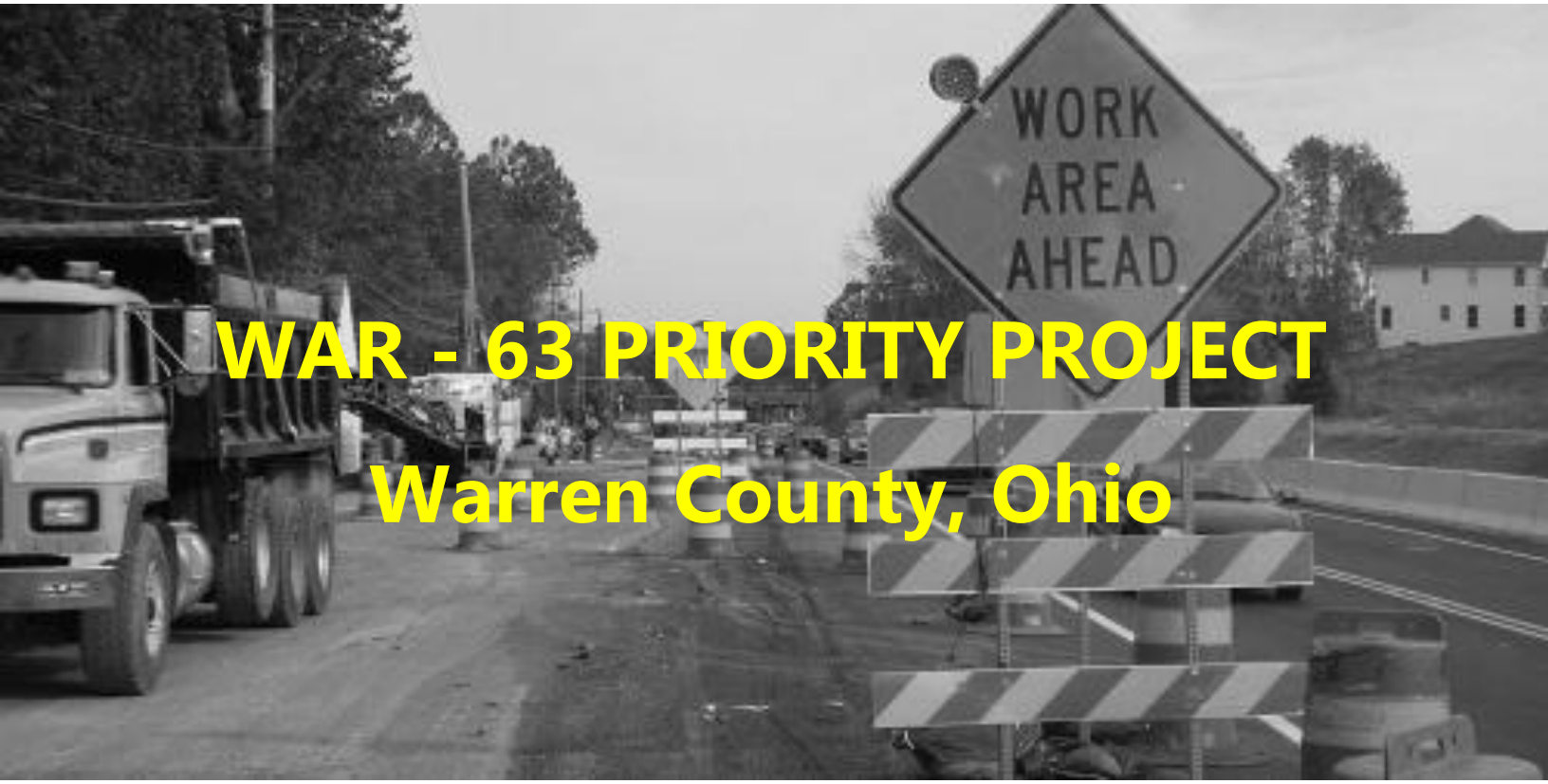
Life-Cycle Cost Analysis



WAR - 63 PRIORITY PROJECT

Warren County, Ohio

Warren County Transportation Improvement District

May 2019 (Final Report June 2019)

LIFE CYCLE COST ANALYSIS

WAR-63 PRIORITY PROJECT

WARREN COUNTY, OHIO

WARREN COUNTY TRANSPORTATION IMPROVEMENT DISTRICT
210 W Main Street
Lebanon, OH 45036
513.695.3301

Neil F. Tunison, P.E., P.S.
TID Secretary-Treasurer, Warren County Engineer

Prepared by

RL RECORD Consultants (Cincinnati, Ohio) – Technical Team Lead
SHA Engineering (Mason, Ohio) – Technical Team Member

With the assistance and cooperation of the
Warren County Transportation Improvement District
Technical and Administrative staff

June 2019

TABLE OF CONTENTS

Executive Summary

Life-cycle cost analysis (LCCA) work was completed for the WAR-63 Priority Project using FHWA's *RealCost* software tool. The purpose of the LCCA work was to aid Warren County and its partners in identifying Best Value approaches to delivering and managing needed transportation improvements over the life of the investment, and also to provide project life activity costs to Benefit-Cost work separately performed for the Project. The LCCA work gives confirmation to all investors, stakeholders and citizens that life-cycle costs have been considered and, to the extent practicable, incorporated in recommended strategies for the Priority Project.

LCCA is an engineering economic analysis tool that considers all of the costs – those borne by public agencies as well as those borne by roadway users - incurred during the service life of an asset. LCCA is promoted and encouraged by the U.S. DOT FHWA as a best practice in indentifying and delivering cost- effective transportation alternatives and project components.

Four improvement scenarios were evaluated for a 31-year analysis period (construction plus a 30 year service life) for the WAR-63 priority project: 1) 4-Lane Undivided, 2) 4-Lane Divided, 3) 4-Lane Undivided expansion to 6 lanes in Service Life Year 10, and 4) 4-Lane Divided expansion to 6 lanes in Service Life Year 10. Also evaluated was the existing facility No-Build condition, to establish baseline activity costs.

LCCA findings are summarized as follows:

After initial construction, the Priority Improvement Project will save users (Warren County motorists) about $376,000 per year in delays and operating costs related to regular facility management and maintenance, assuming a 4-Lane Undivided facility is constructed; the savings increase to about $454,000 with the construction of a 4-Lane Divided facility.

There are LCCA differences between a 4-Lane Undivided and a 4-Lane Divided design. In general, the 4-Lane Divided section provides a 21% better LCCA outcome and substantially lower costs to users, but with higher costs to agencies. The difference in costs to users is primarily related to construction period impacts, with the 4-Lane Undivided section having a tighter construction footprint with more friction and conflicts under maintenance of traffic.

The efficacy of future expansion (addition of 2 through lanes) under each of the two build scenarios was tested. Expansion under the 4-Lane Divided Expansion scenario provided a 23% better LCCA outcome than the 4-Lane Undivided Expansion scenario.

The TID in cooperation with Ohio DOT should consider soliciting Alternative Technical Concept Bids during the Design-Build procurement process to identify best value for agencies and users. These could include bids for both divided and undivided sections, as well as bids based on performance criterial during construction that specifies lanes available, work-zone capacity, permissible queue lengths, speeds and durations.

1.0 Introduction and Overview

A $25 million roadway improvement project is planned and proposed for a 3-mile priority section of Ohio Route 63 in Warren County, Ohio. The Warren County Transportation Improvement District (WCTID) is the lead local agency and primary local funder of construction costs. In partnership with the Ohio Department of Transportation, the project will be delivered in a design-build package, with certain performance elements attached to the project delivery.

As the primary local funder of the project, the WCTID is interested in project life cycle costs for best ways to address corridor capacity, safety and operational needs. Understanding life cycle costs is expected to help identify some of the performance-based Alternative Technical Concepts that may be appropriate to incorporate in the Design-Build project delivery package to be developed by ODOT and the WCTID in early 2020.

Life Cycle Cost Analysis (LCCA) is an engineering and economic analysis method for assessing the total cost of constructing, maintaining, and operating a facility over an extended period of time (typically 30 years). LCCA considers the costs incurred by both the implementing agency and the users of the facility.

Life cycle costs directly couple to, and help illuminate, Asset Management requirements for a given transportation investment.

*Real*Cost version 2.5, a software product and LCCA tool developed by the U.S. DOT Federal Highway Administration Office of Asset Management, was used to evaluate user costs associated with five strategic alternatives for the WAR-63 Priority Project. *Real*Cost can be used to evaluate comparative life-cycle costs of detail design options for a given project (different structure or pavement designs, for example). For the WAR-63 project, we have adapted the capabilities of the *Real*Cost tool to identify life-cycle costs at the larger scale of entire strategic alternatives incorporating different detail design conditions.

A separate Benefit-Cost Analysis (BCA) is being conducted for the WAR-63 Priority Project[1]. The latest version of the *California Life-Cycle Benefit/Cost Analysis Model 6.2*[2], an approved Benefit-Cost model used in DOT grants programs assessments, is being used to compare alternative strategies with differing performance profiles for the WAR-63 Priority Project.

Because *Real*Cost calculates user costs (for example, costs extending from time penalties during construction or ongoing or periodic asset management activities) at a greater level of detail and confidence than *Cal-B/C*, the user cost outputs from the *Real*Cost tool allow

[1] A project construction funding request is being submitted to USDOT under its *BUILD* infrastructure grants program; BUILD requires submittal of a Benefit-Cost Analysis compliant with USDOT guidance.
[2] California Department of Transportation, with INFRA updates, 2019

identification and evaluation of the design parameters that most influence the important user cost metric.
The construction and ongoing activity agency costs determined in the *Real*Cost life-cycle cost work are used as consistent inputs to the separate Benefit-Cost work.

Unlike *Cal-B/C* or other benefit-cost analysis tools, *Real*Cost does not calculate vehicle operating, accident or emission costs. These costs are accounted for under the BCA work.

2.0 Methods and Approach

The methods used in Life Cycle Cost Analysis for the WAR-63 Priority Project follow guidance established by FHWA for application of the *Real*Cost tool. A deterministic cost analysis approach was used in the analysis.

Including identification of analysis period, there are six steps involved in FHWA's LCCA methodology[3]:

Step 1 Select analysis period
Step 2 Establish alternative design strategies
Step 3 Determine activity timing
Step 4 Estimate agency costs
Step 5 Compute life-cycle (including user) costs
Step 6 Evaluate the results

Step 1 – Select analysis period

An analysis period of 30 years or more is typical for life cycle cost evaluation in transportation[4]. A 31-year analysis period was selected for the WAR-63 Priority Project (construction plus a 30 year service life), which fully incorporates the first cycle of major roadway rehabilitation work, and, to appropriately simplify salvage value calculations per FHWA guidance corresponds to the structural life of six major culverts spanning the project corridor.

Step 2 – Establish alternative design strategies

*Real*Cost's capabilities were adapted to estimate the total (user and agency) discounted life cycle costs (absent vehicle operating, accident or emission costs) associated with five alternative design strategies identified for the WAR-63 Priority Project. Each alternative strategy has a different performance profile which is accounted for and evaluated separately under the project Benefit-Cost work using the *Cal-B/C* analysis tool.
The five Strategies evaluated were:

1. No Build;
2. Four Lane Undivided;
3. Four Lane Divided;
4. Four Lane Undivided Expansion to 6 Lanes in Service Year 10;
5. Four Lane Divided Expansion to 6 Lanes in Service Year 10.

Evaluating the No-Build scenario, Scenario 1, helps identify the costs borne by roadway users in continuing to operate and maintain an inadequate existing facility, compared to new investment scenarios. Scenario 2 describes the "minimum build" design alternative: a four-lane undivided section with center turns lanes at access locations. Scenario 3 is a four-lane divided section (grass median, with center turn lanes at access locations).

[3] *Life-Cycle Cost Analysis RealCost User Manual* (FHWA, 2004)
[4] *Life-Cycle Cost Analysis RealCost User Manual version 2.5,* page 1 (FHWA, 2010)

Scenarios 4 and 5 account for life-cycle costs of adding 2 additional through-capacity lanes (one in each direction) to Scenarios 2 and 3, respectively, in Analysis Year 10, as "just-in-time" accommodation of future corridor development and traffic growth.

Step 3 – Determine activity timing
A schedule of initial and future activities for implementation and ongoing management of each of the strategies was developed, including estimated timing, duration and frequency of for each activity.

Step 4 – Estimate agency costs
Agency costs for the initial construction and future costs of rehabilitation, maintenance and operation of each strategic alternative were estimated using developed component construction cost estimates and best professional judgments from team design and operations engineers.

Schedules of activity timing and agency costs are outlined in these tables found in **Appendix A**:

Table 1. *Activity Costs and Timing by Strategy*

Table 2. *Maintenance Cost Build – Minor and Regular Maintenance Costs*

Table 3. *Maintenance Cost Requiring no Maintenance of Traffic - Input Values*

Step 5 – Compute life-cycle costs
There are two additional input components to computation of life-cycle costs:

First, Project Level Data was accumulated for each strategy.

These inputs and justification can be found in Table 4 in **Appendix B**:

Table 4. *Strategy Level Inputs*

Second, Activity Level Data was developed and complied for each strategy. These inputs and descriptions can be found in in Tables 5 through 9 in **Appendix C**:

Table 5. *Activity Level Inputs – No Build Strategy*

Table 6. *Activity Level Inputs – 4-Lane Undivided Strategy*

Table 7. *Activity Level Inputs – 4-Lane Divided Strategy*

Table 8. *Activity Level Inputs – 4-Lane Undivided Expansion Strategy*

Table 9. *Activity Level Inputs – 4-Lane Divided Expansion Strategy*

From these inputs, *Real*Cost v. 2.5 was used to calculate the discounted agency and user life cycle costs for each strategy.

The *Real*Cost excel spreadsheet files used in calculating Life Cycle Costs are available in **ATTACHMENT 5B** at this link:
ftp://ftp.co.warren.oh.us/WAR-63%20Priority%20Project%20BUILD%20application%20ATTACHMENTS/

Step 6 – Evaluate results

The deterministic results of the life-cycle cost analysis were evaluated and compared among alternative strategies. Section 4 of this report provides a summary of the results, which are also provided in Tables 10 through 12 in Appendix D:

Table 10. *Summary of Life Cycle Costs Including Initial Construction Period Costs*

Table 11. *Summary of Life Cycle Costs – Expansion and Rehabilitation Costs*

Table 12. *Summary of Life Cycle Costs – Rehabilitation Costs Only*

3.0 Summary of Inputs to Analysis

The LCCA work for the WAR-63 Priority Project accounted for the following input categories in assessing life-cycle costs:

Activity Level Inputs

- Agency Construction Cost
- Work Zone User Costs
- Work Zone Duration (days)
- Number of Lanes Open in Each direction During Work Zone
- Activity Service Life (years)
- Activity Structural Life (years)
- Maintenance Frequency (years)
- Agency Maintenance Cost
- Work Zone Length (miles)
- Work Zone Speed Limit (mph)
- Work Zone Capacity (vphpl)
- Traffic Hourly Distribution
- Time of Day Lane Closures (24-hour clock)

Primary Maintenance Cost Categories

- Pavement
- Culverts
- Open Drainage
- Shoulders
- Guardrail
- Median
- Cable Barrier
- Signs and Signals
- Outages

Activity Costs and Timing by Strategy

- Initial Construction
- Expansion: 4-Lane to 6-Lane (if applicable)
- Pavement:
  - Replace Surface Wearing Course
  - Full Depth Pavement Rehabilitation
- Culverts: Replace Cross-culverts @ 6 locations
- Open Drainage: Major Open Drainage Rehabilitation
- Shoulders: Major Shoulder Rehabilitation
- Guardrail: Guardrail Replacement
- Median (If applicable): Major Graded Median Rehabilitation
- Cable Barrier (if applicable): Median Cable Barrier Replacement
- Signs and Signals: Replace Overhead Signs and Signals
- Outages: Spot Incident Repairs

Under Work Zone User Costs, FHWA default values for user 'value of time' costs were used for all strategies/alternatives, as follows:

Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60

4.0 Results and Key Findings by Scenario

Results of Life-Cycle Cost Analysis for the WAR-63 Priority Project are summarized by scenario in the tables in Appendix D.

Table 10. *Summary of Life Cycle Costs Including Initial Construction Period Costs*

Table 11. *Summary of Life Cycle Costs – Expansion and Rehabilitation Costs*

Table 12. *Summary of Life Cycle Costs – Rehabilitation Costs Only*

The results are expressed both as Present Value and Equivalent Uniform Annual Cost, assuming a 7% discount rate. All salvage values appropriate for the 30-year analysis period have been accounted for in the reporting of PV and EUAC values. Agency costs and user costs are reported separately.

General Findings

User costs are particularly sensitive to work-zone limitation on speed and capacity, as well as duration. Work-zone conditions that limit these variables result in significantly higher user costs.

No Build Scenario

The no-build scenario results in the highest present value agency rehabilitation costs (87% greater than the next highest scenario – 4-Lane Divided) and the highest present value user cost (twice the next highest scenario – 4-Lane Undivided). This is a result partly of timing of subsequent costs following initial construction being delayed, but even when considering undiscounted agency costs, rehabilitation costs for the no-build scenario exceed those of the 4-Lane Divided scenario by $2,158,830 or 39%.

Four Lane Undivided and Four Lane Divided Scenarios

Present value of agency costs of the 4-Lane Divided scenario exceed those of the 4-Lane Undivided scenario by $4,216,350 or 16%, but these are dwarfed by the higher user costs associated with the 4-Lane Undivided scenario amounting to a present value difference of $13,446,960, or almost three times those associated with the 4-Lane Divided scenario.

If one considers the differential cost between doing something and doing nothing (build vs. no-build), the incremental cost of the 4-Lane Undivided scenario amounts to a discounted present value of $21,911,170 in agency life-cycle costs and an increase of $8,611,690 in user costs (less than the total $13, 319,210 in construction period user costs).

The incremental cost of the 4-Lane Divided scenario amounts to a discounted present value of $26,127,520 in agency life-cycle costs and a decrease in user costs of $4,835,240 over the 31-year life of the project (including the initial construction period).

Four Lane Undivided and Four Lane Divided Expansion Scenarios

The capacity expansion scenarios were included to illustrate and examine the penalty of expanding two additional through lanes, one in each direction, to handle expected future traffic demand. This would involve adding two lanes to the south for the 4-Lane Undivided section (and in the process reworking the roadway cross section), and two lanes inboard in the median zone for the 4-Lane Divided section.

Over the life time of the project, the NPV of agency costs for the 4-Lane Divided section exceed those of the 4-Lane Undivided section by $2,110,770. Again, it is user costs that dwarf the agency cost savings, with the NPV of user costs for the 4-Lane Undivided Expansion scenario exceeding the 4-Lane Divided Expansion scenario by $12,637,060 over the life of the project, over a 10-fold increase. This is primarily a result of initial construction and expansion period lane restrictions necessary for maintenance of traffic.

5.0 Recommendations for Project Implementation

Estimates of activity costs and identification of timing of subsequent rehabilitation activities are carried forward to the Benefit-Cost Analysis and the Asset Management Plan.

The TID in cooperation with Ohio DOT should consider soliciting Alternative Technical Concept Bids during the Design-Build procurement process to identify best value for agencies and users. These could include bids for both divided and undivided sections, as well as bids based on performance criterial during construction that specifies lanes available, work-zone capacity, permissible queue lengths, speeds and durations.

Appendix A – ACTIVITY TIMING AND ESTIMATE OF AGENCY COSTS

Table 1. *Activity Costs and Timing by Strategy*

WARREN COUNTY TRANSPORTATION IMPROVEMENT DISTRICT
WAR 63 PRIORITY SEGMENT
LIFE CYCLE COST ANALYSIS
ACTIVITY COSTS AND TIMING BY STRATEGY

Activity	No Build Cost		4-Lane Undivided		4-Lane Divided		4-Lane Undivided Expansion				4-Lane Divided Expansion			
	Cost	First Occurance/ Frequency	Cost	First Occurance/ Fequency	Cost	First Occurance/ Fequency	Cost (Service Life Years 1-10)	First Occurance/ Frequency (Service Life Years 1-10)	Cost (Service Life Years 11-30)	First Occurance/ Frequency (Service Life Years 11-30)	Cost (Service Life Years 1-10)	First Occurance/ Frequency (Service Life Years 1-10)	Cost (Service Life Years 11-30)	First Occurance/ Frequency (Service Life 11-30)
Initial Construction:														
Construction only (no ROW or development costs)	$ -		$ 24,000,000	1/31	$ 28,000,000	1/31	$ 24,000,000	1/31	$ -		$ 28,000,000	1/31	$ -	
Expansion:														
4-Lane to 6-Lane	$ -						$ -		$ 15,000,000	12/31	$ -		$ 10,000,000	12/31
Pavement:														
Replace Surface Wearing Course	$ 450,000	1/11	$ 750,000	16/15	$ 750,000	16/15	$ -		$ 1,125,000	17/15	$ -		$ 1,125,000	17/15
Full Deapth Pavement Rehabilitation	$ 3,515,000	11/15												
Culverts:														
Replace Cross-culverts @ 6 locations	$ 576,000	11/30	$ -	31/30	$ -	31/30	$ -		$ -		$ -		$ -	
Open Drainage:														
Major Open Drainage Rehabilitation	$ 180,000	5/15	$ 180,000	16/15	$ 215,000	16/15	$ -		$ 180,000	27/15	$ -		$ 180,000	27/15
Shoulders:														
Major Shoulder Rehabilitation	$ 123,000	11/10	$ 123,000	11/10	$ 123,000	11/10	$ -		$ 123,000	27/15	$ -		$ 123,000	27/10
Guardrail:														
Guardrail Replacement	$ 77,000	11/18	$ 159,000	18/18	$ 159,000	18/18			$ 159,000	30/18	$ -		$ 159,000	30/18
Median:														
Major Graded Median Rehabilitation					$ 153,000	11/10					$ -		$ 110,000	22/10
Cable Barrier														
Median Cable Barrier Replacement					$ 366,000	21/20					$ -		$ -	
Signs and Signals														
Replace Overhead Signs and Signals	$ 473,000	11/15	$ 945,000	16/15	$ 158,000	16/15			$ 1,417,500	27/15	$ -		$ 1,417,500	27/15
Outages														
Spot Incident Caused Repairs	$ 55,000	1/2	$ 55,000	1/4	$ 55,000	1/5	$ 55,000	1/4	$ 55,000	12/5	$ 55,000	1/5	$ 55,000	12/5

Table 2. *Maintenance Cost Build – Minor and Regular Maintenance Costs*

Warren County Transportation Improvement District
Life Cycle Cost Analysis
WAR-SR-63
Minor and Regular Maintenance (No MOT Required)

	No Build				4-Lane Divided				4-Lane Undivided			
	Cost per Occurance	Frequency of Occurance (Number per Time Period)	Time Period	Annual Cost	Cost per Occurance	Frequency of Occurance (Number per Time Period)	Time Period	Annual Cost	Cost per Occurance	Frequency of Occurance (Number per Time Period)	Time Period	Annual Cost
Pavement												
Snow Removal/Pretreatment	$ 3,000	8.00	Annual	$ 24,000	$ 5,000	8.00	Annual	$ 40,000	$ 5,000	8.00	Annual	$ 40,000
Crack Sealing/Pot Hole Repair	$ 5,400	3.00	Annual	$ 16,200	$ 3,600	3.00	Annual	$ 10,800	$ 3,600	3.00	Annual	$ 10,800
Subtotal				$ 40,200				$ 50,800				$ 50,800
Culverts												
Culvert Inspection (6)	$ 2,100	1.00	Annual	$ 2,100	$ 2,100	1.00	Annual	$ 2,100	$ 2,100	1.00	Annual	$ 2,100
Culvert Cleanout (6)	$ 5,000	0.50	Annual	$ 2,500	$ 7,000	0.50	Annual	$ 3,500	$ 10,000	0.50	Annual	$ 5,000
Subtotal				$ 4,600				$ 5,600				$ 7,100
Open Drainage												
Stormwater BMP Maintenance	$ -	0.00	Annual	$ -	$	0.00	Annual	$ -	$ -	0.00	Annual	$ -
Ditch Cleaning	$ 8,500	0.25	Annual	$ 2,125	$ 8,500	0.25	Annual	$ 2,125	$ 8,500	0.25	Annual	$ 2,125
Curb Inlet Cleanout	$ 1,000	0.25	Annual	$ 250	$ 1,000	0.25	Annual	$ 250	$ 1,000	0.25	Annual	$ 250
Subtotal				$ 2,375				$ 2,375				$ 2,375
Shoulders												
Mowing	$ 1,200	3.00	Annual	$ 3,600	$ 2,400	3.00	Annual	$ 7,200	$ 2,400	3.00	Annual	$ 7,200
Litter and Debris Cleanup	$ 1,200	2.00	Annual	$ 2,400	$ 1,200	2.00	Annual	$ 2,400	$ 1,200	2.00	Annual	$ 2,400
Sweeping and Vacuuming	$ 2,200	2.00	Annual	$ 4,400	$ 2,200	2.00	Annual	$ 4,400	$ 2,200	2.00	Annual	$ 4,400
ROW Fence Repair/Replacement	$ 8,500	0.10	Annual	$ 850	$ 8,500	0.10	Annual	$ 850	$ 8,500	0.10	Annual	$ 850
Subtotal				$ 11,250				$ 14,850				$ 14,850
Guardrail												
Median												
Mowing									$ 1,200	3.00	Annual	$ 3,600
Barrier												
Signs and Signals												
Signal Inspection/Timing	$ 2,100	1.00	Annual	$ 2,100	$ 2,100	1.00	Annual	$ 2,100	$ 2,100	1.00	Annual	$ 2,100
Bulb/Lamp/Sensor Replacement	$ 600	1.00	Annual	$ 600	$ 600	1.00	Annual	$ 600	$ 600	1.00	Annual	$ 600
Signal Repair/Maintenance	$ 3,000	0.25	Annual	$ 750	$ 3,000	0.25	Annual	$ 750	$ 3,000	0.25	Annual	$ 750
Sign Replacement (Traffic Control and Ground Mounted)	$ 24,000	0.10	Annual	$ 2,400	$ 24,000	0.10	Annual	$ 2,400	$ 36,000	0.10	Annual	$ 3,600
Subtotoal				$ 5,850				$ 5,850				$ 7,050
Outages												
Total				$ 64,275				$ 79,475				$ 85,775

Table 3. ***Maintenance Cost Requiring No Maintenance of Traffic - Input Values***

WARREN COUNTY TRANSPORTATION IMPROVEMENT DISTRICT
WAR 63 PRIORITY SEGMENT
LIFE CYCLE COST ANALYSIS
MAINTENANCE COSTS - NO MOT

Activity	No Build	4-Lane Undivided	4-Lane Divided	4-Lane Undivided Expansion (Years 1-10)	4-Lane Undivided Expansion (Years 11-30)	4-Lane Divided Expansion (Years 1-10)	4-Lane Divided Expansion (Years 11-30)
Pavement	$ 40,000	$ 51,000	$ 51,000	$ 51,000	$ 76,500	$ 51,000	$ 76,500
Culverts	$ 5,000	$ 6,000	$ 7,000	$ 6,000	$ 9,000	$ 7,000	$ 9,000
Open Drainage	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000
Shoulders	$ 11,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000
Guardrail							
Median			$ 4,000			$ 4,000	$ 4,000
Cable Barrier							
Signs and Signals	$ 6,000	$ 6,000	$ 7,000	$ 6,000	$ 9,000	$ 7,000	$ 9,000
Outages							
	$ 64,000	$ 80,000	$ 86,000	$ 80,000	$ 111,500	$ 86,000	$ 115,500

Appendix B – PROJECT LEVEL INPUT DATA BY SCENARIO

Table 4. *Strategy Level Inputs*

WARREN COUNTY TRANSPORTATION IMPROVEMENT DISTRICT
WAR 63 PRIORITY SEGMENT
LIFE CYCLE COST ANALYSIS
STRATEGY LEVEL INPUTS

	No Build	4-Lane Undivided	4-Lane Divided	4-Lane Undivided Expansion Years 1-10	4-Lane Undivided Expansion Years 10-30	4-Lane Divided Expansion Years 1-10	4-Lane Divided Expansion Years 10-30	Remarks
1. Economic Variables								
Value of Time for Passenger Cars ($/hour)	$ 14.80	$ 14.80	$ 14.80	$ 14.80	$ 14.80	$ 14.80	$ 14.80	U.S. DOT Benefit-Cost Guidance Appendix A
Value of Time for Single Unit Trucks ($/hour)	$ 28.60	$ 28.60	$ 28.60	$ 28.60	$ 28.60	$ 28.60	$ 28.60	U.S. DOT Benefit-Cost Guidance Appendix A
Value of Time for Combination Trucks ($/hour)	$ 28.60	$ 28.60	$ 28.60	$ 28.60	$ 28.60	$ 28.60	$ 28.60	U.S. DOT Benefit-Cost Guidance Appendix A
2. Analysis Options								
Include User Costs in Analysis	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Recommended *Real* Cost Defualts
Include User Cost Remaning Life Value	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Recommended *Real* Cost Defualts
Use Differential User Costs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Recommended *Real* Cost Defualts
User Cost Computation Method	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Recommended *Real* Cost Defualts
Include Agency Cost Remaining Life Value	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Recommended *Real* Cost Defualts
Traffic Direction	Both	Both	Both	Both	Both	Both	Both	Recommended *Real* Cost Defualts
Analysis Period (Years)	31	31	31	31	31	31	31	Recommended *Real* Cost Defualts
Beginning of Analysis Period	2021	2021	2021	2021	2021	2021	2021	Recommended *Real* Cost Defualts
Discount Rate (%)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	Recommended *Real* Cost Defualts
Number of Alternatives	2	2	2	2	2	2	2	Recommended *Real* Cost Defualts
3. Traffic Data								
AADT Construction Year (total for both directions)	20,600	20,600	20,600	20,600	20,600	20,600	20,600	Current AADT
Cars as Percentage of AADT (%)	91.0%	91.0%	91.0%	91.0%	91.0%	91.0%	91.0%	
Single Unit Trucks as % of AADT (%)	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	ODOT Traffic Count Database
Combination Trucks as % of AADT (%)	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	Recommended *Real* Cost Defualts
Annual Growth Rate of Traffic (%)	3.0%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%	ODOT SHIFT Tool and Reasoned Judgement
Speed Limit Under Normal Operating Conditions (mph)	55	55	55	55	55	55	55	Posted Speed
Number of Lanes in Each Direction During Normal Conditions	1	2	2	2	3	2	3	Design
Free Flow Capacity (vphpl)	1500	1900	1900	1900	1900	1900	1900	Reasoned Judegement
Rural or Urban Hourly Traffic Distribution	Rural	Rural	Rural	Rural	Rural	Rural	Rural	Straddles Unbanized Boundary
Queue Dissipation Capacity (vphpl)	1100	1100	1100	1100	1100	1100	1100	Reasoned Judegement
Maximum AADT (total for both directions)	40,000	40,000	40,000	40,000	40,000	40,000	40,000	ODOT SHIFT forecast tool
Maximum Queue Length (miles)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	Alternate Route Available

Appendix C – ACTIVITY LEVEL INPUT DATA BY SCENARIO

Table 5. *Activity Level Inputs – No Build Strategy*

WARREN COUNTY TRANSPORTATION IMPROVEMENT DISTRICT
WAR 63 PRIORITY SEGMENT
LIFE CYCLE COST ANALYSIS
ACTIVITY LEVEL INPUTS
NO BUILD STRATEGY

	Initial Construction	Expansion	Pavement	Culverts	Major Drainage Rehabilitation	Major Shoulder Rehabilitation	Guardrial Replacement	Major Median Rehabilitation	Median Barrier Replacement	Overhead Sign & Signal Replacement	Outages Requiring Maintenance of Traffic*
Activity 1											
Agency Construction Cost			$ 450,000	$ -	$ -	$ -	$ -			$ -	$ 55,000
Work Zone User Costs			Calculated	Calculated	Calculated	Calculated	Calculated			Calculated	Calculated
Work Zone Duration (days)			60	0	0	0	0			0	1
Number of Lanes Open in Each Direction During Work Zone			0.5	0.5	1.0	0.5	0.5			0.5	0.5
Activity Service Life (years)			11	11	5	11	10			11	2
Activity Structural Life (years)			11	11	5	11	10			11	0
Maintenance Frequency (years)			1	1	1	1	0			1	0
Agency Maintenance Cost			$ 40,000	$ 5,000	$ 2,000	$ 11,000	$ -			$ 6,000	$ -
Work Zone Length (miles)			3.00	0.00	0.00	0.00	0.00			0.00	0.10
Work Zone Speed Limit (mph)			40	40	50	25	25			40	25
Work Zone Capacity (vphpl)			500	500	500	500	500			750	500
Traffic Hourly Distribution			Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1			Week Day 1	Week Day 1
Time of Day Lane Closures (24 hour clock)			7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00			7:00 - 15:00	7:00 - 15:00
Activity 2											
Agency Construction Cost			$ 3,515,000	$ 576,000	$ 180,000	$ 123,000	$ 77,000			$ 473,000	
Work Zone User Costs			Calculated	Calculated	Calculated	Calculated	Calculated			Calculated	
Work Zone Duration (days)			120	54	30	30	20			6	
Number of Lanes Open in Each Direction During Work Zone			0.5	0.5	1.0	0.5	0.5			0.5	
Activity Service Life (years)			15	25	15	10	18			15	
Activity Structural Life (years)			25	30	15	10	18			15	
Maintenance Frequency (years)			1	1	1	1	0			1	
Agency Maintenance Cost			$ 40,000	$ 5,000	$ 2,000	$ 11,000	$ -			$ 6,000	
Work Zone Length (miles)			3.00	0.20	3.00	3.00	0.50			0.10	
Work Zone Speed Limit (mph)			40	40	50	25	25			40	
Work Zone Capacity (vphpl)			500	500	750	500	500			750	
Traffic Hourly Distribution			Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1			Week Day 1	
Time of Day Lane Closures (24 hour clock)			7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00			7:00 - 15:00	
Activity 3											
Agency Construction Cost			$ 450,000		$ 180,000	$ 123,000	$ 77,000			$ 473,000	
Work Zone User Costs			Calculated		Calculated	Calculated	Calculated			Calculated	
Work Zone Duration (days)			60		30	30	20			6	
Number of Lanes Open in Each Direction During Work Zone			0.5		1.0	0.5	0.5			0.5	
Activity Service Life (years)			5		11	10	3			5	
Activity Structural Life (years)			15		15	10	18			15	
Maintenance Frequency (years)			1		1	1	0			1	
Agency Maintenance Cost			$ 40,000		$ 2,000	$ 11,000	$ -			$ 6,000	
Work Zone Length (miles)			3.00		3.00	3.00	0.50			0.10	
Work Zone Speed Limit (mph)			40		50	25	25			40	
Work Zone Capacity (vphpl)			500		750	500	500			750	
Traffic Hourly Distribution			Week Day 1		Week Day 1	Week Day 1	Week Day 1			Week Day 1	
Time of Day Lane Closures (24 hour clock)			7:00 - 15:00		7:00 - 15:00	7:00 - 15:00	7:00 - 15:00			7:00 - 15:00	

*Outages occur every 2 years -Activity 1 is repeated 16 times

Table 6. *Activity Level Inputs – 4-Lane Undivided Strategy*

WARREN COUNTY TRANSPORTATION IMPROVEMENT DISTRICT
WAR 63 PRIORITY SEGMENT
LIFE CYCLE COST ANALYSIS
ACTIVITY LEVEL INPUTS
4-LANE UNDIVIDED STRATEGY

	Initial Construction	Expansion	Pavement	Culverts	Major Drainage Rehabilitation	Major Shoulder Rehabilitation	Guardrial Replacement	Major Median Rehabilitation	Median Barrier Replacement	Overhead Sign & Signal Replacement	Outages Requiring Maintenance of Traffic*
Activity 1											
Agency Construction Cost	$ 24,000,000		$ -	$ -	$ -	$ -	$ -			$ -	$ 55,000
Work Zone User Costs	Calculated		Calculated	Calculated	Calculated	Calculated	Calculated			Calculated	Calculated
Work Zone Duration (days)	365		0	0	0	0	0			0	1
Number of Lanes Open in Each Direction During Work Zone	1.0		1.0	1.0	1.0	1.0	1.0			1.0	1.0
Activity Service Life (years)	31		16	31	16	11	18			16	4
Activity Structural Life (years)	31		16	31	16	11	18			16	0
Maintenance Frequency (years)	0		1	1	1	1	0			1	0
Agency Maintenance Cost	$ -		$ 51,000	$ 6,000	$ 2,000	$ 15,000	$ -			$ 6,000	$ -
Work Zone Length (miles)	3		0.00	0.00	0.00	0.00	0.00			0.00	0.10
Work Zone Speed Limit (mph)	40		40	40	40	25	25			40	40
Work Zone Capacity (vphpl)	500		500	500	500	500	500			500	750
Traffic Hourly Distribution	Week Day 1		Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1			Week Day 1	Week Day 1
Time of Day Lane Closures (24 hour clock)	7:00 - 15:00		7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00			7:00 - 15:00	7:00 - 15:00
Activity 2											
Agency Construction Cost			$ 750,000	$ 180,000	$ 123,000	$ 159,000				$ 945,000	
Work Zone User Costs			Calculated	Calculated	Calculated	Calculated				Calculated	
Work Zone Duration (days)			75	30	30	20				24	
Number of Lanes Open in Each Direction During Work Zone			1.0	1.0	2.0	1.5				1.0	
Activity Service Life (years)			15	15	10	13				15	
Activity Structural Life (years)			15	15	10	18				15	
Maintenance Frequency (years)			1	1	1	0				1	
Agency Maintenance Cost			$ 51,000	$ 2,000	$ 15,000	$ -				$ 6,000	
Work Zone Length (miles)			3.00	3.00	3.00	0.50				0.10	
Work Zone Speed Limit (mph)			40	50	25	25				40	
Work Zone Capacity (vphpl)			500	500	500	500				500	
Traffic Hourly Distribution			Week Day 1	Week Day 1	Week Day 1	Week Day 1				Week Day 1	
Time of Day Lane Closures (24 hour clock)			7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00				7:00 - 15:00	
Activity 3											
Agency Construction Cost					$ 123,000						
Work Zone User Costs					Calculated						
Work Zone Duration (days)					30						
Number of Lanes Open in Each Direction During Work Zone					2.0						
Activity Service Life (years)					10						
Activity Structural Life (years)					10						
Maintenance Frequency (years)					1						
Agency Maintenance Cost					$ 15,000						
Work Zone Length (miles)					3.00						
Work Zone Speed Limit (mph)					25						
Work Zone Capacity (vphpl)					500						
Traffic Hourly Distribution					Week Day 1						
Time of Day Lane Closures (24 hour clock)					7:00 - 15:00						

*Outages occur every 4 years -Activity 1 is repeated 8 times

Table 7. *Activity Level Inputs – 4-Lane Divided Strategy*

WARREN COUNTY TRANSPORTATION IMPROVEMENT DISTRICT
WAR 63 PRIORITY SEGMENT
LIFE CYCLE COST ANALYSIS
ACTIVITY LEVEL INPUTS
4-LANE DIVIDED STRATEGY

	Initial Construction	Expansion	Pavement	Culverts	Major Drainage Rehabilitation	Major Shoulder Rehabilitation	Guardrial Replacement	Major Median Rehabilitation	Median Barrier Replacement	Overhead Sign & Signal Replacement	Outages Requiring Maintenance of Traffic*
Activity 1											
Agency Construction Cost	$ 28,000,000		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 55,000
Work Zone User Costs	Calculated		Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Caculated	Calculated	Calculated
Work Zone Duration (days)	365		0	0	0	0	0	0	0	0	1
Number of Lanes Open in Each Direction During Work Zone	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Activity Service Life (years)	31		16	31	16	11	18	11	20	16	5
Activity Structural Life (years)	31		16	31	16	11	18	11	20	16	0
Maintenance Frequency (years)	0		1	1	1	1	1	1	1	1	0
Agency Maintenance Cost	$ -		$ 51,000	$ 7,000	$ 2,000	$ 15,000	$ -	$ 4,000	$ -	$ 7,000	$ -
Work Zone Length (miles)	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Work Zone Speed Limit (mph)	45		40	40	50	40	25	50	50	40	40
Work Zone Capacity (vphpl)	1000		500	500	750	750	500	1150	1150	750	750
Traffic Hourly Distribution	Week Day 1		Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1
Time of Day Lane Closures (24 hour clock)	7:00 - 15:00		7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00
Activity 2											
Agency Construction Cost			$ 750,000	$ 180,000	$ 123,000	$ 159,000	$ 153,000	$ 366,000	$ 945,000		
Work Zone User Costs			Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated		
Work Zone Duration (days)			75	30	30	20	30	70	24		
Number of Lanes Open in Each Direction During Work Zone			1.0	1.0	2.0	1.5	1.5	2.0	1.0		
Activity Service Life (years)			15	15	10	13	10	11	15		
Activity Structural Life (years)			15	15	10	18	10	20	15		
Maintenance Frequency (years)			1	1	1	1	1	1	1		
Agency Maintenance Cost			$ 51,000	$ 2,000	$ 15,000	$ -	$ 4,000	$ -	$ 7,000		
Work Zone Length (miles)			3.00	3.00	3.00	0.50	3.00	3.00	0.10		
Work Zone Speed Limit (mph)			40	50	40	25	50	50	40		
Work Zone Capacity (vphpl)			500	750	750	500	1150	1150	750		
Traffic Hourly Distribution			Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1		
Time of Day Lane Closures (24 hour clock)			7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00		
Activity 3											
Agency Construction Cost					$ 123,000		$ 153,000				
Work Zone User Costs					Calculated		Calculated				
Work Zone Duration (days)					30		30				
Number of Lanes Open in Each Direction During Work Zone					2.0		1.5				
Activity Service Life (years)					10		10				
Activity Structural Life (years)					10		10				
Maintenance Frequency (years)					1		1				
Agency Maintenance Cost					$ 15,000		$ 4,000				
Work Zone Length (miles)					3.00		3.00				
Work Zone Speed Limit (mph)					40		50				
Work Zone Capacity (vphpl)					750		1150				
Traffic Hourly Distribution					Week Day 1		Week Day 1				
Time of Day Lane Closures (24 hour clock)					7:00 - 15:00		7:00 - 15:00				

*Outages occur every 5 years -Activity 1 is repeated 6 times

Table 8. *Activity Level Inputs – 4-Lane Undivided Expansion Strategy*

WARREN COUNTY TRANSPORTATION IMPROVEMENT DISTRICT
WAR 63 PRIORITY SEGMENT
LIFE CYCLE COST ANALYSIS
ACTIVITY LEVEL INPUTS
4-LANE UNDIVIDED EXPANSION STRATEGY

	Initial Construction	Expansion	Pavement	Culverts	Major Drainage Rehabilitation	Major Shoulder Rehabilitation	Guardrial Replacement	Major Median Rehabilitation	Median Barrier Replacement	Overhead Sign & Signal Replacement	Outages Requiring Maintenance of Traffic*
Activity 1											
Agency Construction Cost	$ 24,000,000	$ -	$ -	$ -	$ -	$ -	$ -			$ -	$ 55,000
Work Zone User Costs	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated			Calculated	Calculated
Work Zone Duration (days)	365	0	0	0	0	0	0			0	1
Number of Lanes Open in Each Direction During Work Zone	1.0	1.0	1.0	1.0	1.0	1.0	1.0			1.0	1.0
Activity Service Life (years)	11	11	11	11	11	11	11			11	4
Activity Structural Life (years)	31	31	11	11	11	11	11			11	0
Maintenance Frequency (years)	0	0	1	1	1	1	0			1	0
Agency Maintenance Cost	$ -	$ -	$ 51,000	$ 6,000	$ 2,000	$ 15,000	$ -			$ 6,000	$ -
Work Zone Length (miles)	3	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.10
Work Zone Speed Limit (mph)	40	40	40	40	40	25	25			40	40
Work Zone Capacity (vphpl)	500	750	750	750	750	750	750			750	750
Traffic Hourly Distribution	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1			Week Day 1	Week Day 1
Time of Day Lane Closures (24 hour clock)	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00			7:00 - 15:00	7:00 - 15:00
Activity 2											
Agency Construction Cost	$ 15,000,000	$ -	$ -	$ -		$ -				$ -	$ 55,000
Work Zone User Costs	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated				Calculated	Calculated
Work Zone Duration (days)	240	0	0	0	0	0				0	1
Number of Lanes Open in Each Direction During Work Zone	2.0	2.0	2.0	2.0	2.0	2.5				2.0	2.0
Activity Service Life (years)	20	15	20	15	10	18				15	5
Activity Structural Life (years)	31	15	20	15	10	18				15	0
Maintenance Frequency (years)	0	1	1	1	1	0				1	0
Agency Maintenance Cost	$ -	$ 76,500	$ 9,000	$ 2,000	$ 15,000	$ -				$ 9,000	$ -
Work Zone Length (miles)	3.00	3.00	0.00	3.00	3.00	0.50				0.10	0.10
Work Zone Speed Limit (mph)	45	45	45	50	25	25				40	40
Work Zone Capacity (vphpl)	1000	1000	1000	1000	1000	1000				500	1000
Traffic Hourly Distribution	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1				Week Day 1	Week Day 1
Time of Day Lane Closures (24 hour clock)	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00				7:00 - 15:00	7:00 - 15:00
Activity 3											
Agency Construction Cost		$ 1,125,000		$ 180,000	$ 123,000	$ 159,000				$ 1,417,500	
Work Zone User Costs		Calculated		Calculated	Calculated	Calculated				Calculated	
Work Zone Duration (days)		75		30	30	20				24	
Number of Lanes Open in Each Direction During Work Zone		2.0		2.0	2.0	2.5				2.0	
Activity Service Life (years)		5		5	10	2				5	
Activity Structural Life (years)		15		15	10	18				15	
Maintenance Frequency (years)		1		1	1	0				1	
Agency Maintenance Cost		$ 76,500		$ 2,000	$ 15,000	$ -				$ 9,000	
Work Zone Length (miles)		3.00		3.00	3.00	0.50				0.10	
Work Zone Speed Limit (mph)		45		50	25	25				40	
Work Zone Capacity (vphpl)		1000		1000	1000	1000				500	
Traffic Hourly Distribution		Week Day 1		Week Day 1	Week Day 1	Week Day 1				Week Day 1	
Time of Day Lane Closures (24 hour clock)		7:00 - 15:00		7:00 - 15:00	7:00 - 15:00	7:00 - 15:00				7:00 - 15:00	

*Years 1-10: Activity 1 is repeated 3 times; Years 11-30: Activity 2 is repeated 4 times

Table 9. Activity Level Inputs – 4-Lane Divided Expansion Strategy

WARREN COUNTY TRANSPORTATION IMPROVEMENT DISTRICT
WAR 63 PRIORITY SEGMENT
LIFE CYCLE COST ANALYSIS
ACTIVITY LEVEL INPUTS
4-LANE DIVIDED STRATEGY

	Initial Construction	Expansion	Pavement	Culverts	Major Drainage Rehabilitation	Major Shoulder Rehabilitation	Guardrial Replacement	Major Median Rehabilitation	Median Barrier Replacement	Overhead Sign & Signal Replacement	Outages Requiring Maintenance of Traffic*
Activity 1											
Agency Construction Cost	$ 28,000,000		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 55,000
Work Zone User Costs	Calculated		Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Caculated	Calculated	Calculated
Work Zone Duration (days)	365		0	0	0	0	0	0	0	0	1
Number of Lanes Open in Each Direction During Work Zone	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Activity Service Life (years)	31		16	31	16	11	18	11	20	16	5
Activity Structural Life (years)	31		16	31	16	11	18	11	20	16	0
Maintenance Frequency (years)	0		1	1	1	1	1	1	1	1	0
Agency Maintenance Cost	$ -		$ 51,000	$ 7,000	$ 2,000	$ 15,000	$ -	$ 4,000	$ -	$ 7,000	$ -
Work Zone Length (miles)	3		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Work Zone Speed Limit (mph)	45		40	40	50	40	25	50	50	40	40
Work Zone Capacity (vphpl)	1000		500	500	750	750	500	1150	1150	750	750
Traffic Hourly Distribution	Week Day 1		Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1
Time of Day Lane Closures (24 hour clock)	7:00 - 15:00		7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00
Activity 2											
Agency Construction Cost			$ 750,000	$ 180,000	$ 123,000	$ 159,000	$ 153,000	$ 366,000	$ 945,000		
Work Zone User Costs			Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated		
Work Zone Duration (days)			75	30	30	20	30	70	24		
Number of Lanes Open in Each Direction During Work Zone			1.0	1.0	2.0	1.5	1.5	2.0	1.0		
Activity Service Life (years)			15	15	10	13	10	11	15		
Activity Structural Life (years)			15	15	10	18	10	20	15		
Maintenance Frequency (years)			1	1	1	1	1	1	1		
Agency Maintenance Cost			$ 51,000	$ 2,000	$ 15,000	$ -	$ 4,000	$ -	$ 7,000		
Work Zone Length (miles)			3.00	3.00	3.00	0.50	3.00	3.00	0.10		
Work Zone Speed Limit (mph)			40	50	40	25	50	50	40		
Work Zone Capacity (vphpl)			500	750	750	500	1150	1150	750		
Traffic Hourly Distribution			Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1	Week Day 1		
Time of Day Lane Closures (24 hour clock)			7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00	7:00 - 15:00		
Activity 3											
Agency Construction Cost					$ 123,000		$ 153,000				
Work Zone User Costs					Calculated		Calculated				
Work Zone Duration (days)					30		30				
Number of Lanes Open in Each Direction During Work Zone					2.0		1.5				
Activity Service Life (years)					10		10				
Activity Structural Life (years)					10		10				
Maintenance Frequency (years)					1		1				
Agency Maintenance Cost					$ 15,000		$ 4,000				
Work Zone Length (miles)					3.00		3.00				
Work Zone Speed Limit (mph)					40		50				
Work Zone Capacity (vphpl)					750		1150				
Traffic Hourly Distribution					Week Day 1		Week Day 1				
Time of Day Lane Closures (24 hour clock)					7:00 - 15:00		7:00 - 15:00				

*Outages occur every 5 years -Activity 1 is repeated 6 times

Appendix D – SUMMARY OF LIFE CYCLE COST ANALYSIS RESULTS BY SCENARIO

Table 10. *Summary of Life Cycle Costs Including Initial Construction Period Costs*

WARREN COUNTY TRANSPORTATION IMPROVEMENT DISTRICT
WAR 63 PRIORITY SEGMENT
LIFE CYCLE COST ANALYSIS
SUMMARY INCLUDING INITIAL CONSTRUCTION PERIOD COSTS

NO BUILD

ACTIVITIES	Undiscounted Sum		Present Value (Discounted at 7%)		Equivalent Uniform Annual Cost	
	Agency Cost	User Cost	Agency Cost	User Cost	Agency Cost	User Cost
Initial Build	$ -	$ -	$ -	$ -	$ -	$ -
Expannsion	$ -	$ -	$ -	$ -	$ -	$ -
Pavement	$ 4,532,000	$ 8,141,320	$ 2,544,770	$ 5,308,310	$ 203,060	$ 423,590
Culverts	$ 529,000	$ 1,755,620	$ 309,750	$ 1,143,360	$ 24,720	$ 91,240
Major Drainage Rehab	$ 368,000	$ 835,680	$ 191,840	$ 313,930	$ 15,310	$ 25,050
Major Shoulder Rehab	$ 554,000	$ 3,226,790	$ 216,760	$ 1,149,860	$ 17,300	$ 91,760
Guardrail Replacement	$ 89,830	$ 2,139,850	$ 42,850	$ 1,006,350	$ 3,420	$ 80,300
Major Median Rehab	$ -	$ -	$ -	$ -	$ -	$ -
Median Barrier Replacement	$ -	$ -	$ -	$ -	$ -	$ -
Overhead Sign/Signal Replacement	$ 761,130	$ 335,310	$ 330,380	$ 145,530	$ 26,620	$ 11,730
Outages Requiring MOT	$ 880,000	$ 770,740	$ 384,710	$ 326,980	$ 30,700	$ 26,090
	$ 7,713,960	$ 17,205,310	$ 4,021,060	$ 9,394,320	$ 321,130	$ 749,760

4 LANE UNDIVIDED

ACTIVITIES	Undiscounted Sum		Present Value (Discounted at 7%)		Equivalent Uniform Annual Cost	
	Agency Cost	User Cost	Agency Cost	User Cost	Agency Cost	User Cost
Initial Build	$ 24,000,000	$ 13,319,210	$ 24,000,000	$ 13,319,210	$ 1,915,130	$ 1,062,830
Expansion	$ -	$ -	$ -	$ -	$ -	$ -
Pavement	$ 2,229,000	$ 6,259,140	$ 869,640	$ 2,120,190	$ 63,390	$ 169,180
Culverts	$ 180,000	$ -	$ 74,450	$ -	$ 5,940	$ -
Major Drainage Rehab	$ 238,000	$ 2,445,910	$ 85,110	$ 828,510	$ 6,790	$ 66,110
Major Shoulder Rehab	$ 666,000	$ 2,265,130	$ 263,530	$ 656,230	$ 21,030	$ 52,360
Guardrail Replacement	$ 114,830	$ 927,460	$ 41,620	$ 336,150	$ 3,320	$ 26,820
Major Median Rehab	$ -	$ -	$ -	$ -	$ -	$ -
Median Barrier Replacement	$ -	$ -	$ -	$ -	$ -	$ -
Overhead Sign/Signal Replacement	$ 1,119,000	$ 1,942,020	$ 392,530	$ 657,830	$ 31,320	$ 52,490
Outages Requiring MOT	$ 440,000	$ 320,800	$ 205,350	$ 87,920	$ 16,390	$ 7,020
	$ 28,986,830	$ 27,479,670	$ 25,932,230	$ 18,006,040	$ 2,063,310	$ 1,436,810

4-LANE DIVIDED

ACTIVITIES	Undiscounted Sum		Present Value (Discounted at 7%)		Equivalent Uniform Annual Cost	
	Agency Cost	User Cost	Agency Cost	User Cost	Agency Cost	User Cost
Initial Build	$ 28,000,000	$ 854,290	$ 28,000,000	$ 854,290	$ 2,234,310	$ 68,170
Expansion	$ -	$ -	LE	$ -	$ -	$ -
Pavement	$ 2,229,000	$ 6,259,140	$ 869,640	$ 2,120,190	$ 69,390	$ 169,180
Culverts	$ 210,000	$ -	$ 86,860	$ -	$ 6,930	$ -
Major Drainage Rehab	$ 238,000	$ 1,628,730	$ 85,110	$ 551,710	$ 6,790	$ 44,020
Major Shoulder Rehab	$ 666,000	$ 381,410	$ 263,530	$ 129,700	$ 21,030	$ 10,350
Guardrail Replacement	$ 114,830	$ 927,460	$ 41,620	$ 336,150	$ 3,320	$ 26,820
Major Median Rehab	$ 418,000	$ 110,770	$ 156,410	$ 37,670	$ 12,480	$ 3,010
Median Barrier Replacement	$ 201,300	$ 77,580	$ 74,360	$ 28,660	$ 5,930	$ 2,290
Overhead Sign/Signal Replacement	$ 1,148,000	$ 1,284,610	$ 404,600	$ 435,140	$ 32,290	$ 34,720
Outages Requiring MOT	$ 330,000	$ 220,700	$ 166,450	$ 65,570	$ 13,280	$ 5,230
	$ 33,555,130	$ 11,744,690	$ 30,148,580	$ 4,559,080	$ 2,405,750	$ 363,790

4-LANE UNDIVIDED EXPANSION YEAR 10

ACTIVITIES	Undiscounted Sum		Present Value (Discounted at 7%)		Equivalent Uniform Annual Cost	
	Agency Cost	User Cost	Agency Cost	User Cost	Agency Cost	User Cost
Initial Build	$ 24,000,000	$ 13,319,210	$ 24,000,000	$ 13,319,210	$ 1,915,130	$ 1,062,830
Expansion	$ 9,677,420	$ 512,470	$ 6,472,920	$ 342,770	$ 516,520	$ 27,350
Pavement	$ 2,262,000	$ 113,620	$ 822,310	$ 30,790	$ 65,620	$ 2,460
Culverts	$ 231,000	$ -	$ 86,330	$ -	$ 6,890	$ -
Major Drainage Rehab	$ 116,000	$ 21,390	$ 39,790	$ 5,800	$ 3,170	$ 460
Major Shoulder Rehab	$ 543,000	$ 632,190	$ 205,090	$ 152,680	$ 16,370	$ 12,180
Guardrail Replacement	$ 17,670	$ 13,790	$ 5,000	$ 3,900	$ 400	$ 310
Major Median Rehab						
Median Barrier Replacement						
Overhead Sign/Signal Replacement	$ 694,500	$ 415,240	$ 212,850	$ 112,550	$ 16,980	$ 8,980
Outages Requiring MOT	$ 385,000	$ 21,220	$ 271,080	$ 13,460	$ 21,630	$ 1,070
	$ 37,926,590	$ 15,049,130	$ 32,115,370	$ 13,981,160	$ 2,562,710	$ 1,115,640

4-LANE DIVIDED EXPANSION YEAR 10

ACTIVITIES	Undiscounted Sum		Present Value (Discounted at 7%)		Equivalent Uniform Annual Cost	
	Agency Cost	User Cost	Agency Cost	User Cost	Agency Cost	User Cost
Initial Build	$ 28,000,000	$ 854,290	$ 28,000,000	$ 854,290	$ 2,234,310	$ 68,170
Expansion	$ 6,774,190	$ 241,220	$ 4,531,050	$ 161,340	$ 361,560	$ 12,870
Pavement	$ 2,262,000	$ 113,620	$ 822,310	$ 30,790	$ 65,620	$ 2,460
Culverts	$ 241,000	$ -	$ 93,360	$ -	$ 7,450	$ -
Major Drainage Rehab	$ 116,000	$ 21,390	$ 39,790	$ 5,800	$ 3,170	$ 460
Major Shoulder Rehab	$ 543,000	$ 632,190	$ 205,090	$ 152,680	$ 16,370	$ 12,180
Guardrail Replacement	$ 17,670	$ 13,790	$ 5,000	$ 3,900	$ 400	$ 310
Major Median Rehab	$ 22,000	$ 64,040	$ 73,340	$ 15,470	$ 5,850	$ 1,230
Median Barrier Replacement	$ -	$ -	$ -	$ -	$ -	$ -
Overhead Sign/Signal Replacement	$ 704,500	$ 415,240	$ 219,880	$ 112,550	$ 17,550	$ 8,980
Outages Requiring MOT	$ 330,000	$ 10,590	$ 236,320	$ 7,280	$ 18,860	$ 580
	$ 39,010,360	$ 2,366,370	$ 34,226,140	$ 1,344,100	$ 2,731,140	$ 107,240

Table 11. *Summary of Life Cycle Costs – Expansion and Rehabilitation Costs*

WARREN COUNTY TRANSPORTATION IMPROVEMENT DISTRICT
WAR 63 PRIORITY SEGMENT
LIFE CYCLE COST ANALYSIS
SUMMARY OF EXPANSION AND REHABILITATION COSTS

NO BUILD

ACTIVITIES	Undiscounted Sum		Present Value (Discounted at 7%)		Equivalent Uniform Annual Cost	
	Agency Cost	User Cost	Agency Cost	User Cost	Agency Cost	User Cost
Expannsion	$ -	$ -	$ -	$ -	$ -	$ -
Pavement	$ 4,532,000	$ 8,141,320	$ 2,544,770	$ 5,308,310	$ 203,060	$ 423,590
Culverts	$ 529,000	$ 1,755,620	$ 309,750	$ 1,143,360	$ 24,720	$ 91,240
Major Drainage Rehab	$ 368,000	$ 835,680	$ 191,840	$ 313,930	$ 15,310	$ 25,050
Major Shoulder Rehab	$ 554,000	$ 3,226,790	$ 216,760	$ 1,149,860	$ 17,300	$ 91,760
Guardrail Replacement	$ 89,830	$ 2,139,850	$ 42,850	$ 1,006,350	$ 3,420	$ 80,300
Major Median Rehab	$ -	$ -	$ -	$ -	$ -	$ -
Median Barrier Replacement	$ -	$ -	$ -	$ -	$ -	$ -
Overhead Sign/Signal Replacement	$ 761,130	$ 335,310	$ 330,380	$ 145,530	$ 26,620	$ 11,730
Outages Requiring MOT	$ 880,000	$ 770,740	$ 384,710	$ 326,980	$ 30,700	$ 26,090
	$ 7,713,960	$ 17,205,310	$ 4,021,060	$ 9,394,320	$ 321,130	$ 749,760

4-LANE UNDIVIDED

ACTIVITIES	Undiscounted Sum		Present Value (Discounted at 7%)		Equivalent Uniform Annual Cost	
	Agency Cost	User Cost	Agency Cost	User Cost	Agency Cost	User Cost
Expansion	$ -	$ -	$ -	$ -	$ -	$ -
Pavement	$ 2,229,000	$ 6,259,140	$ 869,640	$ 2,120,190	$ 63,390	$ 169,180
Culverts	$ 180,000	$ -	$ 74,450	$ -	$ 5,940	$ -
Major Drainage Rehab	$ 238,000	$ 2,445,910	$ 85,110	$ 828,510	$ 6,790	$ 66,110
Major Shoulder Rehab	$ 666,000	$ 2,265,130	$ 263,530	$ 656,230	$ 21,030	$ 52,360
Guardrail Replacement	$ 114,830	$ 927,460	$ 41,620	$ 336,150	$ 3,320	$ 26,820
Major Median Rehab	$ -	$ -	$ -	$ -	$ -	$ -
Median Barrier Replacement	$ -	$ -	$ -	$ -	$ -	$ -
Overhead Sign/Signal Replacement	$ 1,119,000	$ 1,942,020	$ 392,530	$ 657,830	$ 31,320	$ 52,490
Outages Requiring MOT	$ 440,000	$ 320,800	$ 205,350	$ 87,920	$ 16,390	$ 7,020
	$ 4,986,830	$ 14,160,460	$ 1,932,230	$ 4,686,830	$ 148,180	$ 373,980

4-LANE DIVIDED

ACTIVITIES	Undiscounted Sum		Present Value (Discounted at 7%)		Equivalent Uniform Annual Cost	
	Agency Cost	User Cost	Agency Cost	User Cost	Agency Cost	User Cost
Expansion	$ -	$ -	$ -	$ -	$ -	$ -
Pavement	$ 2,229,000	$ 6,259,140	$ 869,640	$ 2,120,190	$ 69,390	$ 169,180
Culverts	$ 210,000	$ -	$ 86,860	$ -	$ 6,930	$ -
Major Drainage Rehab	$ 238,000	$ 1,628,730	$ 85,110	$ 551,710	$ 6,790	$ 44,020
Major Shoulder Rehab	$ 666,000	$ 381,410	$ 263,530	$ 129,700	$ 21,030	$ 10,350
Guardrail Replacement	$ 114,830	$ 927,460	$ 41,620	$ 336,150	$ 3,320	$ 26,820
Major Median Rehab	$ 418,000	$ 110,770	$ 156,410	$ 37,670	$ 12,480	$ 3,010
Median Barrier Replacement	$ 201,300	$ 77,580	$ 74,360	$ 28,660	$ 5,930	$ 2,290
Overhead Sign/Signal Replacement	$ 1,148,000	$ 1,284,610	$ 404,600	$ 435,140	$ 32,290	$ 34,720
Outages Requiring MOT	$ 330,000	$ 220,700	$ 166,450	$ 65,570	$ 13,280	$ 5,230
	$ 5,555,130	$ 10,890,400	$ 2,148,580	$ 3,704,790	$ 171,440	$ 295,620

4-LANE UNDIVIDED EXPANSION YEAR 10

ACTIVITIES	Undiscounted Sum		Present Value (Discounted at 7%)		Equivalent Uniform Annual Cost	
	Agency Cost	User Cost	Agency Cost	User Cost	Agency Cost	User Cost
Expansion	$ 9,677,420	$ 512,470	$ 6,472,920	$ 342,770	$ 516,520	$ 27,350
Pavement	$ 2,262,000	$ 113,620	$ 822,310	$ 30,790	$ 65,620	$ 2,460
Culverts	$ 231,000	$ -	$ 86,330	$ -	$ 6,890	$ -
Major Drainage Rehab	$ 116,000	$ 21,390	$ 39,790	$ 5,800	$ 3,170	$ 460
Major Shoulder Rehab	$ 543,000	$ 632,190	$ 205,090	$ 152,680	$ 16,370	$ 12,180
Guardrail Replacement	$ 17,670	$ 13,790	$ 5,000	$ 3,900	$ 400	$ 310
Major Median Rehab						
Median Barrier Replacement						
Overhead Sign/Signal Replacement	$ 694,500	$ 415,240	$ 212,850	$ 112,550	$ 16,980	$ 8,980
Outages Requiring MOT	$ 385,000	$ 21,220	$ 271,080	$ 13,460	$ 21,630	$ 1,070
	$ 13,926,590	$ 1,729,920	$ 8,115,370	$ 661,950	$ 647,580	$ 52,810

4-LANE DIVIDED EXPANSION YEAR 10

ACTIVITIES	Undiscounted Sum		Present Value (Discounted at 7%)		Equivalent Uniform Annual Cost	
	Agency Cost	User Cost	Agency Cost	User Cost	Agency Cost	User Cost
Expansion	$ 6,774,190	$ 241,220	$ 4,531,050	$ 161,340	$ 361,560	$ 12,870
Pavement	$ 2,262,000	$ 113,620	$ 822,310	$ 30,790	$ 65,620	$ 2,460
Culverts	$ 241,000	$ -	$ 93,360	$ -	$ 7,450	$ -
Major Drainage Rehab	$ 116,000	$ 21,390	$ 39,790	$ 5,800	$ 3,170	$ 460
Major Shoulder Rehab	$ 543,000	$ 632,190	$ 205,090	$ 152,680	$ 16,370	$ 12,180
Guardrail Replacement	$ 17,670	$ 13,790	$ 5,000	$ 3,900	$ 400	$ 310
Major Median Rehab	$ 22,000	$ 64,040	$ 73,340	$ 15,470	$ 5,850	$ 1,230
Median Barrier Replacement	$ -	$ -	$ -	$ -	$ -	$ -
Overhead Sign/Signal Replacement	$ 704,500	$ 415,240	$ 219,880	$ 112,550	$ 17,550	$ 8,980
Outages Requiring MOT	$ 330,000	$ 10,590	$ 236,320	$ 7,280	$ 18,860	$ 580
	$ 11,010,360	$ 1,512,080	$ 6,226,140	$ 489,810	$ 496,830	$ 39,070

Table 12. *Summary of Life Cycle Costs – Rehabilitation Costs Only*

WARREN COUNTY TRANSPORTATION IMPROVEMENT DISTRICT
WAR 63 PRIORITY SEGMENT
LIFE CYCLE COST ANALYSIS
SUMMARY OF REHABILITATION COSTS

NO BUILD

ACTIVITIES	Undiscounted Sum		Present Value (Discounted at 7%)		Equivalent Uniform Annual Cost	
	Agency Cost	User Cost	Agency Cost	User Cost	Agency Cost	User Cost
Pavement	$ 4,532,000	$ 8,141,320	$ 2,544,770	$ 5,308,310	$ 203,060	$ 423,590
Culverts	$ 529,000	$ 1,755,620	$ 309,750	$ 1,143,360	$ 24,720	$ 91,240
Major Drainage Rehab	$ 368,000	$ 835,680	$ 191,840	$ 313,930	$ 15,310	$ 25,050
Major Shoulder Rehab	$ 554,000	$ 3,226,790	$ 216,760	$ 1,149,860	$ 17,300	$ 91,760
Guardrail Replacement	$ 89,830	$ 2,139,850	$ 42,850	$ 1,006,350	$ 3,420	$ 80,300
Major Median Rehab	$ -	$ -	$ -	$ -	$ -	$ -
Median Barrier Replacement	$ -	$ -	$ -	$ -	$ -	$ -
Overhead Sign/Signal Replacement	$ 761,130	$ 335,310	$ 330,380	$ 145,530	$ 26,620	$ 11,730
Outages Requiring MOT	$ 880,000	$ 770,740	$ 384,710	$ 326,980	$ 30,700	$ 26,090
	$ 7,713,960	$ 17,205,310	$ 4,021,060	$ 9,394,320	$ 321,130	$ 749,760

4-LANE UNDIVIDED

ACTIVITIES	Undiscounted Sum		Present Value (Discounted at 7%)		Equivalent Uniform Annual Cost	
	Agency Cost	User Cost	Agency Cost	User Cost	Agency Cost	User Cost
Pavement	$ 2,229,000	$ 6,259,140	$ 869,640	$ 2,120,190	$ 63,390	$ 169,180
Culverts	$ 180,000	$ -	$ 74,450	$ -	$ 5,940	$ -
Major Drainage Rehab	$ 238,000	$ 2,445,910	$ 85,110	$ 828,510	$ 6,790	$ 66,110
Major Shoulder Rehab	$ 666,000	$ 2,265,130	$ 263,530	$ 656,230	$ 21,030	$ 52,360
Guardrail Replacement	$ 114,830	$ 927,460	$ 41,620	$ 336,150	$ 3,320	$ 26,820
Major Median Rehab	$ -	$ -	$ -	$ -	$ -	$ -
Median Barrier Replacement	$ -	$ -	$ -	$ -	$ -	$ -
Overhead Sign/Signal Replacement	$ 1,119,000	$ 1,942,020	$ 392,530	$ 657,830	$ 31,320	$ 52,490
Outages Requiring MOT	$ 440,000	$ 320,800	$ 205,350	$ 87,920	$ 16,390	$ 7,020
	$ 4,986,830	$ 14,160,460	$ 1,932,230	$ 4,686,830	$ 148,180	$ 373,980

4-LANE DIVIDED

ACTIVITIES	Undiscounted Sum		Present Value (Discounted at 7%)		Equivalent Uniform Annual Cost	
	Agency Cost	User Cost	Agency Cost	User Cost	Agency Cost	User Cost
Pavement	$ 2,229,000	$ 6,259,140	$ 869,640	$ 2,120,190	$ 69,390	$ 169,180
Culverts	$ 210,000	$ -	$ 86,860	$ -	$ 6,930	$ -
Major Drainage Rehab	$ 238,000	$ 1,628,730	$ 85,110	$ 551,710	$ 6,790	$ 44,020
Major Shoulder Rehab	$ 666,000	$ 381,410	$ 263,530	$ 129,700	$ 21,030	$ 10,350
Guardrail Replacement	$ 114,830	$ 927,460	$ 41,620	$ 336,150	$ 3,320	$ 26,820
Major Median Rehab	$ 418,000	$ 110,770	$ 156,410	$ 37,670	$ 12,480	$ 3,010
Median Barrier Replacement	$ 201,300	$ 77,580	$ 74,360	$ 28,660	$ 5,930	$ 2,290
Overhead Sign/Signal Replacement	$ 1,148,000	$ 1,284,610	$ 404,600	$ 435,140	$ 32,290	$ 34,720
Outages Requiring MOT	$ 330,000	$ 220,700	$ 166,450	$ 65,570	$ 13,280	$ 5,230
	$ 5,555,130	$ 10,890,400	$ 2,148,580	$ 3,704,790	$ 171,440	$ 295,620

4-LANE UNDIVIDED EXPANSION YEAR 10

ACTIVITIES	Undiscounted Sum		Present Value (Discounted at 7%)		Equivalent Uniform Annual Cost	
	Agency Cost	User Cost	Agency Cost	User Cost	Agency Cost	User Cost
Pavement	$ 2,262,000	$ 113,620	$ 822,310	$ 30,790	$ 65,620	$ 2,460
Culverts	$ 231,000	$ -	$ 86,330	$ -	$ 6,890	$ -
Major Drainage Rehab	$ 116,000	$ 21,390	$ 39,790	$ 5,800	$ 3,170	$ 460
Major Shoulder Rehab	$ 543,000	$ 632,190	$ 205,090	$ 152,680	$ 16,370	$ 12,180
Guardrail Replacement	$ 17,670	$ 13,790	$ 5,000	$ 3,900	$ 400	$ 310
Major Median Rehab	$ -	$ -	$ -	$ -	$ -	$ -
Median Barrier Replacement	$ -	$ -	$ -	$ -	$ -	$ -
Overhead Sign/Signal Replacement	$ 694,500	$ 415,240	$ 212,850	$ 112,550	$ 16,980	$ 8,980
Outages Requiring MOT	$ 385,000	$ 21,220	$ 271,080	$ 13,460	$ 21,630	$ 1,070
	$ 4,249,170	$ 1,217,450	$ 1,642,450	$ 319,180	$ 131,060	$ 25,460

4-LANE DIVIDED EXPANSION YEAR 10

ACTIVITIES	Undiscounted Sum		Present Value (Discounted at 7%)		Equivalent Uniform Annual Cost	
	Agency Cost	User Cost	Agency Cost	User Cost	Agency Cost	User Cost
Pavement	$ 2,262,000	$ 113,620	$ 822,310	$ 30,790	$ 65,620	$ 2,460
Culverts	$ 241,000	$ -	$ 93,360	$ -	$ 7,450	$ -
Major Drainage Rehab	$ 116,000	$ 21,390	$ 39,790	$ 5,800	$ 3,170	$ 460
Major Shoulder Rehab	$ 543,000	$ 632,190	$ 205,090	$ 152,680	$ 16,370	$ 12,180
Guardrail Replacement	$ 17,670	$ 13,790	$ 5,000	$ 3,900	$ 400	$ 310
Major Median Rehab	$ 22,000	$ 64,040	$ 73,340	$ 15,470	$ 5,850	$ 1,230
Median Barrier Replacement	$ -	$ -	$ -	$ -	$ -	$ -
Overhead Sign/Signal Replacement	$ 704,500	$ 415,240	$ 219,880	$ 112,550	$ 17,550	$ 8,980
Outages Requiring MOT	$ 330,000	$ 10,590	$ 236,320	$ 7,280	$ 18,860	$ 580
	$ 4,236,170	$ 1,270,860	$ 1,695,090	$ 328,470	$ 135,270	$ 26,200

Appendix E – *REAL*COST INPUT AND RESULTS BY SENARIO AND ACTIVITY

*REAL*COST INPUT AND RESULTS

NO BUILD SCENARIO

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.0
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	1
Free Flow Capacity (vphpl)	1500
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	No Build - Pavement 1		***Alternative 2***	No Build - Pavement 2	
Number of Activities	3		***Number of Activities***	3	
Activity 1	REPLACE SURFACE WEARING COURSE		**Activity 1**	REPLACE SURFACE WEARING COURSE	
Agency Construction Cost ($1000)	$450.00		Agency Construction Cost ($1000)	$450.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	60		Work Zone Duration (days)	60	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	40		Agency Maintenance Cost ($1000)	40	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	0:00	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	FULL DEPTH PAVEMENT REHAB		**Activity 2**	FULL DEPTH PAVEMENT REHAB	
Agency Construction Cost ($1000)	$3,515.00		Agency Construction Cost ($1000)	$3,515.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	120		Work Zone Duration (days)	120	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	15.0		Activity Service Life (years)	15.0	
Activity Structural Life (years)	25.0		Activity Structural Life (years)	25.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	40		Agency Maintenance Cost ($1000)	40	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	REPLACE SURFACE WEARING COURSE		**Activity 3**	REPLACE SURFACE WEARING COURSE	
Agency Construction Cost ($1000)	$450.00		Agency Construction Cost ($1000)	$450.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	60		Work Zone Duration (days)	60	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	40		Agency Maintenance Cost ($1000)	40	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$4,532.00*	*$8,141.32*	*$4,532.00*	*$8,141.32*
Present Value	**$2,544.77**	**$5,308.31**	**$2,544.77**	**$5,308.31**
EUAC	$203.06	$423.59	$203.06	$423.59

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.0
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	1
Free Flow Capacity (vphpl)	1500
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	No Build - Culverts 1		***Alternative 2***	No Build - Culverts 2	
Number of Activities	2		***Number of Activities***	2	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	5		Agency Maintenance Cost ($1000)	5	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	REPLACE CROSS CULVERTS (TOTAL FO		**Activity 2**	REPLACE CROSS CULVERTS (TOTAL FO	
Agency Construction Cost ($1000)	$576.00		Agency Construction Cost ($1000)	$576.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	54		Work Zone Duration (days)	54	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	25.0		Activity Service Life (years)	25.0	
Activity Structural Life (years)	30.0		Activity Structural Life (years)	30.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	5		Agency Maintenance Cost ($1000)	5	
Work Zone Length (miles)	0.20		Work Zone Length (miles)	0.20	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$529.00*	*$1,755.62*	*$529.00*	*$1,755.62*
Present Value	**$309.75**	**$1,143.36**	**$309.75**	**$1,143.36**
EUAC	$24.72	$91.24	$24.72	$91.24

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.0
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	1
Free Flow Capacity (vphpl)	1500
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

Probabilistic Life Cycle Cost Analysis Worksheet

5. Construction							
Alternative 1	No Build - Major Open Drainage Rehab 1			***Alternative 2***	No Build - Major Open Drainage Rehab 2		
Number of Activities	3			***Number of Activities***	3		
Activity 1	INITIAL BUILD			**Activity 1**	INITIAL BUILD		
Agency Construction Cost ($1000)	$0.00			Agency Construction Cost ($1000)	$0.00		
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)			
Work Zone Duration (days)	0			Work Zone Duration (days)	0		
No of Lanes Open in Each Direction During Work	1			No of Lanes Open in Each Direction During Work	1		
Activity Service Life (years)	5.0			Activity Service Life (years)	5.0		
Activity Structural Life (years)	5.0			Activity Structural Life (years)	5.0		
Maintenance Frequency (years)	1			Maintenance Frequency (years)	1		
Agency Maintenance Cost ($1000)	2			Agency Maintenance Cost ($1000)	2		
Work Zone Length (miles)	0.00			Work Zone Length (miles)	0.00		
Work Zone Speed Limit (mph)	50			Work Zone Speed Limit (mph)	50		
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500		
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1		
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			
Inbound	Start	End		*Inbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Outbound	Start	End		*Outbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Activity 2	MAJOR OPEN DRAINAGE REHAB			**Activity 2**	MAJOR OPEN DRAINAGE REHAB		
Agency Construction Cost ($1000)	$180.00			Agency Construction Cost ($1000)	$180.00		
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)			
Work Zone Duration (days)	30			Work Zone Duration (days)	30		
No of Lanes Open in Each Direction During Work	1			No of Lanes Open in Each Direction During Work	1		
Activity Service Life (years)	15.0			Activity Service Life (years)	15.0		
Activity Structural Life (years)	15.0			Activity Structural Life (years)	15.0		
Maintenance Frequency (years)	1			Maintenance Frequency (years)	1		
Agency Maintenance Cost ($1000)	2			Agency Maintenance Cost ($1000)	2		
Work Zone Length (miles)	3.00			Work Zone Length (miles)	3.00		
Work Zone Speed Limit (mph)	50			Work Zone Speed Limit (mph)	50		
Work Zone Capacity (vphpl)	750			Work Zone Capacity (vphpl)	750		
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1		
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			
Inbound	Start	End		*Inbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Outbound	Start	End		*Outbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Activity 3	MAJOR OPEN DRAINAGE REHAB			**Activity 3**	MAJOR OPEN DRAINAGE REHAB		
Agency Construction Cost ($1000)	$180.00			Agency Construction Cost ($1000)	$180.00		
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)			
Work Zone Duration (days)	30			Work Zone Duration (days)	30		
No of Lanes Open in Each Direction During Work	1			No of Lanes Open in Each Direction During Work	1		
Activity Service Life (years)	11.0			Activity Service Life (years)	11.0		
Activity Structural Life (years)	15.0			Activity Structural Life (years)	15.0		
Maintenance Frequency (years)	1			Maintenance Frequency (years)	1		
Agency Maintenance Cost ($1000)	2			Agency Maintenance Cost ($1000)	2		
Work Zone Length (miles)	3.00			Work Zone Length (miles)	3.00		
Work Zone Speed Limit (mph)	50			Work Zone Speed Limit (mph)	50		
Work Zone Capacity (vphpl)	750			Work Zone Capacity (vphpl)	750		
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1		
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			
Inbound	Start	End		*Inbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Outbound	Start	End		*Outbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$368.00*	*$835.68*	*$368.00*	*$835.68*
Present Value	**$191.84**	**$313.93**	**$191.84**	**$313.93**
EUAC	$15.31	$25.05	$15.31	$25.05

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET

1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.0
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	1
Free Flow Capacity (vphpl)	1500
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

Probabilistic Life Cycle Cost Analysis Worksheet

5. Construction							
Alternative 1	No Build - Major Shoulder Rehab 1			***Alternative 2***	No Build - Major Shoulder Rehab 2		
Number of Activities	3			***Number of Activities***	3		
Activity 1	INITIAL BUILD			**Activity 1**	INITIAL BUILD		
Agency Construction Cost ($1000)	$0.00			Agency Construction Cost ($1000)	$0.00		
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)			
Work Zone Duration (days)	0			Work Zone Duration (days)	0		
No of Lanes Open in Each Direction During Work	0.5			No of Lanes Open in Each Direction During Work	0.5		
Activity Service Life (years)	11.0			Activity Service Life (years)	11.0		
Activity Structural Life (years)	11.0			Activity Structural Life (years)	11.0		
Maintenance Frequency (years)	1			Maintenance Frequency (years)	1		
Agency Maintenance Cost ($1000)	11			Agency Maintenance Cost ($1000)	11		
Work Zone Length (miles)	0.00			Work Zone Length (miles)	0.00		
Work Zone Speed Limit (mph)	25			Work Zone Speed Limit (mph)	25		
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500		
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1		
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			
Inbound	Start	End		*Inbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Outbound	Start	End		*Outbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Activity 2	MAJOR SHUOLDER REHAB			**Activity 2**	MAJOR SHUOLDER REHAB		
Agency Construction Cost ($1000)	$123.00			Agency Construction Cost ($1000)	$123.00		
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)			
Work Zone Duration (days)	30			Work Zone Duration (days)	30		
No of Lanes Open in Each Direction During Work	0.5			No of Lanes Open in Each Direction During Work	0.5		
Activity Service Life (years)	10.0			Activity Service Life (years)	10.0		
Activity Structural Life (years)	10.0			Activity Structural Life (years)	10.0		
Maintenance Frequency (years)	1			Maintenance Frequency (years)	1		
Agency Maintenance Cost ($1000)	11			Agency Maintenance Cost ($1000)	11		
Work Zone Length (miles)	3.00			Work Zone Length (miles)	3.00		
Work Zone Speed Limit (mph)	25			Work Zone Speed Limit (mph)	25		
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500		
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1		
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			
Inbound	Start	End		*Inbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Outbound	Start	End		*Outbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Activity 3	MAJOR SHUOLDER REHAB			**Activity 3**	MAJOR SHUOLDER REHAB		
Agency Construction Cost ($1000)	$123.00			Agency Construction Cost ($1000)	$123.00		
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)			
Work Zone Duration (days)	30			Work Zone Duration (days)	30		
No of Lanes Open in Each Direction During Work	0.5			No of Lanes Open in Each Direction During Work	0.5		
Activity Service Life (years)	10.0			Activity Service Life (years)	10.0		
Activity Structural Life (years)	10.0			Activity Structural Life (years)	10.0		
Maintenance Frequency (years)	1			Maintenance Frequency (years)	1		
Agency Maintenance Cost ($1000)	11			Agency Maintenance Cost ($1000)	11		
Work Zone Length (miles)	3.00			Work Zone Length (miles)	3.00		
Work Zone Speed Limit (mph)	25			Work Zone Speed Limit (mph)	25		
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500		
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1		
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			
Inbound	Start	End		*Inbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Outbound	Start	End		*Outbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$554.00*	*$3,226.79*	*$554.00*	*$3,226.79*
Present Value	**$216.76**	**$1,149.86**	**$216.76**	**$1,149.86**
EUAC	$17.30	$91.76	$17.30	$91.76

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.0
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	1
Free Flow Capacity (vphpl)	1500
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided - Guardrail Replacement 1		***Alternative 2***	4-Lane Undivided - Guardrail Replacement 2	
Number of Activities	3		***Number of Activities***	3	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	10.0		Activity Service Life (years)	10.0	
Activity Structural Life (years)	10.0		Activity Structural Life (years)	10.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	GUARDRAIL REPLACEMENT 1		**Activity 2**	GUARDRAIL REPLACEMENT 2	
Agency Construction Cost ($1000)	$77.00		Agency Construction Cost ($1000)	$77.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	20		Work Zone Duration (days)	20	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	18.0		Activity Service Life (years)	18.0	
Activity Structural Life (years)	18.0		Activity Structural Life (years)	18.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.50		Work Zone Length (miles)	0.50	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	GUARDRAIL REPLACEMENT 1		**Activity 3**	GUARDRAIL REPLACEMENT 2	
Agency Construction Cost ($1000)	$77.00		Agency Construction Cost ($1000)	$77.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	20		Work Zone Duration (days)	20	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	3.0		Activity Service Life (years)	3.0	
Activity Structural Life (years)	18.0		Activity Structural Life (years)	18.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.50		Work Zone Length (miles)	0.50	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$89.83*	*$2,139.85*	*$89.83*	*$2,139.85*
Present Value	**$42.85**	**$1,006.35**	**$42.85**	**$1,006.35**
EUAC	$3.42	$80.30	$3.42	$80.30

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET

1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	30
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.0
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	1
Free Flow Capacity (vphpl)	1500
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	Baseline Build - Overhead Signs and Signa		***Alternative 2***	Baseline Build - Overhead Signs and Signal	
Number of Activities	3		***Number of Activities***	3	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	6		Agency Maintenance Cost ($1000)	6	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	REPLACE OVERHEAD SIGNS AND SIGNA		**Activity 2**	REPLACE OVERHEAD SIGNS AND SIGNA	
Agency Construction Cost ($1000)	$473.00		Agency Construction Cost ($1000)	$473.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	6		Work Zone Duration (days)	6	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	15.0		Activity Service Life (years)	15.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	6		Agency Maintenance Cost ($1000)	6	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	REPLACE OVERHEAD SIGNS AND SIGNA		**Activity 3**	REPLACE OVERHEAD SIGNS AND SIGNA	
Agency Construction Cost ($1000)	$473.00		Agency Construction Cost ($1000)	$473.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	6		Work Zone Duration (days)	6	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	6		Agency Maintenance Cost ($1000)	6	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$761.13*	*$335.31*	*$761.13*	*$335.31*
Present Value	**$330.38**	**$145.53**	**$330.38**	**$145.53**
EUAC	$26.62	$11.73	$26.62	$11.73

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET

1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	7.0
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	1
Free Flow Capacity (vphpl)	1500
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	Baseline Build - Outages 1		***Alternative 2***	Baseline Build - Outages 2	
Number of Activities	16		***Number of Activities***	16	
Activity 1	SPOT INCIDENT-CAUSED REPAIR		**Activity 1**	SPOT INCIDENT-CAUSED REPAIR	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1.00E+00		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	2.0		Activity Service Life (years)	2.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	SPOT INCIDENT-CAUSED REPAIR		**Activity 2**	SPOT INCIDENT-CAUSED REPAIR	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	2.0		Activity Service Life (years)	2.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	SPOT INCIDENT-CAUSED REPAIR		**Activity 3**	SPOT INCIDENT-CAUSED REPAIR	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	2.0		Activity Service Life (years)	2.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 4	SPOT INCIDENT-CAUSED REPAIR		**Activity 4**	SPOT INCIDENT-CAUSED REPAIR	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	2.0		Activity Service Life (years)	2.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Activity 5	SPOT INCIDENT-CAUSED REPAIR		**Activity 5**	SPOT INCIDENT-CAUSED REPAIR	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	2.0		Activity Service Life (years)	2.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Activity 6	SPOT INCIDENT-CAUSED REPAIR		**Activity 6**	SPOT INCIDENT-CAUSED REPAIR	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	2.0		Activity Service Life (years)	2.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Activity 7	SPOT INCIDENT-CAUSED REPAIR		**Activity 7**	SPOT INCIDENT-CAUSED REPAIR	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	2.0		Activity Service Life (years)	2.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Activity 8	SPOT INCIDENT-CAUSED REPAIR		**Activity 8**	SPOT INCIDENT-CAUSED REPAIR	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	0.5		No of Lanes Open in Each Direction During Work	0.5	
Activity Service Life (years)	2.0		Activity Service Life (years)	2.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Activity 9	SPOT INCIDENT-CAUSED REPAIR		**Activity 9**	SPOT INCIDENT-CAUSED REPAIR	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	

User Work Zone Costs ($1000)				User Work Zone Costs ($1000)			
Work Zone Duration (days)	1			Work Zone Duration (days)	1		
No of Lanes Open in Each Direction During Work	0.5			No of Lanes Open in Each Direction During Work	0.5		
Activity Service Life (years)	2.0			Activity Service Life (years)	2.0		
Activity Structural Life (years)	0.0			Activity Structural Life (years)	0.0		
Maintenance Frequency (years)	0			Maintenance Frequency (years)	0		
Agency Maintenance Cost ($1000)	0			Agency Maintenance Cost ($1000)	0		
Work Zone Length (miles)	0.10			Work Zone Length (miles)	0.10		
Work Zone Speed Limit (mph)	25			Work Zone Speed Limit (mph)	25		
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500		
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1		
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			
Inbound	Start	End		*Inbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Outbound	Start	End		*Outbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Activity 10	SPOT INCIDENT-CAUSED REPAIR			**Activity 10**	SPOT INCIDENT-CAUSED REPAIR		
Agency Construction Cost ($1000)	$55.00			Agency Construction Cost ($1000)	$55.00		
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)			
Work Zone Duration (days)	1			Work Zone Duration (days)	1		
No of Lanes Open in Each Direction During Work	0.5			No of Lanes Open in Each Direction During Work	0.5		
Activity Service Life (years)	2.0			Activity Service Life (years)	2.0		
Activity Structural Life (years)	0.0			Activity Structural Life (years)	0.0		
Maintenance Frequency (years)	0			Maintenance Frequency (years)	0		
Agency Maintenance Cost ($1000)	0			Agency Maintenance Cost ($1000)	0		
Work Zone Length (miles)	0.10			Work Zone Length (miles)	0.10		
Work Zone Speed Limit (mph)	25			Work Zone Speed Limit (mph)	25		
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500		
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1		
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			
Inbound	Start	End		*Inbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Outbound	Start	End		*Outbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Activity 11	SPOT INCIDENT-CAUSED REPAIR			**Activity 11**	SPOT INCIDENT-CAUSED REPAIR		
Agency Construction Cost ($1000)	$55.00			Agency Construction Cost ($1000)	$55.00		
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)			
Work Zone Duration (days)	1			Work Zone Duration (days)	1		
No of Lanes Open in Each Direction During Work	0.5			No of Lanes Open in Each Direction During Work	0.5		
Activity Service Life (years)	2.0			Activity Service Life (years)	2.0		
Activity Structural Life (years)	0.0			Activity Structural Life (years)	0.0		
Maintenance Frequency (years)	0			Maintenance Frequency (years)	0		
Agency Maintenance Cost ($1000)	0			Agency Maintenance Cost ($1000)	0		
Work Zone Length (miles)	0.10			Work Zone Length (miles)	0.10		
Work Zone Speed Limit (mph)	25			Work Zone Speed Limit (mph)	25		
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500		
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1		
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			
Inbound	Start	End		*Inbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Outbound	Start	End		*Outbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Activity 12	SPOT INCIDENT-CAUSED REPAIR			**Activity 12**	SPOT INCIDENT-CAUSED REPAIR		
Agency Construction Cost ($1000)	$55.00			Agency Construction Cost ($1000)	$55.00		
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)			
Work Zone Duration (days)	1			Work Zone Duration (days)	1		
No of Lanes Open in Each Direction During Work	0.5			No of Lanes Open in Each Direction During Work	0.5		
Activity Service Life (years)	2.0			Activity Service Life (years)	2.0		
Activity Structural Life (years)	0.0			Activity Structural Life (years)	0.0		
Maintenance Frequency (years)	0			Maintenance Frequency (years)	0		
Agency Maintenance Cost ($1000)	0			Agency Maintenance Cost ($1000)	0		
Work Zone Length (miles)	0.10			Work Zone Length (miles)	0.10		
Work Zone Speed Limit (mph)	25			Work Zone Speed Limit (mph)	25		
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500		
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1		
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			
Inbound	Start	End		*Inbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Outbound	Start	End		*Outbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Activity 13	SPOT INCIDENT-CAUSED REPAIR			**Activity 13**	SPOT INCIDENT-CAUSED REPAIR		
Agency Construction Cost ($1000)	$55.00			Agency Construction Cost ($1000)	$55.00		
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)			
Work Zone Duration (days)	1			Work Zone Duration (days)	1		
No of Lanes Open in Each Direction During Work	0.5			No of Lanes Open in Each Direction During Work	0.5		

Activity Service Life (years)	2.0			Activity Service Life (years)	2.0		
Activity Structural Life (years)	0.0			Activity Structural Life (years)	0.0		
Maintenance Frequency (years)	0			Maintenance Frequency (years)	0		
Agency Maintenance Cost ($1000)	0			Agency Maintenance Cost ($1000)	0		
Work Zone Length (miles)	0.10			Work Zone Length (miles)	0.10		
Work Zone Speed Limit (mph)	25			Work Zone Speed Limit (mph)	25		
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500		
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1		
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			
Inbound	Start	End		*Inbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Outbound	Start	End		*Outbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Activity 14	SPOT INCIDENT-CAUSED REPAIR			**Activity 14**	SPOT INCIDENT-CAUSED REPAIR		
Agency Construction Cost ($1000)	$55.00			Agency Construction Cost ($1000)	$55.00		
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)			
Work Zone Duration (days)	1			Work Zone Duration (days)	1		
No of Lanes Open in Each Direction During Work	0.5			No of Lanes Open in Each Direction During Work	0.5		
Activity Service Life (years)	2.0			Activity Service Life (years)	2.0		
Activity Structural Life (years)	0.0			Activity Structural Life (years)	0.0		
Maintenance Frequency (years)	0			Maintenance Frequency (years)	0		
Agency Maintenance Cost ($1000)	0			Agency Maintenance Cost ($1000)	0		
Work Zone Length (miles)	0.10			Work Zone Length (miles)	0.10		
Work Zone Speed Limit (mph)	25			Work Zone Speed Limit (mph)	25		
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500		
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1		
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			
Inbound	Start	End		*Inbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Outbound	Start	End		*Outbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Activity 15	SPOT INCIDENT-CAUSED REPAIR			**Activity 15**	SPOT INCIDENT-CAUSED REPAIR		
Agency Construction Cost ($1000)	$55.00			Agency Construction Cost ($1000)	$55.00		
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)			
Work Zone Duration (days)	1			Work Zone Duration (days)	1		
No of Lanes Open in Each Direction During Work	0.5			No of Lanes Open in Each Direction During Work	0.5		
Activity Service Life (years)	2.0			Activity Service Life (years)	2.0		
Activity Structural Life (years)	0.0			Activity Structural Life (years)	0.0		
Maintenance Frequency (years)	0			Maintenance Frequency (years)	0		
Agency Maintenance Cost ($1000)	0			Agency Maintenance Cost ($1000)	0		
Work Zone Length (miles)	0.10			Work Zone Length (miles)	0.10		
Work Zone Speed Limit (mph)	25			Work Zone Speed Limit (mph)	25		
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500		
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1		
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			
Inbound	Start	End		*Inbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Outbound	Start	End		*Outbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Activity 16	SPOT INCIDENT-CAUSED REPAIR			**Activity 16**	SPOT INCIDENT-CAUSED REPAIR		
Agency Construction Cost ($1000)	$55.00			Agency Construction Cost ($1000)	$55.00		
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)			
Work Zone Duration (days)	1			Work Zone Duration (days)	1		
No of Lanes Open in Each Direction During Work	0.5			No of Lanes Open in Each Direction During Work	0.5		
Activity Service Life (years)	2.0			Activity Service Life (years)	2.0		
Activity Structural Life (years)	0.0			Activity Structural Life (years)	0.0		
Maintenance Frequency (years)	0			Maintenance Frequency (years)	0		
Agency Maintenance Cost ($1000)	0			Agency Maintenance Cost ($1000)	0		
Work Zone Length (miles)	0.10			Work Zone Length (miles)	0.10		
Work Zone Speed Limit (mph)	25			Work Zone Speed Limit (mph)	25		
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500		
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1		
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			
Inbound	Start	End		*Inbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Outbound	Start	End		*Outbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$880.00*	*$770.74*	*$880.00*	*$770.74*
Present Value	**$384.71**	**$326.98**	**$384.71**	**$326.98**
EUAC	$30.70	$26.09	$30.70	$26.09

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

*REAL*COST INPUT AND RESULTS

4-LANE UNDIVIDED SCENARIO

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET

1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction							
Alternative 1	4-Lane Undivided Initial Construction 1			***Alternative 2***	4-Lane Undivided Initial Construction 2		
Number of Activities	1			***Number of Activities***	1		
Activity 1	INITIAL BUILD			**Activity 1**	INITIAL BUILD		
Agency Construction Cost ($1000)	$24,000.00			Agency Construction Cost ($1000)	$24,000.00		
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)			
Work Zone Duration (days)	365			Work Zone Duration (days)	365		
No of Lanes Open in Each Direction During Work	1			No of Lanes Open in Each Direction During Work	1		
Activity Service Life (years)	31.0			Activity Service Life (years)	31.0		
Activity Structural Life (years)	31.0			Activity Structural Life (years)	31.0		
Maintenance Frequency (years)	0			Maintenance Frequency (years)	0		
Agency Maintenance Cost ($1000)	0			Agency Maintenance Cost ($1000)	0		
Work Zone Length (miles)	3.00			Work Zone Length (miles)	3.00		
Work Zone Speed Limit (mph)	40			Work Zone Speed Limit (mph)	40		
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500		
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1		
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			
Inbound	Start	End		*Inbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Outbound	Start	End		*Outbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$24,000.00*	*$13,319.21*	*$24,000.00*	*$13,319.21*
Present Value	**$24,000.00**	**$13,319.21**	**$24,000.00**	**$13,319.21**
EUAC	$1,915.13	$1,062.83	$1,915.13	$1,062.83

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET

1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided - Pavement 1		***Alternative 2***	4-Lane Undivided - Pavement 2	
Number of Activities	2		***Number of Activities***	2	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	16.0		Activity Service Life (years)	16.0	
Activity Structural Life (years)	16.0		Activity Structural Life (years)	16.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	51		Agency Maintenance Cost ($1000)	51	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	SURFACE WEARING COURSE REPLACEI		**Activity 2**	SURFACE WEARING COURSE REPLACEI	
Agency Construction Cost ($1000)	$750.00		Agency Construction Cost ($1000)	$750.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	75		Work Zone Duration (days)	75	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	15.0		Activity Service Life (years)	15.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	51		Agency Maintenance Cost ($1000)	51	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$2,229.00*	*$6,259.14*	*$2,229.00*	*$6,259.14*
Present Value	**$869.64**	**$2,120.19**	**$869.64**	**$2,120.19**
EUAC	$69.39	$169.18	$69.39	$169.18

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

INPUT WORKSHEET

1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction						
Alternative 1	4-Lane Undivided - Culverts 1			***Alternative 2***	4-Lane Undivided - Culverts 2	
Number of Activities	1			***Number of Activities***	1	
Activity 1	INITIAL BUILD			**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00			Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)		
Work Zone Duration (days)	0			Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1			No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	31.0			Activity Service Life (years)	31.0	
Activity Structural Life (years)	31.0			Activity Structural Life (years)	31.0	
Maintenance Frequency (years)	1			Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	6			Agency Maintenance Cost ($1000)	6	
Work Zone Length (miles)	0.00			Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	40			Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End		*Inbound*	Start	End
First period of lane closure	7	15		First period of lane closure	7	15
Second period of lane closure				Second period of lane closure		
Third period of lane closure				Third period of lane closure		
Outbound	Start	End		*Outbound*	Start	End
First period of lane closure	7	15		First period of lane closure	7	15
Second period of lane closure				Second period of lane closure		
Third period of lane closure				Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$180.00*	*$0.00*	*$180.00*	*$0.00*
Present Value	**$74.45**	**$0.00**	**$74.45**	**$0.00**
EUAC	$5.94	$0.00	$5.94	$0.00

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided - Major Open Drainage Re		***Alternative 2***	4-Lane Undivided - Major Open Drainage Re	
Number of Activities	2		***Number of Activities***	2	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	16.0		Activity Service Life (years)	16.0	
Activity Structural Life (years)	16.0		Activity Structural Life (years)	16.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	2		Agency Maintenance Cost ($1000)	2	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	MAJOR OPEN DRAINAGE REHAB		**Activity 2**	MAJOR OPEN DRAINAGE REHAB	
Agency Construction Cost ($1000)	$180.00		Agency Construction Cost ($1000)	$180.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	30		Work Zone Duration (days)	30	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	15.0		Activity Service Life (years)	15.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	2		Agency Maintenance Cost ($1000)	2	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$238.00*	*$2,445.91*	*$238.00*	*$2,445.91*
Present Value	**$85.11**	**$828.51**	**$85.11**	**$828.51**
EUAC	$6.79	$66.11	$6.79	$66.11

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided - Major Shoulder Rehab 1		***Alternative 2***	4-Lane Undivided - Major Shoulder Rehab 2	
Number of Activities	3		***Number of Activities***	3	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	15		Agency Maintenance Cost ($1000)	15	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	MAJOR SHUOLDER REHAB		**Activity 2**	MAJOR SHUOLDER REHAB	
Agency Construction Cost ($1000)	$123.00		Agency Construction Cost ($1000)	$123.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	30		Work Zone Duration (days)	30	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	10.0		Activity Service Life (years)	10.0	
Activity Structural Life (years)	10.0		Activity Structural Life (years)	10.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	15		Agency Maintenance Cost ($1000)	15	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	MAJOR SHUOLDER REHAB		**Activity 3**	MAJOR SHUOLDER REHAB	
Agency Construction Cost ($1000)	$123.00		Agency Construction Cost ($1000)	$123.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	30		Work Zone Duration (days)	30	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	10.0		Activity Service Life (years)	10.0	
Activity Structural Life (years)	10.0		Activity Structural Life (years)	10.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	15		Agency Maintenance Cost ($1000)	15	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$666.00*	*$2,265.13*	*$666.00*	*$2,265.13*
Present Value	**$263.53**	**$656.23**	**$263.53**	**$656.23**
EUAC	$21.03	$52.36	$21.03	$52.36

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

INPUT WORKSHEET

1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided - Guardrail Replacement 1		***Alternative 2***	4-Lane Undivided - Guardrail Replacement 2	
Number of Activities	2		***Number of Activities***	2	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	18.0		Activity Service Life (years)	18.0	
Activity Structural Life (years)	18.0		Activity Structural Life (years)	18.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	MAJOR SHUOLDER REHAB		**Activity 2**	MAJOR SHUOLDER REHAB	
Agency Construction Cost ($1000)	$159.00		Agency Construction Cost ($1000)	$159.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	20		Work Zone Duration (days)	20	
No of Lanes Open in Each Direction During Work	1.5		No of Lanes Open in Each Direction During Work	1.5	
Activity Service Life (years)	13.0		Activity Service Life (years)	13.0	
Activity Structural Life (years)	18.0		Activity Structural Life (years)	18.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.50		Work Zone Length (miles)	0.50	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$114.83*	*$927.46*	*$114.83*	*$927.46*
Present Value	**$41.62**	**$336.15**	**$41.62**	**$336.15**
EUAC	$3.32	$26.82	$3.32	$26.82

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

INPUT WORKSHEET

1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided - Overhead Signs and Sig		***Alternative 2***	4-Lane Undivided - Overhead Signs and Sig	
Number of Activities	2		***Number of Activities***	2	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	16.0		Activity Service Life (years)	16.0	
Activity Structural Life (years)	16.0		Activity Structural Life (years)	16.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	6		Agency Maintenance Cost ($1000)	6	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	REPLACE OVERHEAD SIGNS AND SIGNA		**Activity 2**	REPLACE OVERHEAD SIGNS AND SIGNA	
Agency Construction Cost ($1000)	$945.00		Agency Construction Cost ($1000)	$945.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	24		Work Zone Duration (days)	24	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	15.0		Activity Service Life (years)	15.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	6		Agency Maintenance Cost ($1000)	6	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$1,119.00*	*$1,942.02*	*$1,119.00*	*$1,942.02*
Present Value	**$392.53**	**$657.83**	**$392.53**	**$657.83**
EUAC	$31.32	$52.49	$31.32	$52.49

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

INPUT WORKSHEET

1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided - Outages 1		***Alternative 2***	4-Lane Undivided - Outages 2	
Number of Activities	8		***Number of Activities***	8	
Activity 1	SPOT INCIDENT-CAUSED REPAIRS		**Activity 1**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	4.0		Activity Service Life (years)	4.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	SPOT INCIDENT-CAUSED REPAIRS		**Activity 2**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	4.0		Activity Service Life (years)	4.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	SPOT INCIDENT-CAUSED REPAIRS		**Activity 3**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	4.0		Activity Service Life (years)	4.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 4	SPOT INCIDENT-CAUSED REPAIRS		**Activity 4**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	4.0		Activity Service Life (years)	4.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Activity 5	SPOT INCIDENT-CAUSED REPAIRS		Activity 5	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	4.0		Activity Service Life (years)	4.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Activity 6	SPOT INCIDENT-CAUSED REPAIRS		Activity 6	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	4.0		Activity Service Life (years)	4.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Activity 7	SPOT INCIDENT-CAUSED REPAIRS		Activity 7	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	4.0		Activity Service Life (years)	4.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Activity 8	SPOT INCIDENT-CAUSED REPAIRS		Activity 8	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	4.0		Activity Service Life (years)	4.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$440.00*	*$320.80*	*$440.00*	*$320.80*
Present Value	**$205.35**	**$87.92**	**$205.35**	**$87.92**
EUAC	$16.39	$7.02	$16.39	$7.02

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

*REAL*COST INPUT AND RESULTS

4-LANE DIVIDED SCENARIO

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET

1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction					
Alternative 1	4-Lane Divided - Initial Build 1		***Alternative 2***	4-Lane Divided - Initial Build 2	
Number of Activities	1		***Number of Activities***	1	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$28,000.00		Agency Construction Cost ($1000)	$28,000.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	365		Work Zone Duration (days)	365	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	31.0		Activity Service Life (years)	31.0	
Activity Structural Life (years)	31.0		Activity Structural Life (years)	31.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	45		Work Zone Speed Limit (mph)	45	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$28,000.00*	*$854.29*	*$28,000.00*	*$854.29*
Present Value	**$28,000.00**	**$854.29**	**$28,000.00**	**$854.29**
EUAC	$2,234.31	$68.17	$2,234.31	$68.17

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET

1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Divided - Pavement Rehab 1		***Alternative 2***	4-Lane Divided - Pavement Rehab 2	
Number of Activities	2		***Number of Activities***	2	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	16.0		Activity Service Life (years)	16.0	
Activity Structural Life (years)	16.0		Activity Structural Life (years)	16.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	51		Agency Maintenance Cost ($1000)	51	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	45		Work Zone Speed Limit (mph)	45	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	SURFACE WEARING COURSE REPLACEI		**Activity 2**	SURFACE WEARING COURSE REPLACEI	
Agency Construction Cost ($1000)	$750.00		Agency Construction Cost ($1000)	$750.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	75		Work Zone Duration (days)	75	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	15.0		Activity Service Life (years)	15.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	51		Agency Maintenance Cost ($1000)	51	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$2,229.00*	*$6,259.14*	*$2,229.00*	*$6,259.14*
Present Value	**$869.64**	**$2,120.19**	**$869.64**	**$2,120.19**
EUAC	$69.39	$169.18	$69.39	$169.18

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

INPUT WORKSHEET

1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction						
Alternative 1	4-Lane Divided - Culverts 1			***Alternative 2***	4-Lane Divided - Culverts 2	
Number of Activities	1			***Number of Activities***	1	
Activity 1	INITIAL BUILD			**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00			Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)		
Work Zone Duration (days)	0			Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1			No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	31.0			Activity Service Life (years)	31.0	
Activity Structural Life (years)	31.0			Activity Structural Life (years)	31.0	
Maintenance Frequency (years)	1			Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	7			Agency Maintenance Cost ($1000)	7	
Work Zone Length (miles)	0.00			Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	40			Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End		*Inbound*	Start	End
First period of lane closure	7	15		First period of lane closure	7	15
Second period of lane closure				Second period of lane closure		
Third period of lane closure				Third period of lane closure		
Outbound	Start	End		*Outbound*	Start	End
First period of lane closure	7	15		First period of lane closure	7	15
Second period of lane closure				Second period of lane closure		
Third period of lane closure				Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$210.00*	*$0.00*	*$210.00*	*$0.00*
Present Value	**$86.86**	**$0.00**	**$86.86**	**$0.00**
EUAC	$6.93	$0.00	$6.93	$0.00

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Divided - Drainage Rehab 1		***Alternative 2***	4-Lane Divided - Drainage Rehab 2	
Number of Activities	2		***Number of Activities***	2	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	16.0		Activity Service Life (years)	16.0	
Activity Structural Life (years)	16.0		Activity Structural Life (years)	16.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	2		Agency Maintenance Cost ($1000)	2	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	MAJOR OPEN DRAINAGE REHAB		**Activity 2**	MAJOR OPEN DRAINAGE REHAB	
Agency Construction Cost ($1000)	$180.00		Agency Construction Cost ($1000)	$180.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	30		Work Zone Duration (days)	30	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	15.0		Activity Service Life (years)	15.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	2		Agency Maintenance Cost ($1000)	2	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$238.00*	*$1,628.73*	*$238.00*	*$1,628.73*
Present Value	**$85.11**	**$551.71**	**$85.11**	**$551.71**
EUAC	$6.79	$44.02	$6.79	$44.02

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Divided - Major Shoulder Rehabilitati		***Alternative 2***	4-Lane Divided - Major Shoulder Rehabilitati	
Number of Activities	3		***Number of Activities***	3	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	15		Agency Maintenance Cost ($1000)	15	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	MAJOR SHOULDER REHAB		**Activity 2**	MAJOR SHOULDER REHAB	
Agency Construction Cost ($1000)	$123.00		Agency Construction Cost ($1000)	$123.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	30		Work Zone Duration (days)	30	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	10.0		Activity Service Life (years)	10.0	
Activity Structural Life (years)	10.0		Activity Structural Life (years)	10.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	15		Agency Maintenance Cost ($1000)	15	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	MAJOR SHOULDER REHAB		**Activity 3**	MAJOR SHOULDER REHAB	
Agency Construction Cost ($1000)	$123.00		Agency Construction Cost ($1000)	$123.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	30		Work Zone Duration (days)	30	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	10.0		Activity Service Life (years)	10.0	
Activity Structural Life (years)	10.0		Activity Structural Life (years)	10.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	15		Agency Maintenance Cost ($1000)	15	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$666.00*	*$381.41*	*$666.00*	*$381.41*
Present Value	**$263.53**	**$129.70**	**$263.53**	**$129.70**
EUAC	$21.03	$10.35	$21.03	$10.35

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction					
Alternative 1	4-Lane Divided - Guardrail Replacement 1		***Alternative 2***	4-Lane Divided - Guardrail Replacement 2	
Number of Activities	2		***Number of Activities***	2	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	18.0		Activity Service Life (years)	18.0	
Activity Structural Life (years)	18.0		Activity Structural Life (years)	18.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	GUARDRAIL REPLACEMENT 1		**Activity 2**	GUARDRAIL REPLACEMENT 2	
Agency Construction Cost ($1000)	$159.00		Agency Construction Cost ($1000)	$159.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	20		Work Zone Duration (days)	20	
No of Lanes Open in Each Direction During Work	1.5		No of Lanes Open in Each Direction During Work	1.5	
Activity Service Life (years)	13.0		Activity Service Life (years)	13.0	
Activity Structural Life (years)	18.0		Activity Structural Life (years)	18.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.50		Work Zone Length (miles)	0.50	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$114.83*	*$927.46*	*$114.83*	*$927.46*
Present Value	**$41.62**	**$336.15**	**$41.62**	**$336.15**
EUAC	$3.32	$26.82	$3.32	$26.82

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1150
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

Probabilistic Life Cycle Cost Analysis Worksheet

5. Construction

Alternative 1	4-Lane Divided - Major Graded Median Reha		***Alternative 2***	4-Lane Divided - Major Graded Median Reha	
Number of Activities	3		***Number of Activities***	3	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	4		Agency Maintenance Cost ($1000)	4	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	1150		Work Zone Capacity (vphpl)	1150	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	MAJOR GRADED MEDIAN REHAB		**Activity 2**	MAJOR GRADED MEDIAN REHAB	
Agency Construction Cost ($1000)	$153.00		Agency Construction Cost ($1000)	$153.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	30		Work Zone Duration (days)	30	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	10.0		Activity Service Life (years)	10.0	
Activity Structural Life (years)	10.0		Activity Structural Life (years)	10.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	4		Agency Maintenance Cost ($1000)	4	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	1150		Work Zone Capacity (vphpl)	1150	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	MAJOR GRADED MEDIAN REHAB		**Activity 3**	MAJOR GRADED MEDIAN REHAB	
Agency Construction Cost ($1000)	$153.00		Agency Construction Cost ($1000)	$153.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	30		Work Zone Duration (days)	30	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	10.0		Activity Service Life (years)	10.0	
Activity Structural Life (years)	10.0		Activity Structural Life (years)	10.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	4		Agency Maintenance Cost ($1000)	4	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	1150		Work Zone Capacity (vphpl)	1150	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$418.00*	*$110.77*	*$418.00*	*$110.77*
Present Value	**$156.41**	**$37.67**	**$156.41**	**$37.67**
EUAC	$12.48	$3.01	$12.48	$3.01

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.20
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Divided - Median Cable Barrier Repa		***Alternative 2***	4-Lane Divided - Median Cable Barrier Repl	
Number of Activities	2		***Number of Activities***	2	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	20.0		Activity Service Life (years)	20.0	
Activity Structural Life (years)	20.0		Activity Structural Life (years)	20.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	1150		Work Zone Capacity (vphpl)	1150	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	MEDIAN CABLE BARRIER REPLACEMENT		**Activity 2**	MEDIAN CABLE BARRIER REPLACEMENT	
Agency Construction Cost ($1000)	$366.00		Agency Construction Cost ($1000)	$366.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	70		Work Zone Duration (days)	70	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	20.0		Activity Structural Life (years)	20.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	1150		Work Zone Capacity (vphpl)	1150	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$201.30*	*$77.58*	*$201.30*	*$77.58*
Present Value	**$74.36**	**$28.66**	**$74.36**	**$28.66**
EUAC	$5.93	$2.29	$5.93	$2.29

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Divided - Overhead Signs and Signa		***Alternative 2***	4-Lane Divided - Overhead Signs and Signa	
Number of Activities	2		***Number of Activities***	2	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	16.0		Activity Service Life (years)	16.0	
Activity Structural Life (years)	16.0		Activity Structural Life (years)	16.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	7		Agency Maintenance Cost ($1000)	7	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	REPLACE OVERHEAD SIGNS AND SIGNA		**Activity 2**	REPLACE OVERHEAD SIGNS AND SIGNA	
Agency Construction Cost ($1000)	$945.00		Agency Construction Cost ($1000)	$945.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	24		Work Zone Duration (days)	24	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	15.0		Activity Service Life (years)	15.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	7		Agency Maintenance Cost ($1000)	7	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$1,148.00*	*$1,284.61*	*$1,148.00*	*$1,284.61*
Present Value	**$404.60**	**$435.14**	**$404.60**	**$435.14**
EUAC	$32.29	$34.72	$32.29	$34.72

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET

1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Divided - Outages 1		***Alternative 2***	4-Lane Divided - Outages 2	
Number of Activities	6		***Number of Activities***	6	
Activity 1	SPOT INCIDENT-CAUSED REPAIR		**Activity 1**	SPOT INCIDENT-CAUSED REPAIR	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1.00E+00		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	SPOT INCIDENT-CAUSED REPAIR		**Activity 2**	SPOT INCIDENT-CAUSED REPAIR	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	SPOT INCIDENT-CAUSED REPAIR		**Activity 3**	SPOT INCIDENT-CAUSED REPAIR	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 4	SPOT INCIDENT-CAUSED REPAIR		**Activity 4**	SPOT INCIDENT-CAUSED REPAIR	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Activity 5	SPOT INCIDENT-CAUSED REPAIR		**Activity 5**	SPOT INCIDENT-CAUSED REPAIR	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Activity 6	SPOT INCIDENT-CAUSED REPAIR		**Activity 6**	SPOT INCIDENT-CAUSED REPAIR	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$330.00*	*$220.70*	*$330.00*	*$220.70*
Present Value	**$166.45**	**$65.57**	**$166.45**	**$65.57**
EUAC	$13.28	$5.23	$13.28	$5.23

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

*REAL*COST INPUT AND RESULTS

4-LANE UNDIVIDED EXPANSION SCENARIO

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction					
Alternative 1	4-Lane Undivided Expansion Year10 - Initial		***Alternative 2***	4-Lane Undivided Expansion Year 10 - Initia	
Number of Activities	1		***Number of Activities***	1	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$24,000.00		Agency Construction Cost ($1000)	$24,000.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	365		Work Zone Duration (days)	365	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	31.0		Activity Structural Life (years)	31.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$24,000.00*	*$13,319.21*	*$24,000.00*	*$13,319.21*
Present Value	**$24,000.00**	**$13,319.21**	**$24,000.00**	**$13,319.21**
EUAC	$1,915.13	$1,062.83	$1,915.13	$1,062.83

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided Expansion Year10 - Expa		***Alternative 2***	4-Lane Undivided Expansion Year 10 - Exp	
Number of Activities	2		***Number of Activities***	2	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	31.0		Activity Structural Life (years)	31.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	EXPANSION TO 6 LANES		**Activity 2**	EXPANSION TO 6 LANES	
Agency Construction Cost ($1000)	$15,000.00		Agency Construction Cost ($1000)	$15,000.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	240		Work Zone Duration (days)	240	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	20.0		Activity Service Life (years)	20.0	
Activity Structural Life (years)	31.0		Activity Structural Life (years)	31.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	45		Work Zone Speed Limit (mph)	45	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$9,677.42*	*$512.47*	*$9,677.42*	*$512.47*
Present Value	**$6,472.92**	**$342.77**	**$6,472.92**	**$342.77**
EUAC	$516.52	$27.35	$516.52	$27.35

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided Expansion Year10 - Pave		***Alternative 2***	4-Lane Undivided Expansion Year 10 - Pav	
Number of Activities	3		***Number of Activities***	3	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	51		Agency Maintenance Cost ($1000)	51	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	EXPANSION TO 6 LANES		**Activity 2**	EXPANSION TO 6 LANES	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	15.0		Activity Service Life (years)	15.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	76.5		Agency Maintenance Cost ($1000)	76.5	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	45		Work Zone Speed Limit (mph)	45	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	SURFACE WEARING COURSE REPLACEI		**Activity 3**	SURFACE WEARING COURSE REPLACEI	
Agency Construction Cost ($1000)	$1,125.00		Agency Construction Cost ($1000)	$1,125.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	75		Work Zone Duration (days)	75	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	76.5		Agency Maintenance Cost ($1000)	76.5	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	45		Work Zone Speed Limit (mph)	45	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$2,262.00*	*$113.62*	*$2,262.00*	*$113.62*
Present Value	**$822.31**	**$30.79**	**$822.31**	**$30.79**
EUAC	$65.62	$2.46	$65.62	$2.46

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided - Culverts 1		***Alternative 2***	4-Lane Undivided - Culverts 2	
Number of Activities	2		***Number of Activities***	2	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	6		Agency Maintenance Cost ($1000)	6	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	INITIAL BUILD		**Activity 2**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	20.0		Activity Service Life (years)	20.0	
Activity Structural Life (years)	20.0		Activity Structural Life (years)	20.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	9		Agency Maintenance Cost ($1000)	9	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	45		Work Zone Speed Limit (mph)	45	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$231.00*	*$0.00*	*$231.00*	*$0.00*
Present Value	**$86.33**	**$0.00**	**$86.33**	**$0.00**
EUAC	$6.89	$0.00	$6.89	$0.00

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided - Major Open Drainage Re		***Alternative 2***	4-Lane Undivided - Major Open Drainage Re	
Number of Activities	3		***Number of Activities***	3	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	2		Agency Maintenance Cost ($1000)	2	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	MAJOR OPEN DRAINAGE REHAB		**Activity 2**	MAJOR OPEN DRAINAGE REHAB	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	15.0		Activity Service Life (years)	15.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	2		Agency Maintenance Cost ($1000)	2	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	MAJOR OPEN DRAINAGE REHAB		**Activity 3**	MAJOR OPEN DRAINAGE REHAB	
Agency Construction Cost ($1000)	$180.00		Agency Construction Cost ($1000)	$180.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	30		Work Zone Duration (days)	30	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	2		Agency Maintenance Cost ($1000)	2	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$116.00*	*$21.39*	*$116.00*	*$21.39*
Present Value	**$39.79**	**$5.80**	**$39.79**	**$5.80**
EUAC	$3.17	$0.46	$3.17	$0.46

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

Probabilistic Life Cycle Cost Analysis Worksheet

5. Construction

Alternative 1	4-Lane Undivided - Major Shoulder Rehab 1		***Alternative 2***	4-Lane Undivided - Major Shoulder Rehab 2	
Number of Activities	3		***Number of Activities***	3	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	15		Agency Maintenance Cost ($1000)	15	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	MAJOR SHOULDER REHAB		**Activity 2**	MAJOR SHOULDER REHAB	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	10.0		Activity Service Life (years)	10.0	
Activity Structural Life (years)	10.0		Activity Structural Life (years)	10.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	15		Agency Maintenance Cost ($1000)	15	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	MAJOR SHOULDER REHAB		**Activity 3**	MAJOR SHOULDER REHAB	
Agency Construction Cost ($1000)	$123.00		Agency Construction Cost ($1000)	$123.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	30		Work Zone Duration (days)	30	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	10.0		Activity Service Life (years)	10.0	
Activity Structural Life (years)	10.0		Activity Structural Life (years)	10.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	15		Agency Maintenance Cost ($1000)	15	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$543.00*	*$632.19*	*$543.00*	*$632.19*
Present Value	**$205.09**	**$152.68**	**$205.09**	**$152.68**
EUAC	$16.37	$12.18	$16.37	$12.18

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided - Guardrail Replacement 1		***Alternative 2***	4-Lane Undivided - Guardrail Replacement 2	
Number of Activities	3		***Number of Activities***	3	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	GUARDRAIL REPLACEMENT		**Activity 2**	GUARDRAIL REPLACEMENT	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	2.5		No of Lanes Open in Each Direction During Work	2.5	
Activity Service Life (years)	18.0		Activity Service Life (years)	18.0	
Activity Structural Life (years)	18.0		Activity Structural Life (years)	18.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.50		Work Zone Length (miles)	0.50	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	GUARDRAIL REPLACEMENT		**Activity 3**	GUARDRAIL REPLACEMENT	
Agency Construction Cost ($1000)	$159.00		Agency Construction Cost ($1000)	$159.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	20		Work Zone Duration (days)	20	
No of Lanes Open in Each Direction During Work	2.5		No of Lanes Open in Each Direction During Work	2.5	
Activity Service Life (years)	2.0		Activity Service Life (years)	2.0	
Activity Structural Life (years)	18.0		Activity Structural Life (years)	18.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.50		Work Zone Length (miles)	0.50	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$17.67*	*$13.79*	*$17.67*	*$13.79*
Present Value	**$5.00**	**$3.90**	**$5.00**	**$3.90**
EUAC	$0.40	$0.31	$0.40	$0.31

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction						
Alternative 1	4-Lane Undivided - Overhead Signs and Sig			***Alternative 2***	4-Lane Undivided - Overhead Signs and Sig	
Number of Activities	3			***Number of Activities***	3	
Activity 1	INITIAL BUILD			**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00			Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)		
Work Zone Duration (days)	0			Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1			No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0			Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0			Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1			Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	6			Agency Maintenance Cost ($1000)	6	
Work Zone Length (miles)	0.00			Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	40			Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750			Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End		*Inbound*	Start	End
First period of lane closure	7	15		First period of lane closure	7	15
Second period of lane closure				Second period of lane closure		
Third period of lane closure				Third period of lane closure		
Outbound	Start	End		*Outbound*	Start	End
First period of lane closure	7	15		First period of lane closure	7	15
Second period of lane closure				Second period of lane closure		
Third period of lane closure				Third period of lane closure		
Activity 2	REPLACE OVERHEAD SIGNS AND SIGNA			**Activity 2**	REPLACE OVERHEAD SIGNS AND SIGNA	
Agency Construction Cost ($1000)	$0.00			Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)		
Work Zone Duration (days)	0			Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	2			No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	15.0			Activity Service Life (years)	15.0	
Activity Structural Life (years)	15.0			Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1			Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	9			Agency Maintenance Cost ($1000)	9	
Work Zone Length (miles)	0.10			Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40			Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End		*Inbound*	Start	End
First period of lane closure	7	15		First period of lane closure	7	15
Second period of lane closure				Second period of lane closure		
Third period of lane closure				Third period of lane closure		
Outbound	Start	End		*Outbound*	Start	End
First period of lane closure	7	15		First period of lane closure	7	15
Second period of lane closure				Second period of lane closure		
Third period of lane closure				Third period of lane closure		
Activity 3	REPLACE OVERHEAD SIGNS AND SIGNA			**Activity 3**	REPLACE OVERHEAD SIGNS AND SIGNA	
Agency Construction Cost ($1000)	$1,417.50			Agency Construction Cost ($1000)	$1,417.50	
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)		
Work Zone Duration (days)	24			Work Zone Duration (days)	24	
No of Lanes Open in Each Direction During Work	2			No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	5.0			Activity Service Life (years)	5.0	
Activity Structural Life (years)	15.0			Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1			Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	9			Agency Maintenance Cost ($1000)	9	
Work Zone Length (miles)	0.10			Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40			Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500			Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End		*Inbound*	Start	End
First period of lane closure	7	15		First period of lane closure	7	15
Second period of lane closure				Second period of lane closure		
Third period of lane closure				Third period of lane closure		
Outbound	Start	End		*Outbound*	Start	End
First period of lane closure	7	15		First period of lane closure	7	15
Second period of lane closure				Second period of lane closure		
Third period of lane closure				Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$694.50*	*$415.24*	*$694.50*	*$415.24*
Present Value	**$212.85**	**$112.55**	**$212.85**	**$112.55**
EUAC	$16.98	$8.98	$16.98	$8.98

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided - Outages 1		***Alternative 2***	4-Lane Undivided - Outages 2	
Number of Activities	3		***Number of Activities***	3	
Activity 1	SPOT INCIDENT-CAUSED REPAIRS		**Activity 1**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	4.0		Activity Service Life (years)	4.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	SPOT INCIDENT-CAUSED REPAIRS		**Activity 2**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	4.0		Activity Service Life (years)	4.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	SPOT INCIDENT-CAUSED REPAIRS		**Activity 3**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	4.0		Activity Service Life (years)	4.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$165.00*	*$16.03*	*$165.00*	*$16.03*
Present Value	**$128.97**	**$10.32**	**$128.97**	**$10.32**
EUAC	$10.29	$0.82	$10.29	$0.82

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided - Outages 1		***Alternative 2***	4-Lane Undivided - Outages 2	
Number of Activities	4		***Number of Activities***	4	
Activity 1	SPOT INCIDENT-CAUSED REPAIRS		**Activity 1**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	SPOT INCIDENT-CAUSED REPAIRS		**Activity 2**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	SPOT INCIDENT-CAUSED REPAIRS		**Activity 3**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 4	SPOT INCIDENT-CAUSED REPAIRS		**Activity 4**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$220.00*	*$5.19*	*$220.00*	*$5.19*
Present Value	**$142.11**	**$3.14**	**$142.11**	**$3.14**
EUAC	$11.34	$0.25	$11.34	$0.25

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

*REAL*COST INPUT AND RESULTS

4-LANE DIVIDED EXPANSION SCENARIO

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction							
Alternative 1	4-Lane ivided Expansion Year10 - Initial Cor			***Alternative 2***	4-Lane Divided Expansion Year 10 - Initial C		
Number of Activities	1			***Number of Activities***	1		
Activity 1	INITIAL BUILD			**Activity 1**	INITIAL BUILD		
Agency Construction Cost ($1000)	$28,000.00			Agency Construction Cost ($1000)	$28,000.00		
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)			
Work Zone Duration (days)	365			Work Zone Duration (days)	365		
No of Lanes Open in Each Direction During Work	1			No of Lanes Open in Each Direction During Work	1		
Activity Service Life (years)	11.0			Activity Service Life (years)	11.0		
Activity Structural Life (years)	31.0			Activity Structural Life (years)	31.0		
Maintenance Frequency (years)	0			Maintenance Frequency (years)	0		
Agency Maintenance Cost ($1000)	0			Agency Maintenance Cost ($1000)	0		
Work Zone Length (miles)	3.00			Work Zone Length (miles)	3.00		
Work Zone Speed Limit (mph)	45			Work Zone Speed Limit (mph)	45		
Work Zone Capacity (vphpl)	1000			Work Zone Capacity (vphpl)	1000		
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1		
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			
Inbound	Start	End		*Inbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			
Outbound	Start	End		*Outbound*	Start	End	
First period of lane closure	7	15		First period of lane closure	7	15	
Second period of lane closure				Second period of lane closure			
Third period of lane closure				Third period of lane closure			

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$28,000.00*	*$854.29*	*$28,000.00*	*$854.29*
Present Value	**$28,000.00**	**$854.29**	**$28,000.00**	**$854.29**
EUAC	$2,234.31	$68.17	$2,234.31	$68.17

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction						
Alternative 1	4-Lane Undivided Expansion Year10 - Expa			***Alternative 2***	4-Lane Undivided Expansion Year 10 - Exp	
Number of Activities	2			***Number of Activities***	2	
Activity 1	INITIAL BUILD			**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00			Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)		
Work Zone Duration (days)	0			Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1			No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0			Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0			Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	0			Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0			Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.00			Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	50			Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	1150			Work Zone Capacity (vphpl)	1150	
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End		*Inbound*	Start	End
First period of lane closure	7	15		First period of lane closure	7	15
Second period of lane closure				Second period of lane closure		
Third period of lane closure				Third period of lane closure		
Outbound	Start	End		*Outbound*	Start	End
First period of lane closure	7	15		First period of lane closure	7	15
Second period of lane closure				Second period of lane closure		
Third period of lane closure				Third period of lane closure		
Activity 2	EXPANSION TO 6 LANES			**Activity 2**	EXPANSION TO 6 LANES	
Agency Construction Cost ($1000)	$10,500.00			Agency Construction Cost ($1000)	$10,500.00	
User Work Zone Costs ($1000)				User Work Zone Costs ($1000)		
Work Zone Duration (days)	240			Work Zone Duration (days)	240	
No of Lanes Open in Each Direction During Work	2			No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	20.0			Activity Service Life (years)	20.0	
Activity Structural Life (years)	31.0			Activity Structural Life (years)	31.0	
Maintenance Frequency (years)	0			Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0			Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	3.00			Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	50			Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	1150			Work Zone Capacity (vphpl)	1150	
Traffic Hourly Distribution	Week Day 1			Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)				Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End		*Inbound*	Start	End
First period of lane closure	7	15		First period of lane closure	7	15
Second period of lane closure				Second period of lane closure		
Third period of lane closure				Third period of lane closure		
Outbound	Start	End		*Outbound*	Start	End
First period of lane closure	7	15		First period of lane closure	7	15
Second period of lane closure				Second period of lane closure		
Third period of lane closure				Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$6,774.19*	*$241.22*	*$6,774.19*	*$241.22*
Present Value	**$4,531.05**	**$161.34**	**$4,531.05**	**$161.34**
EUAC	$361.56	$12.87	$361.56	$12.87

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Divided Expansion Year10 - Paveme		***Alternative 2***	4-Lane Divided Expansion Year 10 - Paven	
Number of Activities	3		***Number of Activities***	3	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	51		Agency Maintenance Cost ($1000)	51	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	45		Work Zone Speed Limit (mph)	45	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	100	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	EXPANSION TO 6 LANES		**Activity 2**	EXPANSION TO 6 LANES	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	15.0		Activity Service Life (years)	15.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	76.5		Agency Maintenance Cost ($1000)	76.5	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	45		Work Zone Speed Limit (mph)	45	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	SURFACE WEARING COURSE REPLACEI		**Activity 3**	SURFACE WEARING COURSE REPLACEI	
Agency Construction Cost ($1000)	$1,125.00		Agency Construction Cost ($1000)	$1,125.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	75		Work Zone Duration (days)	75	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	76.5		Agency Maintenance Cost ($1000)	76.5	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	45		Work Zone Speed Limit (mph)	45	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$2,262.00*	*$113.62*	*$2,262.00*	*$113.62*
Present Value	**$822.31**	**$30.79**	**$822.31**	**$30.79**
EUAC	$65.62	$2.46	$65.62	$2.46

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

INPUT WORKSHEET

1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided - Culverts 1		***Alternative 2***	4-Lane Undivided - Culverts 2	
Number of Activities	2		***Number of Activities***	2	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	7		Agency Maintenance Cost ($1000)	7	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	INITIAL BUILD		**Activity 2**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	20.0		Activity Service Life (years)	20.0	
Activity Structural Life (years)	20.0		Activity Structural Life (years)	20.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	9		Agency Maintenance Cost ($1000)	9	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	45		Work Zone Speed Limit (mph)	45	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$241.00*	*$0.00*	*$241.00*	*$0.00*
Present Value	**$93.36**	**$0.00**	**$93.36**	**$0.00**
EUAC	$7.45	$0.00	$7.45	$0.00

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction					
Alternative 1	4-Lane Undivided - Major Open Drainage Re		***Alternative 2***	4-Lane Undivided - Major Open Drainage Re	
Number of Activities	3		***Number of Activities***	3	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	2		Agency Maintenance Cost ($1000)	2	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	MAJOR OPEN DRAINAGE REHAB		**Activity 2**	MAJOR OPEN DRAINAGE REHAB	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	15.0		Activity Service Life (years)	15.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	2		Agency Maintenance Cost ($1000)	2	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	MAJOR OPEN DRAINAGE REHAB		**Activity 3**	MAJOR OPEN DRAINAGE REHAB	
Agency Construction Cost ($1000)	$180.00		Agency Construction Cost ($1000)	$180.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	30		Work Zone Duration (days)	30	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	2		Agency Maintenance Cost ($1000)	2	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$116.00*	*$21.39*	*$116.00*	*$21.39*
Present Value	**$39.79**	**$5.80**	**$39.79**	**$5.80**
EUAC	$3.17	$0.46	$3.17	$0.46

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Divided - Major Shoulder Rehab 1		***Alternative 2***	4-Lane Divided - Major Shoulder Rehab 2	
Number of Activities	3		***Number of Activities***	3	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	15		Agency Maintenance Cost ($1000)	15	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	MAJOR SHOULDER REHAB		**Activity 2**	MAJOR SHOULDER REHAB	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	10.0		Activity Service Life (years)	10.0	
Activity Structural Life (years)	10.0		Activity Structural Life (years)	10.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	15		Agency Maintenance Cost ($1000)	15	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	MAJOR SHOULDER REHAB		**Activity 3**	MAJOR SHOULDER REHAB	
Agency Construction Cost ($1000)	$123.00		Agency Construction Cost ($1000)	$123.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	30		Work Zone Duration (days)	30	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	10.0		Activity Service Life (years)	10.0	
Activity Structural Life (years)	10.0		Activity Structural Life (years)	10.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	15		Agency Maintenance Cost ($1000)	15	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$543.00*	*$632.19*	*$543.00*	*$632.19*
Present Value	**$205.09**	**$152.68**	**$205.09**	**$152.68**
EUAC	$16.37	$12.18	$16.37	$12.18

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided - Guardrail Replacement 1		***Alternative 2***	4-Lane Undivided - Guardrail Replacement 2	
Number of Activities	3		***Number of Activities***	3	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	GUARDRAIL REPLACEMENT		**Activity 2**	GUARDRAIL REPLACEMENT	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	2.5		No of Lanes Open in Each Direction During Work	2.5	
Activity Service Life (years)	18.0		Activity Service Life (years)	18.0	
Activity Structural Life (years)	18.0		Activity Structural Life (years)	18.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.50		Work Zone Length (miles)	0.50	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	GUARDRAIL REPLACEMENT		**Activity 3**	GUARDRAIL REPLACEMENT	
Agency Construction Cost ($1000)	$159.00		Agency Construction Cost ($1000)	$159.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	20		Work Zone Duration (days)	20	
No of Lanes Open in Each Direction During Work	2.5		No of Lanes Open in Each Direction During Work	2.5	
Activity Service Life (years)	2.0		Activity Service Life (years)	2.0	
Activity Structural Life (years)	18.0		Activity Structural Life (years)	18.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.50		Work Zone Length (miles)	0.50	
Work Zone Speed Limit (mph)	25		Work Zone Speed Limit (mph)	25	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$17.67*	*$13.79*	*$17.67*	*$13.79*
Present Value	**$5.00**	**$3.90**	**$5.00**	**$3.90**
EUAC	$0.40	$0.31	$0.40	$0.31

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1150
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Divided Expansion - Major Graded M		***Alternative 2***	4-Lane Divided Expansion - Major Graded M	
Number of Activities	3		***Number of Activities***	3	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	4		Agency Maintenance Cost ($1000)	4	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	1150		Work Zone Capacity (vphpl)	1150	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	MAJOR GRADED MEDIAN REHAB		**Activity 2**	MAJOR GRADED MEDIAN REHAB	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	10.0		Activity Service Life (years)	10.0	
Activity Structural Life (years)	10.0		Activity Structural Life (years)	10.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	4		Agency Maintenance Cost ($1000)	4	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	1150		Work Zone Capacity (vphpl)	1150	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	MAJOR GRADED MEDIAN REHAB		**Activity 3**	MAJOR GRADED MEDIAN REHAB	
Agency Construction Cost ($1000)	$110.00		Agency Construction Cost ($1000)	$110.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	30		Work Zone Duration (days)	30	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	10.0		Activity Service Life (years)	10.0	
Activity Structural Life (years)	10.0		Activity Structural Life (years)	10.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	4		Agency Maintenance Cost ($1000)	4	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	1150		Work Zone Capacity (vphpl)	1150	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$222.00*	*$64.04*	*$222.00*	*$64.04*
Present Value	**$73.34**	**$15.47**	**$73.34**	**$15.47**
EUAC	$5.85	$1.23	$5.85	$1.23

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.20
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction					
Alternative 1	4-Lane Divided Expansion - Median Cable B		***Alternative 2***	4-Lane Divided Expansion - Median Cable B	
Number of Activities	2		***Number of Activities***	2	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	1150		Work Zone Capacity (vphpl)	1150	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	EXPANSION		**Activity 2**	EXPANSION	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	20.0		Activity Service Life (years)	20.0	
Activity Structural Life (years)	20.0		Activity Structural Life (years)	20.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	3.00		Work Zone Length (miles)	3.00	
Work Zone Speed Limit (mph)	50		Work Zone Speed Limit (mph)	50	
Work Zone Capacity (vphpl)	1150		Work Zone Capacity (vphpl)	1150	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3			**Activity 3**		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$0.00*	*$0.00*	*$0.00*	*$0.00*
Present Value	**$0.00**	**$0.00**	**$0.00**	**$0.00**
EUAC	$0.00	$0.00	$0.00	$0.00

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Divided - Overhead Signs and Signa		***Alternative 2***	4-Lane Divided - Overhead Signs and Signa	
Number of Activities	3		***Number of Activities***	3	
Activity 1	INITIAL BUILD		**Activity 1**	INITIAL BUILD	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	11.0		Activity Service Life (years)	11.0	
Activity Structural Life (years)	11.0		Activity Structural Life (years)	11.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	7		Agency Maintenance Cost ($1000)	7	
Work Zone Length (miles)	0.00		Work Zone Length (miles)	0.00	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	REPLACE OVERHEAD SIGNS AND SIGNA		**Activity 2**	REPLACE OVERHEAD SIGNS AND SIGNA	
Agency Construction Cost ($1000)	$0.00		Agency Construction Cost ($1000)	$0.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	0		Work Zone Duration (days)	0	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	15.0		Activity Service Life (years)	15.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	9		Agency Maintenance Cost ($1000)	9	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	REPLACE OVERHEAD SIGNS AND SIGNA		**Activity 3**	REPLACE OVERHEAD SIGNS AND SIGNA	
Agency Construction Cost ($1000)	$1,417.50		Agency Construction Cost ($1000)	$1,417.50	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	24		Work Zone Duration (days)	24	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	15.0		Activity Structural Life (years)	15.0	
Maintenance Frequency (years)	1		Maintenance Frequency (years)	1	
Agency Maintenance Cost ($1000)	9		Agency Maintenance Cost ($1000)	9	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	500		Work Zone Capacity (vphpl)	500	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$704.50*	*$415.24*	*$704.50*	*$415.24*
Present Value	**$219.88**	**$112.55**	**$219.88**	**$112.55**
EUAC	$17.55	$8.98	$17.55	$8.98

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	2
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Divided - Outages 1		***Alternative 2***	4-Lane Divided - Outages 2	
Number of Activities	2		***Number of Activities***	2	
Activity 1	SPOT INCIDENT-CAUSED REPAIRS		**Activity 1**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	SPOT INCIDENT-CAUSED REPAIRS		**Activity 2**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	1		No of Lanes Open in Each Direction During Work	1	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	750		Work Zone Capacity (vphpl)	750	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$110.00*	*$5.40*	*$110.00*	*$5.40*
Present Value	**$94.21**	**$4.14**	**$94.21**	**$4.14**
EUAC	$7.52	$0.33	$7.52	$0.33

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**

Probabilistic Life Cycle Cost Analysis Worksheet

INPUT WORKSHEET	
1. Economic Variables	
Value of Time for Passenger Cars ($/hour)	$14.80
Value of Time for Single Unit Trucks ($/hour)	$28.60
Value of Time for Combination Trucks ($/hour)	$28.60
2. Analysis Options	
Include User Costs in Analysis	Yes
Include User Cost Remaining Life Value	Yes
Use Differential User Costs	Yes
User Cost Computation Method	Calculated
Include Agency Cost Remaining Life Value	Yes
Traffic Direction	Both
Analysis Period (Years)	31
Beginning of Analysis Period	2021
Discount Rate (%)	7.0
Number of Alternatives	2
3. Project Details	
State Route	SR63
Project Name	State Route 63 Priority Segment
Region	OH
County	Warren
Analyzed By	Diana Martin
Mileposts	
Begin	0.00
End	3.00
Length of Project (miles)	3.00
Comments	
4. Traffic Data	
AADT Construction Year (total for both directions)	20,600
Cars as Percentage of AADT (%)	91.0
Single Unit Trucks as Percentage of AADT (%)	2.0
Combination Trucks as Percentage of AADT (%)	7.0
Annual Growth Rate of Traffic (%)	3.2
Speed Limit Under Normal Operating Conditions (mph)	55
No of Lanes in Each Direction During Normal Conditions	3
Free Flow Capacity (vphpl)	1900
Rural or Urban Hourly Traffic Distribution	Rural
Queue Dissipation Capacity (vphpl)	1100
Maximum AADT (total for both directions)	40,000
Maximum Queue Length (miles)	1.0

5. Construction

Alternative 1	4-Lane Undivided - Outages 1		***Alternative 2***	4-Lane Undivided - Outages 2	
Number of Activities	4		***Number of Activities***	4	
Activity 1	SPOT INCIDENT-CAUSED REPAIRS		**Activity 1**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 2	SPOT INCIDENT-CAUSED REPAIRS		**Activity 2**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 3	SPOT INCIDENT-CAUSED REPAIRS		**Activity 3**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Activity 4	SPOT INCIDENT-CAUSED REPAIRS		**Activity 4**	SPOT INCIDENT-CAUSED REPAIRS	
Agency Construction Cost ($1000)	$55.00		Agency Construction Cost ($1000)	$55.00	
User Work Zone Costs ($1000)			User Work Zone Costs ($1000)		
Work Zone Duration (days)	1		Work Zone Duration (days)	1	
No of Lanes Open in Each Direction During Work	2		No of Lanes Open in Each Direction During Work	2	
Activity Service Life (years)	5.0		Activity Service Life (years)	5.0	
Activity Structural Life (years)	0.0		Activity Structural Life (years)	0.0	
Maintenance Frequency (years)	0		Maintenance Frequency (years)	0	
Agency Maintenance Cost ($1000)	0		Agency Maintenance Cost ($1000)	0	
Work Zone Length (miles)	0.10		Work Zone Length (miles)	0.10	
Work Zone Speed Limit (mph)	40		Work Zone Speed Limit (mph)	40	
Work Zone Capacity (vphpl)	1000		Work Zone Capacity (vphpl)	1000	
Traffic Hourly Distribution	Week Day 1		Traffic Hourly Distribution	Week Day 1	
Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)			Time of Day of Lane Closures (use whole numbers based on a 24-hour clock)		
Inbound	Start	End	*Inbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		
Outbound	Start	End	*Outbound*	Start	End
First period of lane closure	7	15	First period of lane closure	7	15
Second period of lane closure			Second period of lane closure		
Third period of lane closure			Third period of lane closure		

Probabilistic Life Cycle Cost Analysis Worksheet

Total Cost				
	Alternative 1		Alternative 2	
Total Cost	Agency Cost ($1000)	User Cost ($1000)	Agency Cost ($1000)	User Cost ($1000)
Undiscounted Sum	*$220.00*	*$5.19*	*$220.00*	*$5.19*
Present Value	**$142.11**	**$3.14**	**$142.11**	**$3.14**
EUAC	$11.34	$0.25	$11.34	$0.25

Lowest Present Value Agency Cost	**Alternative 1**
Lowest Present Value User Cost	**Alternative 1**