CHAPTER 10
BENEFIT-COST PROGRAM: PRINT-OUT

The print-out of the **Benefit-Cost Program** which follows contains all data tables, results tables, and graphs from the **Benefit-Cost Program.** The print-out consists of three parts:

1. A one-page summary of data inputs;

2. A twelve-page report containing all of the data entry and results pages from the Benefit-Cost Program; and

3. Seven pages of graphs illustrating flood hazard, damages, and benefit-cost results.

SUMMARY

Scenario Run ID: 1

City Office Annex | 55 A Street | Cape Squirrel, VA 22222

Mitigation Project: Elevate 5 feet

Building Type: 2 Story w/o Basement

DATA USED FOR THIS ANALYSIS:

Building Replacement Value ($/sf)	$75.00
Total Floor Area (square feet):	2,000
Total Building Replacement Value:	$150,000
Demolition Threshold Damge Percentage:	50%
Total Contents Value	$50,000
Total Displacement Costs ($/month):	$2,750
Cost of Providing Services from this Building ($/day)	$534
Post-Disaster Continuity Premium ($/day)	$500
Total Value of Lost Services ($/day)	$1,034
Total Monthly Rent from All Tenants ($/month)	$500
Estimated Net Income of Commercial Businesses ($/month)	$1,500
Total Mitigation Project Costs	$53,205
Discount Rate	7.00%
Project Useful Life (years)	30

DATA THAT VARY BY FLOOD DEPTH:

Flood Depth (ft)	Building DDF (%)	Modified DDF (%)	Contents DDF (%)	Displacement Time (days)	Functional Downtime (days)	Building Mit. Effectiveness (%	Contents Mit. Effectiveness (%	Annual # of Floods
-2	0	0	0	0	0	100	100	1.123E-01
-1	0	0	0	0	0	100	100	5.751E-02
0	5	5	8	0	5	100	100	6.450E-02
1	9	9	14	0	9	100	100	2.948E-02
2	13	13	20	54	13	100	100	1.208E-02
3	18	18	27	94	18	100	100	3.677E-03
4	20	20	30	110	20	100	100	1.221E-03
5	22	22	33	126	22	77	77	4.494E-04
6	24	24	36	142	24	63	63	1.801E-04
7	26	26	39	158	26	50	50	7.752E-05
8	29	29	44	182	29	38	38	3.547E-05
9	33	33	50	214	30	39	39	1.711E-05
10	38	38	57	254	30	42	42	8.645E-06
11	38	38	57	254	30	37	37	4.548E-06
12	38	38	57	254	30	32	32	2.481E-06
13	38	38	57	254	30	24	24	1.397E-06
14	38	38	57	254	30	13	13	8.102E-07
15	38	38	57	254	30	0	0	4.822E-07
16	38	38	57	254	30	0	0	2.939E-07
17	38	38	57	254	30	0	0	1.831E-07
18	38	38	57	254	30	0	0	1.163E-07

SUMMARY OF PROJECT BENEFITS AND COSTS

PROJECT BENEFITS	$36,691
PROJECT COSTS	$53,205
PROJECT BENEFITS MINUS PROJECT COSTS :	($16,513)
BENEFIT-COST RATIO:	0.69

FEMA Disclaimer: The results produced by this analysis are neither conclusive evidence that the proposed project is cost-effective, nor a guarantee that a project is eligible for any government grant for whatever purpose

Analyst: Goettel & Horner

FEMA Benefit-Cost Analysis of Hazard Mitigation Projects

RIVERINE FLOOD

Version 1.0
November 18, 1994

Report of Benefit-Cost Analysis

Building Name	City Office Annex
Address	55 A Street Cape Squirrel, VA 22222
Analyst	Goettel & Horner
Project Description	Elevate 5 feet
Project Number	123456
Application Date	January 1, 1994
Scenario Run ID	1

Benefit-Cost Program Prepared for the

Federal Emergency Management Agency

by

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FEMA Disclaimer:

The results produced by this analysis are neither conclusive evidence that the proposed project is cost-effective, nor a guarantee that a project is eligible for any government grant for whatever purpose.

LEVEL ONE DATA

PROJECT INFORMATION

Building Name	City Office Annex
Address	55 A Street
City, State, Zip	Cape Squirrel, VA 22222
Owner	City of Cape Squirrel
Contact Person	Sam Smith, City Manager
Disaster Number	FEMA-000-DR-VA
Project Number	123456
Application Date	January 1, 1994
Discount Rate	7.00%
Scenario Run ID	1
Analyst	Goettel & Horner

BUILDING DATA

Building Type Selected: 2 Story w/o Basement

BUILDING INFORMATION

Zero Flood Depth (elevation in feet)	6.0
Number of Stories Above Grade	2
Construction Date	1965
Historic Building Controls	No

BUILDING SIZE AND USE

Total Floor Area (sf)	2,000
Area Occupied by Owner or Public/Nonprofit Agencies (sf)	1,500

BUILDING VALUE

Building Replacement Value ($/sf)		$75.00
Total Building Replacement Value ($)		$150,000
Building Damage that would Result in Demolition	Percent	50
	Value	$75,000

BUILDING CONTENTS

Contents Description	office furniture, computers & files
Total Value of Contents	$50,000
Value of Contents ($/sf)	$25.00

DISPLACEMENT COSTS DUE TO FLOOD DAMAGE

Rental Cost of Temporary Building Space ($/sf/month)	$1.50
Rental Cost of Temporary Building Space ($/month)	$2,250
Other Costs of Displacement ($/month)	$500
Total Displacement Costs ($/month)	$2,750

LEVEL ONE DATA (Continued) Page 2

City Office Annex | 55 A Street | Cape Squirrel, VA 22222

Scenario Run ID: 1

VALUE OF PUBLIC/NONPROFIT SERVICES

Description of Services Provided	City Planning Office
Annual Budget of Public/Nonprofit Agencies	$195,000
Is Rent Included in this Budget?	Rent Included
If Rent is NOT Included, a Proxy Rent is Added to the Budget ($/month)	
User-Entered Rent Estimate, in Place of Proxy Rent ($/month)	$0
Cost of Providing Services from this Building ($/day)	$534
Post-Disaster Continuity Premium ($/day)	$500
Total Value of Lost Services ($/day)	$1,034

RENT & BUSINESS INCOME

Total Monthly Rent from All Tenants ($/month)	$500
Estimated Net Income of Commercial Businesses ($/month)	$1,500

MITIGATION PROJECT DATA

Type of Mitigation Selected	Elevation
Project Description	Elevate 5 feet
Project Useful Life (years)	30

Mitigation Effectiveness

Mitigation Measure	100% Effective to Depth	0% Effective at Depth
Elevation	4	N/A
Relocation/Buyout	N/A	N/A
Flood Barriers		
Other		

Mitigation Project Cost (excluding relocation costs)	$40,000
Base Year of Costs	1994
Annual Maintenance Costs ($/year)	$500
Present Value of Annual Maintenance Costs ($)	$6,205
Relocation Costs for Mitigation Project	
Relocation Time Due to Project (months)	2
Rental Cost during Occupant Relocation ($/sf/month)	$2.00
Rental Cost during Occupant Relocation ($/month)	$3,000
Other Relocation Costs ($/month)	$500
Total Relocation Costs	$7,000
Total Mitigation Project Costs	$53,205

FLOOD HAZARD RISK

City Office Annex 55 A Street Cape Squirrel, VA 22222

Scenario Run ID 1

REFERENCE INFORMATION FROM LEVEL ONE DATA

Zero Flood Depth (elevation in feet). 6

FLOOD HAZARD DATA

Data from Flood Insurance Study (FIS) and Flood Insurance Rate Map (FIRM)

Flood Frequency (years)	Discharge (cfs)	Elevation (ft)
10	279,000	5.8
50	351,000	7.4
100	377,000	8.0
500	444,000	9.5

EXPECTED ANNUAL NUMBER OF FLOODS

Flood Depth (feet)	Default Estimate	User Estimate
-2	1.12E-01	
-1	5.75E-02	
0	6.45E-02	
1	2.95E-02	
2	1.21E-02	
3	3.68E-03	
4	1.22E-03	
5	4.49E-04	
6	1.80E-04	
7	7.75E-05	
8	3.55E-05	
9	1.71E-05	
10	8.64E-06	
11	4.55E-06	
12	2.48E-06	
13	1.40E-06	
14	8.10E-07	
15	4.82E-07	
16	2.94E-07	
17	1.83E-07	
18	1.16E-07	

COMMENTS: FLOOD HAZARD RISK ESTIMATES

LEVEL TWO DATA: BUILDING DEPTH-DAMAGE FUNCTION

City Office Annex	55 A Street	Cape Squirrel, VA 22222

Scenario Run ID: 1

REFERENCE INFORMATION FROM LEVEL ONE DATA

Building Type:	2 Story w/o Basement
Number of Stories Above Grade	2
Construction Date	1965
Historic Building Controls	No
Total Floor Area (square feet):	2,000
Total Building Replacement Value:	$150,000
Demolition Threshold Damage Percentage:	50%

BUILDING DEPTH-DAMAGE FUNCTION (DDF)

Flood Depth (feet)	ESTIMATED BUILDING DAMAGE			
	Default DDF (%)	User-Entered DDF (%)	Modified DDF (%)	Modified DDF ($)
-2	0		0	$0
-1	0		0	$0
0	5		5	$7,500
1	9		9	$13,500
2	13		13	$19,500
3	18		18	$27,000
4	20		20	$30,000
5	22		22	$33,000
6	24		24	$36,000
7	26		26	$39,000
8	29		29	$43,500
9	33		33	$49,500
10	38		38	$57,000
11	38		38	$57,000
12	38		38	$57,000
13	38		38	$57,000
14	38		38	$57,000
15	38		38	$57,000
16	38		38	$57,000
17	38		38	$57,000
18	38		38	$57,000

COMMENTS: BUILDING DDF

LEVEL TWO DATA: CONTENTS DEPTH-DAMAGE FUNCTION Page 5

City Office Annex	55 A Street	Cape Squirrel, VA 22222

Scenario Run ID: 1

REFERENCE INFORMATION FROM LEVEL ONE DATA

Contents Description	office furniture, computers & files
Total Value of Contents	$50,000
Value of Contents ($/sf)	$25.00

CONTENTS DEPTH-DAMAGE FUNCTION (DDF)

Flood Depth (feet)	Building DDF(%)	ESTIMATED CONTENTS DAMAGE		
		Default DDF (%)	User-Entered DDF (%)	DDF ($)
-2	0	0		$0
-1	0	0		$0
0	5	8		$3,750
1	9	14		$6,750
2	13	20		$9,750
3	18	27		$13,500
4	20	30		$15,000
5	22	33		$16,500
6	24	36		$18,000
7	26	39		$19,500
8	29	44		$21,750
9	33	50		$24,750
10	38	57		$28,500
11	38	57		$28,500
12	38	57		$28,500
13	38	57		$28,500
14	38	57		$28,500
15	38	57		$28,500
16	38	57		$28,500
17	38	57		$28,500
18	38	57		$28,500

COMMENTS: CONTENTS DDF

LEVEL TWO DATA: DISPLACEMENT TIME

City Office Annex	55 A Street	Cape Squirrel, VA 22222

Scenario Run ID: 1

REFERENCE INFORMATION FROM LEVEL ONE DATA

Rental Cost of Temporary Building Space ($/sf/month)	$1.50
Rental Cost of Temporary Building Space ($/month)	$2,250
Other Costs of Displacement ($/month)	$500
Total Displacement Costs ($/month)	$2,750
Total Monthly Rent from All Tenants ($/month)	$500

DISPLACEMENT TIME DUE TO BUILDING FLOOD DAMAGE

Flood Depth (feet)	Modified DDF (%)	Default (days)	User-Entered (days)	Displacement Costs	Rental Income Losses
-2	0	0		$0	$0
-1	0	0		$0	$0
0	5	0		$0	$0
1	9	0		$0	$0
2	13	54		$4,950	$900
3	18	94		$8,617	$1,567
4	20	110		$10,083	$1,833
5	22	126		$11,550	$2,100
6	24	142		$13,017	$2,367
7	26	158		$14,483	$2,633
8	29	182		$16,683	$3,033
9	33	214		$19,617	$3,567
10	38	254		$23,283	$4,233
11	38	254		$23,283	$4,233
12	38	254		$23,283	$4,233
13	38	254		$23,283	$4,233
14	38	254		$23,283	$4,233
15	38	254		$23,283	$4,233
16	38	254		$23,283	$4,233
17	38	254		$23,283	$4,233
18	38	254		$23,283	$4,233

COMMENTS: DISPLACEMENT TIME ESTIMATES

LEVEL TWO DATA: FUNCTIONAL DOWNTIME

City Office Annex	55 A Street	Cape Squirrel, VA 22222

Scenario Run ID: 1

REFERENCE INFORMATION FROM LEVEL ONE DATA

Cost of Providing Services from this Building ($/day)	$534
Post-Disaster Continuity Premium ($/day)	$500
Total Value of Lost Services ($/day)	$1,034
Estimated Net Income of Commercial Businesses ($/month)	$1,500

FUNCTIONAL DOWNTIME ESTIMATES

Flood Depth (feet)	Building DDF (%)	Default Downtime (days)	User-Entered Downtime (days)	Value of Lost Services	Lost Business Income
-2	0	0		$0	$0
-1	0	0		$0	$0
0	5	5		$5,171	$250
1	9	9		$9,308	$450
2	13	13		$13,445	$650
3	18	18		$18,616	$900
4	20	20		$20,685	$1,000
5	22	22		$22,753	$1,100
6	24	24		$24,822	$1,200
7	26	26		$26,890	$1,300
8	29	29		$29,993	$1,450
9	33	30		$31,027	$1,500
10	38	30		$31,027	$1,500
11	38	30		$31,027	$1,500
12	38	30		$31,027	$1,500
13	38	30		$31,027	$1,500
14	38	30		$31,027	$1,500
15	38	30		$31,027	$1,500
16	38	30		$31,027	$1,500
17	38	30		$31,027	$1,500
18	38	30		$31,027	$1,500

COMMENTS: FUNCTIONAL DOWNTIME ESTIMATES

LEVEL TWO DATA: MITIGATION PROJECT EFFECTIVENESS

City Office Annex | 55 A Street | Cape Squirrel, VA 22222

Scenario Run ID: 1

REFERENCE INFORMATION FROM LEVEL ONE DATA

Building Type	2 Story w/o Basement
Total Floor Area (sf)	2,000
Total Building Replacement Value	$150,000
Demolition Threshold Damage Percentage	50%
Type of Mitigation Selected	Elevation
Project Description	Elevate 5 feet
Total Mitigation Project Costs	$53,205

MITIGATION EFFECTIVENESS (percent of damages avoided)

Flood Depth (feet)	BUILDING DAMAGES			CONTENTS DAMAGES		
	Building DDF (%)	Default Eff. (%)	User-Entered Eff. (%)	Contents DDF (%)	Default Eff. (%)	User-Entered Eff. (%)
-2	0	100		0	100	
-1	0	100		0	100	
0	5	100		8	100	
1	9	100		14	100	
2	13	100		20	100	
3	18	100		27	100	
4	20	100		30	100	
5	22	77		33	77	
6	24	63		36	63	
7	26	50		39	50	
8	29	38		44	38	
9	33	39		50	39	
10	38	42		57	42	
11	38	37		57	37	
12	38	32		57	32	
13	38	24		57	24	
14	38	13		57	13	
15	38	0		57	0	
16	38	0		57	0	
17	38	0		57	0	
18	38	0		57	0	

COMMENTS: MITIGATION EFFECTIVENESS ESTIMATES

SUMMARY OF DAMAGES BEFORE MITIGATION

City Office Annex | 55 A Street | Cape Squirrel, VA 22222

Scenario Run ID: 1

Building Type: 2 Story w/o Basement

SCENARIO DAMAGES BEFORE MITIGATION ($ per event)

Flood Depth	Building Damages	Contents Damages	Displacement Costs	Business Losses	Rental Losses	Public/ Nonprofit	Total
-2	$0	$0	$0	$0	$0	$0	$0
-1	$0	$0	$0	$0	$0	$0	$0
0	$7,500	$3,750	$0	$250	$0	$5,171	$16,671
1	$13,500	$6,750	$0	$450	$0	$9,308	$30,008
2	$19,500	$9,750	$4,950	$650	$900	$13,445	$49,195
3	$27,000	$13,500	$8,617	$900	$1,567	$18,616	$70,200
4	$30,000	$15,000	$10,083	$1,000	$1,833	$20,685	$78,602
5	$33,000	$16,500	$11,550	$1,100	$2,100	$22,753	$87,003
6	$36,000	$18,000	$13,017	$1,200	$2,367	$24,822	$95,405
7	$39,000	$19,500	$14,483	$1,300	$2,633	$26,890	$103,807
8	$43,500	$21,750	$16,683	$1,450	$3,033	$29,993	$116,410
9	$49,500	$24,750	$19,617	$1,500	$3,567	$31,027	$129,961
10	$57,000	$28,500	$23,283	$1,500	$4,233	$31,027	$145,544
11	$57,000	$28,500	$23,283	$1,500	$4,233	$31,027	$145,544
12	$57,000	$28,500	$23,283	$1,500	$4,233	$31,027	$145,544
13	$57,000	$28,500	$23,283	$1,500	$4,233	$31,027	$145,544
14	$57,000	$28,500	$23,283	$1,500	$4,233	$31,027	$145,544
15	$57,000	$28,500	$23,283	$1,500	$4,233	$31,027	$145,544
16	$57,000	$28,500	$23,283	$1,500	$4,233	$31,027	$145,544
17	$57,000	$28,500	$23,283	$1,500	$4,233	$31,027	$145,544
18	$57,000	$28,500	$23,283	$1,500	$4,233	$31,027	$145,544

EXPECTED ANNUAL DAMAGES BEFORE MITIGATION ($ per year)

Flood Depth	Building Damages	Contents Damages	Displacement Costs	Business Losses	Rental Losses	Public/ Nonprofit	Total
-2	$0	$0	$0	$0	$0	$0	$0
-1	$0	$0	$0	$0	$0	$0	$0
0	$484	$242	$0	$16	$0	$334	$1,075
1	$398	$199	$0	$13	$0	$274	$885
2	$236	$118	$60	$8	$11	$162	$594
3	$99	$50	$32	$3	$6	$68	$258
4	$37	$18	$12	$1	$2	$25	$96
5	$15	$7	$5	$0	$1	$10	$39
6	$6	$3	$2	$0	$0	$4	$17
7	$3	$2	$1	$0	$0	$2	$8
8	$2	$1	$1	$0	$0	$1	$4
9	$1	$0	$0	$0	$0	$1	$2
10	$0	$0	$0	$0	$0	$0	$1
11	$0	$0	$0	$0	$0	$0	$1
12	$0	$0	$0	$0	$0	$0	$0
13	$0	$0	$0	$0	$0	$0	$0
14	$0	$0	$0	$0	$0	$0	$0
15	$0	$0	$0	$0	$0	$0	$0
16	$0	$0	$0	$0	$0	$0	$0
17	$0	$0	$0	$0	$0	$0	$0
18	$0	$0	$0	$0	$0	$0	$0
Total	$1,281	$641	$114	$43	$21	$883	$2,982

SUMMARY OF DAMAGES AFTER MITIGATION

City Office Annex | 55 A Street | Cape Squirrel, VA 22222

Scenario Run ID: 1

Project Description: Elevate 5 feet

SCENARIO DAMAGES AFTER MITIGATION ($ per event)

Flood Depth	Building Damages	Contents Damages	Displacement Costs	Business Losses	Rental Losses	Public/ Nonprofit	Total
-2	$0	$0	$0	$0	$0	$0	$0
-1	$0	$0	$0	$0	$0	$0	$0
0	$0	$0	$0	$0	$0	$0	$0
1	$0	$0	$0	$0	$0	$0	$0
2	$0	$0	$0	$0	$0	$0	$0
3	$0	$0	$0	$0	$0	$0	$0
4	$0	$0	$0	$0	$0	$0	$0
5	$7,500	$3,750	$2,625	$250	$477	$5,171	$19,774
6	$13,500	$6,750	$4,881	$450	$888	$9,308	$35,777
7	$19,500	$9,750	$7,242	$650	$1,317	$13,445	$51,904
8	$27,000	$13,500	$10,355	$900	$1,883	$18,616	$72,254
9	$30,000	$15,000	$11,889	$909	$2,162	$18,804	$78,764
10	$33,000	$16,500	$13,480	$868	$2,451	$17,963	$84,262
11	$36,000	$18,000	$14,705	$947	$2,674	$19,596	$91,923
12	$39,000	$19,500	$15,931	$1,026	$2,896	$21,229	$99,583
13	$43,500	$21,750	$17,769	$1,145	$3,231	$23,679	$111,073
14	$49,500	$24,750	$20,220	$1,303	$3,676	$26,945	$126,394
15	$57,000	$28,500	$23,283	$1,500	$4,233	$31,027	$145,544
16	$57,000	$28,500	$23,283	$1,500	$4,233	$31,027	$145,544
17	$57,000	$28,500	$23,283	$1,500	$4,233	$31,027	$145,544
18	$57,000	$28,500	$23,283	$1,500	$4,233	$31,027	$145,544

EXPECTED ANNUAL DAMAGES AFTER MITIGATION ($ per year)

Flood Depth	Building Damages	Contents Damages	Displacement Costs	Business Losses	Rental Losses	Public/ Nonprofit	Total
-2	$0	$0	$0	$0	$0	$0	$0
-1	$0	$0	$0	$0	$0	$0	$0
0	$0	$0	$0	$0	$0	$0	$0
1	$0	$0	$0	$0	$0	$0	$0
2	$0	$0	$0	$0	$0	$0	$0
3	$0	$0	$0	$0	$0	$0	$0
4	$0	$0	$0	$0	$0	$0	$0
5	$3	$2	$1	$0	$0	$2	$9
6	$2	$1	$1	$0	$0	$2	$6
7	$2	$1	$1	$0	$0	$1	$4
8	$1	$0	$0	$0	$0	$1	$3
9	$1	$0	$0	$0	$0	$0	$1
10	$0	$0	$0	$0	$0	$0	$1
11	$0	$0	$0	$0	$0	$0	$0
12	$0	$0	$0	$0	$0	$0	$0
13	$0	$0	$0	$0	$0	$0	$0
14	$0	$0	$0	$0	$0	$0	$0
15	$0	$0	$0	$0	$0	$0	$0
16	$0	$0	$0	$0	$0	$0	$0
17	$0	$0	$0	$0	$0	$0	$0
18	$0	$0	$0	$0	$0	$0	$0
Total	$9	$5	$3	$0	$1	$6	$25

SUMMARY OF BENEFITS FROM MITIGATION

City Office Annex | 55 A Street | Cape Squirrel, VA 22222

Scenario Run ID: 1

Project Description: Elevate 5 feet

EXPECTED ANNUAL BENEFITS FROM MITIGATION ($ per year)

Flood Depth	Building Damages	Contents Damages	Displacement Costs	Business Losses	Rental Losses	Public/ Nonprofit	Total
-2	$0	$0	$0	$0	$0	$0	$0
-1	$0	$0	$0	$0	$0	$0	$0
0	$484	$242	$0	$16	$0	$334	$1,075
1	$398	$199	$0	$13	$0	$274	$885
2	$236	$118	$60	$8	$11	$162	$594
3	$99	$50	$32	$3	$6	$68	$258
4	$37	$18	$12	$1	$2	$25	$96
5	$11	$6	$4	$0	$1	$8	$30
6	$4	$2	$1	$0	$0	$3	$11
7	$2	$1	$1	$0	$0	$1	$4
8	$1	$0	$0	$0	$0	$0	$2
9	$0	$0	$0	$0	$0	$0	$1
10	$0	$0	$0	$0	$0	$0	$1
11	$0	$0	$0	$0	$0	$0	$0
12	$0	$0	$0	$0	$0	$0	$0
13	$0	$0	$0	$0	$0	$0	$0
14	$0	$0	$0	$0	$0	$0	$0
15	$0	$0	$0	$0	$0	$0	$0
16	$0	$0	$0	$0	$0	$0	$0
17	$0	$0	$0	$0	$0	$0	$0
18	$0	$0	$0	$0	$0	$0	$0
Total	$1,272	$636	$110	$42	$20	$877	$2,957

BENEFIT-COST RESULTS

City Office Annex | 55 A Street | Cape Squirrel, VA 22222

Scenario Run ID: 1

Building Type: 2 Story w/o Basement

Project Description: Elevate 5 feet

REFERENCE INFORMATION FROM LEVEL ONE DATA

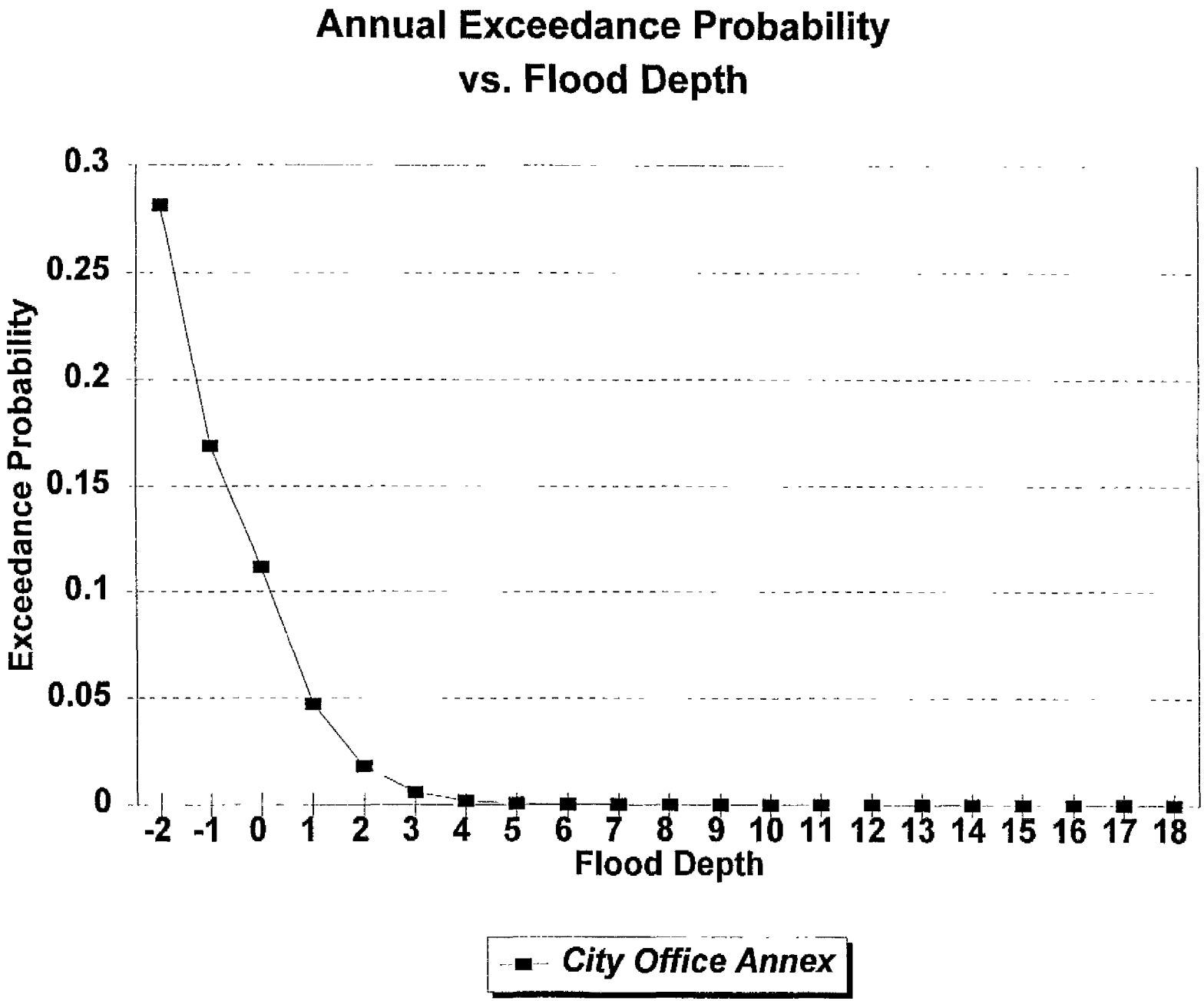
Discount Rate	7.00%
Project Useful Life (years)	30
Present Value Coefficient	12.41

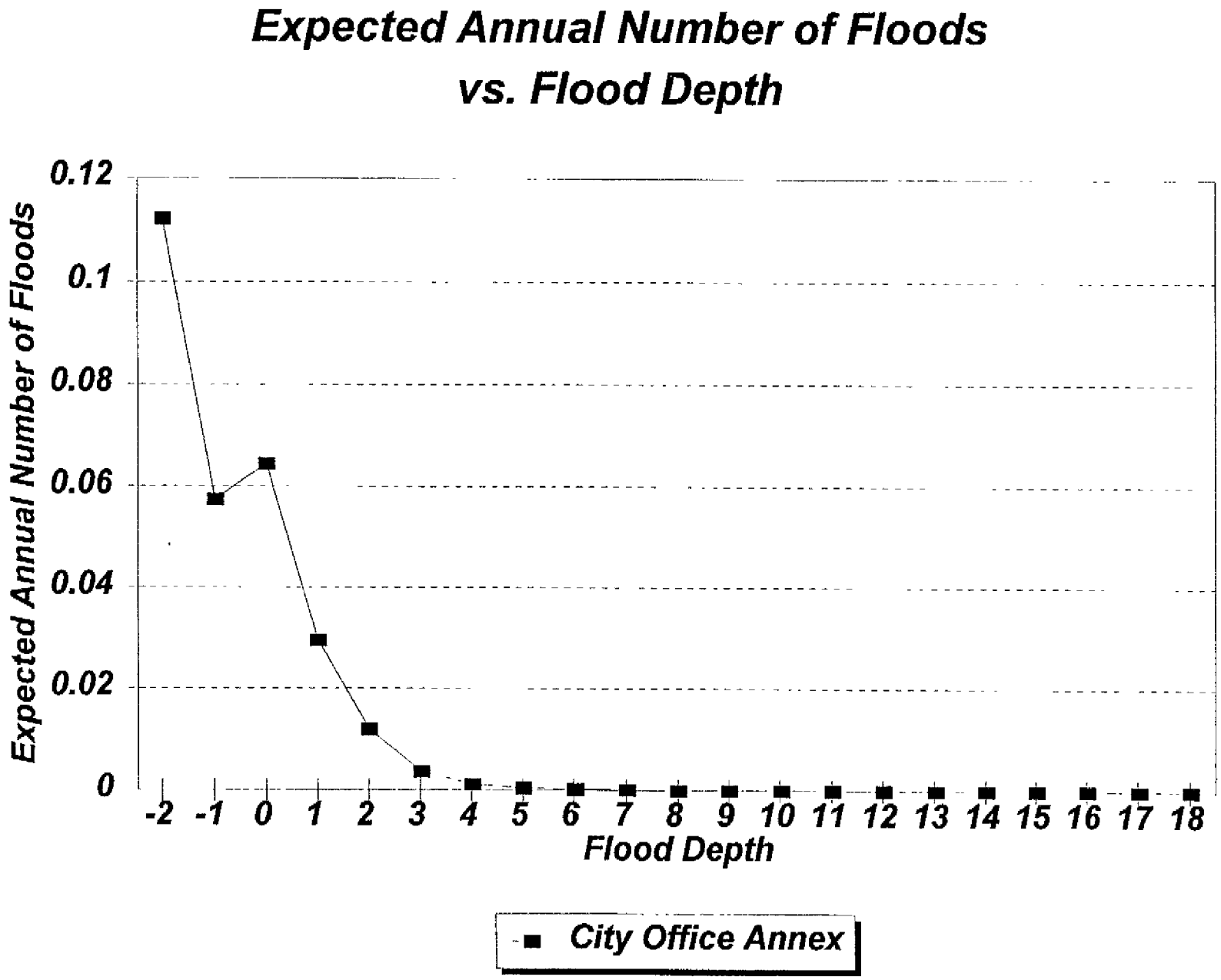
SUMMARY OF EXPECTED DAMAGES AND BENEFITS

	Expected Annual Damages Before Mitigation	Expected Annual Damages After Mitigation	Expected Annual Benefits	Present Value of Annual Benefits
Building Damages	$1,281	$9	$1,272	$15,779
Contents Damages	$641	$5	$636	$7,890
Displacement Costs	$114	$3	$110	$1,369
Business Income Lost	$43	$0	$42	$526
Rental Income Lost	$21	$1	$20	$249
Gov't Services Lost	$883	$6	$877	$10,879
Total Losses	$2,982	$25	$2,957	$36,691

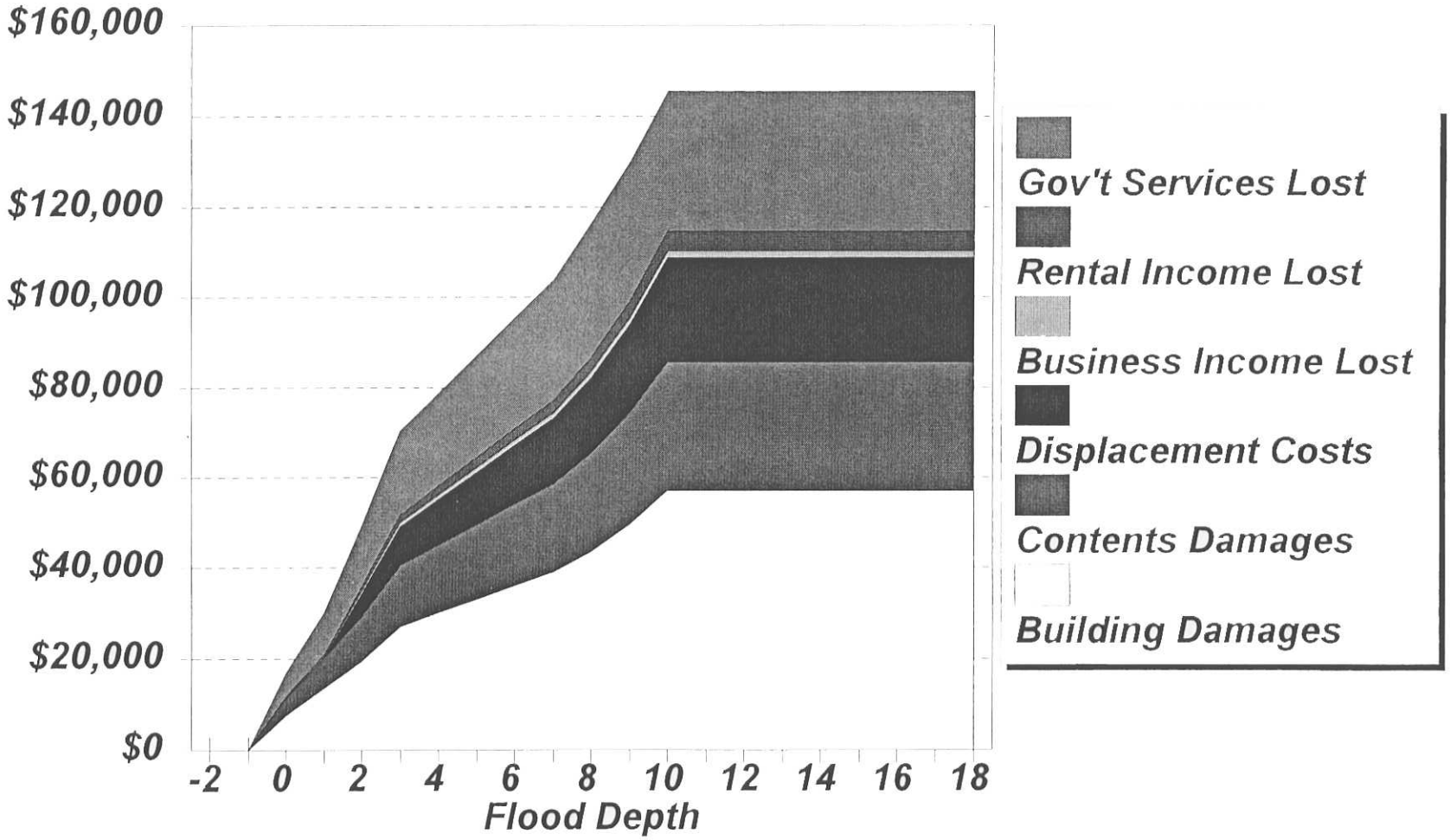
PROJECT BENEFITS	$36,691
PROJECT COSTS	$53,205
BENEFITS MINUS COSTS	($16,513)
BENEFIT-COST RATIO	**0.69**

FEMA Disclaimer: The results produced by this analysis are neither conclusive evidence that the proposed project is cost-effective, nor a guarantee that a project is eligible for any government grant for whatever purpose.

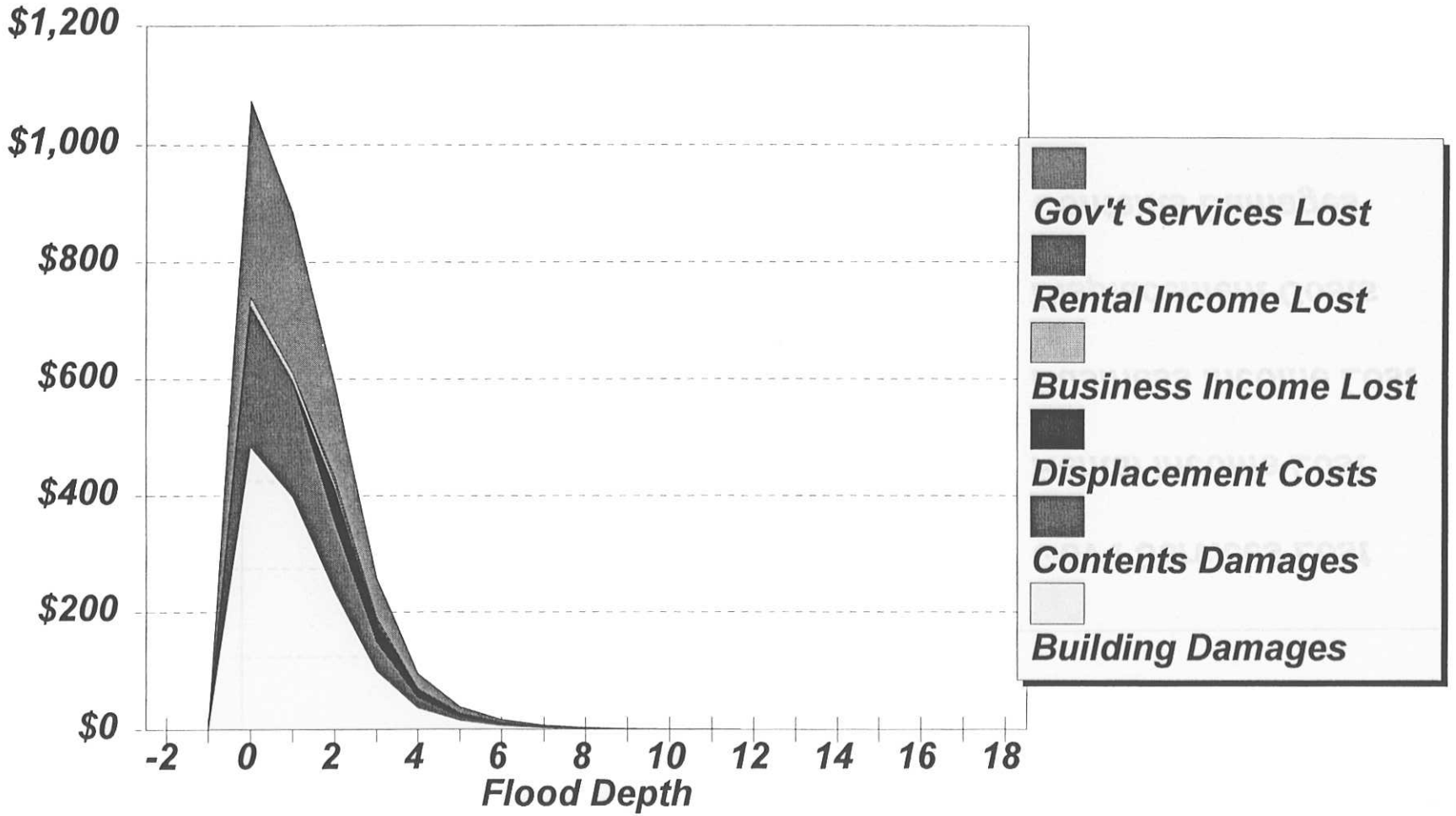

Annual Exceedance Probability
vs. Flood Depth
Exceedance Probability
0.3
0.25
0.2
0.15
0.1
0.05
0
-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Flood Depth
City Office Annex

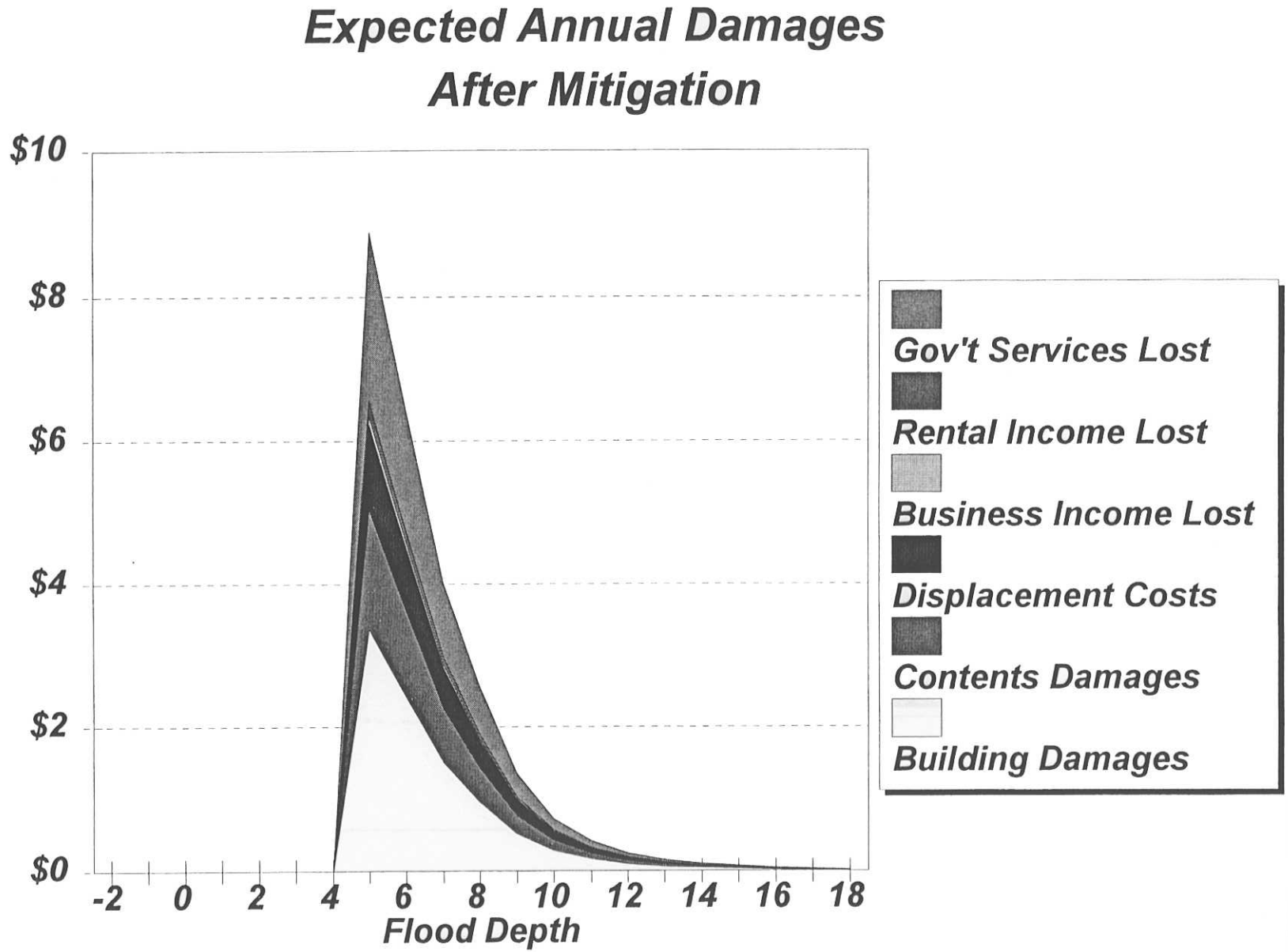

Expected Annual Number of Floods
vs. Flood Depth
Expected Annual Number of Floods
0.12
0.1
0.08
0.06
0.04
0.02
0
-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Flood Depth
City Office Annex

Scenario Damages
Before Mitigation

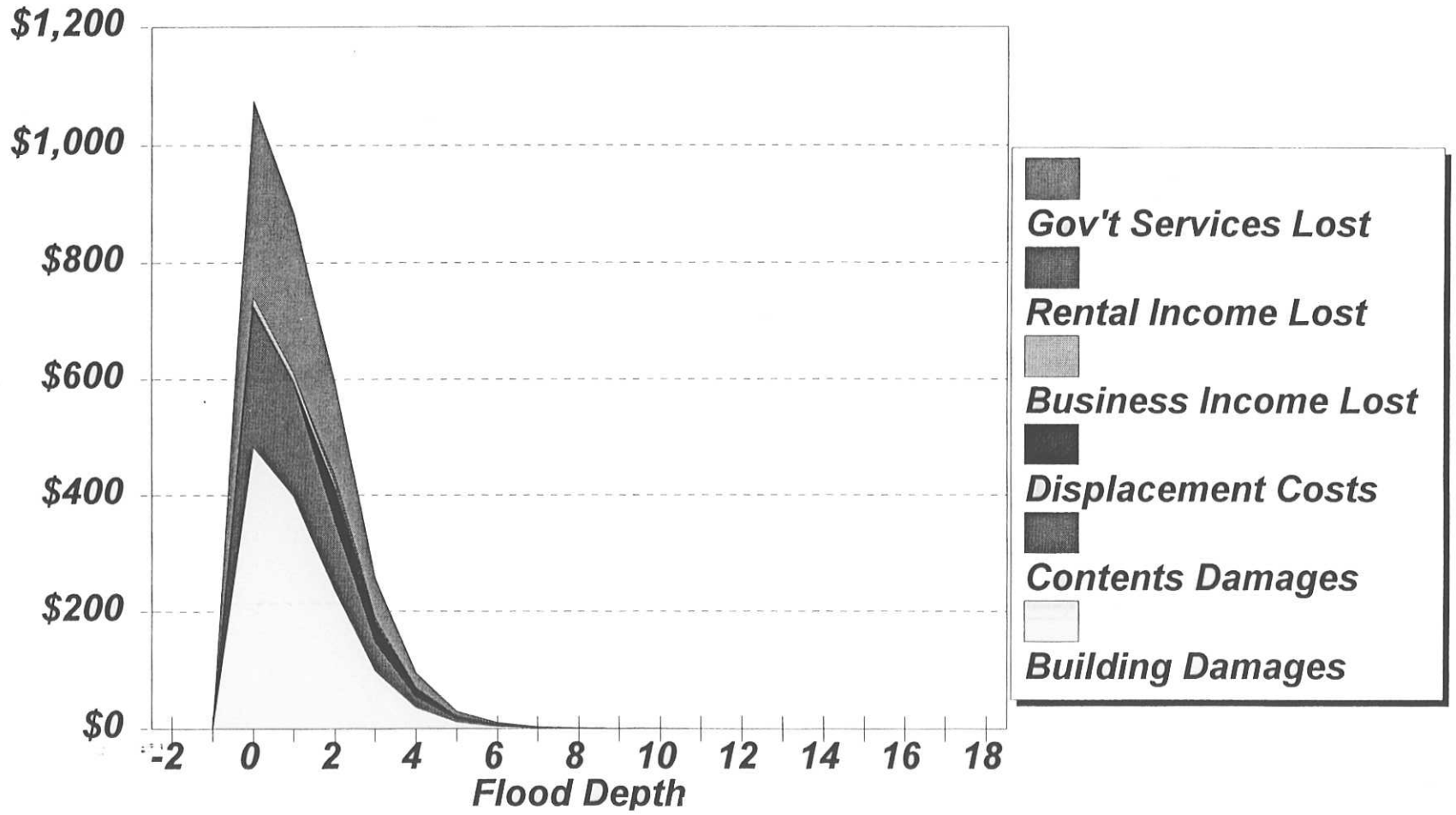
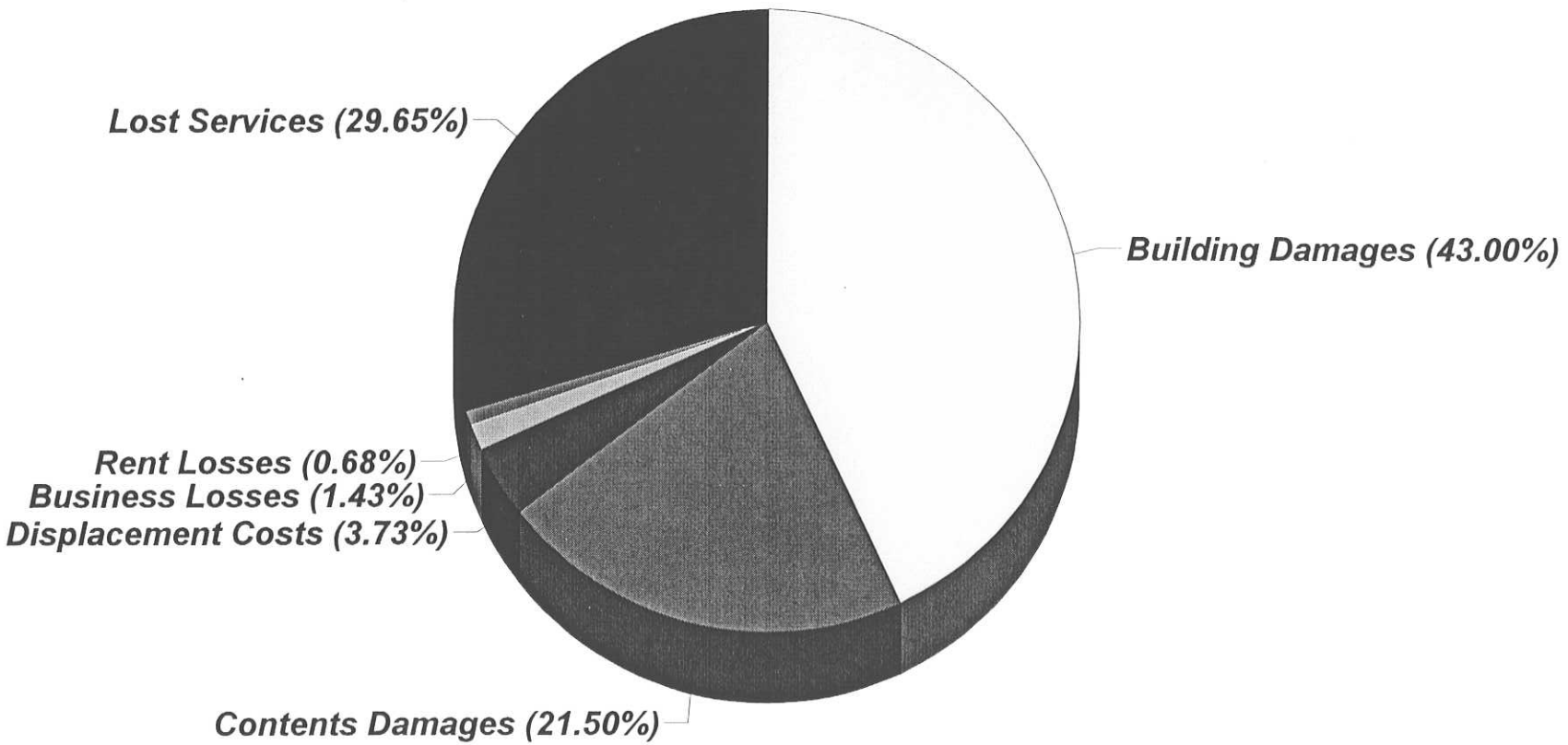


Expected Annual Damages
Before Mitigation




Expected Annual Damages
After Mitigation
$10
$8
$6
$4
$2
$0
-2
0
2
4
6
8
10
12
14
16
18
Flood Depth
Gov't Services Lost
Rental Income Lost
Business Income Lost
Displacement Costs
Contents Damages
Building Damages

Expected Annual Benefits from Mitigation



Mitigation Project Benefits