

Appendix A10

ESAL Calculations

This work sheet is used for the purpose of calculating the 80 kN ESAL using the "simple" method. These calculations were taken from Figure 4-1 of the NYS Comprehensive Pavement Design Manual (June 2000). Enter the parameters for items 0 through 8 below in the blue blocks. The 80 kN ESAL count is calculated based on a compound traffic growth rate

ENTER DATA IN ALL SHEETS BEFORE PRINTING

PIN #:	P.I.N. 5512.52
Project:	Route 33, Kensington Expressway - City Streets
Location:	NY Route 33 - Region 5 - Buffalo
Date:	Rev'd - 11/6/2017

INPUT PARAMETERS:

0.	Construction Year	2027
1.	Design Life (use 50 years for determining pavement thickness)	50
2.	Projected Construction Year AADT	14875
3.	Percent Heavy Trucks Class 4 or greater	4%
4.	Percent Trucks in Design Direction	50%
5.	Percent Trucks in Design Lane	100%
6.	Truck Equivalency Factor (avg. ESAL per truck)	1.35
7.	Truck Volume Growth Rate	2.00%
8.	Annual Truck Weight Growth Rate	0.50%
9.	Modulus of Resilience Value	48

19	Enter the Functional Classification Code of the highway
NO	Does this road have full or partial access control?
NO	Is there a possibility of damaging homes, historic sites, etc., due to excessive vibration during compaction.
NO	Will there be less than 2000 MT of each course placed?
NO	Is the highway located in either Dutchess, Orange, Rockland, Putnam, Westchester, Nassau, Suffolk, Sullivan County or the City of New York?
NO	Are there are more than 3 lanes on this road?

RESULTS:

AADT for Design Year 2077	39,252
• Use 'F' series high friction asphalt.	
Total 80 kN ESAL Count for the Design Life	15,181,547
• The 'Estimated Traffic' level should be < 30.0 million 80 Kn ESALs.	
• 64V-22	
•	

PAVEMENT THICKNESS TABLE

80 kN ESAL Calculation Sheet

Date:

6/7/2023

Version 3.2

Updated 11/1/2017 MPH

Prepared by:

LaBella Associates

This work sheet is used for the purpose of calculating the 80 kN ESAL using the "simple" method. These calculations were taken from Figure 4-1 of the NYS Comprehensive Pavement Design Manual (June 2000). Enter the parameters for items 0 through 8 below in the blue blocks. The 80 kN ESAL count is calculated based on a compound traffic growth rate

Enter data also in pavt. thickness sheet. Print this sheet + item numbers

TOTAL ESAL VALUE	15,181,547	
Total HMA Thickness	7	inches

SELECT GRANULAR SUBGRADE	GRAVEL	BASE	BINDER	TOP
inches	inches	inches	inches	inches
0	12	3.0	2.5	1.5

ACTUAL PAVEMENT THICKNESSES TO USE

	THICKNESS
SELECT GRANULAR SUBGRADE	0 in.
GRAVEL	12 in.
BASE	3 in.
BINDER	2.5 in.
TOP	1.5 in.

80 kN ESAL calculation Work Sheet

Version 3.2

Updated 11/1/2017 MPH

Prepared by:

LaBella Associates

Date:

6/7/2023

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Make Sure to Double Check All Data

P.I.N. #:	P.I.N. 5512.52
Project:	Route 33, Kensington Expressway - City Streets
Date:	Rev'd - 11/6/2017

INPUT PARAMETERS:

0. Construction Completion Year
1. Design Life (Use 20 years for determining mix)
2. Initial AADT
3. Percent Heavy Trucks Class 5 or greater
4. Percent Trucks in Design Direction
5. Percent Trucks in Design Lane
6. Truck Equivalency Factor (avg. ESAL per truck)
7. Truck Volume Growth Rate
8. Annual Truck Weight Growth Rate

Double Check

2027
20
14875
4%
50%
100%
1.35
2.00%
0.50%

Notes:

- 19 The Functional Classification of the highway is 19 - Urban Local.
- NO This road does not have full or partial access control.
- NO There is no possibility of damaging homes, historic sites, etc., due to excessive vibration during compaction.
- NO There will be more than 2000 MT of each course placed. ESALS are greater than 0.3 million.
- NO The highway is not located in either Dutchess, Orange, Rockland, Putnam, Westchester, Nassau, Suffolk, Sullivan County or the City of New York?
- NO There are less than 4 lanes on this road.

RESULTS:

AADT for Design Year 2047	21,670				
<ul style="list-style-type: none"> • Use 'F' series high friction asphalt. 					
Total 80 kN ESAL Count for the Design Life	3,780,509				
<ul style="list-style-type: none"> • The 'Estimated Traffic' level should be < 10.0 million 80 Kn ESALs. 					
Recommended SUPERPAVE Item number					
	<table border="1"> <tr> <td>TOP: 402.09</td> <td>Or: 402.12</td> </tr> <tr> <td>BINDER: 402.19</td> <td></td> </tr> </table>	TOP: 402.09	Or: 402.12	BINDER: 402.19	
TOP: 402.09	Or: 402.12				
BINDER: 402.19					
<ul style="list-style-type: none"> • Confirm with the Regional Materials Engineer • Remember to add the appropriate Quality Payment Items • Remember to Print Out the Applicable Special Note 					
Your Special Note Is for:	64V-22				

This work sheet is used for the purpose of calculating the 80 kN ESAL using the "simple" method. These calculations were taken from Figure 4-1 of the NYS Comprehensive Pavement Design Manual (June 2000). Enter the parameters for items 0 through 8 below in the blue blocks. The 80 kN ESAL count is calculated based on a compound traffic growth rate

ENTER DATA IN ALL SHEETS BEFORE PRINTING

PIN #:	P.I.N. 5512.52
Project:	Route 33, Kensington Expressway - Humboldt Parkway
Location:	NY Route 33 - Region 5 - Buffalo
Date:	Rev'd - 11/6/2017

INPUT PARAMETERS:

0.	Construction Year	2027
1.	Design Life (use 50 years for determining pavement thickness)	50
2.	Projected Construction Year AADT	12890
3.	Percent Heavy Trucks Class 4 or greater	4%
4.	Percent Trucks in Design Direction	100%
5.	Percent Trucks in Design Lane	100%
6.	Truck Equivalency Factor (avg. ESAL per truck)	1.35
7.	Truck Volume Growth Rate	2.00%
8.	Annual Truck Weight Growth Rate	0.50%
9.	Modulus of Resilience Value	48

- Enter the Functional Classification Code of the highway
- Does this road have full or partial access control?
- Is there a possibility of damaging homes, historic sites, etc., due to excessive vibration during compaction.
- Will there be less than 2000 MT of each course placed?
- Is the highway located in either Dutchess, Orange, Rockland, Putnam, Westchester, Nassau, Suffolk, Sullivan County or the City of New York?
- Are there are more than 3 lanes on this road?

RESULTS:

AADT for Design Year 2077	34,014
• Use 'F' series high friction asphalt.	
Total 80 kN ESAL Count for the Design Life	26,311,279
• The 'Estimated Traffic' level should be < 30.0 million 80 Kn ESALs.	
• 64V-22	
•	

PAVEMENT THICKNESS TABLE

80 kN ESAL Calculation Sheet

Date:

6/7/2023

Version 3.2

Updated 11/1/2017 MPH

Prepared by:

LaBella Associates

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Enter data also in pavt. thickness sheet. Print this sheet + item numbers

TOTAL ESAL VALUE	26,311,279	
Total HMA Thickness	8	inches

SELECT GRANULAR SUBGRADE	GRAVEL	BASE	BINDER	TOP
inches	inches	inches	inches	inches
0	12	4.0	2.5	1.5

ACTUAL PAVEMENT THICKNESSES TO USE

	THICKNESS
SELECT GRANULAR SUBGRADE	0 in.
GRAVEL	12 in.
BASE	4 in.
BINDER	2.5 in.
TOP	1.5 in.

80 kN ESAL calculation Work Sheet

Version 3.2

Updated 11/1/2017 MPH

Prepared by:

LaBella Associates

Date:

6/7/2023

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Make Sure to Double Check All Data

P.I.N. #:	P.I.N. 5512.52
Project:	Route 33, Kensington Expressway - Humboldt Parkway
Date:	Rev'd - 11/6/2017

INPUT PARAMETERS:

0. Construction Completion Year
1. Design Life (Use 20 years for determining mix)
2. Initial AADT
3. Percent Heavy Trucks Class 5 or greater
4. Percent Trucks in Design Direction
5. Percent Trucks in Design Lane
6. Truck Equivalency Factor (avg. ESAL per truck)
7. Truck Volume Growth Rate
8. Annual Truck Weight Growth Rate

Double Check

2027
20
12890
4%
100%
100%
1.35
2.00%
0.50%

Notes:

- 19 The Functional Classification of the highway is 19 - Urban Local.
- NO This road does not have full or partial access control.
- NO There is no possibility of damaging homes, historic sites, etc., due to excessive vibration during compaction.
- NO There will be more than 2000 MT of each course placed. ESALS are greater than 0.3 million.
- NO The highway is not located in either Dutchess, Orange, Rockland, Putnam, Westchester, Nassau, Suffolk, Sullivan County or the City of New York?
- NO There are less than 4 lanes on this road.

RESULTS:

AADT for Design Year 2047	18,778				
<ul style="list-style-type: none"> • Use 'F' series high friction asphalt. 					
Total 80 kN ESAL Count for the Design Life	6,552,035				
<ul style="list-style-type: none"> • The 'Estimated Traffic' level should be < 10.0 million 80 Kn ESALs. 					
Recommended SUPERPAVE Item number					
	<table border="1"> <tr> <td>TOP: 402.09</td> <td>Or: 402.12</td> </tr> <tr> <td>BINDER: 402.19</td> <td></td> </tr> </table>	TOP: 402.09	Or: 402.12	BINDER: 402.19	
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BINDER: 402.19					
<ul style="list-style-type: none"> • Confirm with the Regional Materials Engineer • Remember to add the appropriate Quality Payment Items • Remember to Print Out the Applicable Special Note 					
Your Special Note Is for:	64V-22				

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ENTER DATA IN ALL SHEETS BEFORE PRINTING

PIN #:	P.I.N. 5512.52
Project:	Route 33, Kensington Expressway - Mainline
Location:	NY Route 33 - Region 5 - Buffalo
Date:	Rev'd - 11/6/2017

INPUT PARAMETERS:

0.	Construction Year	2027
1.	Design Life (use 50 years for determining pavement thickness)	50
2.	Projected Construction Year AADT	78700
3.	Percent Heavy Trucks Class 4 or greater	14%
4.	Percent Trucks in Design Direction	50%
5.	Percent Trucks in Design Lane	80%
6.	Truck Equivalency Factor (avg. ESAL per truck)	1.35
7.	Truck Volume Growth Rate	2.00%
8.	Annual Truck Weight Growth Rate	0.50%
9.	Modulus of Resilience Value	48

12	Enter the Functional Classification Code of the highway
YES	Does this road have full or partial access control?
NO	Is there a possibility of damaging homes, historic sites, etc., due to excessive vibration during compaction.
NO	Will there be less than 2000 MT of each course placed?
NO	Is the highway located in either Dutchess, Orange, Rockland, Putnam, Westchester, Nassau, Suffolk, Sullivan County or the City of New York?
YES	Are there are more than 3 lanes on this road?

RESULTS:

AADT for Design Year 2077	207,674
•	Use 'F' series high friction asphalt.
Total 80 kN ESAL Count for the Design Life	224,901,223
•	The 'Estimated Traffic' level should be > 100.0 million 80 Kn ESALs.
•	64V-22
•	

PAVEMENT THICKNESS TABLE

80 kN ESAL Calculation Sheet

Date:

6/7/2023

Version 3.2

Updated 11/1/2017 MPH

Prepared by:

LaBella Associates

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Enter data also in pavt. thickness sheet. Print this sheet + item numbers

TOTAL ESAL VALUE	224,901,223
Total HMA Thickness	10 inches

SELECT GRANULAR SUBGRADE	GRAVEL	BASE	BINDER	TOP
inches	inches	inches	inches	inches
12	12	6.0	2.5	1.5

ACTUAL PAVEMENT THICKNESSES TO USE

	THICKNESS
SELECT GRANULAR SUBGRADE	12 in.
GRAVEL	12 in.
BASE	6 in.
BINDER	2.5 in.
TOP	1.5 in.

80 kN ESAL calculation Work Sheet

Version 3.2

Updated 11/1/2017 MPH

Prepared by:

LaBella Associates

Date:

6/7/2023

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Make Sure to Double Check All Data

P.I.N. #:	P.I.N. 5512.52
Project:	Route 33, Kensington Expressway - Mainline
Date:	Rev'd - 11/6/2017

INPUT PARAMETERS:

0. Construction Completion Year
1. Design Life (Use 20 years for determining mix)
2. Initial AADT
3. Percent Heavy Trucks Class 5 or greater
4. Percent Trucks in Design Direction
5. Percent Trucks in Design Lane
6. Truck Equivalency Factor (avg. ESAL per truck)
7. Truck Volume Growth Rate
8. Annual Truck Weight Growth Rate

Double Check

2027
20
78700
14%
50%
80%
1.35
2.00%
0.50%

Notes:

- The Functional Classification of the highway is 12 - Urban Principal Arterial - Expressway.
- This road has full or partial access control.
- There is a possibility of damaging homes, historic sites, etc., due to excessive vibration during compaction.
- There will be more than 2000 MT of each course placed. ESALS are greater than 0.3 million.
- The highway is not located in either Dutchess, Orange, Rockland, Putnam, Westchester, Nassau, Suffolk, Sullivan County or the City of New York?
- There are 4 or more lanes on this road.

RESULTS:

AADT for Design Year 2047	114,651				
<ul style="list-style-type: none"> • Use 'F' series high friction asphalt. 					
Total 80 kN ESAL Count for the Design Life	56,004,906				
<ul style="list-style-type: none"> • The 'Estimated Traffic' level should be < 100.0 million 80 Kn ESALs. 					
Recommended SUPERPAVE Item number					
	<table border="1"> <tr> <td>TOP: 402.09</td> <td>Or: 402.12</td> </tr> <tr> <td>BINDER: 402.19</td> <td></td> </tr> </table>	TOP: 402.09	Or: 402.12	BINDER: 402.19	
TOP: 402.09	Or: 402.12				
BINDER: 402.19					
<ul style="list-style-type: none"> • Confirm with the Regional Materials Engineer • Remember to add the appropriate Quality Payment Items • Remember to Print Out the Applicable Special Note 					
Your Special Note Is for:	64V-22				

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ENTER DATA IN ALL SHEETS BEFORE PRINTING

PIN #:	P.I.N. 5512.52
Project:	Route 33, Kensington Expressway - Ramps
Location:	NY Route 33 - Region 5 - Buffalo
Date:	Rev'd - 11/6/2017

INPUT PARAMETERS:

0.	Construction Year	2027
1.	Design Life (use 50 years for determining pavement thickness)	50
2.	Projected Construction Year AADT	11500
3.	Percent Heavy Trucks Class 4 or greater	4%
4.	Percent Trucks in Design Direction	100%
5.	Percent Trucks in Design Lane	100%
6.	Truck Equivalency Factor (avg. ESAL per truck)	1.35
7.	Truck Volume Growth Rate	2.00%
8.	Annual Truck Weight Growth Rate	0.50%
9.	Modulus of Resilience Value	48

12	Enter the Functional Classification Code of the highway
YES	Does this road have full or partial access control?
NO	Is there a possibility of damaging homes, historic sites, etc., due to excessive vibration during compaction.
NO	Will there be less than 2000 MT of each course placed?
NO	Is the highway located in either Dutchess, Orange, Rockland, Putnam, Westchester, Nassau, Suffolk, Sullivan County or the City of New York?
NO	Are there are more than 3 lanes on this road?

RESULTS:

AADT for Design Year 2077	30,346
• Use 'F' series high friction asphalt.	
Total 80 kN ESAL Count for the Design Life	23,473,989
• The 'Estimated Traffic' level should be < 30.0 million 80 Kn ESALs.	
• 64V-22	
•	

PAVEMENT THICKNESS TABLE

80 kN ESAL Calculation Sheet
Version 3.2
Prepared by:

Date: 6/7/2023
Updated 11/1/2017 MPH
LaBella Associates

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Enter data also in pavt. thickness sheet. Print this sheet + item numbers

TOTAL ESAL VALUE	23,473,989	
Total HMA Thickness	8	inches

SELECT GRANULAR SUBGRADE	GRAVEL	BASE	BINDER	TOP
inches	inches	inches	inches	inches
0	12	4.0	2.5	1.5

ACTUAL PAVEMENT THICKNESSES TO USE	
	<u>THICKNESS</u>
SELECT GRANULAR SUBGRADE	0 in.
GRAVEL	12 in.
BASE	4 in.
BINDER	2.5 in.
TOP	1.5 in.

80 kN ESAL calculation Work Sheet

Version 3.2

Updated 11/1/2017 MPH

Prepared by:

LaBella Associates

Date:

6/7/2023

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Make Sure to Double Check All Data

P.I.N. #:	P.I.N. 5512.52
Project:	Route 33, Kensington Expressway - Ramps
Date:	Rev'd - 11/6/2017

INPUT PARAMETERS:

0. Construction Completion Year
1. Design Life (Use 20 years for determining mix)
2. Initial AADT
3. Percent Heavy Trucks Class 5 or greater
4. Percent Trucks in Design Direction
5. Percent Trucks in Design Lane
6. Truck Equivalency Factor (avg. ESAL per truck)
7. Truck Volume Growth Rate
8. Annual Truck Weight Growth Rate

Double Check

2027
20
11500
4%
100%
100%
1.35
2.00%
0.50%

Notes:

- The Functional Classification of the highway is 12 - Urban Principal Arterial - Expressway.
- This road has full or partial access control.
- There is a possibility of damaging homes, historic sites, etc., due to excessive vibration during compaction.
- There will be more than 2000 MT of each course placed. ESALS are greater than 0.3 million.
- The highway is not located in either Dutchess, Orange, Rockland, Putnam, Westchester, Nassau, Suffolk, Sullivan County or the City of New York?
- There are less than 4 lanes on this road.

RESULTS:

AADT for Design Year 2047	16,753				
<ul style="list-style-type: none"> • Use 'F' series high friction asphalt. 					
Total 80 kN ESAL Count for the Design Life	5,845,493				
<ul style="list-style-type: none"> • The 'Estimated Traffic' level should be < 10.0 million 80 Kn ESALs. 					
Recommended SUPERPAVE Item number					
	<table border="1"> <tr> <td>TOP: 402.09</td> <td>Or: 402.12</td> </tr> <tr> <td>BINDER: 402.19</td> <td></td> </tr> </table>	TOP: 402.09	Or: 402.12	BINDER: 402.19	
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	<ul style="list-style-type: none"> • Confirm with the Regional Materials Engineer • Remember to add the appropriate Quality Payment Items • Remember to Print Out the Applicable Special Note 				
Your Special Note Is for:	64V-22				