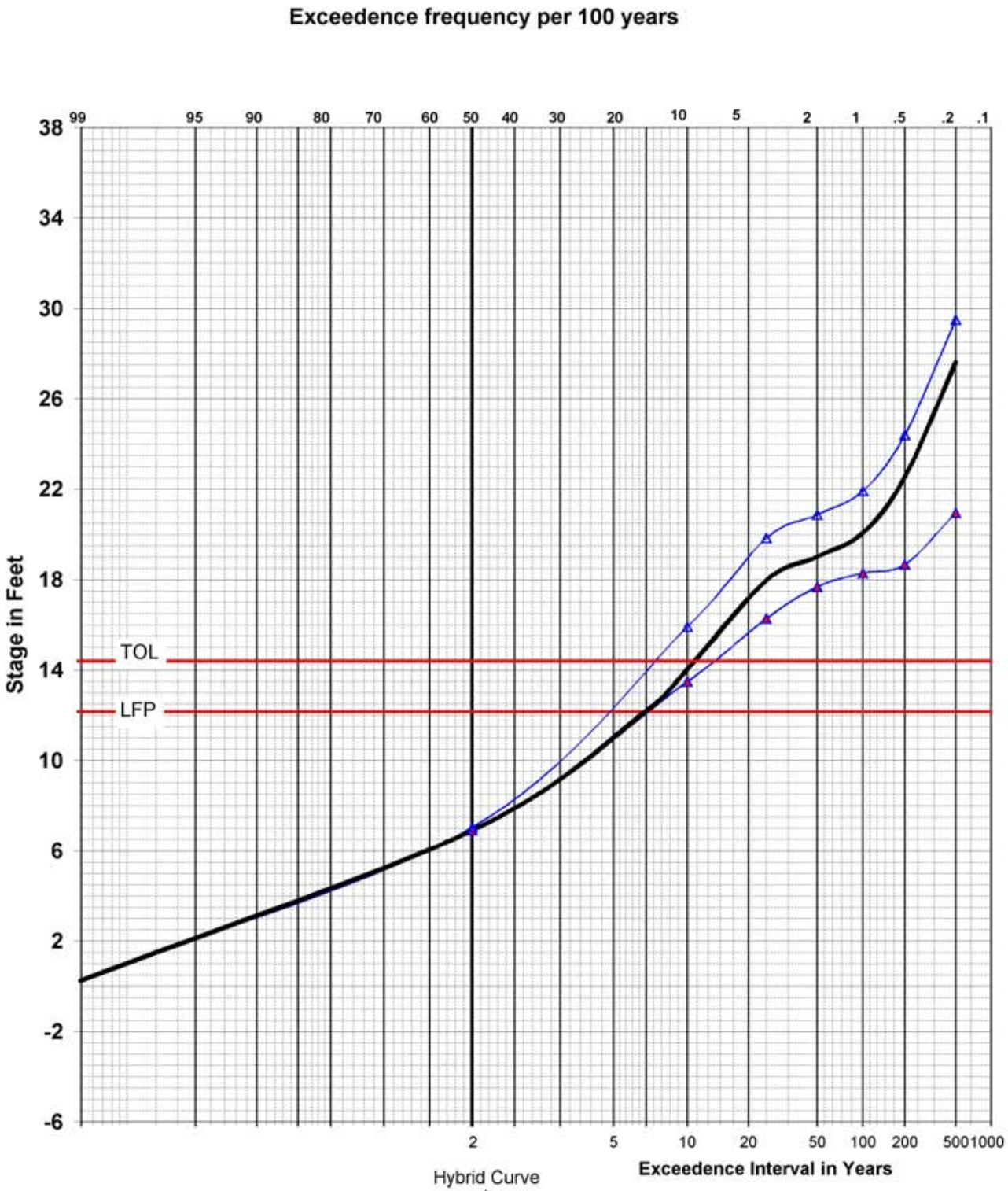
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC58

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-49**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Haas Slough mile 2.25
Left Bank

Top of Levee/Bank 14.39
LFP 12.14

Hybrid Curve

Yr	Stage
1.01	0.25
2	6.9
6.6	12.14
10	14.04
25	17.97
50	19.01
100	20.07
200	22.54

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

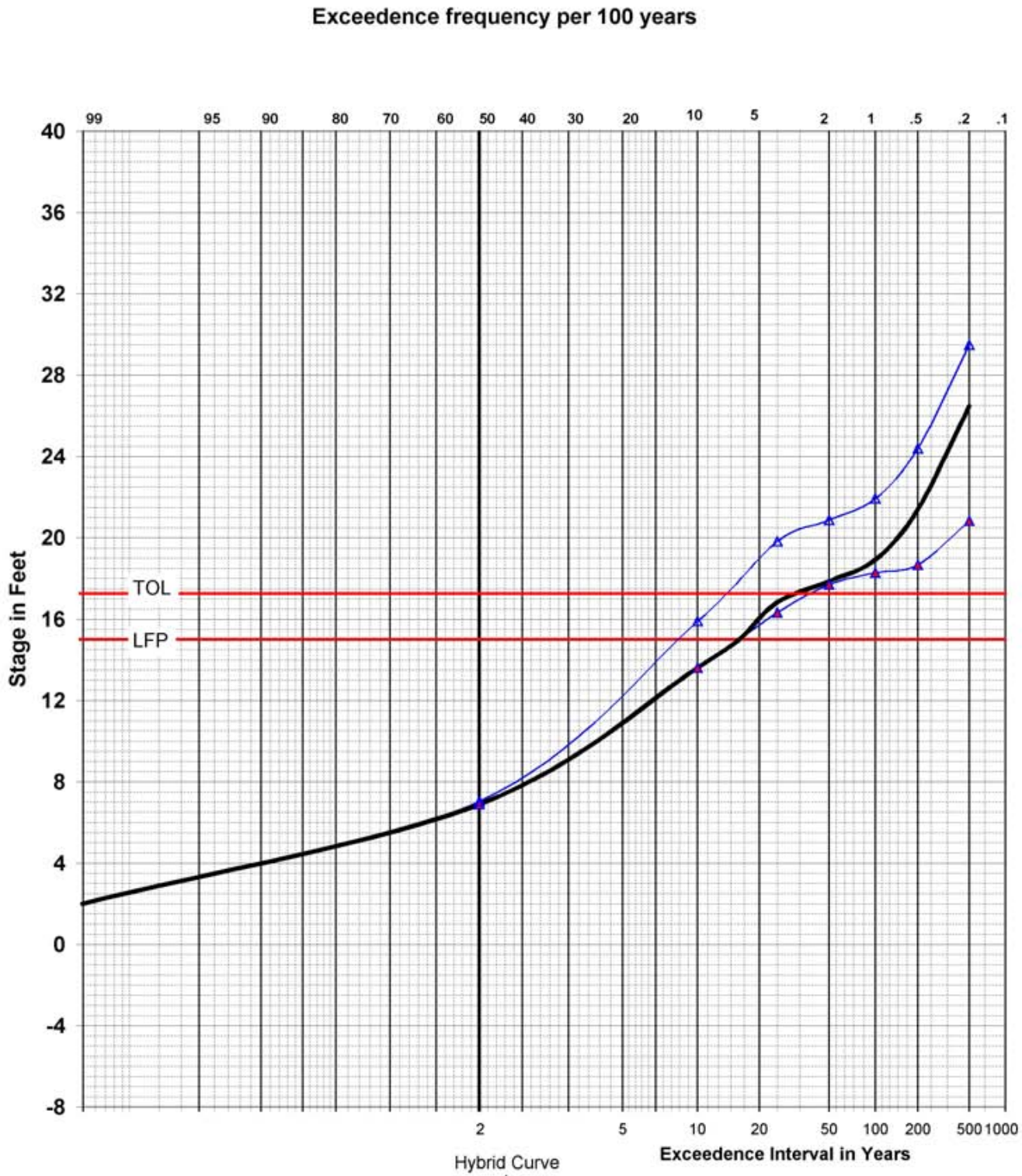
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC59

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-50**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Cache Slough mile 24.25

Left Bank

Top of Levee/Bank 17.25

LFP 15

Hybrid Curve

Yr	Stage
1.01	2
2	6.9
10	13.6
15.8	15
25	16.83
50	17.87
100	18.93
200	21.4
500	26.49

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

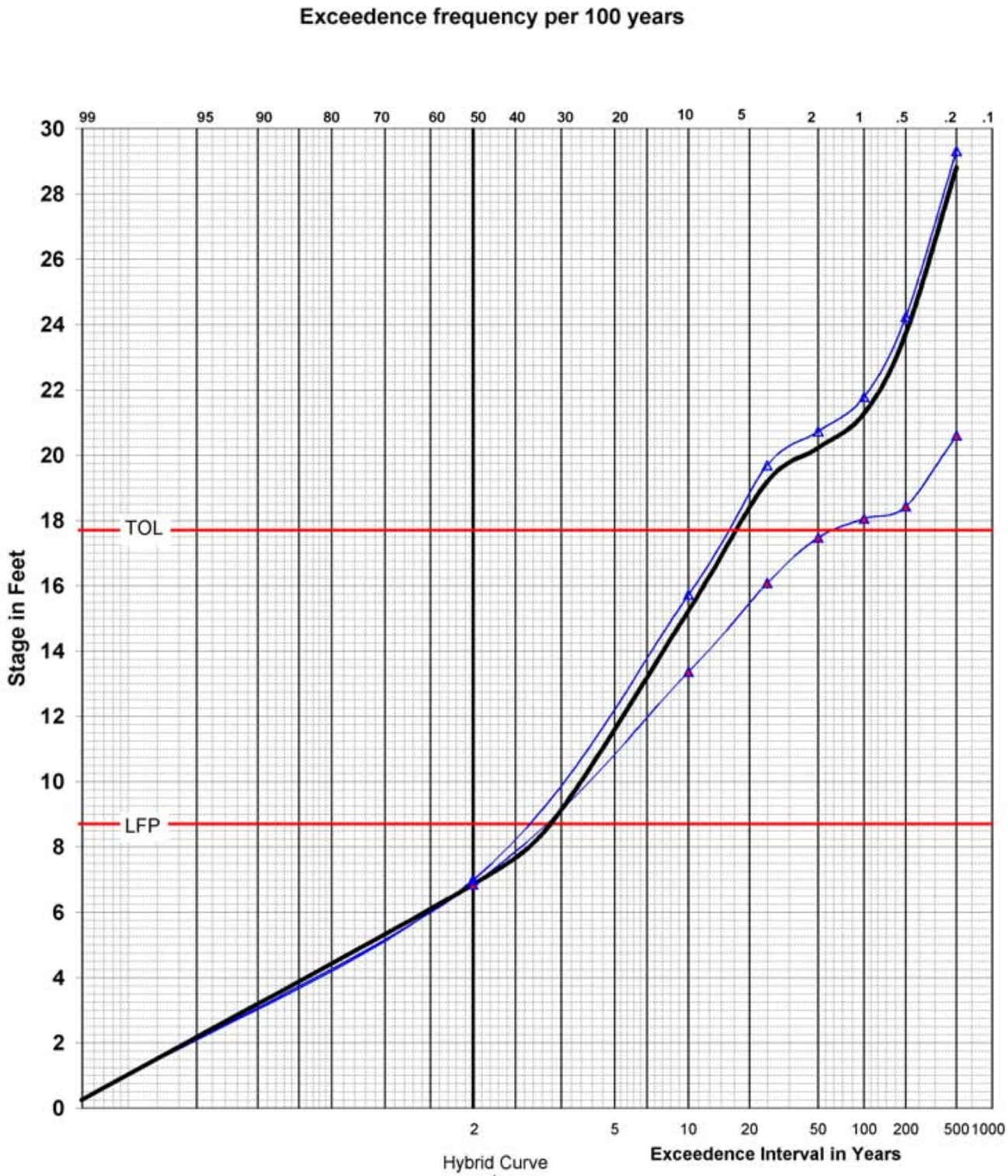
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC60

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-51**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Cache Slough mile 21.00
Right Bank

Top of Levee/Bank	17.7
LFP	8.7

Hybrid Curve

Yr	Stage
1.01	0.25
2	6.85
3.1	8.7
10	15.23
25	19.19
50	20.23
100	21.28
200	23.73
500	28.81

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

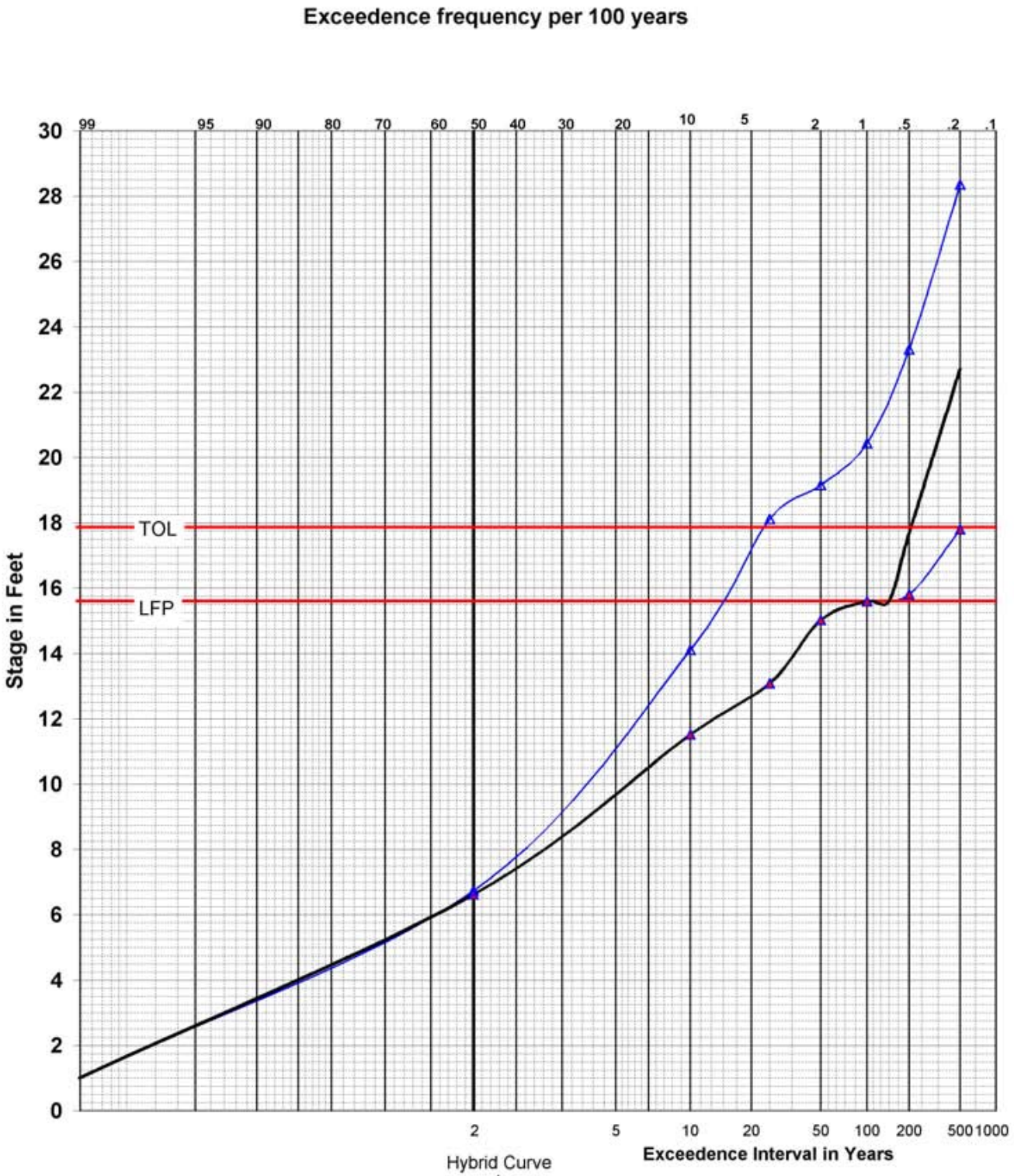
RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC61

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-52**



Legend

Solid Triangle = Base Conditions @ IP

Hollow Triangle = Infinite Channel @ IP

Heavy Solid = Hybrid @ IP

Lindsey Slough mile 21.50
Right Bank

Top of Levee/Bank 17.86
LFP 15.61

Hybrid Curve

Yr	Stage
1.01	1
2	6.62
10	11.52
25	13.08
50	15.02
100	15.59
143	15.61
200	17.67
500	22.72

COMPREHENSIVE STUDY

Phase II Economics

BASELINE

STAGE FREQUENCY CURVE

RISK BASED ANALYSIS

SACRAMENTO RIVER

DAMAGE AREA SAC62

Corps of Engineers, Sacramento District

October 2002 **PLATE D.1-53**