

Regional Mobility Grant Program

Workshop

Calculating Measures of Effectiveness

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**Washington State
Department of Transportation**

Measures of Effectiveness

The Calculations

- Annual Reductions in
 - Vehicle Trips
 - Vehicle Miles Traveled
 - Person Hours of Delay

Example #1

Park and Ride Expansion

- Park and Ride Expansion Project
 - The existing park and ride is used primarily by commuters and has reached capacity. The expansion of the lot will provide an additional 100 spaces. In the opening year utilization is anticipated at 50% with the lot being fully utilized by year 10.

Example #1

Park and Ride Expansion

Key Facts:

- Commuter use
- 100 spaces
- 50% initial utilization
- 100% utilization in year 10

Example #1

Park and Ride Expansion

Calculating Annual Reduction in

Vehicle Trips

$$= (\textit{utilization}) * (\textit{capacity}) * \left(2 \frac{\textit{trips}}{\textit{day}} \right) * \left(260 \frac{\textit{days}}{\textit{year}} \right)$$

= *Vehicle Trips Reduced Annually*

Example #1

Park and Ride Expansion

Calculating Annual Reduction in

Vehicle Trips

= (*utilization*)

= (*0.50 utilization*)

Example #1

Park and Ride Expansion

Calculating Annual Reduction in

Vehicle Trips

$$= (\textit{utilization}) * (\textit{capacity})$$

$$= (0.50 \textit{ utilization}) * (100 \textit{ spaces})$$

Example #1

Park and Ride Expansion

Calculating Annual Reduction in

Vehicle Trips

$$= (\textit{utilization}) * (\textit{capacity}) * \left(2 \frac{\textit{trips}}{\textit{day}} \right)$$

$$= (0.50 \textit{ utilization}) * (100 \textit{ spaces}) * \left(2 \frac{\textit{trips}}{\textit{day}} \right)$$

Example #1

Park and Ride Expansion

Calculating Annual Reduction in

Vehicle Trips

$$= (\textit{utilization}) * (\textit{capacity}) * \left(2 \frac{\textit{trips}}{\textit{day}} \right) * \left(260 \frac{\textit{days}}{\textit{year}} \right)$$

$$= (0.50 \textit{ utilization}) * (100 \textit{ spaces}) * \left(2 \frac{\textit{trips}}{\textit{day}} \right) * \left(260 \frac{\textit{days}}{\textit{year}} \right)$$

Example #1

Park and Ride Expansion

Calculating Annual Reduction in

Vehicle Trips

$$= (0.50 \text{ utilization}) * (100 \text{ spaces}) * \left(2 \frac{\text{trips}}{\text{day}}\right) * \left(260 \frac{\text{days}}{\text{year}}\right)$$

= 26,000 *Vehicle Trips Reduced*

Initial Year

Example #1

Park and Ride Expansion

Calculating Annual Reduction in

Vehicle Trips

$$= (1.00 \text{ utilization}) * (100 \text{ spaces}) * \left(2 \frac{\text{trips}}{\text{day}} \right) * \left(260 \frac{\text{days}}{\text{year}} \right)$$

= 52,000 *Vehicle Trips Reduced*

Year 10

Example #1

Park and Ride Expansion

Calculating Annual Reduction in
Vehicle Miles Traveled (VMT)

$$\begin{aligned} &= (\textit{Vehicle Trips Reduced Annually}) * \\ &\quad (\textit{Average One Way Trip Length in Miles}) \\ &= \textit{Vehicle Miles Traveled Reduced Annually} \end{aligned}$$

Example #1

Park and Ride Expansion

Calculating Annual Reduction in
Vehicle Miles Traveled (VMT)

= (*Vehicle Trips Reduced Annually*)

= (*26,000 Vehicle Trips Reduced*)

Example #1

Park and Ride Expansion

Calculating Annual Reduction in
Vehicle Miles Traveled (VMT)

$$\begin{aligned} &= (\textit{Vehicle Trips Reduced Annually}) * \\ &\quad (\textit{Average One Way Trip Length in Miles}) \\ &= (26,000 \textit{ Vehicle Trips Reduced}) * (13 \textit{ miles}) \end{aligned}$$

Example #1

Park and Ride Expansion

Calculating Annual Reduction in
Vehicle Miles Traveled (VMT)

$$= (26,000 \text{ Vehicle Trips Reduced}) * (13 \text{ miles})$$

$$= 338,000 \text{ Vehicle Miles Traveled Reduced}$$

Initial Year

Example #1

Park and Ride Expansion

Calculating Annual Reduction in
Vehicle Miles Traveled (VMT)

$$= (52,000 \text{ Vehicle Trips Reduced}) * (13 \text{ miles})$$

$$= 676,000 \text{ Vehicle Miles Traveled Reduced}$$

Year 10

Example #1

Park and Ride Expansion

Measures of Effectiveness

Annual Vehicle Trip Reduction

Range of 26,000 – 52,000 annual vehicle trips reduced

Annual Vehicle Miles Traveled Reduction

Range of 338,000 – 676,000 annual vehicle miles
traveled reduced

Example #2

Transit Service

- Transit Service Project
 - This new commuter service will provide transit along a congested corridor connecting areas where service does not currently exist. The service will provide 10 trips per weekday. Average daily ridership is estimated at 240 riders per day traveling an average distance of 15 miles.

Example #2

Transit Service

Key Facts:

- Commuter service during peak period
- 10 trips per weekday
- Average of 240 riders per day
- Average 15 mile one way rider trip length

Example #2

Transit Service

Calculating Annual Reduction in

Vehicle Trips

$$= \left((\text{daily ridership}) * \left(260 \frac{\text{days}}{\text{year}} \right) \right) - \left((\text{daily bus trips}) * \left(260 \frac{\text{days}}{\text{year}} \right) \right)$$

= *Vehicle Trips Reduced Annually*

Example #2

Transit Service

Calculating Annual Reduction in

Vehicle Trips

= ((*daily ridership*))

= ((240 *daily riders*))

Example #2

Transit Service

Calculating Annual Reduction in

Vehicle Trips

$$= \left((\text{daily ridership}) * \left(260 \frac{\text{days}}{\text{year}} \right) \right)$$

$$= \left((240 \text{ daily riders}) * \left(260 \frac{\text{days}}{\text{year}} \right) \right)$$

Example #2

Transit Service

Calculating Annual Reduction in

Vehicle Trips

$$= \left((\text{daily ridership}) * \left(260 \frac{\text{days}}{\text{year}} \right) \right) - ((\text{daily bus trips}))$$

$$= \left((240 \text{ daily riders}) * \left(260 \frac{\text{days}}{\text{year}} \right) \right) - ((10 \text{ daily bus trips}))$$

Example #2

Transit Service

Calculating Annual Reduction in

Vehicle Trips

$$= \left((\text{daily ridership}) * \left(260 \frac{\text{days}}{\text{year}} \right) \right) - \left((\text{daily bus trips}) * \left(260 \frac{\text{days}}{\text{year}} \right) \right)$$

$$= \left((240 \text{ daily riders}) * \left(260 \frac{\text{days}}{\text{year}} \right) \right) - \left((10 \text{ daily bus trips}) * \left(260 \frac{\text{days}}{\text{year}} \right) \right)$$

Example #2

Transit Service

Calculating Annual Reduction in

Vehicle Trips

$$= \left((240 \text{ daily riders}) * \left(260 \frac{\text{days}}{\text{year}} \right) \right) - \left((10 \text{ daily bus trips}) * \left(260 \frac{\text{days}}{\text{year}} \right) \right)$$

= 59,800 Vehicle Trips Reduced Annually

Example #2

Transit Service

Calculating Annual Reduction in
Vehicle Miles Traveled (VMT)

$$= (\textit{Vehicle Trips Reduced Annually}) * (\textit{Average One Way Rider Trip Length in Miles})$$

$$= \textit{Vehicle Miles Traveled Reduced Annually}$$

Example #2

Transit Service

Calculating Annual Reduction in
Vehicle Miles Traveled (VMT)

= (*Vehicle Trips Reduced Annually*)

= (*59,800 Vehicle Trips Reduced*)

Example #2

Transit Service

Calculating Annual Reduction in
Vehicle Miles Traveled (VMT)

$$= (\textit{Vehicle Trips Reduced Annually}) * \\ (\textit{Average One Way Rider Trip Length in Miles})$$

$$= (59,800 \textit{ Vehicle Trips Reduced}) * (15 \textit{ miles})$$

Example #2

Transit Service

Calculating Annual Reduction in
Vehicle Miles Traveled (VMT)

$$= (59,800 \text{ Vehicle Trips Reduced}) * (15 \text{ miles})$$

$$= 897,000 \text{ Vehicle Miles Traveled Reduced Annually}$$

Example #2

Transit Service

Measures of Effectiveness

Annual Vehicle Trip Reduction

59,800 annual vehicle trips reduced

Annual Vehicle Miles Traveled Reduction

897,000 annual vehicle miles traveled reduced

Example #3

Roadway Improvement Project

Calculating Annual Reduction in
Person Hours of Delay

See Your Project Engineer

