COLORADO
Department of Transportation

**C-470 Express Toll Lanes Project HOV3+ Exemption Analysis**

September 30, 2015

## 1. Summary

To support the ongoing development of the C-470 Express Lanes Project (the Project) and related toll policy discussions, the Colorado Department of Transportation (CDOT)—in partnership with the High Performance Transportation Enterprise (HPTE)—undertook an analysis to determine the potential impacts associated with a carpool exemption policy for high occupancy vehicles with three or more passengers (HOV3+).

Current and prior planning has assumed that all vehicles, regardless of occupancy, would be subject to tolls in the Express Lanes; however, a final policy recommendation regarding HOV exemptions has not yet been formulated. To support that decision, this analysis evaluates the potential traffic, revenue and financing implication associated with an HOV3+ exemption policy.

It is currently estimated that the implementation of an HOV3+ exemption policy in the Express Lanes would generate limited long-term growth in the share of HOV3+ carpools relative to other classes, and negatively impact CDOT/HPTE's project financials. Fully funding the project would necessitate a more leveraged and risky financial structure that would require, for example, additional draws on and/or a longer repayment period for the CDOT O&M loan. Depending on the type of debt and market terms and conditions at the time of financing, a financing sufficient to fund the project as designed may not be executable.

Lower net cash flows—particularly in the early years of operation when revenues are disproportionately impacted by HOV3+ exemptions—would reduce net construction proceeds by as much as $40 million. Furthermore, excess toll revenues accruing to HPTE would be reduced by approximately $100 million[1] in net present value, impacting the ability to fund future phases of the C-470 Express Lanes Project.

## 2. Project Background

C-470 has a history of severe congestion, and for well over a decade has operated at failing levels of service. As a solution to this issue, CDOT and its partners began evaluating alternatives to improve mobility and reduce congestion along the corridor, culminating in the proposed C-470 Express Lanes Project. As analyzed in the Revised Environmental Assessment (EA), the Project will be delivered in two phases. The first phase (Interim Project) will provide managed express lanes as follows:

- Westbound: two express lanes from I-25 to approximately Colorado Boulevard, and one lane from Colorado Boulevard to Wadsworth Boulevard
- Eastbound: one express lane from Platte Canyon Road to I-25

Currently, available funding has limited construction scope the Interim project; however, future construction of the Ultimate configuration would extend and add lanes to achieve two express lanes in each direction between I-25 and Kipling Parkway. Exhibit 1 illustrates the existing and proposed corridor configurations associated with the Interim Project.

[1]Net revenues available after debt service, operations and maintenance costs and repayment of any O&M loan balances (as needed) discounted at 5%.

*Exhibit 1: C-470 Lane Configurations*

| Existing Configuration | Proposed Configuration |
| --- | --- |
|  |  |

## 3. Cost and Revenue Impact

One of the key considerations in evaluating a toll exemption policy is the potential impact on the Project's cash flows, both in terms of reduced revenue collection resulting from both the exemption itself and toll evasion / occupancy violations, as well as increased operations and maintenance costs (O&M). The following sections describe each of these items and their estimated impact on project cash flows, and ultimately its financial feasibility.

### a. Traffic and Revenue

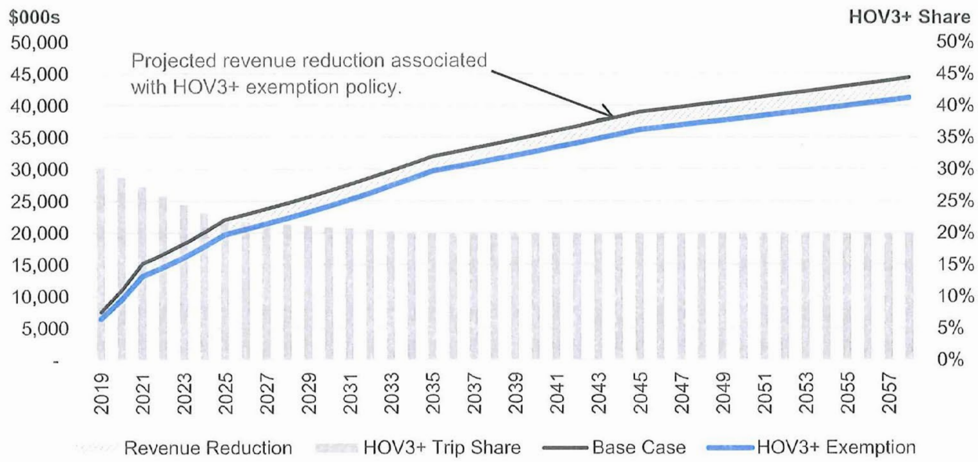
As an initial step toward understanding the impact of an HOV3+ exemption policy, the Project's investment grade T&R consultant, Louis Berger Group (LBG), prepared an estimate of the potential share of HOV3+ vehicles that would use the Express Lanes and the extent to which that usage would impact gross toll revenue. This preliminary effort, which was conducted using a traffic simulation model, indicated that HOV3+ users would account for approximately **32%** of Express Lane trips in 2018 and approximately **20%** by 2035. Gross revenue is anticipated to be 15% and 7% lower in 2018 and 2035, respectively, when compared to revenues forecasted without an HOV3+ exemption policy ("Base Case"). A table detailing the approximate HOV3+ trip shares and revenue impacts by model year is provided below.

*Exhibit 2: Estimated HOV3+ Trip Shares and Gross Revenue (2015 $000s)*

| Model Year | HOV3+ Trip Share (%) | Gross Revenue (HOV3+ Exempt) | Gross Revenue (Base Case) | Gross Revenue Delta (%) |
| --- | --- | --- | --- | --- |
| **2018** | 32% | $9,789 | $11,460 | -15% |
| **2025** | 22% | $19,806 | $22,114 | -10% |
| **2035** | 20% | $29,736 | $32,021 | -7% |

**Note:** Values shown in the above exhibit are expressed in 2015 dollars; gross revenues do not include ramp-up, toll collection costs, leakage, or other adjustments associated with an investment grade financing analysis.

*Exhibit 3: Comparison of Gross Base Case and HOV3+ Exemption Revenue (2015 $)*




**Note:** Values shown in the above exhibit are expressed in 2015 dollars. However, the impacts cited in the following discussion are expressed in nominal terms.

While the overall share of Express Lane toll-exempt trips is anticipated to decline over the forecast horizon, LBG also indicated that HOV3+ trips (by volume) are projected to grow by approximately 1% per year between 2018 and 2035 – well below the rate of growth in toll trips, which is anticipated to be 5% per year over the same period.

| | | |
|---|---|---|
| **2035 Nominal Cash Flow Impact:** | **-$3.2mm** | **-7%** |

## b. Revenue Leakage

Based on a survey of all-electronic toll facilities across the U.S., a baseline revenue leakage assumption of 10% per year was established for the Base Case (i.e., where HOVs do not receive a toll exemption in the Express Lanes) cash flows. This amount reflects a variety of factors that may result in revenue leakage, including toll equipment errors, non-payment by customers, weather-related events, etc.

As noted in the prior section, the introduction of HOV3+ exemptions would create additional opportunity for leakage resulting from occupancy violations. Data for existing CDOT HOV facilities suggests that occupancy violation rates can reach as high as 25% without routine enforcement (this is reduced to 15% with enforcement.

For the purpose of this analysis, it is assumed that an HOV3+ exemption policy would increase the 10% Base Case leakage rate to 15% per year.

| | | |
|---|---|---|
| **2035 Nominal Cash Flow Impact:** | **-$2.2mm** | **-5%** |

### c. Toll Collection O&M

#### Transaction Processing

The process of collecting tolls requires a complex system of in-lane toll equipment and back office software to record and collect the applicable toll from customers using the corridor. As an all-electronic system, customers will be encouraged to establish a prepaid transponder account, whereby readers placed throughout the corridor will automatically detect the customer's transponder and deduct the appropriate toll from that account. In cases where a transponder is not present, cameras at each toll location will automatically record the customer's license plate number and either match that license plate to a pre-registered account, or generate an invoice for non-account customers.

To handle these transactions, a third-party vendor will be procured to operate and maintain the toll collection system, interface with customers, and provide back office support. For the purpose of this analysis, it is assumed that the cost of such services will be transaction-based, whereby the selected vendor will charge CDOT each time a transaction in the C-470 Express Lanes is processed (similar to existing contracts for the US-36 and I-25 Express Lanes with the E-470 Public Highway Authority). Depending on the type of transaction that is incurred (i.e., transponder or license plate), a different price will be charged to CDOT.

Toll rates on C-470 will be designed, at a minimum, to offset transaction processing costs to remain "net revenue neutral," even during periods of low usage. This pricing methodology is only possible when all vehicles in the Express Lanes are required to pay a toll. In an HOV3+ exemption scenario, transaction processing would still be required, but a toll would not be collected to offset the cost. In effect, these transactions are net revenue negative, since they only generate a cost but not an offsetting revenue.

*Exhibit 4: Hypothetical Revenue of Base Case and HOV3+ Exemption Policy*

| Scenario | Transponder Toll (Hypothetical) | Transponder Processing Cost[2] | Net Revenue |
|---|---|---|---|
| Base Case (HOV3+ Tolled) | $1.00 | ($0.18) | **$0.82** |
| HOV3+ (Toll Free) | $0.00 | ($0.001) | **($0.001)** |

As illustrated in the above table, each HOV3+ toll transaction generates a net loss of $0.001 on a simple comparison of average revenue to average cost, before any losses (leakage) associated with intentional or unintentional occupancy violations.

| 2035 Nominal Cash Flow Impact: | +$0.1mm | <1% |
|---|---|---|

#### Enforcement

Similar to the US-36 and I-25 Express Lanes, customers who are eligible to receive an HOV3+ toll exemption would be required to install a multi-switch transponder in order to declare their HOV3+ status each time they use the corridor. By default, non-switchable transponders and license plate transactions would be treated as full toll customers, since the system would have no way to determine the occupancy of those vehicles.

However, by allowing customers to self-declare their HOV3+ status (and thus toll exemption), this introduces the risk that customers will intentionally or unintentionally select the incorrect transponder occupancy setting.

[2] 2010 dollars (Parsons Brinckerhoff, 2015)

In the case of unintentional user error, a vehicle may travel as an HOV3+ in one direction, then re-enter the corridor as a single occupant vehicle (SOV) without changing the transponder setting. As a result, the toll is waved and revenue is not collected for that transaction.

To counteract these situations, visual enforcement at select locations throughout the corridor would be provided by Colorado State Patrol (CSP), the cost which would paid out of toll revenues. While the annual cost of CSP enforcement will vary according to violation trends, it is assumed that C-470 would allocate approximately $250,000 (2015 dollars) for targeted and routine enforcement activities within the corridor.

Although violators will be ticketed and fined for occupancy violations, it is not assumed that any violation revenue will flow back to the Project. Enforcement would be provided with the sole purpose of reducing losses (revenue leakage) attributed to occupancy violations.

| 2035 Nominal Cash Flow Impact: | -$0.2mm | <1% |
| --- | --- | --- |

### d. Capital Costs

Beyond increased operating costs and financing adjustments, HOV3+ exemptions would also necessitate additional upfront capital to cover:

- Additional engineering/design/construction to accommodate "toll enforcement zones"
- Additional in-lane toll equipment to support visual enforcement efforts

The total combined cost of these items is estimated to be approximately $1 million (about 0.4% of the Project's base capital costs), requiring additional upfront financing and associated debt service.

| 2035 Nominal Cash Flow Impact: | -$0.1mm | <1% |
| --- | --- | --- |

## 4. Financing & Credit Impact

### a. Credit Rating Implications

Toll exemption policies are generally viewed as a credit negative due to the direct impact those vehicles have on lane performance, travel reliability, and available capacity for toll paying vehicles. In a November 2013 report titled *U.S. Managed Lanes: Empirical Data Steers Credit Analysis*, Fitch Ratings notes that the "nature of the HOV and transit policies can significantly impact revenues" and that "a key rating driver going forward will be the HOV policy and other policies governing access to [managed lanes]." The report further explains that exemption policies for HOV2+ vehicles are inherently more risky than facilities with HOV3+ policies; however, despite lower upfront revenue risk, it should be noted that as demand for the corridor increases with population and employment, an increasing number of toll-free HOV3+ vehicles will absorb Express Lane capacity, thus decreasing capacity available for toll-paying vehicles.

A similar outlook report by Moody's Investor Service in May 2013 suggests that "a small diversion of traffic onto tolled lanes frees up capacity on non-tolled alternative, hence decreasing the incentive for additional users to move to the tolled lane." In the context of C-470, providing toll exemptions may cause a portion of those vehicles to shift to the Express Lanes, which would reduce capacity for toll paying vehicles and open capacity in the general purpose (GP) lanes. The increased capacity in the GP lanes could induce vehicles that would have otherwise paid to enter the Express Lanes.

To compensate for the increased revenue variability associated with the implementation of a toll exemption policy (e.g. the risk of additional HOV 3+ traffic above projected levels using the lanes, potential unforeseen impacts on overall corridor congestion and mobility), rating agencies and investors would be expected to take a slightly more conservative view on the credit (manifested through increased coverage ratios, additional liquidity measures, and/or an additional haircut to revenues). The total impact of these considerations has been assumed to be equivalent to a 5% additional reduction in toll revenues. This would result in a cash flow reduction of $2.2 million in 2035 for debt sizing purposes.

| 2035 Nominal Cash Flow Impact: | -$2.2mm | -5% |
|---|---|---|

## 5. Summary of Impacts

### a. Project Cash Flows

The table below summarizes all impacts to project cash flows in 2035.

*Exhibit 4: Revenue Impact Summary*

| 2035 Nominal Impacts | Amount ($mm) |
|---|---|
| Gross Revenue | -$3.2 |
| Rev. Adjustments: Leakage | -$2.2 |
| O&M: Transaction Processing | +$0.1 |
| O&M: Enforcement | -$0.2 |
| Additional Debt Service: Increase Capital Cost | -$0.1 |
| Credit: T&R Risk Adjustment | -$2.2 |
| Total of Individual Impacts | -$7.8 |
| **Total Combined Impacts*** | **-$7.3** |

*Nominal impacts noted above are not additive, given the interrelated nature of gross revenues, leakage, and the T&R risk adjustment factor. As such, the "total combined impacts" row provides a bottom line summary of all impacts in the HOV3+ exemption scenario.

### b. Funding Impact

Design and construction funding for the C-470 Express Lanes Project will be provided in the form of public monies (RAMP, FASTER, HSIP, and other public contributions) as well debt backed by toll revenues. The extent to which debt can be raised for the project is primarily a function of the near- and mid-term cash flow available for interest and principal payments on project debt. Based on the anticipated Project cash flow under an HOV3+ exemption policy, it is estimated that debt capacity could be reduced by as much as **$40 million**, requiring a substantial amount of additional funding to be identified to fully fund the Project (which is also based on an estimated capital cost of $269 million).

In addition, the HOV3+ financial structures would place added risks on CDOT in case of revenue shortfalls or cost overruns as the CDOT O&M loan amount increases and/or is repaid over a longer period of time.

Finally, In addition to the reduction of net proceeds available to fund project construction, the present value of excess toll revenues accruing to HPTE would diminish significantly – by as much as $100 million (assuming a 5% discount rate) – under an HOV3+ toll exemption policy. Excess cash flow, or surplus revenue after debt service and operating costs, is a key indicator of potential funding that could be contributed to future projects, including the second phase of the C-470 Express Lanes or other corridor improvements.