Economic Evaluation Complete Report  
EconGuide Test 1

NOTE: All bounds on uncertainties are given with a 95.0% confidence interval. The number of runs was determined with a 0.1% tolerance.

For Base (Alternative 0) 100.0 Monte-Carlo simulations were run.

For Alt 1 (Alternative 1) 51200.0 Monte-Carlo simulations were run.

For Alt 2 (Alternative 2) 3200.0 Monte-Carlo simulations were run.

The random number seed for these runs was 1204606106.

# Analysis Base Information

* Number of Alternatives: 2
* Planning Horizon: 60 years
* Discount Rate: 3%
* Disaster Rate: Every 35 years
* Uncertainty in Disaster Rate: Gaussian distribution with variance of 5
* Disaster Magnitude: 15% of build cost
* Uncertainty in Disaster Magnitude: Triangular distribution with a min of 5 and a max of 50
* Risk Preference: averse
* Statistical Value of a Life: $7500000

# Summary

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Plan Title | Total Benefits ($) | Total Costs ($) | Net ($) | SIR (%) | IRR (%) | ROI (%) | Non-Disaster ROI (%) |
| Base | 0 | 0 | 0 | 0.00 | --- | 0.00 | 0.00 |
| Alt 1 | 3,944,356 | 2,741,950 | 1,202,407 | 0.45 | 5.12 | 2.40 | 1.00 |
| Alt 2 | 4,430,640 | 3,218,314 | 1,212,326 | 0.39 | 4.76 | 2.29 | 0.80 |

# Base

### Alternative 0

## Fatalities Averted

Number of Statistical Lives Saved: 0.00

Value of Statistical Lives Saved: $0

## Disaster-Related Benefits

|  |  |  |
| --- | --- | --- |
| Title | Amount ($) | Effective Present Value ($) |
| Response and Recovery Cost Reductions |  | 0 |
| Direct Losses Prevented |  | 0 |
| Indirect Losses Prevented |  | 0 |
| Total |  | 0 |

## Resilience Dividend

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Title | Start Year | Recurrence (Years) | Amount ($) | Effective Present Value ($) |
| One Time Cost Reductions |  |  |  | 0 |
| Recurring Cost Reductions |  |  |  | 0 |
| Total |  |  |  | 0 |

## Costs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Title | Start Year | Recurrence (Years) | Amount ($) | Effective Present Value ($) |
| Direct Costs |  |  |  | 0 |
| Indirect Costs |  |  |  | 0 |
| OMR Costs: One-Time |  |  |  | 0 |
| OMR Costs: Recurring |  |  |  | 0 |
| Total |  |  |  | 0 |

## Externalities

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Title | Start Year | Recurrence (Years) | Amount ($) | Effective Present Value ($) |
| One Time Positive Externalities |  |  |  | 0 |
| Recurring Positive Externalities |  |  |  | 0 |
| One Time Negative Externalities |  |  |  | 0 |
| Recurring Negative Externalities |  |  |  | 0 |
| Total |  |  |  | 0 |

# Alt 1

### Alternative 1

## Fatalities Averted

Number of Statistical Lives Saved: 0.34

Value of Statistical Lives Saved: $1,210,406

## Disaster-Related Benefits

|  |  |  |
| --- | --- | --- |
| Title | Amount ($) | Effective Present Value ($) |
| Response and Recovery Cost Reductions |  | 201,734 |
| Alt 1 R&R Reduction | 250,000 | 201,734 |
| Direct Losses Prevented |  | 524,509 |
| Alt 1 Direct Reduction | 650,000 | 524,509 |
| Indirect Losses Prevented |  | 363,122 |
| Alt 1 Indirect Reduction | 450,000 | 363,122 |
| Total |  | 1,089,365 |

Alt 1 Direct Reduction: Triangular distribution with a min of 617500 and a max of 682500

Alt 1 Indirect Reduction: Triangular distribution with a min of 427500 and a max of 472500

Alt 1 R&R Reduction: Triangular distribution with a min of 237500 and a max of 262500

## Resilience Dividend

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Title | Start Year | Recurrence (Years) | Amount ($) | Effective Present Value ($) |
| One Time Cost Reductions |  |  |  | 274,179 |
| Alt 1 NDRB One Time | 3 | N/A | 300,000 | 274,179 |
| Recurring Cost Reductions |  |  |  | 1,370,405 |
| Alt 1 NDRB Recurring | 1 | 1 | 50,000 | 1,370,405 |
| Total |  |  |  | 1,644,585 |

Alt 1 NDRB One Time: Gaussian distribution with variance of 5000

Alt 1 NDRB Recurring: Triangular distribution with a min of 40000 and a max of 60000

## Costs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Title | Start Year | Recurrence (Years) | Amount ($) | Effective Present Value ($) |
| Direct Costs |  |  |  | 2,250,000 |
| Alt 1 Direct | Start-Up | N/A | 2,250,000 | 2,250,000 |
| Indirect Costs |  |  |  | 425,000 |
| Alt 1 Indirect | Start-Up | N/A | 425,000 | 425,000 |
| OMR Costs: One-Time |  |  |  | 41,161 |
| Alt 1 OMR One-Time | 20 | N/A | 75,000 | 41,161 |
| OMR Costs: Recurring |  |  |  | 25,789 |
| Alt 1 OMR Recurring | 5 | 5 | 5,000 | 25,789 |
| Total |  |  |  | 2,741,950 |

Alt 1 Direct: Gaussian distribution with variance of 50000

Alt 1 OMR One-Time: 10% chance of 45000, 40% chance of 50000, and 50% chance of 75000

## Externalities

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Title | Start Year | Recurrence (Years) | Amount ($) | Effective Present Value ($) |
| One Time Positive Externalities |  |  |  | 43,035 |
| Alt 1 One Time | 5.0 | N/A | 50,000 | 43,035 |
| Recurring Positive Externalities |  |  |  | 0 |
| One Time Negative Externalities |  |  |  | 0 |
| Recurring Negative Externalities |  |  |  | 246,673 |
| Alt 1 Recurring | 1.0 | 1.0 | 9,000 | 246,673 |
| Total |  |  |  | -203,638 |

Alt 1 One Time: Triangular distribution with a min of 40000 and a max of 75000

Alt 1 Recurring: Gaussian distribution with variance of 100

# Alt 2

### Alternative 2

## Fatalities Averted

Number of Statistical Lives Saved: 0.43

Value of Statistical Lives Saved: $1,513,008

## Disaster-Related Benefits

|  |  |  |
| --- | --- | --- |
| Title | Amount ($) | Effective Present Value ($) |
| Response and Recovery Cost Reductions |  | 161,387 |
| Alt 2 R&R Reduction | 200,000 | 161,387 |
| Direct Losses Prevented |  | 645,550 |
| Alt 2 Direct Reduction | 800,000 | 645,550 |
| Indirect Losses Prevented |  | 564,856 |
| Alt 2 Indirect Reduction | 700,000 | 564,856 |
| Total |  | 1,371,794 |

Alt 2 Direct Reduction: Rectangular distribution with a min of 760000 and a max of 840000

Alt 2 Indirect Reduction: Rectangular distribution with a min of 665000 and a max of 735000

Alt 2 R&R Reduction: Rectangular distribution with a min of 190000 and a max of 210000

## Resilience Dividend

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Title | Start Year | Recurrence (Years) | Amount ($) | Effective Present Value ($) |
| One Time Cost Reductions |  |  |  | 242,611 |
| Alt 2 NDRB One-Time | 1 | N/A | 250,000 | 242,611 |
| Recurring Cost Reductions |  |  |  | 1,303,227 |
| Alt 2 NDRB Recurring | 5 | 1 | 55,000 | 1,303,227 |
| Total |  |  |  | 1,545,839 |

Alt 2 NDRB One-Time: Rectangular distribution with a min of 150000 and a max of 260000

Alt 2 NDRB Recurring: 15% chance of 45000, 45% chance of 55000, and 40% chance of 60000

## Costs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Title | Start Year | Recurrence (Years) | Amount ($) | Effective Present Value ($) |
| Direct Costs |  |  |  | 2,800,000 |
| Alt 2 Direct | Start-Up | N/A | 2,800,000 | 2,800,000 |
| Indirect Costs |  |  |  | 300,000 |
| Alt 2 Indirect | Start-Up | N/A | 300,000 | 300,000 |
| OMR Costs: One-Time |  |  |  | 50,821 |
| Alt 2 OMR One-Time | 30 | N/A | 125,000 | 50,821 |
| OMR Costs: Recurring |  |  |  | 67,493 |
| Alt 2 OMR Recurring | 2 | 2 | 5,000 | 67,493 |
| Total |  |  |  | 3,218,314 |

Alt 2 Indirect: Triangular distribution with a min of 200000 and a max of 600000

Alt 2 OMR One-Time: Rectangular distribution with a min of 70000 and a max of 150000

Alt 2 OMR Recurring: Gaussian distribution with variance of 500

## Externalities

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Title | Start Year | Recurrence (Years) | Amount ($) | Effective Present Value ($) |
| One Time Positive Externalities |  |  |  | 0 |
| Recurring Positive Externalities |  |  |  | 5,158 |
| Alt 2 Recurring | 5.0 | 5.0 | 1,000 | 5,158 |
| One Time Negative Externalities |  |  |  | 51,010 |
| Alt 2 OneTime | 15.0 | N/A | 80,000 | 51,010 |
| Recurring Negative Externalities |  |  |  | 0 |
| Total |  |  |  | -45,852 |

Alt 2 OneTime: Rectangular distribution with a min of 70000 and a max of 81000

Alt 2 Recurring: 50% chance of 1000, 40% chance of 1500, and 10% chance of 2000