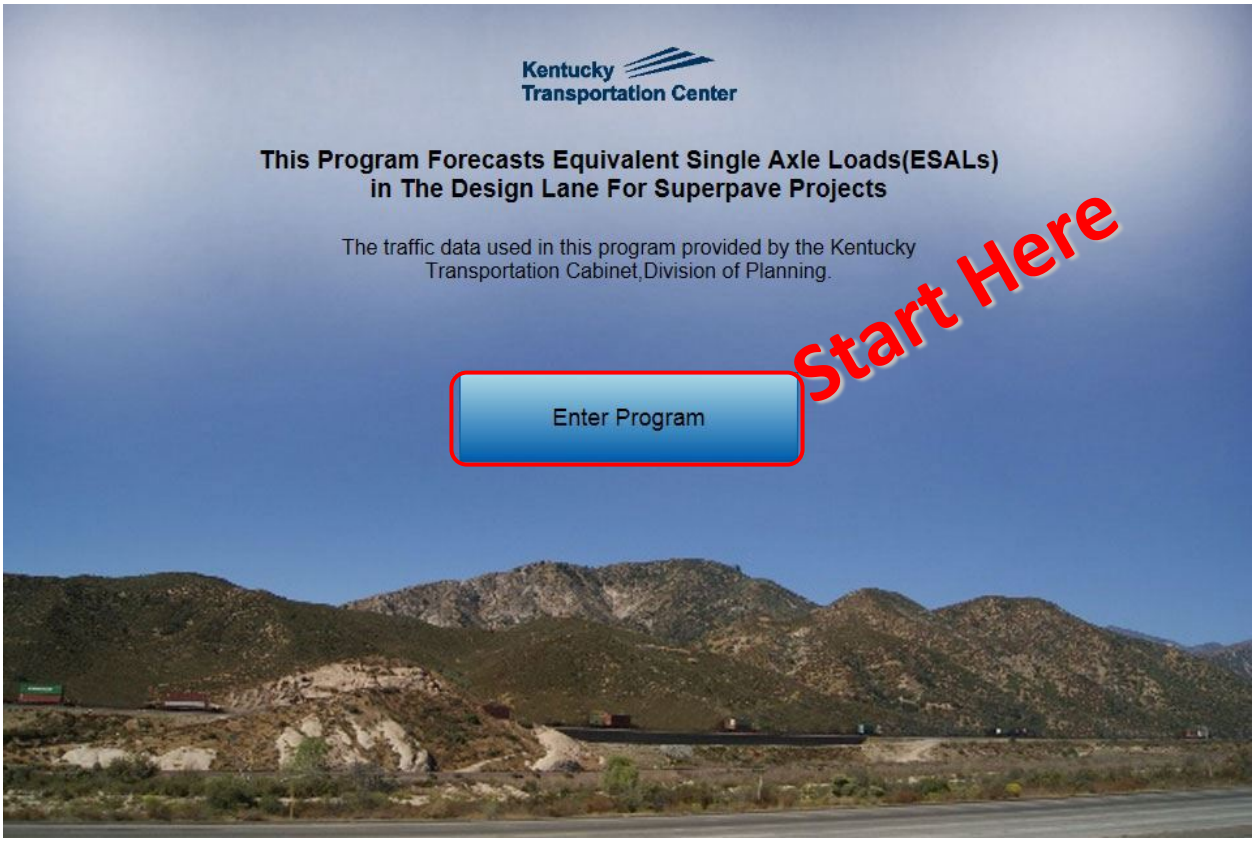
ESAL Program (Web Version)

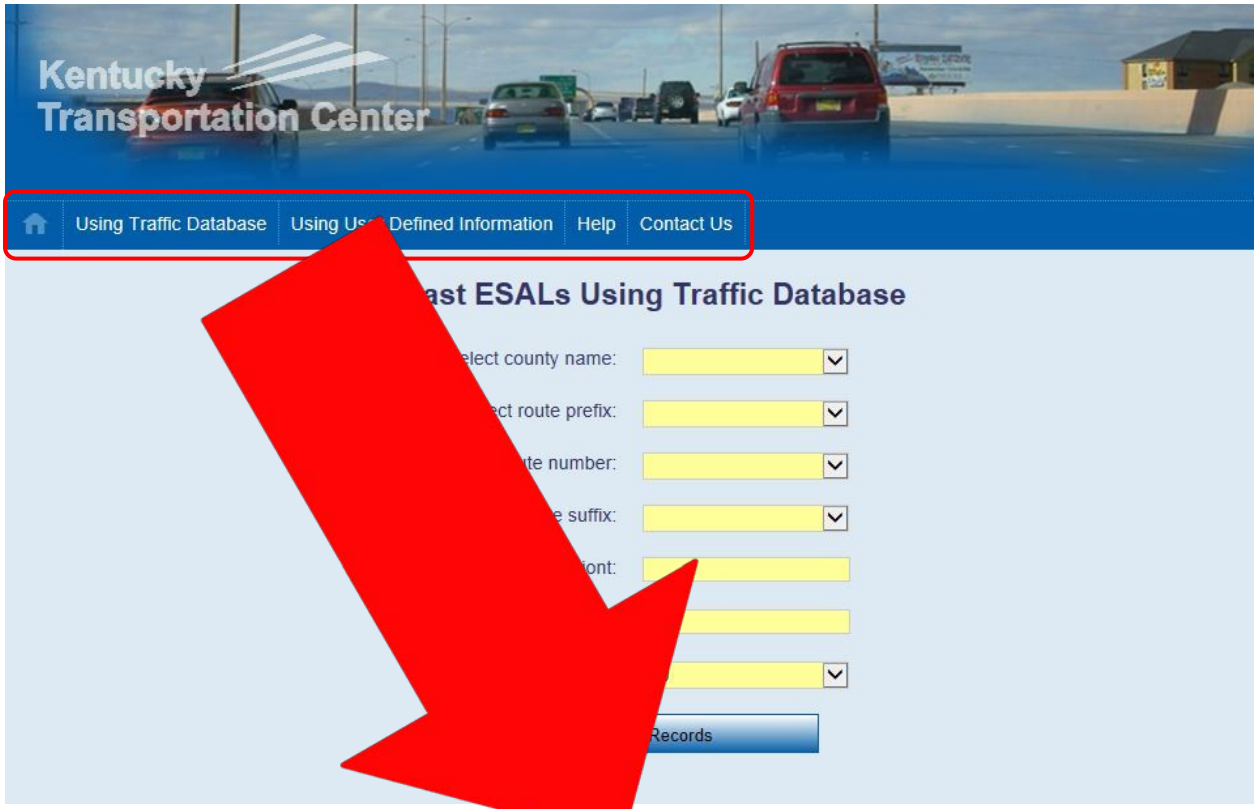
User Instruction

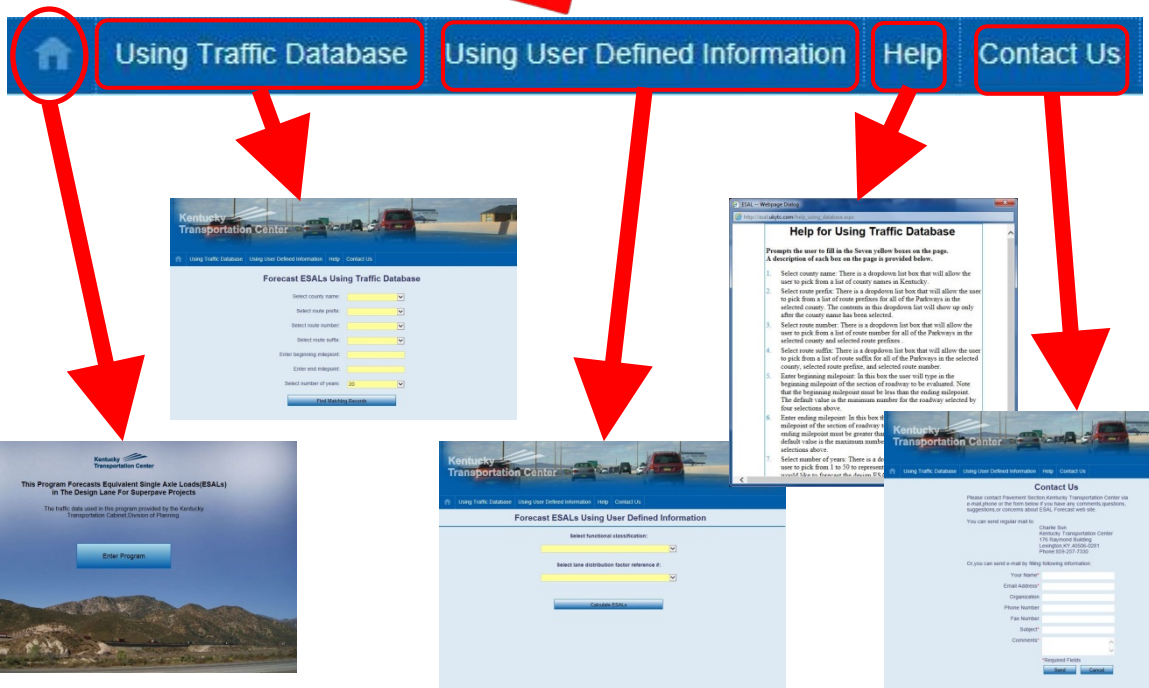
September 25, 2013

http://esal.ukytc.com/



http://esal.ukytc.com/using_database.aspx





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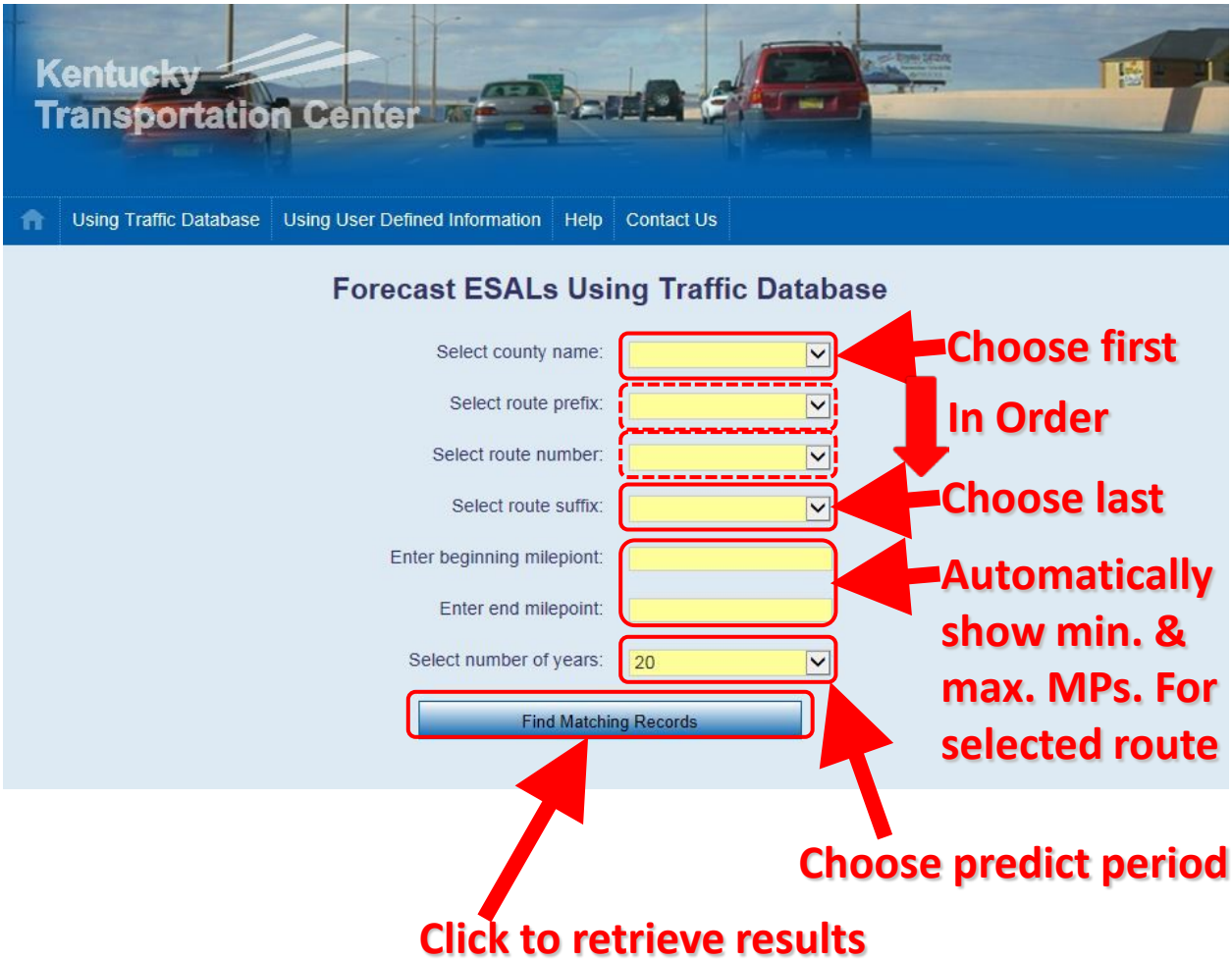
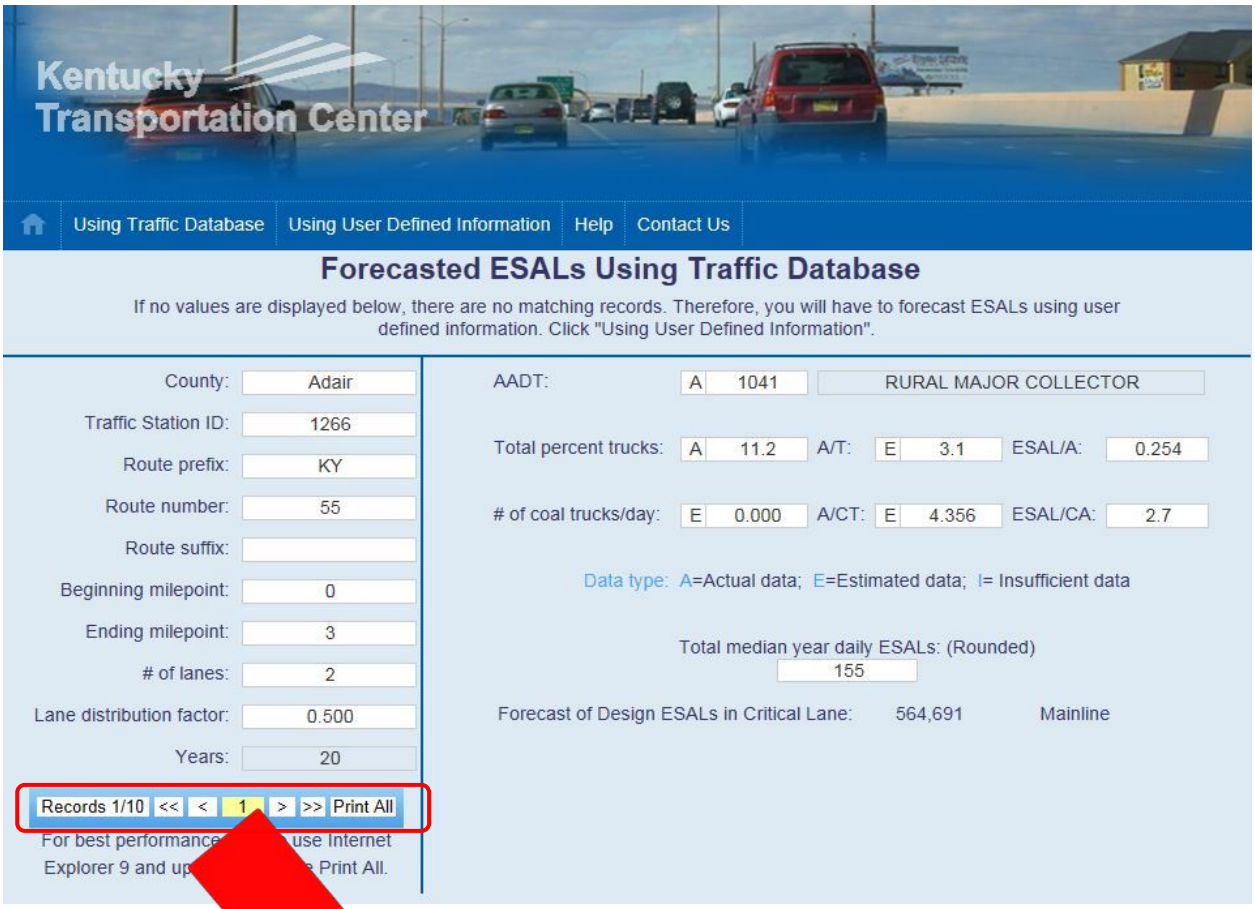


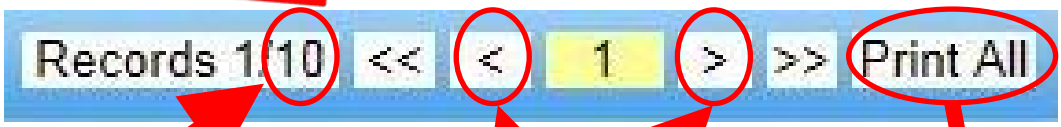
Help for Using Traffic Database

Prompts the user to fill in the Seven yellow boxes on the page.
A description of each box on the page is provided below.

1. Select county name: There is a dropdown list box that will allow the user to pick from a list of county names in Kentucky.
2. Select route prefix: There is a dropdown list box that will allow the user to pick from a list of route prefixes for all of the Parkways in the selected county. The contents in this dropdown list will show up only after the county name has been selected.
3. Select route number: There is a dropdown list box that will allow the user to pick from a list of route number for all of the Parkways in the selected county and selected route prefixes .
4. Select route suffix: There is a dropdown list box that will allow the user to pick from a list of route suffix for all of the Parkways in the selected county, selected route prefixe, and selected route number.
5. Enter beginning milepoint: In this box the user will type in the beginning milepoint of the section of roadway to be evaluated. Note that the beginning milepoint must be less than the ending milepoint. The default value is the minimum number for the roadway selected by four selections above.
6. Enter ending milepoint: In this box the user will type in the ending milepoint of the section of roadway to be evaluated. Note that the ending milepoint must be greater than the beginning milepoint. The default value is the maximum number for the roadway selected by four selections above.
7. Select number of years: There is a dropdown list box that allows the user to pick from 1 to 50 to represent the number of years the user would like to forecast the design ESALs in the critical lane.
8. Find Matching Records: By clicking this button the program will query the database for the records that match the criteria input in numbers 1-7 above, and send the user to the Matching Records page. Matching Records page will allow the user to view all of the matching records and print preview all of the matching records.

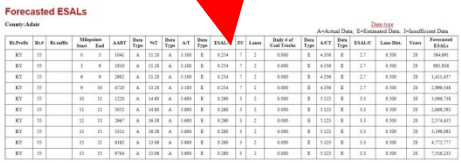
http://esal.ukytc.com/matching_records.aspx





Total records on selected route

Back or forth to see different records



After click on “Print All”

http://esal.ukytc.com/print_all.aspx

Forecasted ESALs

County:Adair

Data type
A=Actual Data; E=Estimated Data; I=Insufficient Data

Rt.Prefix	Rt.#	Rt.suffix	Milepoints Start	Milepoints End	AADT	Data Type	%T	Data Type	A/T	Data Type	ESAL/A	FC	Lanes	Daily # of Coal Trucks	Data Type	A/CT	Data Type	ESAL/C	Lane Dist.	Years	Forecasted ESALs
KY	55		0	3	1041	A	11.20	A	3.100	E	0.254	7	2	0.000	E	4.356	E	2.7	0.500	20	564,691
KY	55		3	6	1810	A	11.20	A	3.100	E	0.254	7	2	0.000	E	4.356	E	2.7	0.500	20	981,836
KY	55		6	9	2602	A	11.20	A	3.100	E	0.254	7	2	0.000	E	4.356	E	2.7	0.500	20	1,411,457
KY	55		9	10	4720	A	13.20	A	3.100	E	0.254	7	2	0.000	E	4.356	E	2.7	0.500	20	2,999,548
KY	55		10	11	1220	A	14.80	A	3.600	E	0.260	3	2	0.000	E	5.123	E	3.3	0.500	20	1,066,738
KY	55		11	12	3052	A	14.80	A	3.600	E	0.260	3	2	0.000	E	5.123	E	3.3	0.500	20	2,668,593
KY	55		12	13	2667	A	16.38	A	3.600	E	0.260	3	2	0.000	E	5.123	E	3.3	0.500	20	2,574,435
KY	55		13	15	3311	A	16.38	A	3.600	E	0.260	3	2	0.000	E	5.123	E	3.3	0.500	20	3,196,083
KY	55		15	21	6162	A	13.06	A	3.600	E	0.260	3	2	0.000	E	5.123	E	3.3	0.500	20	4,772,777
KY	55		15	15	9704	A	13.06	A	3.600	E	0.260	3	2	0.000	E	5.123	E	3.3	0.500	20	7,516,233

Help for Matching Records

Matching Records Page displays the records that match the criteria that were entered on Using Traffic Database Page. If there were no matching records for the specified criteria then the user can go back to Using Traffic Database Page to perform a new search or go to Using User Defined Information Page to calculate ESALs with user defined data.

Disclaimer: This procedure of forecasting ESALs uses default information (example functional class defaults and growth rate default assumptions) to produce ESALs for the Superpave Mix Design. It is not recommended for use in producing ESALs for Pavement Design except for a 'ballpark' estimate.

1. Highway details: Displayed in the highway details box are the items such as: county name, traffic station ID, route prefix, route number, route suffix, beginning milepoint, ending milepoint, number of lanes, lane distribution factor, and predict years for the records that match the search criteria.

   Lane distribution factors are based on Kentucky Transportation Research report UKTRP-85-30. Modifications have been made for 6 and 8 lane roads. Table below

Lane layout	**Lane distribution factor or equations**
1 lane, 1way	1
2 or 3 lanes, 2 way	.5
4 lanes, 1 way	.35
4 or 5 lane, 2 way	.497-(1.84+1.42*(%trucks))*(AADT)*(10^-6)
5 lane, 1 way	.3
6 lane, 1way	.325
> 6 lane, 1 way	(1/ # of lanes) +0.1
6 lane, 2 way	.325
> 6 lane, 2 way	.25

2. ESAL calculating information: Displayed in the ESAL calculating information box are values such as: AADT, functional class, total percent trucks, axles/truck, ESAL/axle, number of coal trucks per day, axles/coal truck, ESAL/coal truck axle. The Division of Planning collected the base data that produced this information. The Division of Planning is responsible for the base data being converted to traffic forecasting information. Any questions about the output information should be addressed to the Division of Planning (1-502-564-7183).

3. The factors for percent trucks, axles per truck, number of coal trucks/day, and axles per coal trucks are defined with either a **A** for actual collected data, **E** for estimated data based on the functional class using the three-year averages from the aggregated 2007 ESALs developed by the Kentucky Transportation Center, or **I** for insufficient data. Forecasted ESALs in coal hauling regions should be checked with the Division of Planning for the accuracy of the number of coal trucks per day.

4. The equation to calculate total median year daily ESALs is
(AADT*(1-%T)*0.005)+((AADT*%T)-CT)*(A/T)*(ESAL/A)+(CT*A/CT*ESAL/CA)
Matching Records Page displays the records that match the criteria that were entered on Using Traffic Database Page. Note: in order to get median year daily ESALs, the growth rates are calculated at the median year using the compound interest equation i.e.: %T*[(1+growth rate)^(N/2)]. If there were no matching records for the specified criteria then the user can go back to Using Traffic Database Page to perform a new search or go to Using User Defined Information Page to calculate ESALs with user defined data.

Functional Class	**Growth Rates (%)**					
	AADT	%T	A/T	ESAL/A	A/CT	ESAL/CA
Rural 1	3.1	.5	0.005	0.02	0	0
Rural 2,3,4	2.7	1.0	0	0.016	0	0
Rural 5,6,7	1.6	1.0	0.007	0.016	0	0
Urban 1	2.9	1.0	0.005	0.02	0	0
Urban 2,3	2.2	1.6	0.015	0.016	0	0
Urban 4,5,6,7	1.5	2.0	0.01	0.02	0	0

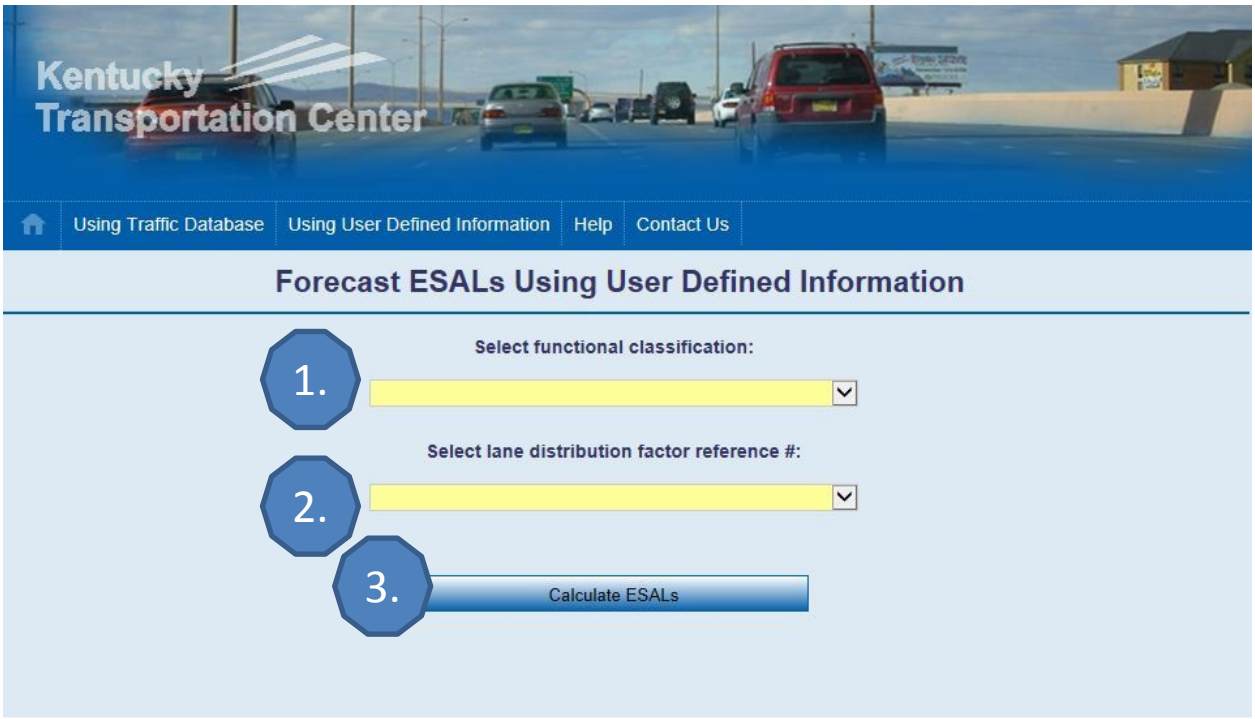
The equation to forecast design ESALs in the Critical Lane is

(Total median daily ESALs)*365*(N)*(Lanedist)

AADT	=	Average daily traffic
%T	=	Percent trucks
CT	=	Number of coal trucks per day
A/T	=	Axles per truck
ESAL/A	=	Equivalent single axle loads per truck axle
A/CT	=	Axles per coal truck
ESAL/CA	=	Equivalent single axle load per coal truck axle
N	=	Number of forecast years
Lanedist	=	Lane distribution factor

5. Mainline or ramp indicates where the data was collected.
6. “Insufficient data, either no lanes or no ADT”, message indicates that the values needed to forecast ESALs are not complete.
7. Print preview allows the user to view the matching records on the computer screen. Once in the print preview, click the print on web explore to print out the report, or close page to go back to previous page.
8. To scroll through all of the matching records, use the right and left arrows located in the bottom left hand corner.

http://esal.ukytc.com/user_define.aspx

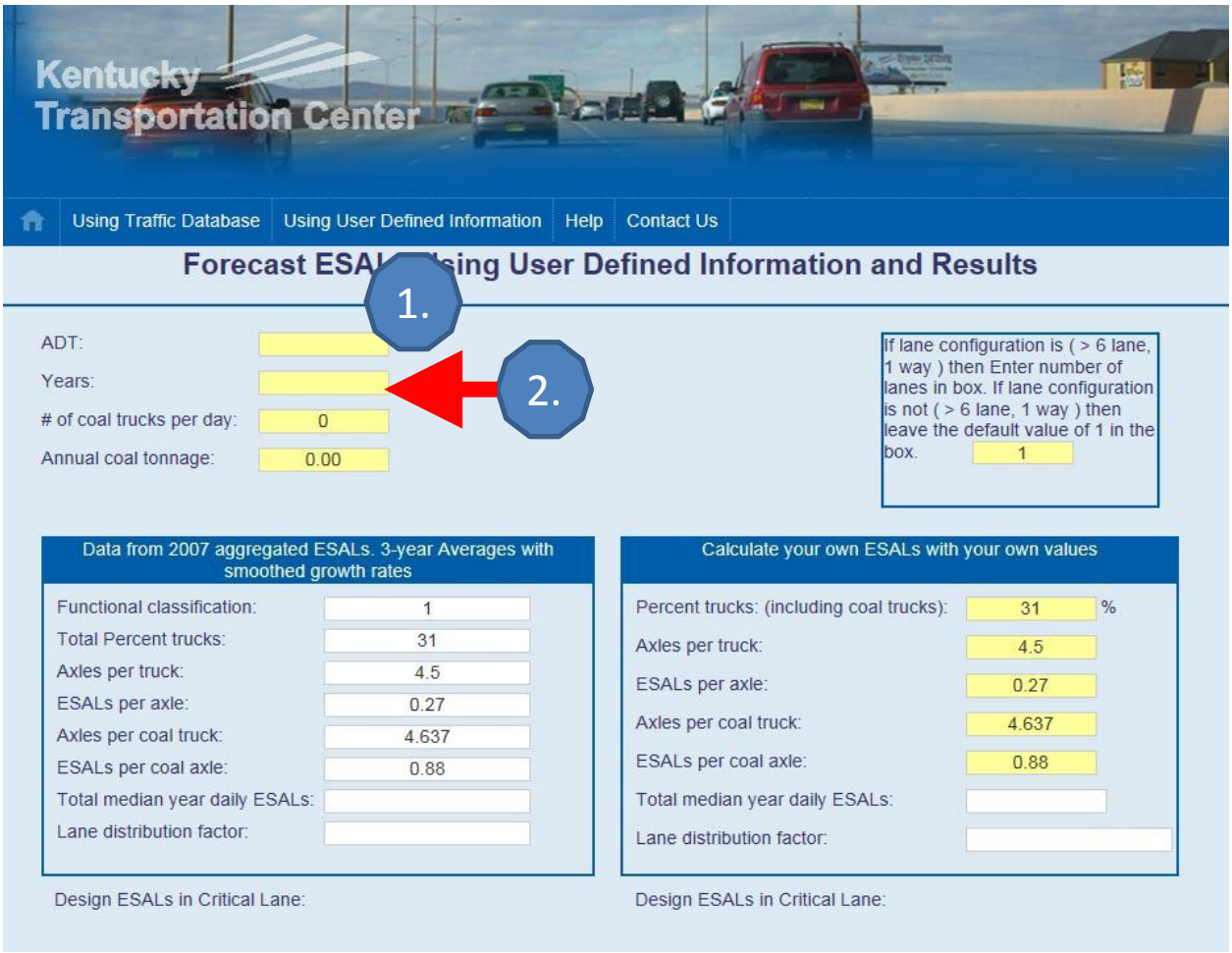


Help for Using User Defined Information

This Page in conjunction with page "Forecast ESALs Using User Defined Information and Results" allows the user to calculate ESALs with user defined data.

1.	Select functional classification: The user must select a functional classification from dropdown list box.
2.	Select lane distribution factor reference: The user must select a value from the lane distribution factor reference dropdown list box.
3.	Click Calculate ESALs button to see the page "Forecast ESALs Using User Defined Information and Results" to complete the ESAL calculating process with user defined data.

http://esal.ukytc.com/user_calc.aspx



Help for User Calculate

This page detailed data output. This page works in conjunction with page "Forecast ESALs Using User Defined Information". The values entered on both pages will be used in the calculation of ESALs on this page.

Disclaimer: This procedure of forecasting ESALs uses default information (example functional class defaults and growth rate default assumptions) to produce ESALs for the Superpave Mix Design. It is not recommended for use in producing ESALs for Pavement Design except for a 'ballpark' estimate.

1. ADT: In this box an ADT value must be entered.
2. Years: In this box a numeric value greater than zero must be entered to forecast ESALs.
3. Enter a value in for one of the following if applicable: If the user is calculating ESALs in a coal-hauling region, there are two different ways to input in the number of coal-trucks per day. The user can enter the number of coal trucks per day or the annual coal tonnage. If annual coal tonnage is entered, the number of coal trucks per day is derived by dividing annual coal tonnage by (365 days * 40 tons). NOTE: only enter coal information in one box; leave the other box defaulted to zero. If there are no coal trucks on the studied route, leave both values equal to zero. Questions pertaining to annual coal tonnage on a particular route should be addressed to the Division of Planning (1-502-564-7183).
4. If lane configuration is (> 6 lane, 1 way) then Enter number of lanes in box. If lane configuration is not (> 6 lane, 1 way) leave the default value of 1 in the box: this box should always have the default value 1 in it, unless the user has picked the (> 6 lane, 1 way) configuration on page "Forecast ESALs Using User Defined Information". If the user has picked the (> 6 lane, 1 way) configuration then the user must input in the number of lanes in the yellow box.
5. ESALs can be calculated for two different scenarios on this page. The user can use the values from the 2007 aggregated ESALs 3-year average values based on functional class, or the user can calculate ESALs with user defined data. NOTE: if the user calculates ESALs with user defined data all yellow boxes (percent trucks, axles per truck, ESALs per axle, axles per coal truck, ESALs per coal axle), must have a value entered.
6. Lane distribution factors are determined by the lane distribution factor reference the user entered on page "Forecast ESALs Using User Defined Information". Lane distribution factors are based on Kentucky Transportation Research report UKTRP-85-30. Modifications have been made for 6 and 8 lane roads.

Lane layout	**Lane distribution factor or equations**
1 lane, 1way	1
2 or 3 lanes, 2 way	.5
4 lanes, 1 way	.35
4 or 5 lane, 2 way	.497-(1.84+1.42*(%trucks))*(AADT)*(10^-6)
5 lane, 1 way	.3

6 lane, 1way	.325
> 6 lane, 1 way	(1/ # of lanes) +0.1
6 lane, 2 way	.325
> 6 lane, 2 way	.25

7. The equation used to calculate total median daily ESALs is

(ADT*(1-%T)*.005)+((ADT*%T)-CT)*(A/T)*(ESAL/A)+(CT*A/CT*ESAL/CA)

where growth rates have already been applied to (ADT, %T, A/T, ESAL/A, A/CT, and ESAL/CA) based on the Functional Classification growth rates provided in the Aggregated 2005 ESALs table. Note: in order to get median year daily ESALs, the growth rates are calculated at the median year using the compound interest equation i.e.: %T*[(1+growth rate)^(N/2)]. The growth rate for ADT was assumed to be 2 percent for all functional classes. The Aggregated 2007 ESALs table with growth rates can be viewed below.

Functional Class	**Growth Rates (%)**					
	AADT	%T	A/T	ESAL/A	A/CT	ESAL/CA
Rural 1	3.1	.5	0.005	0.02	0	0
Rural 2,3,4	2.7	1.0	0	0.016	0	0
Rural 5,6,7	1.6	1.0	0.007	0.016	0	0
Urban 1	2.9	1.0	0.005	0.02	0	0
Urban 2,3	2.2	1.6	0.015	0.016	0	0
Urban 4,5,6,7	1.5	2.0	0.01	0.02	0	0

The equation to forecast design ESALs in the Critical Lane is

(Total median daily ESALs)*365*(N)*(Lanedist)

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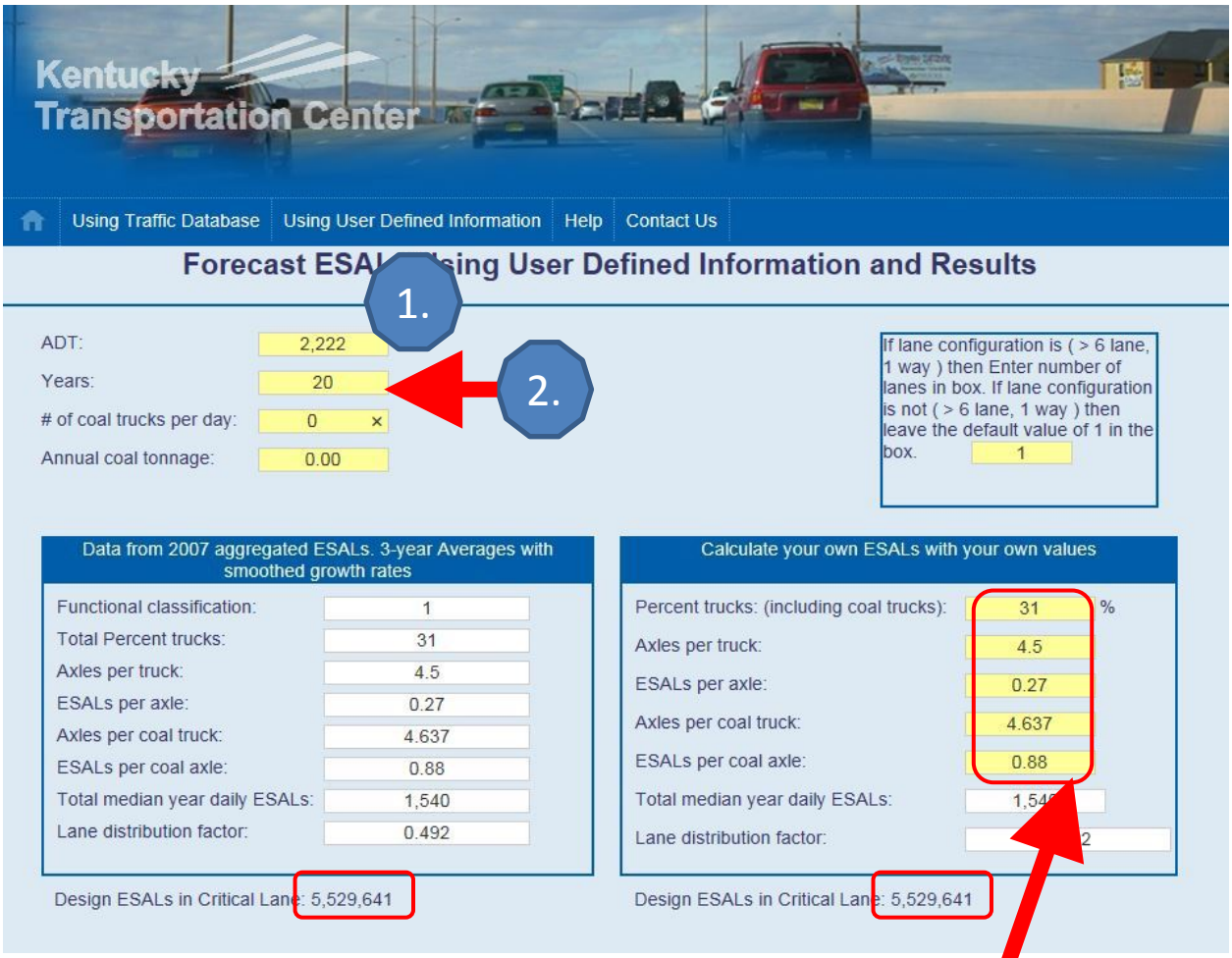
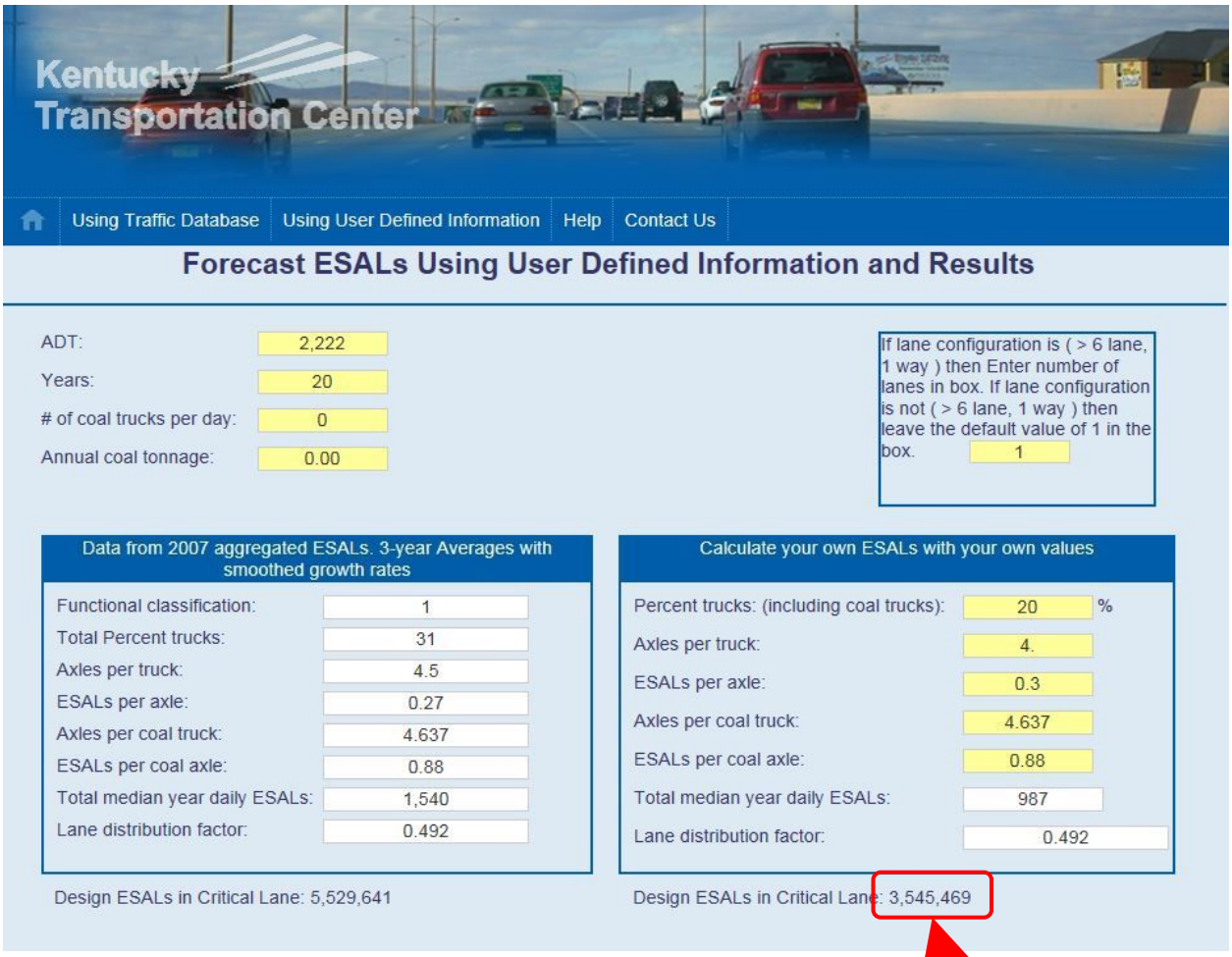
A/T	=	Axles per truck
ESAL/A	=	Equivalent standard axle loads per truck axle
A/CT	=	Axles per coal truck
ESAL/CA	=	Equivalent standard axle load per coal truck axle
N	=	Number of forecast years
Lanedist	=	Lane distribution factor

http://esal.ukytc.com/user_calc.aspx



Change these data to get your own ESAL Value

http://esal.ukytc.com/user_calc.aspx



Your own ESAL Value