THORNCREEK ROAD TO MOSCOW
ENVIRONMENTAL MATRIX
SAFETY ANALYSIS
ALIGNMENTS CARRIED FORWARD

DHP-NH-4110 (156)

KEY # 09294

DISTRICT TRAFFIC ENGINEER

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Date Revised.

In order to compare the Accident Rates for the Alternatives/Alignments the following assumptions will be made: ***1)*** *Limited Access, Accident Rate of 0.60, Road Type 78;* ***2)*** *Partial Control Access, Accident Rate of 0.89, Road Type 75, Alternative/Alignment C-1will be used as a BASE for the comparison as it would have the greatest number of field, residential, county road and commercial approaches associated with it. For the remainder of the 3 Alternative/Alignments carried forward the Base Accident Rate (MVM) will fall between 0.60-Limited Access and 0.89-Partial Control Access and will be prorated accordingly depending on the number of Total Turning Movements estimated for each Alternative/Alignment. The Road Types 75 and 78 are from the Current Idaho Transportation Department "Safety Evaluation Instruction Manual", Dated March 4, 1999, Page 31, Chart III-SEGMENT, b) RURAL.*

BASE

Approach Type & No.			Est. No. Turns/Day
(F)	Field	= 10	0.10
(R)	Residential	= 24	10
(CT)	County	= 7	200
(C)	Commercial	= 14	100

Total Turning Movements (TTM) = (F x 0.1)+(R x 10)+(CT x 200)+(C x 100)
= (10 x 0.1)+(24 x 10)+(7 x 200)+(14 x 100)
(TTM) = 3041

3041/0.29 = **10,486** (*Use this to calculate the Accident Adjustment Rate (AAR) for subsequent alignments)*
NOTE: 0.29 is the Difference between 0.89-Accident Rate for Road Type-75 and 0.60-Accident Rate for Road Type-78 taken from ITD Safety Evaluation Instruction Manual and 3451 is the TOTAL ESTIMATED TURNING MOVEMENTS for C-1 .(See Page 12 for calculation methodology.)

W-4

Approach Type & No.			Est. No. Turns/Day
(F)	Field	= 17	0.10
(R)	Residential	= 8	10
(CT)	County	= 4	200
(C)	Commercial	= 5	100

Total Turning Movements (TTM) = (F x 0.1)+(R x 10)+(CT x 200)+(C x 100)
= (17 x 0.1)+(8 x 10)+(4 x 200)+(5 x 100)
(TTM) = 1381.7

Adjusted Accident Rate (AAR) = 1381.7/10486 + 0.60
= 0.73 AAR

ACCIDENTS/YEAR & COST of ACCIDENTS/YEAR

AVERAGE DAILY TRAFFIC = 6150
YEAR = 365 (days)
LENGTH = 6.69 Miles
ADJUSTED ACCIDENT RATE = 0.73

Million Vehicle Miles (MVM) = $\frac{\text{ADT x YEAR}^{(\text{DAYS})} \text{ x LENGTH}^{(\text{MILES})}}{1{,}000{,}000}$
= $\frac{6150 \text{ x } 365 \text{ x } 6.69}{1{,}000{,}000}$
= 15.02 (MVM)

Accidents/Year (A/Y) = Accident Rate x MVM
= 0.73 x 15.02
= 10.96 (A/Y)

1.2% Fatal Accidents/Year (FA/Y) = 1.2% of 10.96 (A/Y)
Idaho Traffic Collisions-2003 **= 0.13 FA/Y**
ITD-Office of Highway Safety
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37.7% Injury Accidents/Year (IA/Y) = 37.7 % of 10.96 (A/Y)
Idaho Traffic Collisions-2003 **= 4.13 IA/Y**
ITD-Office of Highway Safety
Page 17-Table 10

ESTIMATED COST OF ACCIDENTS/YEAR

0.13 FA/Y @ $3,129,653/Accident = **$407,000/Year**
4.13 IA/Y @ $282,873/Accident = **$1,168,000/Year**
Idaho Traffic Collisions-2003
ITD-Office of Highway Safety
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C-3

Approach Type & No.			Est. No. Turns/Day
(F)	Field	= 10	0.10
(R)	Residential	= 11	10
(CT)	County	= 5	200
(C)	Commercial	= 15	100

Total Turning Movements (TTM) = (F x 0.1)+(R x 10)+(CT x 200)+(C x 100)
= (10 x 0.1)+(11 x 10)+(5 x 200)+(15 x 100)
(TTM) = 2611

Adjusted Accident Rate (AAR) = 2611/10486 + 0.60
= 0.85 AAR

ACCIDENTS/YEAR & COST of ACCIDENTS/YEAR

AVERAGE DAILY TRAFFIC = 6150
YEAR = 365 (days)
LENGTH = 5.9 Miles
ADJUSTED ACCIDENT RATE = 0.85

Million Vehicle Miles (MVM) = $\frac{\text{ADT x YEAR}^{(\text{DAYS})} \text{ x LENGTH}^{(\text{MILES})}}{1{,}000{,}000}$
= $\frac{6150 \text{ x } 365 \text{ x } 5.9}{1{,}000{,}000}$
= 13.24 (MVM)

Accidents/Year (A/Y) = Accident Rate x MVM
= 0.85 x 13.24
= 11.25 (A/Y)

1.2% Fatal Accidents/Year (FA/Y) = 1.2% of 11.25 (A/Y)
Idaho Traffic Collisions-2003 **= 0.13 FA/Y**
ITD-Office of Highway Safety
Page 17-Table 10

37.7% Injury Accidents/Year (IA/Y) = 37.7 % of 11.25 (A/Y)
Idaho Traffic Collisions-2003 **= 4.24 IA/Y**
ITD-Office of Highway Safety
Page 17-Table 10

ESTIMATED COST OF ACCIDENTS/YEAR

0.13 FA/Y @ $3,129,653/Accident = **$407,000/Year**
4.24 IA/Y @ $282,873/Accident = **$1,200,000/Year**
Idaho Traffic Collisions-2003
ITD-Office of Highway Safety
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E-2

Approach Type & No.			Est. No. Turns/Day
(F)	Field	= 13	0.10
(R)	Residential	= 4	10
(CT)	County	= 2	200
(C)	Commercial	= 5	100

Total Turning Movements (TTM) = (F x 0.1)+(R x 10)+(CT x 200)+(C x 100)
= (13 x 0.1)+(4 x 10)+(2 x 200)+(5 x 100)
(TTM) = 941.3

Adjusted Accident Rate (AAR) = 941.3/10486 + 0.60
= 0.69 AAR

ACCIDENTS/YEAR & COST of ACCIDENTS/YEAR

AVERAGE DAILY TRAFFIC = 6150
YEAR = 365 (days)
LENGTH = 5.85 Miles
ADJUSTED ACCIDENT RATE = 0.69

Million Vehicle Miles (MVM) = $\frac{\text{ADT x YEAR}^{(\text{DAYS})} \text{ x LENGTH}^{(\text{MILES})}}{1{,}000{,}000}$
= $\frac{6150 \text{ x } 365 \text{ x } 5.85}{1{,}000{,}000}$
= 13.13 (MVM)

Accidents/Year (A/Y) = Accident Rate x MVM
= 0.69 x 13.13
= 9.06 (A/Y)

1.2% Fatal Accidents/Year (FA/Y) = 1.2% of 9.06 (A/Y)
Idaho Traffic Collisions-2003 **= 0.11 FA/Y**
ITD-Office of Highway Safety
Page 17-Table 10

37.7% Injury Accidents/Year (IA/Y) = 37.7 % of 9.06 (A/Y)
Idaho Traffic Collisions-2003 **= 3.42 IA/Y**
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ESTIMATED COST OF ACCIDENTS/YEAR

0.11 FA/Y @ $3,129,653/Accident = **$344,000/Year**
3.42 IA/Y @ $282,873/Accident = **$968,000/Year**
Idaho Traffic Collisions-2003
ITD-Office of Highway Safety
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EXISTING

ACCIDENT RATE = 1.63
(ITD Safety Evaluation Manual-Page 31, III. SEGMENT, b) RURAL, ROAD TYPE-45)

ACCIDENTS/YEAR & COST of ACCIDENTS/YEAR

AVERAGE DAILY TRAFFIC = 6150
YEAR = 365 (days)
LENGTH = 5.9 Miles
ACCIDENT RATE = 1.63

Million Vehicle Miles (MVM) $= \frac{ADT \times YEAR^{(DAYS)} \times LENGTH^{(MILES)}}{1{,}000{,}000}$

$= \frac{6150 \times 365 \times 5.9}{1{,}000{,}000}$

= 13.24 (MVM)

Accidents/Year (A/Y) = Accident Rate x MVM
= 1.63 x 13.24
= 21.58 (A/Y)

1.2% Fatal Accidents/Year (FA/Y) = 1.2% of 21.58 (A/Y)
Idaho Traffic Collisions-2003 **= 0.26 FA/Y**
ITD-Office of Highway Safety
Page 17-Table 10

37.7% Injury Accidents/Year (IA/Y) = 37.7 % of 21.58 (A/Y)
Idaho Traffic Collisions-2003 **= 8.14 IA/Y**
ITD-Office of Highway Safety
Page 17-Table 10

ESTIMATED COST OF ACCIDENTS/YEAR

0.26 FA/Y @ $3,129,653/Accident = **$814,000/Year**
8.14 IA/Y @ $282,873/Accident = **$2,303,000/Year**
Idaho Traffic Collisions-2003
ITD-Office of Highway Safety
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CALCULATION METHODOLOGY

To prorate the accident rate for the various alternatives/alignments the following proportion was used:

$$\frac{TTMx}{3041} = \frac{ARx}{0.29}$$

Where: TTMx is the total turning movements estimated for each alternatives/alignments.

3041 is the TTM for the base alignment which represents Road Type 75 and an accident rate of 0.89.

ARx is the accident rate variation.

0.29 is the total accident rate variation between Road Types 75 and 78. (Accident Rates of 0.89 and 0.60 respectively)

THE EQUATION CAN BE REDUCED TO THE FOLLOWING:

$$\frac{TTMx}{10{,}486} = ARx$$

ARx is then added to the Base Accident Rate of 0.60 for Road Type 78.