

A Better Option for I-70 East



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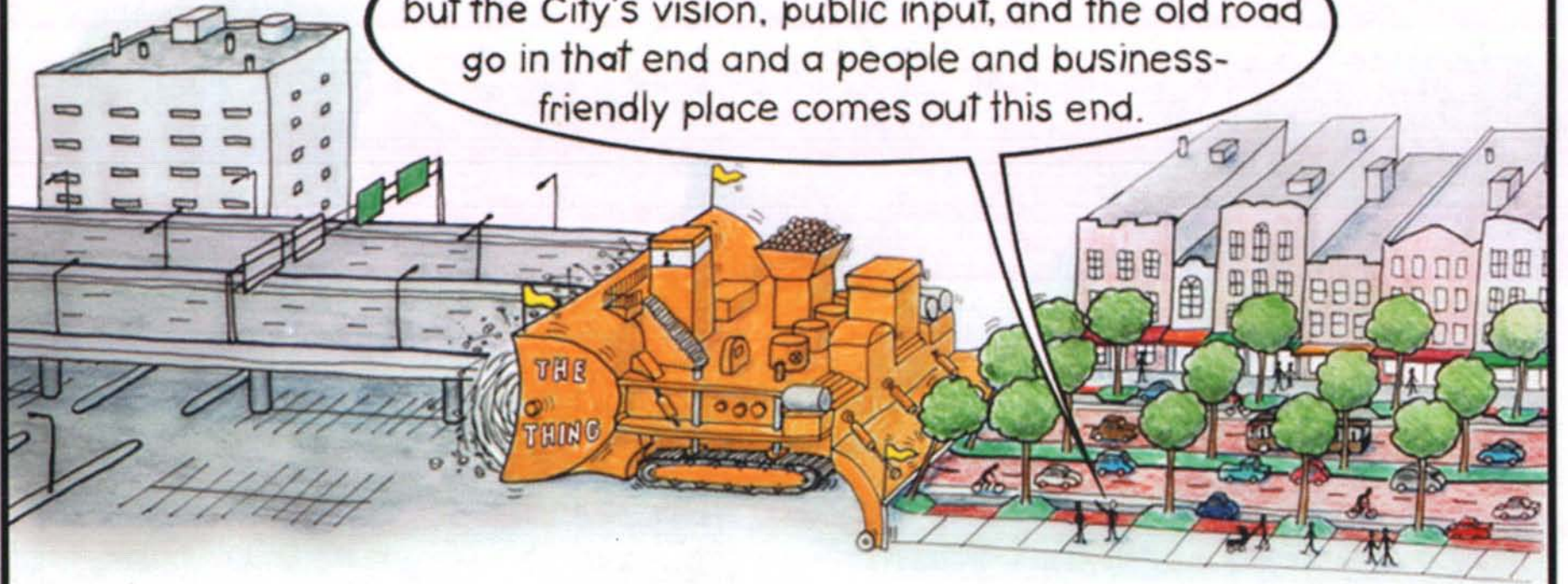
A Better Option for I-70 East



**I-70 Re-Route:
An image of the Boulevard that replaces I-70 on 46th and 48th Avenues**

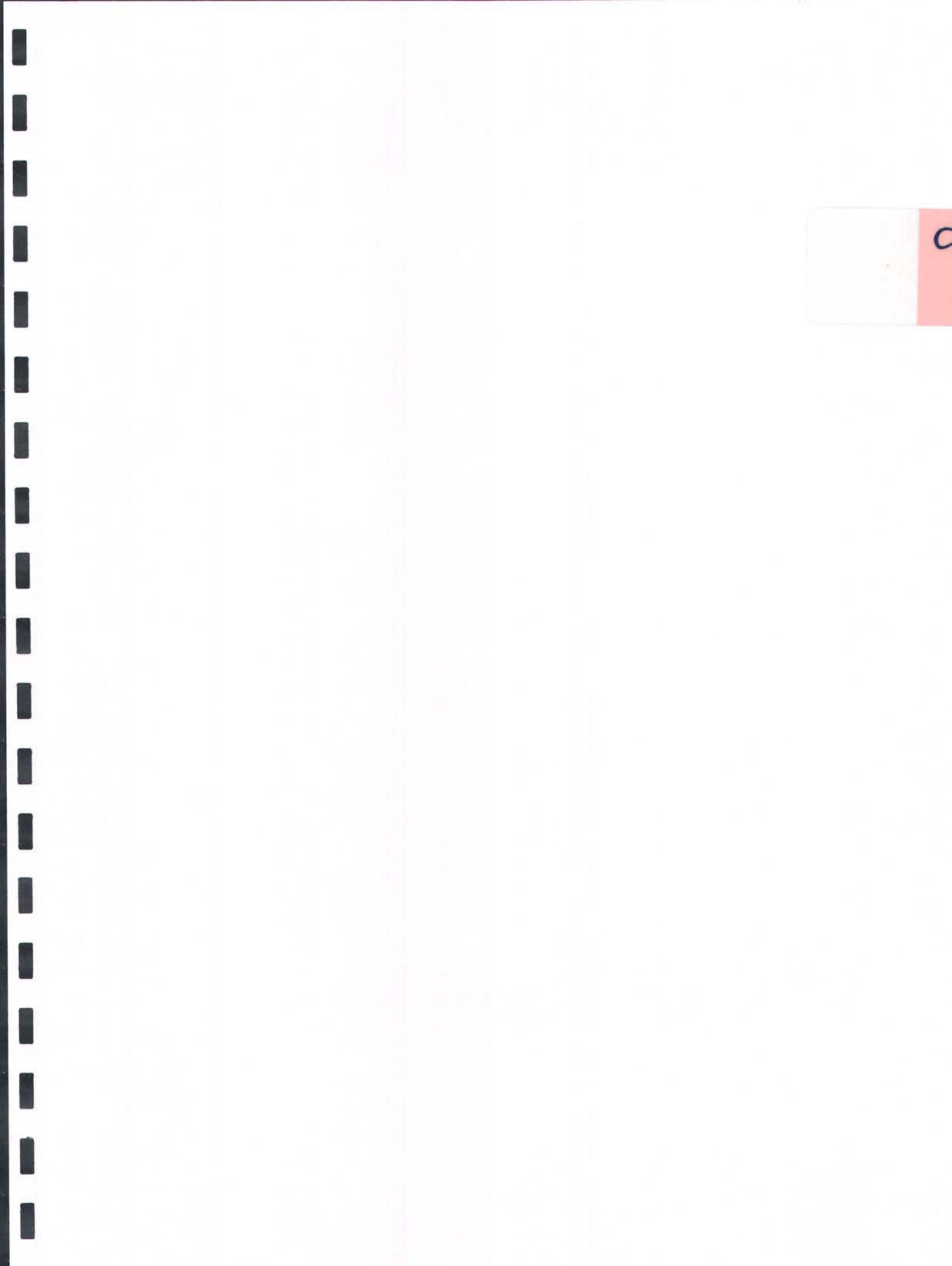


We're not sure why the thing works so well but the City's vision, public input, and the old road go in that end and a people and business-friendly place comes out this end.



Lockwood

The Thing Is ...



Unite North Metro Denver: The I-270/I-76 Reroute Alternative for I-70

The Colorado Department of Transportation is proposing a below grade highway in the present I-70 alignment to replace the elevated viaduct between Brighton Boulevard and Dahlia Street. This would involve widening the highway to ten lanes, including four managed toll lanes, and would incorporate four additional surface frontage lanes.

Another proposal, which CDOT refuses to fully examine, is to close I-70 between Wadsworth Boulevard and Central Park Boulevard, and to divert through traffic onto the current I-76 and I-270. It also advocates construction of a surface boulevard, similar to Martin Luther King, Jr. Boulevard, along what currently is 46th Avenue, and improving the road grid to disperse traffic and encourage alternative transportation. It would funnel traffic from DIA, Green Valley Ranch and Montebello into downtown Denver along Brighton Boulevard, and make this route the gateway into the city.

We believe that the CDOT proposal has the following negative features:

1. This project will leave a 300 ft. canyon (the length of a football field), 28 to 40 feet deep, with 8 to 12 foot sound barrier walls dividing the neighborhoods of Globeville, Elyria and Swansea from the rest of the city. This would only be mitigated by an 800 ft. cover over the approximately 8000 foot length of the cut.
2. The increased air pollution will be detrimental to neighborhoods with already elevated levels of cancer and asthma.
3. It would be extremely disruptive to the education of the students at Swansea Elementary School during the construction process and potentially harmful to their health after completion.
4. CDOT is considering public-private funding for the project, similar to what is occurring along Route 36. This would turn the highway into a partial toll road between Brighton Boulevard and the airport, increasing traffic congestion for local trips.
5. The complex construction process would disrupt traffic during the three to five year construction period.
6. Restriping the bridge over I-25 to create 3 lanes will create a traffic bottleneck for westbound traffic over I-25, and eventually would require widening the highway through Denver west of I-25.
7. There are unresolved issues of contaminated groundwater from ASARCO that will be treated and disposed of into the Platte River.

8. The project will cost a minimum of \$2 billion with no economic benefit to the city.
9. Covering part of I-70 with a park will attract residents to the most polluted part of the community over the interstate.

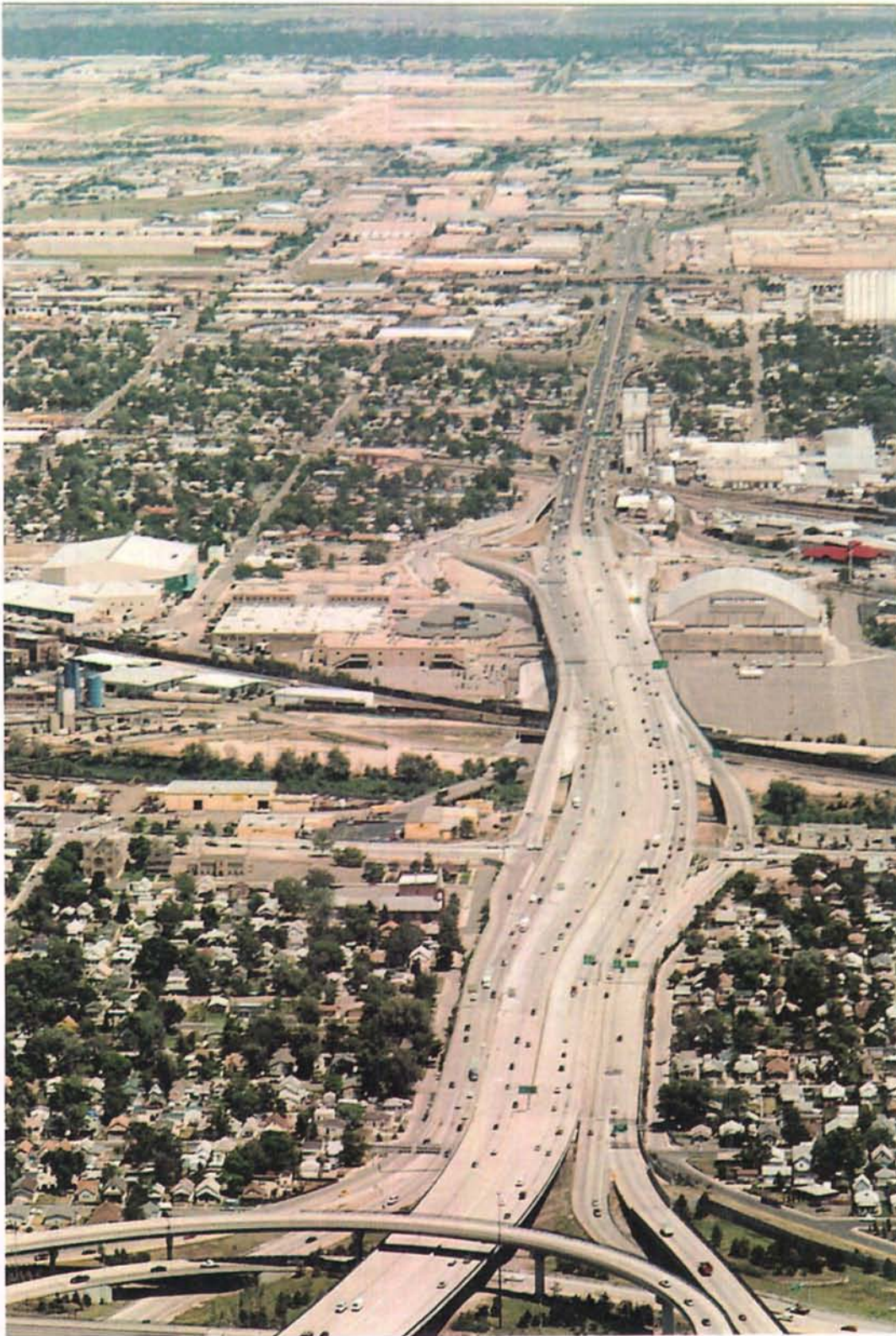
We believe the reroute proposal has the following potential advantages:

1. It will reintegrate the Globeville, Elyria and Swansea neighborhoods into the city.
2. It would allow provision of needed retail and commercial establishments serving the communities.
3. A survey of realtors estimates that removing the highway would increase residential property values by as much as 30%.
4. It would stimulate appropriate economic development along the I-270/I-76 corridor where almost no residential housing exists.
5. The construction of additional lanes along I-76 and I-270 prior to closing I-70 allows for less interruption of traffic during construction and a less complex construction process.
6. It provides Denver with an attractive entry from the airport for visitors to the city.
7. By providing easy access through surface level streets, it supports the development of the Stock Show complex for year-round events and activities at the Denver Coliseum.
8. It provides land almost half the size of Stapleton along the I-70 corridor for an estimated \$1.5 billion in direct and indirect economic development benefits.
9. It supports the development already taking place along Brighton Boulevard.
10. It enhances air quality for the communities and school children.
11. It improves traffic flow and reduces congestion on I-25.
12. It would cost between \$300 million and \$500 million less than the CDOT proposal.

The I-70 reroute option offers a once in a lifetime opportunity to beneficially redesign the northern half of Denver for the next fifty years. We are simply asking CDOT to fully examine this alternative by conducting a Draft Supplementary EIS before it is too late.

Web: www.UniteNorthMetroDenver.com

Today's Mousetrap



D

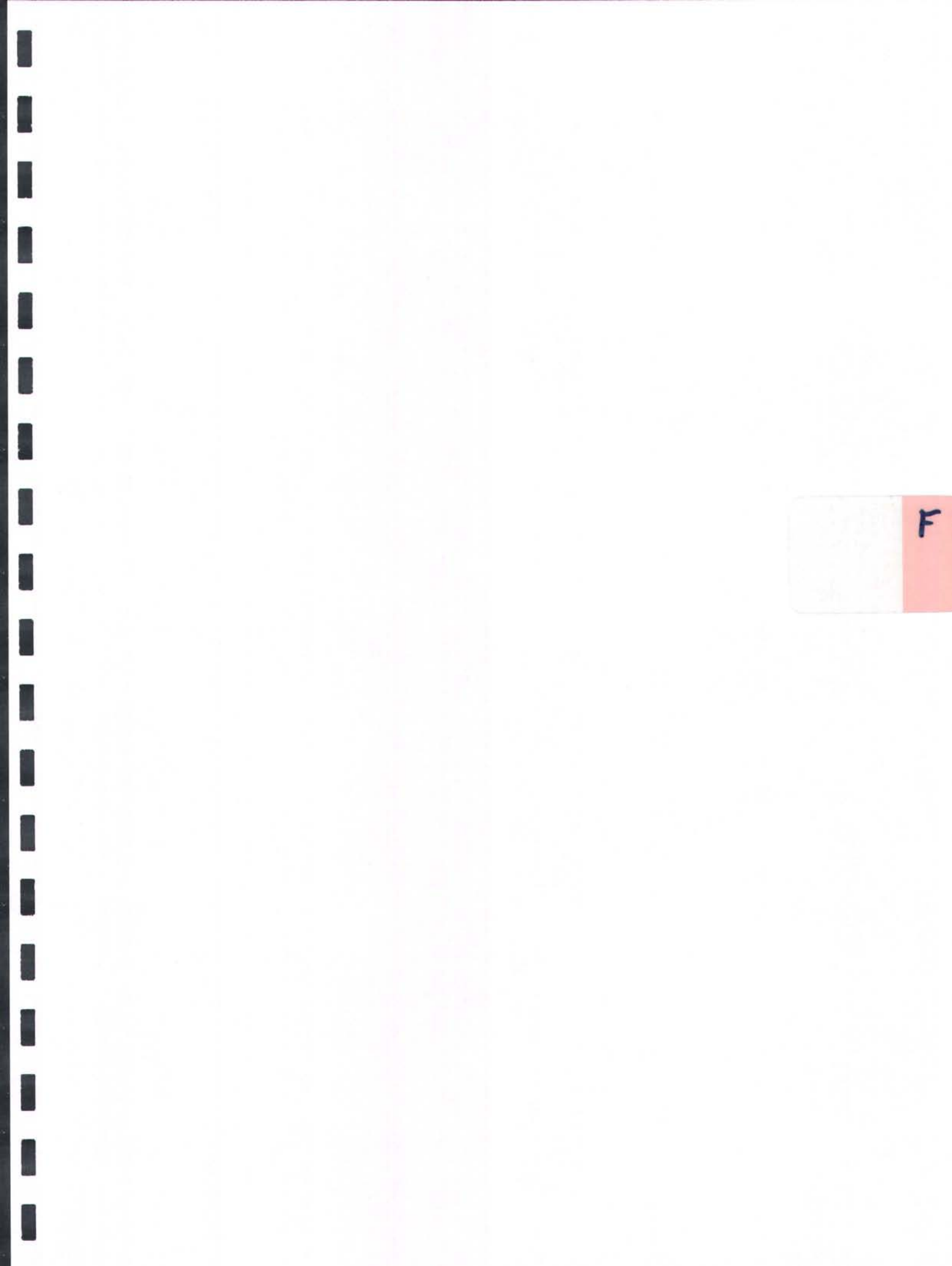
This is what we get when highway engineers do the work of urban planners.



E

A proposed widened, but still elevated, option [not CDOT's preferred alternative]. Fewer houses, fewer business and less of the Swansea Elementary playground is to be demolished compared to the trench.





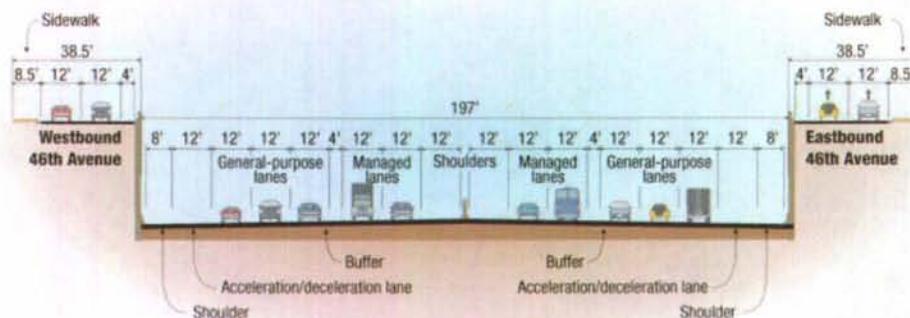
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Diagrams of What We Have Today and the Various Alternatives



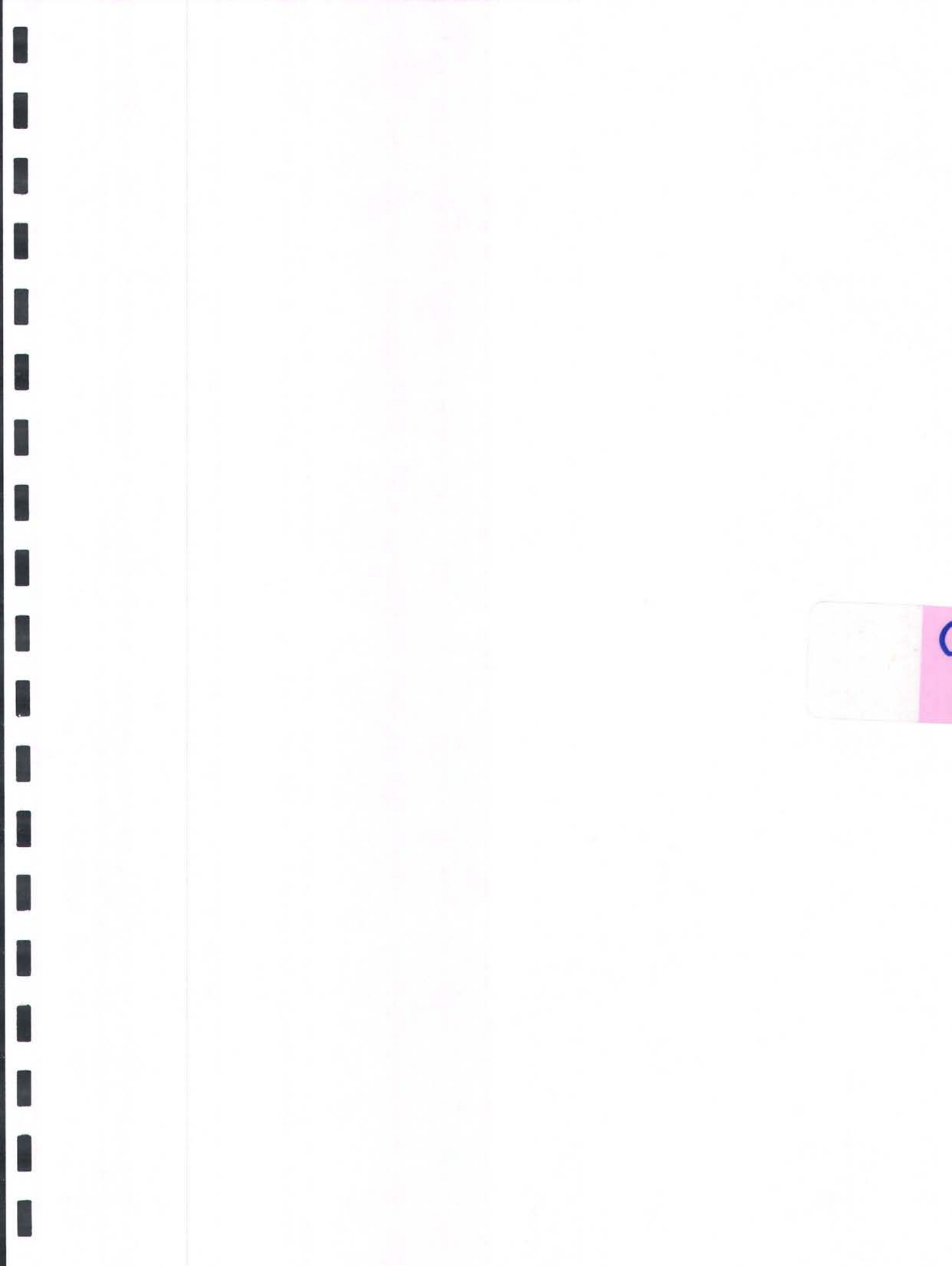
Diagram of Existing Highway

Figure 25 Typical section of the Partial Cover Lowered Alternative, Basic Option with managed lanes (between Brighton Boulevard and Colorado Boulevard)



Partial Cover Lowered Alternative with four toll lanes.

These images are courtesy of the I-70 East: Supplemental Draft Environmental Impact Statement and Section 4(F) Evaluation, Alternative Analysis Technical Report, Attachment C, pages 32 and 56.





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**I-70 East Reconstruction – Denver, Colorado
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Peer Review & White Paper**

October 15, 2014

I. Introduction

Representatives of the American Planning Association's Transportation Planning Division ("TPD team") were invited to Denver, CO to conduct a peer review of the I-70 East Reconstruction project ("I-70 East"). The peer review occurred September 22-23, 2014. During that time, the TPD team conducted a site visit along the I-70 corridor, met with representatives of the Colorado Department of Transportation ("CDOT"), the Denver Regional Council of Governments ("DRCOG"), the City and County of Denver, including the Office of the City Auditor and members of the City Council, representatives of the Colorado Chapter of the American Planning Association and members of the community at large. The TPD team wishes to thank and acknowledge their hard work and passionate commitment to Denver's well-being.

APA, as the nation's leading association of planning professionals, strives to understand the interrelatedness and long term consequences of decisions, balancing socioeconomic, infrastructure and environmental considerations that play into major civic initiatives. APA's Transportation Planning Division likewise exists to facilitate technical information sharing among member professionals who deal with ways transportation effectively and efficiently moves people and goods, shapes urban form, affects economic vitality and impacts quality of life. The Division promotes professional communication among its own members, with other APA divisions and with other professional groups. We assess policies, programs and projects, so as to derive the full public benefits of comprehensive and community-based planning that promote personal mobility and travel choices.

The I-70 East project is one of the most significant public infrastructure investments planned for metropolitan Denver and all of APA's policy considerations are vitally important to project success. It should be noted as well that, as a peer review panel, the TPD team offers its insights and guidance for



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the benefit of all stakeholders involved in the local-decision making process. We are not submitting this report to CDOT as a formal comment on the Draft Environmental Impact Statement for the I-70 East Project. Instead we are offering our insights to the City and County of Denver for your consideration as you move forward with next steps in relation to this project. We do not offer recommendations, but rather considerations that advance project planning in a meaningful way. Likewise, our findings will be shared with transportation professionals across the nation, many of whom are involved with similar projects as so many similar-era highway viaducts reach the end of their useful life. We would also like to emphasize that we were invited to offer an outside perspective on this project. We do not presume to portray that after two days of meetings with numerous groups and after reviewing written documents, we know as much about this project as the many people we met with, nor do we know what is "right" for the community, but do offer a fresh pair of eyes at a key point in the planning process. And we do believe that it is critical for CDOT, DRCOG and Denver to "get it right."

II. Planning Themes & Policy Guidance

Interstate 70 runs east-west from Maryland to Utah and serves local, regional and national transportation functions. As with many such facilities across the country, sections of I-70 were built within a settled urban environment. These areas are often characterized by intense urban redevelopment, a history of highway-related takings and urban mixed use development patterns. The Denver section in the Globeville, Elyria and Swansea neighborhoods exhibits many of these qualities and is therefore a focus of this peer review.

According to CDOT, the purpose of this project is to "replace the bridge between Brighton Boulevard and Colorado Boulevard, because it is 50 years old and nearing the end of its useful life. Also, our goal is to resolve congestion, make the interstate safer, and make it easier to get on and off the highway." (Source: "I-70 East Project Snapshot," September 2014, p. 4.)

Currently, I-70 is a six-lane freeway on a viaduct. The CDOT would prefer to construct a 10-lane freeway section in a trench meeting full AASHTO design criteria (i.e., 12-foot lanes, 12-foot shoulders, etc). The new 10-lane freeway will be comprised of six mainline lanes and four managed lanes. CDOT also



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proposes to modify and maintain the interchange at Vasquez Boulevard, which is located approximately ½-mile west of the Colorado Boulevard interchange.

At this point in the process, CDOT has released its supplemental draft environment impact statement (DEIS) for public comment. The preferred alternative of CDOT and the Federal Highway Administration (FHWA) is known as the Partial Covered Lowered Alternative. While this document will not restate the design features and project scope, it is important to note that I-70 East is being undertaken pursuant to MAP-21, which includes new and progressive approaches to transportation system management. MAP-21 places a renewed emphasis on system preservation/improvement, economic growth, safety and innovative approaches to project financing. CDOT reflects many of these qualities in its purpose and need statement for the I-70 East project. The observations and considerations below are provided to inform and further align project elements with national and state project objectives.

The federal project development and EIS process is very time consuming and that makes it difficult to hold a plan, let alone a constituency for the plan, together over a decade of analysis, revision and supplemental information. This is not unique to I-70 East, hence Congressional intent in MAP-21 to streamline the project development and construction process. That is difficult to do while maintaining a transparent and meaningful dialogue, but there are some good models, including Florida's Efficient Transportation Decision Making (ETDM) process (<http://www.dot.state.fl.us/emo/ETDM.shtm>), which includes environmental and socio-cultural effects screening of projects as part of the MPO Long Range Transportation Plan. The TPD team can make available other resources as the project moves forward.

III. Observations

This section covers the eight key observations of the TPD team. Each of the observations includes some insight from the peer review and research, together with paths forward for consideration by CDOT and other stakeholders. As a prevailing theme, it is noted that CDOT is proposing to spend \$1.2 billion on this project. This is a significant public investment in infrastructure that will benefit the entire state of Colorado, the City and County of Denver and the above-mentioned neighborhoods. However, it is the adjoining neighborhoods that will bear significant impacts from this project. CDOT, DRCOG, the City and County of Denver all offered thoughts on neighborhood revitalization, but likewise recognized that



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resources must be brought to the table in order to correct historic injustices, modernize facilities and restore the integrity and stability of these neighborhoods.

Understandably, the traveling public will not be interested in the finer details as to which public agency has responsibility for planning, designing, constructing and operating public roads; rather they want an integrated system and expect the various jurisdictions to cooperate in all phases of the decision-making process. These observations, therefore, are intended to guide public agencies through the complexities of the project to distill a progressive "way forward".

#1 - Transportation System Planning:

As a general note, the TPD team observed that there was not a common understanding among transportation agencies, other public agencies, and neighborhood groups regarding the transportation system as a whole and the specific role of I-70 within that system. To the point made earlier about the lengthy planning stage for this project, there appears to be a lack of a system planning approach that could have been updated together with the supplemental DEIS. The influence of I-70 in the Denver metro region is significant, and its long-term role relative to the parallel and connecting roadway network, existing and emerging transit network, , and non-auto transportation modes needs to be examined in a comprehensive, integrated manner. In addition, the transportation network must be evaluated in relation to existing land uses, and how those uses are expected to evolve over the next 30-50 years. The importance of coordinated transportation system and land use planning manifests itself in myriad ways that could help to resolve conflicts and broker compromise solutions that achieve positive outcomes for all parties.

Likewise, there appears to be a legitimate question about whether the recommended design alternative is fully consistent with the DRCOG's Regional Transportation Plan. That reflects some ambiguity on the part of the Transportation Plan, or lack of attention on the part of CDOT to affirm consistency by requesting amendment of the Transportation Plan as project concepts evolved. Re-connecting these efforts going forward is both required and informative for the system as a whole.



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Further, a system planning approach should result in broad agreement over the range of multimodal strategies necessary to address future travel demand while minimizing adverse impacts on existing communities, public health, the environment and fiscal efficiency. There appears to be little accomplished in the I-70 corridor planning process to develop and support a carefully thought-out multimodal strategy.

It is unclear if there is a regional freight/goods movement plan with sufficient detail to guide route planning and operational strategies, which are critical in the I-70 corridor. This should be closely linked to evolving land use patterns guiding the location of industrial, warehouse/distribution and intermodal facilities. Signage, wayfinding and operational parameters should all be part of the consideration. We offer an example from the Florida Department of Transportation (<http://tampabayfreight.com/>) that strategically addresses regional freight mobility and accessibility within context-sensitive solutions that reflect economic development, changing land uses and community redevelopment efforts.

There appear to be no vehicle miles traveled ("VMT") targets set for the corridor that would account for anticipated growth/change in development over time and the application of complementary strategies designed to reduce VMT. It was difficult to determine if VMT and other system planning measures (travel time, vehicle hours of delay, person hours of delay, etc.) comparisons were made for initial and refined alternatives. This is important in part because there is extensive research that indicates that VMT is strongly correlated with the production of CO₂ in the atmosphere, which in turn is leading to climate change at a global scale (see for example, TPD peer review panelist, Reid Ewing et al, [Growing Cooler: The Evidence on Urban Development and Climate Change](#)).

The role of arterial and local streets, and non-auto networks, in the corridor remains relatively vague in the context of CDOT's preferred alternative for I-70 East. There is indeed a lack of connectivity in the I-70 corridor section, and while the plan attempts to resolve those issues, there appears to be little agreement on role and function of using the non-interstate network part of the corridor to address connectivity and mitigate travel demand, thus enabling a narrower interstate footprint.

Transit is virtually missing from the conversation in part because transit investments are not directly tied to the I-70 East project proposal. This is unfortunate because the Denver community is truly embracing transit. If there were agreed-upon system-wide and corridor-level VMT and mode share goals, then transit and the role of Transportation Demand Management programs, park-and-ride, shuttle circulators,



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and parking management strategies in major activity centers served by I-70 and I-25 would be a bigger part of the corridor plan.

A stronger focus on how the corridor functions as part of the system, with roles and responsibilities defined, will make it easier for CDOT, local government, partner agencies and local neighborhoods to agree upon strategies for the corridor that balance competing interests and achieve key shared objectives.

#2 - Travel Demand Modeling:

DRCOG is responsible for maintaining the regional travel demand model used as a basis for analysis of travel demand in the I-70 corridor, development, screening and evaluation of alternatives. Yet, there appears to be a general lack of confidence that the model provided reasonably accurate forecasts, with CDOT and others citing it as "using what we have available" or "what was provided to us."

During our on-site interviews, the panel was told that CDOT, and its lead consultant on the I-70 project, Atkins North American, established the need for a 10-lane cross section on I-70 using the DRCOG old travel demand model and the DRCOG old future land use forecast for 2035. We were told they did not test a full range of highway project alternatives. CDOT referred us to DRCOG, and DRCOG referred us to CDOT. A follow-up conference call with key personnel at CDOT and Atkins confirmed what we were told previously. Submitting to an interview was an exceptionally collegial gesture on the part of CDOT, as they are in the comment period for the Supplemental EIS and ordinarily would not provide additional information. While CDOT specifically asked that any conclusions we reach as a panel be submitted as formal comments, the TPD team will not do so directly. However, interested stakeholders may draw from the questions we presented to DRCOG:

- Was an 8-lane cross section (3 general purpose lanes and one managed lane in each direction) ever tested using the DRCOG travel demand model? Was an alternative that did not involve frontage roads on both sides ever tested? With the 10-lane section and frontage roads, the preferred alternative cross section is wider than a football field is long. It would maximize rather than minimize impact on the abutting Environmental Justice neighborhoods. Our on-site



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interviews suggested that an 8-lane cross section was screened out initially and not actually run as a network alternative using the model. This was confirmed in the conference call. It would be important to determine if an 8-lane section would have sufficient capacity in the horizon year before moving to a 10-lane section, given the severe impacts on neighborhoods along the alignment. The fact that the project runs through minority neighborhoods makes it all the more important that the cross section adopted have the absolute minimum width that would meet the purpose and need requirements of the project. Given the desire to minimize impacts on minority neighborhoods, the panel recommends that an 8-lane section, with and without frontage roads, be tested by CDOT and Atkins as lower impact alternatives to a 10-lane widening with frontage roads. Was the 10-lane section tested using DRCOG's new Focus travel demand model? From our conference call, the answer is no. Focus, which became operational in 2010, is an activity-based model that generates trip tours (linked trips such as stopping on the way home from work to do shopping) rather than individual trips. It is state-of-the-art. It accounts for peak spreading, the tendency of travelers to change their time of departure when faced with congestion. Instead, the old travel demand modeling software, Compass, was used by Atkins. Compass is a trip-based model that treats trips as though they are independent of one another rather than linked into tours; it does not account for peak spreading. Atkins is not one of the consulting firms that has worked with Focus. This was confirmed in our conference call. The rationale for the decision to use Compass rather than Focus was the instability of tour generation with Focus, whereas trip generation with Compass is stable from model iteration to iteration. It was also suggested during the conference call that FTA and FHWA have a problem with Focus because tour generation may differ across alternatives in an alternatives analysis, creating an "apples and oranges" comparison. We don't find these rationales compelling and recommend that Focus be used to test the 8- and 10-lane sectional alternatives. (DynusT, the traffic simulation program used by Atkins/CDOT, does account for peak spreading. It is unclear to the panel whether this fully corrects for the failure of Compass to account for peak spreading in the initial phase of travel modeling.)

- Was traffic induced by the 10-lane section accounted for by CDOT and Atkins? The answer is no. It is now widely accepted that major highway projects like the proposed I-70 widening create new travel demands both in the short run, by generating additional trips, and in the long run, by



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altering development patterns. The old Compass model, used in this case, accounts for rerouted trips but not newly generated trips because (in this four-step model) trip generation is assumed to be a simple function of socioeconomics and not affected by roadway levels of service. The new Focus model does account for newly generated trips, but was not used by Atkins (see above). Again, the panel recommends that Focus be used to test the 8- and 10-lane sectional alternatives, with and without frontage roads.

- Was highway induced development accounted for by CDOT and Atkins? The answer is no. DRCOG's old spreadsheet based land use allocation model was the basis for the 2035 land use inputs used by Atkins. It does not account for the development inducing effects of a major highway project like I-70. Future land use patterns assumed as the major inputs to DRCOG's Compass model were the same for build and no-build alternatives. This violates best modeling practices and leaves the project open to technical criticism. DRCOG's new UrbanSim model includes much more realistic treatment of development decisions, and can account for highway induced development. It was not used by Atkins in its modeling work because it was not available until recently, but it is operational now. The panel recommends that UrbanSim be used to test the 8- and 10-lane sections.
- What are operational characteristics (LOS) for different sections of I-70 in the horizon year? Common sense suggests that there will be a serious bottleneck for westbound traffic created by having the 10-lane section of I-70 transition down to 6 lanes to the west of the project. The panel finds it hard to believe that the transition will be a smooth one and that westbound traffic will not back up terribly. An 8-lane cross section would produce a smoother transition to the 6-lane section, and that consideration is among the reasons why it should be tested.

The TPD team emphasizes that the size and scale of a transportation facility is fundamentally based on the forecast demand model. Understanding the assumptions and findings is critical to making an informed decision on the number of lanes, regular and/or managed. The basic problem, as the panel sees it, is that planning for I-70 improvements began more than 10 years ago, and the practice of modeling by CDOT and Atkins has not kept pace with best modeling practices. The methodology memo



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hammered out between CDOT and FHWA at the beginning of the process no longer serves the project partners well.

#3 - Managed Lanes:

The preferred alternative identified by CDOT and analyzed in the DEIS includes a "managed lanes" option. In the DEIS, CDOT discusses the "managed lanes" option as follows:

General-purpose lanes are traffic lanes that do not apply any restrictions to the vehicles using them. Managed lanes implement operational strategies that will be adjusted based on real-time traffic demand on the highway facility. This is accomplished by providing a specially managed travel lane for vehicles to avoid congestion and travel at a higher speed than the general-purpose lanes. The purpose is to provide a reliable, congestion-free option along the highway and provide a way to manage congestion over the long term to reduce the need for future expansion. The Build Alternatives Managed Lanes Option only manages the added capacity. Existing capacity remains as general-purpose lanes. (DEIS, p. 3-18.)

The DEIS also indicates that "the pricing and policies for the managed lanes will be determined through a separate study." (DEIS, p. 3-19).

While it is encouraging to see that CDOT is considering a "managed lanes" option for the project, it is our observation that the use of managed lanes in this corridor could have a significant influence on the overall functionality of this corridor that is not necessarily being taken into account in the planning for this particular project. The Federal Highway Administration (FHWA) has observed that transportation agencies across the country are developing "managed lanes" systems, particularly in urban centers, and that these managed lanes systems can be designed to meet a variety of specific operational goals.

FHWA provides an overview of the managed lanes concept on its agency website

http://ops.fhwa.dot.gov/publications/managelanes_primer/ FHWA defines "Managed lanes" "as highway facilities or a set of lanes where operational strategies are proactively implemented and managed in response to changing conditions." Exhibit 1 is a diagram that captures the potential lane management



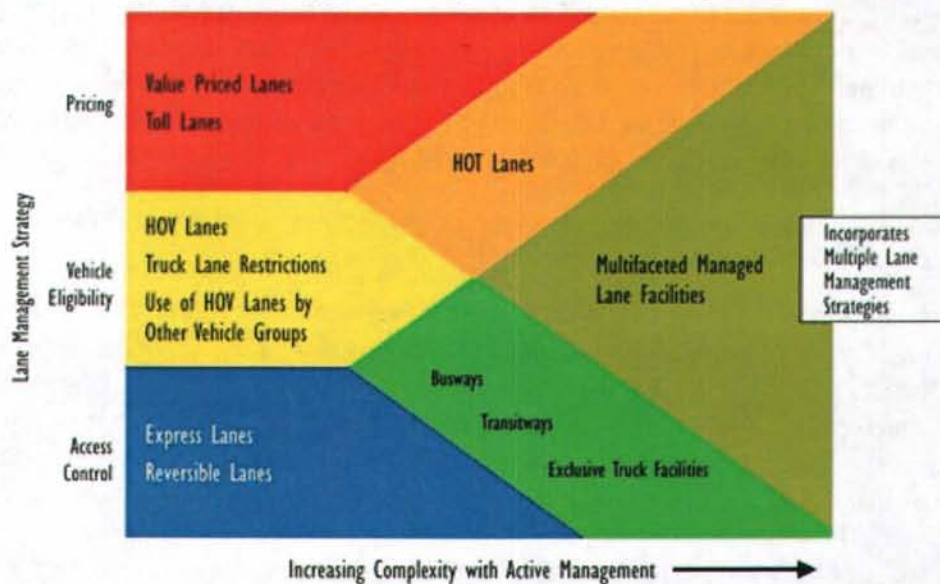
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applications that fall into this broad definition of "managed lanes." On the left of the diagram are the applications of a single operational strategy—pricing, vehicle eligibility, or access control:

- Pricing — Includes both traditional toll lanes and toll lanes that use congestion pricing, where price is varied during certain time periods in order to manage demand (e.g., peak-period surcharge or off-peak discount).
- Vehicle eligibility — The lanes are managed by allowing certain vehicles or restricting others; minimum occupancy is an example of an eligibility restriction.
- Access control — An example would be express lanes where all vehicles are allowed but access is limited during long stretches of the facility, minimizing turbulence in the flow of vehicles.

Exhibit 1: Managed Lane Applications (source: Federal Highway Administration)



As you move to the right on the diagram, you get into the more complicated managed lane facilities that blend more than one of these strategies:



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- Combined pricing and eligibility — HOT lanes where higher occupancy vehicles such as buses, vanpools and carpools are given free or discounted passage and all other vehicles are tolled.
- Combined vehicle eligibility and access control — Examples include exclusive busways, transitways or truck facilities serving a specific type of vehicle, with barrier separation and limited access points
- Multifaceted managed lanes — Integrates all strategies for an actively managed facility that incorporates a high degree of operational flexibility

On its website, FHWA also provides examples of a variety of different operational goals that can be met through the proper design and operation of a managed lanes system. It should also be noted that there is a growing body of research on managed lanes systems that is available at this time, some of which is referenced on the FHWA website.

From our collective experience, we believe that a well-designed managed lane system concept for the I-70 corridor, which is integrated into a larger managed lane system plan for the Metropolitan Denver highway system, and is also connected to the regional and local transit system, would lead better future performance for the entire system, and would also allow for better-informed decisions regarding the specific lane configurations and access points for the I-70 East segment.

We also believe that it will be very important for CDOT and the other transportation agencies that are involved in this planning process to do a better job in explaining the “managed lane” concepts that are under consideration. It was our impression from the meetings we attended with community stakeholders and elected officials that many of them do not have a good understanding of “managed lanes” applications, and that there may be unnecessary fears regarding how the use of these applications would affect public access to the highway system and the cost of using the system.



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#4 - Community and Economic Development:

Considerable efforts are being made to develop cohesive community and economic development plans in tandem with the I-70 East project. The recently-launched North Denver Cornerstone Collaborative together with Council activities are at the heart of this effort and it is very important to move forward ahead of a record of decision. Planning documents, adopted and approved, will provide a framework that will inform the final preferred I-70 East design alternative, articulate desired mitigation efforts and lay the foundation for implementation of land use, economic and community development efforts before, during and post-construction. The City's commitment is well-timed and vital to building a trusting partnership with the community over the next decade.

We heard several times the need to establish (or re-establish) "connectivity" in the adjoining neighborhoods. The actual solutions ranged considerably - from new crossings over the rail tracks, to new street connections, frontage roads and so on. An immediate and iterative process to settle on a set of recommendations to improve connectivity and accessibility should be a priority and efforts to achieve consensus are well worth the effort. Since the cost of such improvements is at the heart of discussions between the City and CDOT, the record of decision (or parallel city/state memorandum of understanding) should lay out the responsibilities of each party. Once construction begins, it will be much more difficult to "go back" and revisit these decisions.

In addition, the panel understood from its conversation with CDOT staff that there will be significant investments to improve storm water drainage and these investments will also benefit the adjacent neighborhoods, which have historically had drainage problems. The TPD commends CDOT for working with the City and County of Denver and the neighborhood to solve this problem across jurisdictional boundaries. However, we did not get the impression from our meeting with community leaders that they were aware of the potential benefits to the neighborhood storm water drainage systems from this project; we believe this issue needs to be addressed more directly by CDOT and the City in their future discussions with the community leaders.

Regardless of the selected alternative, deconstruction of the actual viaduct (let alone other construction work) will be lengthy and disruptive. We do not believe, however, that the true impacts of construction



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activities are commonly understood. Since a preferred alternative has not been selected and more detailed design work will not accelerate for some time, it is important to maintain close contact as design moves forward in order to fully understand these impacts.

During this interim period, we do believe it is important for the City as well to plan for the construction period in part by reaching agreement regarding CDOT's responsibilities during construction. For example, the City may wish to further its efforts to improve the business/resident relationship. One example (of many good ones) would be a good-neighbor compact with local businesses and trucking companies to clamp down on "cutting through" residential streets. The same, of course, goes for CDOT's contractors who will likely be subject to noise and air quality monitoring, but could benefit as well from commonly-agreed to times of construction, haul routes, etc.

Likewise, the implementation of advance projects to facilitate connectivity and alternate routes is well-advised. That work is underway and should continue. It was unclear as to whether added capacity along the northerly alternate route, I-270, would be implemented prior to I-70 East construction work but that is an important early decision.

#5 - Constructability & Construction Impacts:

It is clear that whatever alternative is pursued, other than the "do-nothing" alternative, that the neighborhoods adjacent to I-70 will be significantly impacted during construction. These impacts will include impacts from construction activities, including: dust, noise and vibration, and other impacts resulting from the project including: disruption of circulation on local streets, possible diversion of trucks through the neighborhood from the adjacent industrial areas. However, these impacts will be limited in time to the duration of the project. Other impacts will be much longer in term, including the taking of homes and the major adjustments to the playground for the Swansea Elementary School.

#6 - Vasquez Interchange Design Consideration:

The TPD team also reviewed an option studied by the City and believes that consideration should be given to closing the interchange at Vasquez. This would result in a significant area that could be



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redeveloped for the benefit of the neighborhood to accommodate mixed income housing and neighborhood-serving retail and community or civic uses. The neighborhood is interested in a grocery store, for example. The land may also provide a good alternative for a relocated elementary school. The TPD team understands that Commerce City officials believe this interchange is necessary for truck traffic from their community; hence the importance of an integrated context-sensitive freight system plan.

#7 - Mobility During Construction:

The TPD team recognized that CDOT and the City and County of Denver and the City of Commerce City are all mindful of the significant construction-related impacts. However, it was not apparent to the TPD team that the stakeholders have resolved the "advance package" of mobility-related projects. Clearly, adding lanes to I-270 before the I-70 project begins will help alleviate construction traffic concerns. Similarly, addressing neighborhood circulation issues through multimodal accessibility and connectivity enhancements before construction of I-70 begins will minimize the disruption to local circulation during construction. The timing of projects matters and the advance work should be well into design in order to ensure project delivery prior to the start of intensive I-70 East construction.

#8 - Community Engagement Process:

During our meeting with community leaders, we heard a significant amount of criticism about the community engagement process conducted by CDOT, in collaboration with the City and County of Denver. We were told that the "open house" community meetings conducted by CDOT did not provide opportunities for the community leaders to engage in group discussions with CDOT and the City representatives to help build community consensus regarding issues of concern to them, and that there was not a clear understanding of how CDOT and the City would be taking specific comments received from the public and responding to them directly. We believe that in the future CDOT and the City of Denver staff should work collaboratively to develop a more robust community engagement process, with participation from other interested public agencies such as DRCOG, the regional transit agency, and neighboring cities, along with community and neighborhood residents, business owners and other stakeholders. While one-on-one exploration of maps and design plans with CDOT representatives is an important component of increasing understanding, such a tactic – absent community forums in which



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everyone can hear questions and responses – falls short of achieving meaningful participation that is important to building community consensus.

One “success story” in this realm that should be considered is the I-15 / 40th Street Freeway Project in San Diego. In the early 1990s, the California Department of Transportation (Caltrans) was evaluating options for extending I-15 through some disadvantaged neighborhoods in the Mid-city area south of I-8. Through its planning process, Caltrans became aware of significant community concerns regarding the possible impacts of the highway project on their neighborhoods. This ultimately led to a collaborative planning and community engagement process that included the City of San Diego, Metropolitan Transit District Board, and many other stakeholder groups and community representatives. The result was that Caltrans selected a preferred alternative for this 2.2-mile corridor that was designed to minimize community impacts while at the same time improving the functionality of regional transportation system. In addition, Caltrans and the City entered into a formal Memorandum of Understanding that laid out the specific community improvements that were agreed to (including covers over the freeway at key locations), and identified the responsible parties for each of these improvements. The MOU also laid out mutual understandings regarding highway operation issues and specifically addressed future linkages of a planned regional transit line in the I-15 corridor to existing and planned transit routes serving the community, through elevators to be installed on the intersecting boulevards that would connect to center-median transit stations on I-15 (see attached article and exhibits). Caltrans received an Honorable Mention for this project in the 2002 FHWA Transportation Planning Excellence Award Program.

The APA Transportation Planning Division would be willing to provide more detailed information on this project and its community engagement process for consideration by CDOT and the City and County of Denver, and would also be willing to provide additional assistance to CDOT and the City in designing a similar community outreach and collaboration process for the I-70 East Project as it moves into its next phases of planning and project development.

IV. Organization, Roles and Responsibilities

The TPD team met with numerous stakeholders over the course of the two-day peer review exercise. It is worth noting that these meetings were illuminating from the perspective of partnership and



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coordination. In part because the I-70 East project is now in a critically-important public review phase, stakeholders are both framing their positions on the preferred alternative and planning for the short- and long-term impacts of the project moving forward. At some point in the near future, a project will move forward and it is vitally important for all stakeholders to recognize and embrace their roles. Project success will not be determined solely by the actions of the CDOT as the primary sponsor. Rather Denver, DRCOG, the local neighborhoods and business communities and adjoining municipalities will all need to come to the table in meaningful ways.

The clearest early manifestation is the above-referenced North Denver Cornerstone Collaborative. It was not apparent during our short visit that the Collaborative has truly "launched" with stakeholder buy-in and engagement. This is a key first step which will lead to concrete short- and long-term steps to improve the most-impacted communities. Likewise, it is incumbent on DRCOG to embrace a more meaningful role in system-wide planning and travel demand forecasting. As planners, we are responsible for not only the regulatory aspects of plan development, but also their relevance as a decision-making tool. Finally, as the project sponsor, CDOT is understandably pushing hard to move a project forward.

There will be a point in the process – during preliminary design at the latest – when all stakeholders need to be brought back to the table in a coordinating fashion in order for all parties to stay aligned on construction staging, contractor specifications as they relate to mitigation activities, design features, communications, detours, alternatives routes, the "leave-behind" condition for local roads, surplus land and the non-access line and so on. This process would ideally lead to an I-70 East coordinating committee led jointly by the City and County together with CDOT.

V. National Applicability

As noted in the introduction to this report, many state transportation agencies, regional transportation planning agencies and local governments are now wrestling with the same difficult issues regarding replacement of aging viaducts as is CDOT and the City and County of Denver. A recent report by the Congress of New Urbanism <http://www.cnu.org/highways/freewayswithoutfutures> identifies a significant number of viaducts that are in need of replacement, and provides some additional examples regarding the options being considered for these projects. APA Transportation Planning Division will be sharing our



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observations regarding the I-70 East Project, and lessons learned that could be applied to other projects involving replacement of existing viaducts, with our members and colleagues.

VI. Closing

The TPD team again wishes to thank all of the stakeholders who assisted with the peer review and took the time to meet with us, both in Denver and in follow up conversations. Our hosts were extremely gracious and welcoming during a sensitive phase of the project. We were able to have honest and thoughtful discussions which, when taken as a whole, offered a unique perspective on the project. The findings and insights contained herein reflect both a situation analysis and pathway forward. To that end, the Transportation Planning Division and members of the TPD team are available to you to assist and provide further details on any of the matters discussed herein.



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Peer Review Panelists

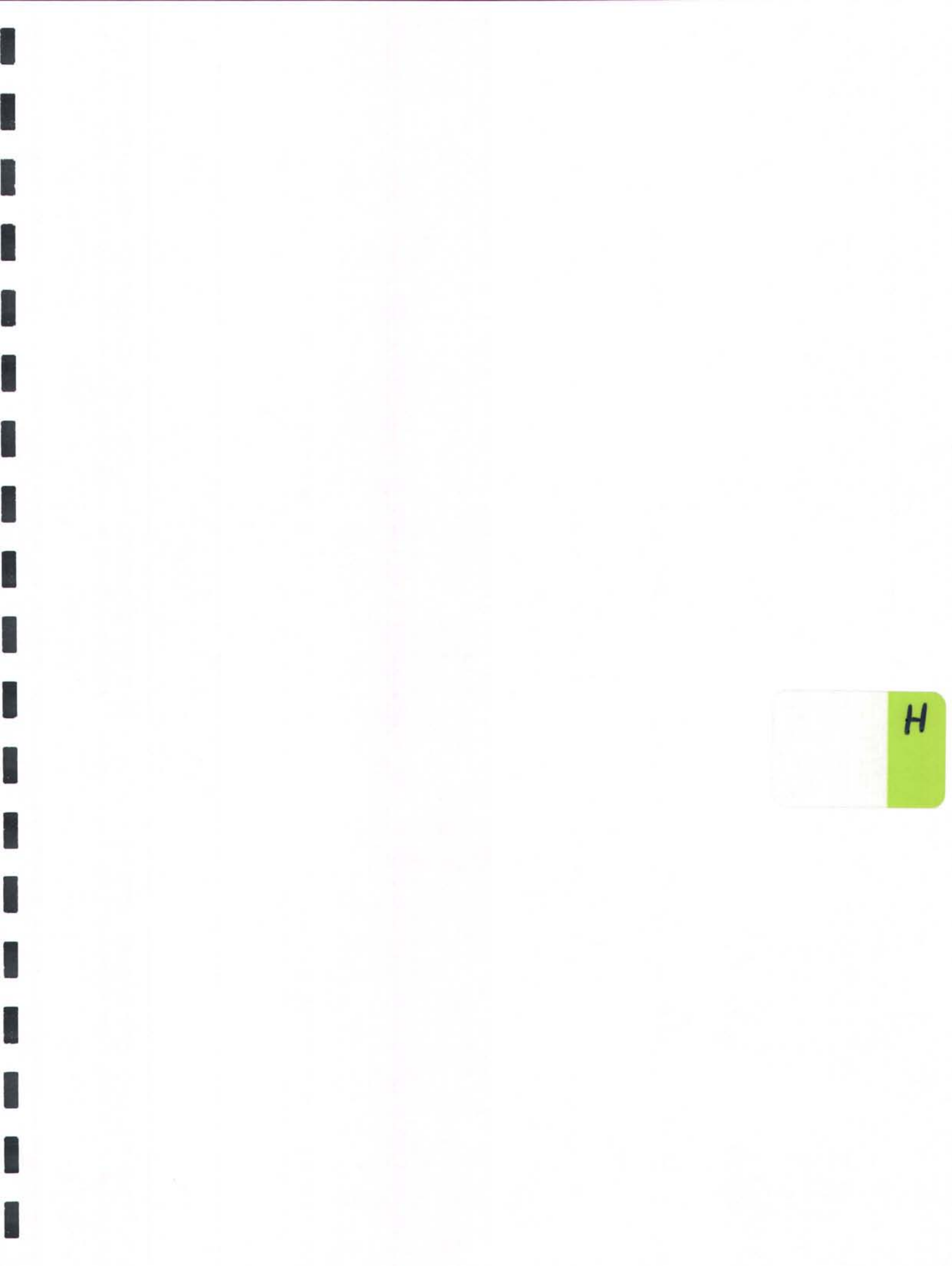
Whit Blanton, FAICP
Vice President and Principal
Renaissance Planning Group
Orlando, FL

Thomas Dow, AICP
Transportation Manager
City of Olathe, KS

Reid Ewing, Ph.D.
Professor of City and Metropolitan Planning & Director of the Metropolitan Research Center
University of Utah
Salt Lake City, UT

Robert A. Leiter, FAICP
Urban and Environmental Planning Consultant
San Diego CA

Michael Piscitelli, AICP
Deputy Economic Development Administrator
City of New Haven, CT



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THE SUPPLEMENTAL DRAFT EIS FOR PROPOSED EXPANSION OF I-70 EAST MUST BE REVISED TO ADEQUATELY DISCLOSE IMPACTS OF EMISSIONS ON COMMUNITY HEALTH AND AIR QUALITY.

**By
Robert E. Yuhnke**

Executive Summary.

The SUPPLEMENTAL DRAFT EIS (SDEIS) for the proposed expansion of I-70 EAST is Not Adequate because the impacts of air pollutants emitted from the Project on the health of near-by residents and on air quality are not investigated or disclosed, and alternatives and/or mitigation needed to enhance the health of nearby communities, and to prevent or avoid violations of national ambient air quality standards have not been identified.

Health Impact Assessment Required.

Evidence documented by Denver Environmental Health showing disparate health outcomes for residents in the Globeville/Elyria/Swansea neighborhoods and the city council districts where I-70 is located compared to other council districts in Denver, including a 50% higher incidence of mortality related to cardiovascular disease, 50,000 more years of life lost annually, and 40% greater rate of hospitalization of children for asthma, demonstrate that these residents are disproportionately affected by the diseases of air pollution. The contribution that emissions from current vehicle travel on heavily trafficked highways such as I-70 make to these adverse community health outcomes must be evaluated, disclosed to decisionmakers and the public, and considered in the evaluation of alternatives to determine the extent to which community health can be enhanced by not increasing exposure to traffic pollution in these neighborhoods.

Modeling of all Mobile Source-Related NAAQS Required.

Both emissions from an expected 30% increase in traffic traveling in the I-70 Project area, and emissions during construction of the project from heavy equipment, could cause violations of national ambient air quality standards (NAAQS) in the Project area. The Clean Air Act (CAA), Part C, requires that States adopt an implementation plan containing control measures to prevent violations of NAAQS in areas that currently attain the NAAQS. If violations of these air quality standards occur, the CAA requires that the plan for the area be revised to reduce ambient concentrations below the level of the NAAQS. 40 CFR §51.160. Violations trigger obligations to develop and implement a control strategy to eliminate the NAAQS violations, and imposes limitations on the permitting of new or modified sources. Preventing violations of the NAAQS protects public health by avoiding pollutant concentrations known to be harmful, is cheaper than requiring emission reductions after violations occur, and is less burdensome on other emission sources.

Consideration of Alternatives and Mitigation Measures to Reduce Public Exposure to Harmful Pollutants, and to Ensure Attainment of NAAQS Required.

The proposed Project is proposed to accommodate at least a 30% increase in traffic and related increases in pollutant exposures in an area where traffic pollution is currently contributing to adverse health impacts in nearby communities. Not included in the analysis are reasonable

alternatives and mitigation measures that enhance the human environment by reducing public exposure to these harmful pollutants. At a minimum, the SDEIS must include an evaluation of measures such as, but not limited to, diverting future traffic to other interstate alignments (I-76 and I-270) where commercial and industrial uses are the predominant near-highway land use, dense urban neighborhoods are not in close proximity to the highway, and schools are not located next to the highway right-of-way. So long as the currently proposed cut-and-cover alternative in the existing I-70 alignment remains the preferred alternative, another option that must be included is the buy-out of all nearby residents, and the re-location of school buildings located within the zone of adverse health impacts adjacent to the Project alignment.

This SDEIS is not adequate under the National Environmental Policy Act (NEPA), or under the requirements of the Federal Aid Highway Act, 23 USC § 109(h), because the Draft Statement, along with the Air Quality Technical Report prepared as Attachment J for the I-70 East SDEIS, fails to –

1. investigate and disclose the impact that highway emissions are having on community health in the Project study area;
2. investigate and identify alternatives and/or mitigation measures that can enhance the human environment by reducing community exposure to harmful air pollutants, and avoid the adverse health effects that will result from increasing exposure to these pollutants that will result if traffic in the corridor is allowed to increase by 30%;
3. investigate and disclose likely violations of the NAAQS for PM_{2.5} and NO₂ caused by those pollutants emitted from vehicles traveling on the completed project and in the area affected by the Project;
4. use credible scientific methods to investigate and disclose likely violations of the NAAQS for PM-10 caused by particulate matter (PM) emitted from or by vehicles traveling on the completed project and in the area affected by the Project;
5. investigate and disclose likely violations of the NAAQS for PM-10, PM_{2.5} and NO₂ caused by those pollutants emitted from heavy equipment and traffic during construction of the Project;
6. investigate and identify alternatives and/or mitigation measures that are necessary and sufficient to prevent or avoid violations of the NAAQS for PM-10, PM_{2.5} and NO₂;
7. demonstrate compliance with the obligations imposed by the Federal-Aid Highway Act, 23 USC §109(h), to estimate the costs of mitigation, compare those costs with the transportation benefits of the proposed Project, determine whether the Project is in the best overall public interest, and commit to implement any necessary mitigation; and
8. include a conformity determination for the Project as required by § 176(c) of the Clean Air Act (CAA) and implementing regulations. 40 CFR §§ 93.116, 123.

I. Impact on Health of Emissions from Vehicle Miles Traveled Not Assessed or Disclosed.

Overall impacts of air pollutants emitted from the Project on community health are the primary concern of this comment. The adverse health outcomes among residents in the I-70 Project area reported by Denver Environmental Health [DEH] in the community health status report released last month demonstrate that these residents are currently experiencing serious adverse effects of current pollutant exposures, and that the impact of future increases in pollutant exposures must

be fully disclosed in the EIS. *See*

https://www.denvergov.org/Portals/746/documents/HIA/HIA%20Composite%20Report_9-18-14.pdf. The higher pollutant exposures expected from increasing traffic by 30% in these neighborhoods will significantly further degrade the health status of these communities. Sacrificing the health of children and increasing years of life lost to build a regional transportation facility is not an acceptable public policy. To ensure open disclosure and consideration of the consequences that Project emissions will have on health, a health impact assessment must be included in the current NEPA review because of the evidence provided by DEH showing that residents in these communities are now experiencing disparate health outcomes compared to other communities in Denver.

A. Health Impacts of Exposure to Traffic Pollution Not Assessed or Disclosed in SDEIS.

The SDEIS contains no discussion of the current health status of these communities, and no investigation of the likely impact that increased vehicle emissions will have on community health. The impacts that Project emissions will have on air quality in the affected communities are only partially addressed. The SDEIS includes modeling to estimate future concentrations in the ambient air for only two transportation-related pollutants: PM-10 and carbon monoxide. The other two criteria pollutants emitted from highways that EPA has identified as having the greatest impact on health, and has recently required be monitored adjacent to highways, PM2.5 and NO2, are not evaluated for impact on future air quality. A shorthand method for using the modeled concentrations of PM-10 to estimate future PM2.5 concentrations indicates that Project emissions will worsen health status in the communities by violating the NAAQS for PM2.5.

In addition to determining the impact of Project emissions on the attainment of the NAAQS, the SDEIS must include an assessment of the health impacts on the community that will result from the full mix of criteria and toxic air pollutants emitted from motor vehicles. Residents do not just breath one pollutant at a time, and the adequacy of national air quality standards to protect health do not account for the cumulative and synergistic effects on human health that result from exposure to the full array of criteria and toxic air pollutants emitted from highways.

1. Adverse Health Outcomes Are Occurring Disproportionately in Communities Affected by I-70 Pollution.

The final DEH report identifies four metrics of health as demonstrating a significant disparity between community health in the four city council districts where I-70 is located, and especially Globeville/Elyria/Swansea (GES) neighborhoods, and other parts of Denver: 1) mortality caused by cardiovascular disease, 2) hospitalization of children for asthma, 3) cancer, and 4) obesity. In addition, the draft DEH report identified years of life lost as another important metric of community health which was significantly worse in the GES neighborhoods compared to the city as a whole.

i) Disproportionately High Cardiovascular Mortality.

The data reported by DEH, HIA, Fig. 6, show that residents in the four city council districts where I-70 is located, (1, 8, 9, and 11) have the highest cardiovascular mortality rates. Residents in city council Dists 1 and 9 experience 30% greater cardiovascular mortality than dist 2 (213 vs. 155). In districts 8 and 11, respectively, cardiovascular mortality is 77% higher than dist 2 (275

vs. 155), and 74% higher (270 vs. 155). On average, cardiovascular mortality in these four council districts along I-70 is roughly 50% greater than other parts of the city. These are remarkably huge differences in cardiovascular mortality, the largest single cause of death in Denver and the U.S.

Increased community exposure to Project emissions will occur primarily in Districts 9 and 8. District 9 includes the GES and other neighborhoods along the east side of I-25 from the Auraria campus to the Commerce City line, including the neighborhoods along I-70 east of the mousetrap. The mortality rate in council district 9 is identical to the rate in council district 1 (213/ 100,000). District 1 includes the neighborhoods on the west side of I-25 from the Auraria campus north to the city line, including the neighborhoods along I-70 west of the mousetrap. Together, these two districts have significantly higher cardiovascular mortality rates than all other council districts except 8 and 11. In addition to emissions from I-70, residents in Dists 1 and 9 are exposed to emissions from I-25, residents in Dist 8 are most exposed to the additional pollution burden coming from the refineries, and district 11 is most exposed to emissions from the I-225 interchange, Pena Blvd and airport operations. A recent study at LAX indicates that residents along the path of aircraft take-offs and landings are exposed to aircraft emissions that are roughly comparable to the emissions from highways in these neighborhoods. It makes sense that all 4 of these council districts show greater rates of the diseases of air pollution, including cardiovascular disease, when compared to other council districts not exposed to emissions from major highways and other high emitting sources.

These data point an incriminating finger at air pollution from the high traffic volumes on interstate highways because all the council districts with higher pollution levels from both interstates and major stationary sources have elevated cardiovascular mortality rates. If higher mortality were observed only in one district, then air pollution could not account for the disparity between that district and both cleaner districts and districts with high pollution levels.

ii) Disproportionately Higher Years of Life Lost.

These massively greater mortality rates obviously contribute to increased years-of-life-lost. Missing from the final DEH report, but no less relevant to the need for a NEPA analysis of health risks, is the discussion of years-of-potential-life-lost (YPLL) that was included in the draft HIA, at p. 9 (published for comment in April). The draft described this metric as commonly "used as an indicator of health equity. Generally, this is a measure of premature death before the age of 75 compared across a population or geographic area. The assumption is that a higher number indicates inequitable social or physical determinants of health. Data from Denver Health indicate that "years of potential life lost" is higher in Globeville and Elyria Swansea than in Denver overall." The draft reported that years-of-life-lost, averaged across the community, is 3.5 years greater for the residents of GES neighborhoods compared to other Denver residents. This means residents of these neighborhoods are losing 50,000 years of life annually compared to other Denver neighborhoods. Deletion of this metric in the final HIA is not explained anywhere. Purging this critical metric of community health from the report makes the report less valuable to residents and decisionmakers because of its importance as a measure for comparing community health among neighborhoods.

The fact that this key metric was deleted without explanation is highly suspicious. Without any explanation, the motive for removing this important metric must be questioned especially since Thad Tecza was told by staff at DEH before the release of the final report that there would be no changes in the data included in the final compared to the draft. The lack of any explanation suggests an intent to deceive the public, and smacks of cover-up. This omission from the final DEH report further highlights the need for these disparate health outcomes to be explored in an EIS.

iii) Disproportionately Higher Hospitalization of Children for Asthma.

The other adverse health outcome for which the disparity between the GES neighborhoods and other areas of the City is quantified is hospitalization for childhood asthma. The final DEH report, Fig. 7, shows 40% greater incidence (38.6 vs. 28.5 admissions/1,000) of hospitalization of children in Elyria/Swansea, and 20% higher in Globeville than the rest of the city. The additional emissions from the train traffic on the main line running between Elyria and Swansea is a plausible explanation for the higher incidence in these neighborhoods. Certainly 40%, and even 20% more children hospitalized for asthma is a significant adverse health outcome for a community that also suffers from other adverse social and economic factors.

The facts that 1) the GES neighborhoods have 3.5 years shorter longevity, or 50,000 years of life lost, compared to the rest of Denver (which was shown by the YPLL data presented in the draft report, but purged from the final), 2) the residents in the districts along the I-70 corridor experienced 50% higher cardiovascular mortality than other parts of the city, and 3) that significantly more children in GES neighborhoods require hospital care for asthma strongly suggests that these adverse health outcomes are linked to air pollution. There is enough variability in socio-economic factors across the four council districts that comprise north Denver that socio-economic factors alone cannot account for higher cardiovascular mortality rates in all four I-70 districts. Some other extrinsic factor, such as air pollution, must be a causative factor.

2. The Disparate Adverse Health Outcomes Observed in Communities Along the I-70 Corridor Are Causally Related to Exposure to Traffic Pollutants.

The DEH report does not offer any explanation for these disparate health outcomes other than air pollution. Air pollution is the only environmental factor identified in the report that is causally related to these diseases. Air pollution offers the only reasonable explanation for the elevated incidence in the GES neighborhoods of the four health outcomes identified by DEH as being significantly worse than other areas of Denver. Increased mortality associated with cardiovascular disease is one of the most significant adverse health outcomes identified by EPA as associated with exposure to PM2.5. The correlation between the observed health outcome among residents in the four I-70 districts and the health outcomes predicted by the health effects data reviewed by EPA is strong. Air pollution is also the only well-documented explanation for the higher incidence of hospitalization for asthma among children. Air pollution also includes indoor air pollution from smoking and other sources in the home, so not all of it comes from highways. But the health effects research reviewed by EPA includes studies showing the prevalence of childhood asthma is linked to increased exposure to air pollution from major traffic corridors. The HIA provides no evidence to show that smoking in the home differs enough

between council districts to explain the significantly greater hospitalization of children for asthma.

i) DEH Report Only Identifies Air Pollution As Causally Linked to Disparate Health Outcomes.

The DEH report does not offer any other explanation for these disparate health outcomes. Along with air pollution, the DEH report lists possible environmental factors contributing to adverse health outcomes -- noise from trains, traffic and industry, elevated summertime e-coli in the S. Platte, and soil contamination. *See* HIA, Environmental Quality, p. 19. But the report notes that soil contaminants have been removed from the community as part of the CERCLA clean-up of the areas around the former smelters. The HIA offers no plausible explanation for how these remaining environmental factors other than air pollution are linked to the adverse health outcomes that demonstrate worsened health for residents in the GES neighborhoods compared to other parts of Denver. EPA's analysis of the effects of air pollutants on health in the Integrated Science Assessments for PM and NO₂ provides a scientific basis for linking PM to all of these adverse health outcomes, and NO₂ to some of them. But none of the other environmental risk factors identified in the DEH report have any apparent causal relationship to these adverse health outcomes. For example, noise has never been identified as a cause of childhood asthma, and e-coli in the river is not linked to pre-mature mortality from cardiovascular disease. The only environmental factor listed in the report that is known to be associated with these diseases is air pollution.

Of the sources of air pollution in these neighborhoods, the HIA states: "Vehicle exhaust is the main source of air pollution in Denver." "The [GES] neighborhoods are close to sources of air pollution from vehicles on I-70 and I-25, which carry approximately 150,000 and 250,000 vehicles per day respectively, and are the main sources of air pollution. Stationary sources such as industrial plants also impact air quality." HIA, pp. 20, 19. The report claims that the highest traffic density in the city is downtown, but CDOT traffic measurements show that the highest traffic density in the metro area is actually at the mousetrap, in the center of Globeville and upwind of Elyria and Swansea where 326,000 vehicles pass through daily.

The communities near the mousetrap are exposed to the highest pollutant levels in Colorado. At the mousetrap the total daily trips passing through the interchange are 326,000, more than 30 percent more traffic than any other location in the state. Traffic counts reported by CDOT for 2012 show AADT at the mousetrap as (truck share shown in parenthesis)¹

I-25 south of interchange: 243,000 (9.1%)
I-25 north of interchange: 198,000 (10.9%)
I-70 west of interchange: 150,000 (9.1%)
I-70 east of interchange: 140,000 (9.3%)

Especially important is the fact that the share of AADT represented by truck trips at the mousetrap is much higher than at other locations along I-25. CDOT's data show

¹ Colorado Department of Transportation, Traffic Data Explorer, 2013. Available online at: <http://dtdapps.coloradodot.info/Otis/TrafficData> (last accessed October 30, 2013).

that approximately 40 percent more truck trips use the I-25 segments north and south of the mousetrap than on I-25 south of downtown at 8th Avenue. Together, the higher AADT and the greater number of truck trips show that the mousetrap is the location in the Denver CBSA where mobile source emissions are the highest.

In addition, regional air quality monitor data received by EPA from the CDPHE, Air Pollution Control Division, and reported on EPA's Air Data website, demonstrate that cumulative effect of traffic emissions combined with industrial pollution is greatest along the interstates. Monitored levels of total particulate matter pollution from all sources in the metro area are highest at the Birch Street monitoring station in Commerce City, located about 2 miles north of Denver city line, and 1.25 miles east of the I-76/I-270 interchange. In the SDEIS, CDOT determined that the pollution levels reported at this monitor are representative of background levels to which I-70 will add emissions from the highway.

Thus when total pollution burden (highway emissions plus existing background) is considered, the neighborhoods along I-70 experience the highest pollution concentrations in the metro area. Therefore it is consistent with the air quality data for the most adverse health outcomes to be observed in the four council districts where I-70 is located.

ii) EPA Finds Causal Relationship Between Exposure to Traffic Pollutants, Cardiovascular Disease, Pre-Mature Mortality, Asthma and other Adverse Health Outcomes Observed in the I-70 Corridor.

The U.S. Environmental Protection Agency (EPA) has now identified four criteria pollutants emitted from highways as presenting significant health risks that must be prevented through attainment of the NAAQS near highways: carbon monoxide (CO), PM-10, PM2.5, and nitrogen oxides (NO₂).² This public health concern is reflected in requirements that states must now establish roadside monitors for PM2.5 and NO₂ in addition to the long-standing requirement to monitor CO.³ In addition to these four mobile source-related criteria pollutants, EPA has identified 92 mobile source air toxic (MSAT) pollutants. MSATs are governed by technology-based standards that must be met in emissions from tailpipes, but are not governed by ambient air standards that limit the concentrations of pollutants to which the public may be exposed. None of these standards take into account the interactions among these pollutants in the ambient air, or their cumulative impact on human health.

Together, these pollutants create a hazardous pall of pollution in the neighborhoods around highways that has been shown to contribute to cardiovascular and respiratory diseases among children, adults and the elderly that 1) increases the need for hospital and urgent care, 2) causes pre-mature death that significantly shortens the lives of residents, 3) increases the prevalence of asthma among children which interferes with school attendance and education, and requires medical treatment and hospitalization, 4) interferes with normal lung development in children and adolescents that results in permanent, lifetime impairment of lung function, 5) increases the incidence of debilitating or fatal cancers, and 6) impairs immune function.

² 40 CFR Part 50.

³ 40 CFR Part 58; 77 Fed. Reg. at 39009 (June 29, 2012); 78 Fed. Reg. at 16,184 (March 14, 2013), *Revisions to Ambient Nitrogen Dioxide Monitoring Requirements*, Final Rule.

In its recent reviews of the adequacy of the NAAQS for PM_{2.5} and NO₂, EPA has identified causal relationships between exposure to these pollutants and many of the adverse health outcomes associated with exposure to highway pollutants. In its review of the health effects literature available through 2009 as part of the Agency's determination to make the NAAQS for PM_{2.5} more protective, EPA found [bold in original]⁴ –

- “a causal relationship exists between short-term exposures to PM_{2.5} and mortality.”
- “a causal relationship exists between long-term exposures to PM_{2.5} and mortality.”
- “a causal relationship exists between short-term exposures to PM_{2.5} and cardiovascular effects.”
- “a causal relationship exists between long-term exposures to PM_{2.5} and cardiovascular effects.”

Although EPA did not attribute these effects exclusively to fine particles emitted from motor vehicles, EPA did cite studies that establish a causal relationship between exposure to traffic PM, or one or more components of traffic PM emissions, and pre-mature mortality and emergency treatment for cardiovascular outcomes. For example, “multiple outcomes have been linked to a PM_{2.5} crustal/soil/road dust source, including cardiovascular mortality”; “studies have reported associations between other sources (i.e., traffic and wood smoke/vegetative burning) and cardiovascular outcomes (i.e., mortality and ED visits)”; “Studies that only examined the effects of individual PM_{2.5} constituents found evidence for an association between EC and cardiovascular hospital admissions and cardiovascular mortality”;⁵ “studies found an association between mortality and the PM_{2.5} sources: ..., traffic”; “recent studies have suggested that PM (both PM_{2.5} and PM_{10-2.5}) from .. road dust sources or PM tracers linked to these sources are associated with cardiovascular effects.”⁶

In addition, EPA cited studies demonstrating a causal relationship between exposure to PM_{2.5} and childhood asthma: “road dust and traffic sources of PM have been found to be associated with increased respiratory symptoms in asthmatic children and decreased PEF in asthmatic adults.”⁷

EPA also found a causal relationship between exposure to NO₂ and childhood hospitalization for asthma: “Epidemiologic evidence exists for **positive associations of short-term ambient NO₂ concentrations below the current [1983] NAAQS level with increased numbers of ED visits and hospital admissions for respiratory causes, especially asthma.** These associations are particularly consistent among children and older adults (65+ years) when all respiratory outcomes are analyzed together, and among children and subjects of all ages for asthma admissions.”⁸

More recent studies not available for EPA's 2008 *ISA for Oxides of Nitrogen*, or 2009 *ISA for PM*, confirm and strengthen these associations. All of the relevant research currently available that establishes the relationship between exposure to traffic pollution and the adverse health outcomes occurring in residents living along the I-70 corridor, including cardiovascular disease, pre-mature mortality, childhood asthma and cancer, should be included in an assessment of the

⁴ *Integrated Science Assessment for Particulate Matter* (US EPA, December 2009), pp. 2-10, 2-11, 2-12.[hereinafter *ISA for PM*]

⁵ Note that “EC” is short-hand for “elemental carbon” which is primarily unburned carbon from fossil fuel combustion, and is a significant component of fine particles emitted from diesel and gasoline engines.

⁶ *ISA for PM*, p. 2-26.

⁷ *Id.*

⁸ *Integrated Science Assessment for Oxides of Nitrogen – Health Criteria* (US EPA, July 2008), p. 5-11.

relationship between adverse health outcomes observed in the I-70 Project area and traffic pollution.

iii) EPA Finds No Threshold for Safe Exposure to Highway Pollutants.

In addition to EPA's findings that there is a causal relationship between the mobile source-related pollutants emitted from highways and the disparate health outcomes reported by DEH in the communities along I-70, EPA also found that there is no safe level of exposure to these pollutants. In the *ISA for PM*, at p. 2-25, EPA concluded that "evidence from the studies evaluated supports the use of a no-threshold, log-linear model." EPA reached a similar conclusion with respect to NO₂: "In studies that have examined concentration-response relationships between NO₂ and health outcomes, the concentration-response relationship appears linear within the observed range of data, including at levels below the current standard. There is **little evidence of any effect threshold.**"⁹ [Emphasis in original.]

The most critical implication of these findings for purposes of assessing health impacts under NEPA is that evidence showing that concentrations of PM_{2.5} and NO₂ are below the NAAQS for these pollutants cannot be relied upon to support a conclusion that exposure to existing concentrations of each of these pollutants is not contributing to the adverse health outcomes being observed in the near-highway communities along I-70.

However, no determination of pollutant exposures for near-highway communities can be made from information provided in the SDEIS because only background concentrations for PM-10 and CO are provided from a monitoring station outside the Project area, and no near-highway measurements are provided for any of the four mobile source-related criteria pollutants.

3. Existing Adverse Health Outcomes in I-70 Project Area, and Likely Increase Adverse Health Outcomes from Higher Project Emissions, Not Adequately Disclosed by Modeling for Attainment of PM-10 and CO NAAQS.

The SDEIS air quality analysis is not a surrogate for a comprehensive health impact assessment because 1) the NAAQS are not an adequate surrogate for the health effects associated with exposure to the full array of pollutants emitted from highways, and 2) the modeling reported in the Air Quality Technical Report only includes two of the four NAAQS that establish limits on ambient concentrations of mobile source-related pollutants. Evidence provided in the SDEIS, but not analyzed or discussed for decisionmakers or the public, strongly suggests that Project emissions will cause the NAAQS for PM_{2.5} to be violated. Other highway pollution data suggest that the NAAQS for NO₂ may be violated by Project emissions as well. Emissions of these pollutants from the Project must also be modeled to determine if these NAAQS will be violated.

i) NAAQS Not a Surrogate for Overall Highway Pollutant Exposures.

All the air pollutants emitted from mobile sources in the I-70 corridor contribute to the adverse health effects experienced by residents in the neighborhoods along I-70. These include the four mobile source related criteria pollutants governed by a NAAQS pursuant to section 109 of the

⁹ *ISA for Oxides of Nitrogen*, p. 5-15.

CAA, and the mobile source air toxic (MSATs) pollutants regulated pursuant to section 202(l). 42 U.S.C. § 7521(l).

EPA has listed pollutants as MSATs that cause chronic adverse health effects, such as cancer, and acute effects from short-term exposures (hours or days) such as asthma attacks. Congress listed benzene, 1,3 butadiene and formaldehyde as mobile source-related air toxics in the 1990 CAA amendments when it required EPA to set vehicle emission standards for these pollutants. *Id.* EPA included these three statutory MSATs and ten other mobile source-related toxic pollutants on a list of 33 priority pollutants targeted for control under EPA's Integrated National Urban Air Toxics Strategy. 64 Fed. Reg. 38,706 (July 19, 1999). This Strategy "established a list of urban HAPs ["hazardous air pollutants"] which pose the greatest threats to public health in urban areas, considering emissions from major, area and mobile sources." *Id.* at 38,714. EPA observed that "mobile sources are an important contributor to the urban air toxics problem." *Id.* at 38,705.

The neighborhoods near I-70 suffer from some of the worst air in the state. More than half a million pounds of toxics were released into the air in Globeville, Swansea, and Elyria in 2012, according to EPA's Toxics Release Inventory – more than any other zip code in Colorado, and more than 20 percent of the state's total toxic air releases.¹⁰ Denver County as a whole suffers from some of the worst diesel particulate pollution in the entire nation – ranking 9th out of the 3,109 counties nationwide. The lifetime cancer risk from diesel soot in Denver exceeds the risk of all other air toxics tracked by EPA. Diesel soot is a major component of PM2.5 near highways, and is a major source of the health risks linked to breathing fine particles. The average lifetime diesel soot cancer risk for a resident of Denver County is 1 in 1,938, which is 516 times greater than the EPA's acceptable cancer level of 1 in a million.¹¹ This diesel pollution is likely most concentrated at the mousetrap, where Colorado's two most heavily traveled highways – I-70 and I-25 -- intersect.

EPA's findings that exposure to MSATs poses serious threats to public health were significantly enhanced by research conducted by the South Coast Air Quality Management District to monitor and model exposures to 31 urban toxic air pollutants in the Los Angeles air basin. Four studies have now been completed in a series known as the *Multiple Air Toxics Exposure Study* (MATES). Beginning with MATES-II (March 2000), the measurements of toxic air pollutants in the ambient air throughout the Los Angeles basin provided compelling new evidence that the cancer risk attributable to public exposure to ambient concentrations of toxic air pollutants is much higher than had been previously suspected, and is attributable primarily to mobile source emissions. The total cancer risk from all sources, including traffic ("on-road mobile"), non-road mobile and stationary sources, averaged across the region was found to be 1400 per million. On-road vehicle emissions account for half of this risk, or 700 per million. This equates to about 1 cancer for each 1450 exposed people.

¹⁰ EPA's TRI website at: <http://www2.epa.gov/toxics-release-inventory-tri-program> using zip code 80216.

¹¹ Clean Air Task Force website, Diesel Soot Health Impacts: Where You Live, Denver County. Available at: <http://www.catf.us/diesel/dieselhealth/county.php?c=08031&site=0> (last accessed October 14, 2013).

MATES-II also demonstrated that higher levels of exposure and risk occur near highways. The study found that the range of cancer risks varied significantly across the region, from 1,120 in a million in the cleanest neighborhoods to about 1,740 in a million in the most polluted. *Id.*, p. 7-1, ¶ 1. The Report found the greatest risk levels at locations where “the dominance of mobile sources is even greater than at other sites.” *Id.*, ¶ 2. It also found that “model results, which are more complete in describing risk levels...than is possible with the monitored data, show that the higher risk levels occur... near freeways.” *Id.*, p. ES-5, ¶ 2. “Results show that the higher pollutant concentrations generally occur near their emission sources.” *Id.*, ¶ 4. These findings provide further evidence that neighborhoods near highways would experience higher concentrations than the regional averages. Based on all these observations, MATES-II concluded that “[f]or mobile source compounds such as benzene, 1-3 butadiene, and particulates associated with diesel fuels, higher concentration levels are seen along freeways and freeway junctions.” *Id.*, p. 5-9.

MATES-IV (September, 2014),¹² the most recent iteration of the toxic air pollutant exposure research in the Los Angeles basin, shows significant reductions in toxic pollutant concentrations other than diesel particulate and associated cancer risks. But the most recent data does not support the conclusion that cleaner vehicles have eliminated the health risks from exposure to MSATs. The MSATs included in the study, benzene and 1,3 butadiene, “were down 35% and 11%, respectively.” But this reduction was significantly less than the reductions in air toxics emitted from stationary sources. The remaining emissions continue to present a significant health risk, especially in locales near highways and interchanges where concentrations are highest.

While diesel particles are counted as part of PM_{2.5} and are included in monitored concentrations, other components of diesel exhaust that include MSATs, and MSATs emitted from gasoline vehicles are not. Emitted as gases from diesel and gasoline vehicles, other MSATs include benzene, formaldehyde, 1,3 butadiene, and the other hazardous air pollutants listed by EPA in its Urban Air Toxics strategy. The AQ Technical Report lists some of these MSATs, and provides estimates of the reductions in these pollutants expected by 2035. However, the SDEIS does not link current emissions to the community exposures that are contributing to adverse health outcomes in nearby communities, and makes no effort to estimate the residual impact that the emission of these pollutants will have on human health during the 20 years after the Project comes into service.

The DEH report, Fig. 11, provides compelling proof that traffic emissions cause benzene pollution levels that are 3 to 5 times higher in neighborhoods near the interstates than in other areas away from major highways. [In response to inquiry, Gregg Thomas at DEH informed me that the units in Fig. 11 are modeled benzene concentrations.] This pattern of elevated exposure to a potent carcinogen near highways is likely typical of other MSATs emitted from highways. These modeling results provide a local example of the exposures that contribute to adverse health outcomes in these neighborhoods.

¹² MATES-IV (South Coast Air Quality Management District, 2014) available at : <http://www.aqmd.gov/docs/default-source/air-quality/air-toxic-studies/mates-iv/mates-iv-draft-report-10-1-14.pdf?sfvrsn=2>.

In its 2009 comments on the DEIS, EPA flagged this omission as a major flaw in the DEIS. As the results of the latest MATES report shows, the health risks associated with exposure to MSATs remain significant. The addition of trend data in the SDEIS showing gradual reductions in future exposure to these pollutants is not enough to establish that the contribution these pollutants make to health effects resulting from continuing exposure to mobile source pollutants will no longer have a significant impact on health. Unless FHWA can establish that no beneficial improvement in health could be achieved by implementing alternatives that remove traffic and pollution from these communities, the obligation remains to disclose the impact that future emissions of mobile source pollutants will have on community health. The available evidence confirms that MSATs will continue to contribute to future overall adverse health outcomes in communities along the I-70 corridor. These impacts are a “significant impact on the human environment” that must be assessed and disclosed under NEPA.

ii) Not All Impacts of Highway-related Pollutants on National Ambient Air Quality Standards Have Been Investigated and Disclosed.

The Air Quality Technical Report (AQ Report), supplemental draft environmental impact statement (SDEIS), claims, at p. 83, that –

Motor vehicle emissions from the implementation of the No-Action and Build Alternatives in the study area have been evaluated. With the exception of PM for several of the project alternatives, the project is not expected to cause any new violations of any standard, increase frequency or severity of any existing violation, or delay timely attainment of the NAAQS.

This assertion is not correct because the AQ Report only includes modeling of expected ambient concentrations for CO and PM-10. An emissions inventory has been developed for PM2.5, but the ambient concentrations of PM2.5 have not been specifically modeled or reported. An emissions inventory has been reported for NO2, but no modeling has been conducted. No explanation is offered in the AQ Report for why PM2.5 and NO2 have not been modeled to determine the impact that emissions of these pollutants will have on attainment of the applicable NAAQS. In addition, the claim that one Build Alternative will not violate the NAAQS for PM-10 is not credible for the reasons discussed below.

Given EPA’s findings that emissions of PM2.5 and NO2 from highways present a significant risk of causing violations of the NAAQS for those pollutants in neighborhoods near highways, and highway emissions studies that confirm those findings, emissions of those pollutants significantly impact the human environment and therefore trigger the obligation under NEPA to (i) investigate and disclose to the public and decisionmakers in the SDEIS the likelihood that emissions of those pollutants from the I-70 Project threaten to violate the NAAQS for PM2.5 and NO2, and (ii) to identify alternatives or mitigation measures sufficient to prevent or avoid any likely violations of such NAAQS. In addition, section 109(h) of the Federal-Aid Highway Act requires that any such mitigation measures needed to prevent violations of NAAQS be implemented in the ROD. As discussed in more detail in the legal section of these comments, the failure to investigate and disclose potential violations of these NAAQS, and the failure to identify such alternatives and/or mitigation measures as are necessary to prevent or avoid such violations makes this SDEIS inadequate as a matter of law.

PM2.5 Attainment. EPA found the highest relative risk factors for the adverse health outcomes observed in the near-I-70 neighborhoods to be associated with exposure to PM2.5 (fine particles smaller than 2.5 micrometers in diameter), also referred to as soot. This is the air pollutant emitted from diesel trucks and gasoline vehicles, and particles that result from brake and pavement wear. But the impact of PM2.5 emitted from the Project on ambient air quality are not modeled in the AQ Technical Report, and not discussed in the SDEIS.

A short-hand approach for using the modeling results for PM-10 to approximate the concentrations of PM2.5 demonstrates that traffic emissions of PM2.5 from every Project scenario will violate the 24-hour NAAQS for PM2.5. Compliance with the annual NAAQS for PM2.5 is not discussed or demonstrated anywhere in the SDEIS.

The emissions inventory developed for the analysis and modeling of PM-10 concentrations includes an emissions inventory for PM2.5, which constitutes a fraction of total PM-10. The inventory data show that PM-10 particles less than 2.5 μm in diameter comprise 57% of total PM-10 emissions from the I-70 Project. *See AQ Report*, Tables 22 and 23, p.69 (showing that daily total PM-10 emissions from traffic in the I-70 in January 2035 will be 0.7 tons/day, and of that total 0.4 t/d will be PM2.5).

The air quality modeling for PM-10 estimates that the cleanest build alternative (the lowered 10-lane scenario with a single 800 foot cover, an interchange at Vasquez Blvd/Steele St and managed lanes) will add 38 $\mu\text{g}/\text{m}^3$ to daily (24-hr) background concentrations of PM-10. The emission inventory data states that of this 38 $\mu\text{g}/\text{m}^3$ of PM-10 added by Project emissions to ambient air concentrations, 57% will be PM2.5. Thus if the 43% of the PM-10 that is larger than 2.5 μm is removed from the calculation, the concentration that remains is particles in the PM2.5 size range. Thus the modeling demonstrates that traffic emissions from the project will add (38 x .57) 21.7 $\mu\text{g}/\text{m}^3$ to daily concentrations of PM2.5 at the peak receptor locations.

Using the same methodology used in the AQ Report to estimate future 24-hour concentrations of PM-10, this 21.7 $\mu\text{g}/\text{m}^3$ of PM2.5 must be added to the 98th percentile concentrations of PM2.5 measured at the monitoring station used to establish background air quality for the Project area. Background 24-hour concentrations of PM2.5 at the Commerce City monitoring station (Birch Street and 71st), using EPA's methodology for calculating the 24-hour "design value,"¹³ consistently exceed 20 $\mu\text{g}/\text{m}^3$ in the project area. *See Design Values for 2011, 2012, 2013* (attached hereto as Appendix A).

When the approximate 24-hour concentrations of PM2.5 added by Project emissions, as derived from the PM-10 modeling results, are added to background PM2.5 design values occurring at the Commerce City monitor, the modeling results for PM-10 demonstrate that even the cleanest Project alternative will contribute to 24-hour concentrations greater than 40 $\mu\text{g}/\text{m}^3$. The 24-hour NAAQS is 35 $\mu\text{g}/\text{m}^3$. The PM-10 modeling results for other Project alternatives show that PM2.5 emitted from these alternatives will add even more than 40 $\mu\text{g}/\text{m}^3$ of PM2.5 to background 24-hour concentrations. Therefore, all Project alternatives will cause violations of the 24-hour NAAQS for PM2.5.

¹³ 40 CFR Part 50, Appendix N.

Given this evidence that the 24-hour NAAQS for PM_{2.5} will be violated, NEPA requires that the Draft EIS must consider Project alternatives or control strategies that will prevent or avoid these violations. *See* 40 CFR §§1502.1, 1502.2(d), 1502.14 and 1502.16(h). To determine whether alternatives or control strategies will be adequate to prevent NAAQS violations, the impact of Project emissions on PM_{2.5} concentrations must include a quantitative assessment of the expected magnitude of violations of both the 24-hour and annual NAAQS, and a quantitative demonstration that alternatives or control strategies will achieve sufficient reductions in emissions to ensure attainment at all receptor locations included in the modeling analysis.

PM-10 Attainment. The modeling results for PM-10 show that traffic emissions from five of the six “build” Project alternatives will violate the 24-hour NAAQS for PM-10. *See* AQ Report, Table 20, p.65. These violations are expected to exceed the PM-10 NAAQS (150 µg/m³) by 20 to 45 µg/m³. Only one “build” alternative (the lowered 10-lane scenario with a single 800 foot cover, an interchange at Vasquez Blvd/Steele St and managed lanes referred to as the “Basic Option”) and the No-build alternative are modeled as exactly attaining the NAAQS.

Despite the requirement of 40 CFR §1502.14(e) that the Draft EIS identify a “preferred alternative,” no alternatives are identified as preferred. Each alternative is treated as an available option for CDOT and FHWA to select. Therefore the Draft EIS must identify Project alternatives or control strategies that will prevent or avoid these modeled NAAQS violations for each of the available options. *See* 40 CFR §§1502.1, 1502.2(d), 1502.14 and 1502.16(h).

In addition, the modeling result for the one lowered, managed lane option that allegedly does not violate the NAAQS is not credible. The emissions for the alternative that demonstrates attainment (the “Basic Option”) is modeled to add only 38 µg/m³ to ambient concentrations of PM-10, whereas emissions from the other lowered, managed lane option (with two covers and no interchange at Vasquez Blvd/Steele St referred to as the “Modified Option”) is expected to add 82 µg/m³ to background concentrations of PM-10, thereby causing concentrations at peak receptors to reach 195 µg/m³, violating the NAAQS by 45 µg/m³. *See* AQ Report, Table 20. Yet the expected winter day emissions of PM-10 from the two alternatives are virtually identical: 0.68 t/day. *See* AQ Report, Table 23 (p. 69). The discussion of PM emissions in the AQ Report, at p.68, explains that –

Although there are minor differences in emissions among the No-Action and Build Alternatives, there is no real discernible difference, since they are all very close in any given year. Therefore, the particulate matter emissions are not a discriminating factor in the selection of a preferred alternative.

It is not plausible that virtually identical emissions from the two lowered, managed lane alternatives could produce daily ambient concentrations of PM-10 that differ by 45 µg/m³.

The traffic data for these two alternatives also does not explain the large (55%) difference in peak daily ambient concentrations of PM-10 added by the two alternatives (38 µg/m³ versus 82 µg/m³). The Basic Option has higher expected traffic (annual VMT = 2,959,000) on I-70, compared to expected traffic on the Modified Option (annual VMT = 2,935,000). Total VMT in the Project study area differs between the two alternatives by less than 0.35%: Basic Option = 25,036,000 versus Modified Option = 25,125,000. *See* I-70 East Environmental Impact Statement, Traffic Technical Report, Figures 86 and 88, pp. 95-96.

Given that the contribution added to ambient concentrations by the Modified Option (82 $\mu\text{g}/\text{m}^3$) is much closer to the concentrations added by other alternatives without managed lanes, and without covers over segments of the lowered portion of the Project, the much lower contribution added by the Basic Option (38 $\mu\text{g}/\text{m}^3$) is the implausible outlier. In the absence of any correlation between the significantly lower ambient concentrations for the Basic Option and key factors that could account for 55% lower concentrations, such as either lower total Project emissions or significantly lower traffic counts, the claim that the Basic Option will not contribute to violations of the NAAQS for PM-10 is not credible.

Information that would help better understand the modeling results is not provided in the AQ Technical report. Missing information includes data files showing inputs to the MOVES emission model and to the dispersion model runs.

II. Construction Emissions.

Neither the Draft EIS, nor the AQ Technical Report include any discussion of the likely impact that construction emissions will have on air quality or adverse health outcomes in the communities affected by emissions from heavy equipment during construction operations.

Emissions during construction will be a much greater concern for this project than most highway projects because of the years of excavation and earth moving that will be required to dig the trench and haul the removed earth to a disposal site 20 or more miles away. For most projects, construction activities are limited to grading, laying a road bed and paving. Here, the years of excavation required will likely increase construction emissions by an order of magnitude compared to most projects.

Despite the potential significance of these emissions for community health, the SDEIS lacks any discussion of the mitigation measures available to CDOT to require contractors to use low sulfur fuels, employ low-emitting equipment that can minimize the impact of diesel fumes on local residents, and other mitigation measures identified in EPA's 2008 comment letter.

EPA has now added non-road emissions factors to the MOVES model for use in modeling the impact of activities such as construction on ambient air quality. This tool should be applied to the expected construction operations during the excavation of the I-70 trench in addition to more traditional highway construction activities to estimate the likely impact on air quality near the construction zone.

In addition the alternatives and mitigation options discussed by EPA in 2009 should be committed to minimize public exposure during construction. Additional measures should be committed if emissions will potentially contribute to exceedances of short-term NAAQS.

III. Legal Standards for Decisionmaking Not Satisfied by SDEIS.

Three statutory regimes establish decisionmaking criteria relevant to the health and air quality issues of concern to local residents: 1) the National Environmental Policy Act (NEPA), 42 U.S.C. 4321 et seq.; 2) section 109(h) of the Federal Aid Highway Act (FAHA), 23 U.S.C. 109(h); and 3) the conformity requirements of section 176(c) of the Clean Air Act, 42 U.S.C. § 7506(c). The SDEIS fails to comply with each of these statutes because it does not –

1. investigate all of the adverse impacts of emissions from the Project;
2. disclose to decisionmakers and the public all potential adverse impacts of the Project;
3. consider numerous reasonable alternatives, or mitigation measures, that can avoid or prevent some or all of the adverse health and air quality impacts;
4. include the costs of mitigation as required by FAHA;
5. does not contain any comparison of mitigation costs with transportation benefits to explain why the Project is in the “best overall public interest”; and
6. does not contain a conformity determination as required by the CAA.

A. NEPA Rules Governing Federal Decisionmaking.

The CEQ NEPA regulations that govern environmental statements require that an EIS must –
1) disclose to the public and the decisionmaker any “significant environmental impact” the proposed action will likely have, 40 CFR 1502.1; and

2) “inform decisionmakers and the public of reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment;” *id.*, and

3) “discuss means to mitigate adverse environmental impacts” which includes avoiding the impacts by not taking the action, or compensating for the impacts by providing alternative resources or environments. 40 CFR 1502.14(f), 1502.16(h), 1508.20.

The Supreme Court has interpreted these provisions to require that an EIS must consider alternatives and mitigation that can avoid or minimize the adverse impacts of a proposed project. As the Supreme Court observed, embedded in these requirements “is an understanding that the EIS will discuss the extent to which adverse effects can be avoided.” *Robertson v. Methow Valley*, 490 U.S. 332, 352 (1989). The SDEIS for I-70 is inadequate because the project alternatives and mitigation options were not evaluated to determine whether they will “avoid or minimize” the adverse health impacts on the near-highway communities that will result from increased exposure to harmful pollutants, or avoid localized NAAQS violations that will likely be caused by emissions from the expanded highway. Equally important, the SDEIS fails to consider alternatives that will “enhance the quality of the human environment” by reducing pollutant exposures in the communities along I-70 below levels that are currently contributing to disparate adverse health outcomes for residents in communities near I-70.

Mitigation cannot be evaluated in the abstract; it must be evaluated with reference to the adverse impacts that are to be avoided. Here, the failure to estimate adverse health outcomes attributable to current and future emissions from I-70, provides no basis for estimating the health benefits likely to accrue to the near-highway communities that could be achieved by reducing pollutant exposures through an alternative that, for example, would divert “through” traffic onto I-76 and

I-270. Similarly, the mitigation needed to avoid violations of the NAAQS for PM_{2.5} or NO₂ cannot be determined without modeling PM_{2.5} and NO₂ emissions from the Project to determine the magnitude of likely violations of the NAAQS. The SDEIS fails to disclose these likely significant impacts, fails to determine the extent of the pollutant concentrations that would need to be reduced to avoid adverse health effects or NAAQS violations, and fails to consider any alternatives or mitigation sufficient to avoid the adverse health effects or NAAQS violations.

Both increased health impacts, 40 CFR 1508.27(b)(2), and the likelihood of violating an environmental standard such as a NAAQS, 40 CFR 1508.27(b)(10), are separate criteria for determining that an impact is "significant" for the purpose of triggering an investigation under NEPA. The failure of this SDEIS to address either the impact of Project emissions on health outcomes in the affected neighborhoods, or the likelihood that emissions will cause the NAAQS for PM_{2.5} and NO₂ to be violated, makes the SDEIS deficient. The I-70 SDEIS falls short of these requirements because the air quality section includes a modeling analysis of only two of the criteria pollutants emitted from highways: CO and PM-10, but not the pollutants EPA has identified as most responsible for the adverse health effects of highways: PM_{2.5} and NO₂. In addition, the SDEIS includes no discussion or analysis of the adverse health impacts associated with the total exposure to all the pollutants emitted from highways that will result from increasing traffic by 30% above current levels. The current SDEIS is deficient both because there is no consideration of the overall public health impact of exposure to all pollutants that will be emitted from the Project, and because the analysis of whether specific criteria pollutants will violate relevant NAAQS is lacking or deficient.

The short-hand approach using the modeling results for PM-10 emissions from the Project discussed above to approximate the impact of PM_{2.5} emissions on attainment of the NAAQS demonstrates why PM_{2.5} emissions from the Project "threaten a violation" of the NAAQS for PM_{2.5}. This evidence may not be suitable for establishing expected concentrations of PM_{2.5} for the purpose of determining whether any proposed alternative or mitigation is sufficient to prevent a violation of the NAAQS, but it is suitable for the purpose of demonstrating that the Project threatens to violate the NAAQS. That threat triggers the obligations to determine what the impact that such emissions will have on attainment of the NAAQS, to ensure the scientific integrity of the methods used to assess the threat, 40 CFR § 1502.24, and to determine how much emission reduction is needed to avoid or prevent the violation.

In this case, where a violation of the CAA is threatened by causing or contributing to violations of a NAAQS, the methods prescribed by EPA for assessing the impact of highway emissions on NAAQS violations should be used because the use of a method not approved by EPA would not satisfy the requirement that an EIS "shall state how alternatives ... will or will not achieve the requirements of ... other environmental laws and policies." 40 CFR § 1502.2(d). The analysis for PM-10 and CO apply the methodologies prescribed by EPA in its Quantitative Guidance for making project-level conformity determinations. Those methodologies should be applied to assess the likely impacts of PM_{2.5} and NO₂ emissions as well.

Both the adverse health outcomes documented in the communities adjacent to I-70, and the likelihood that Project emissions will contribute to violations of one or more NAAQS, trigger the obligation under NEPA to consider alternatives and/or mitigation that can avoid or minimize

these adverse impacts. 40 CFR § 1502.1 (duty to inform of alternatives that can avoid or minimize adverse impacts), §§ 1502.14 and 1502.16(e) (duty to compare alternatives based on their environmental impacts), §§ 1502.14(f) and 1502.16(h) (duty to disclose all means to mitigate adverse environmental impacts not avoided by preferred alternative), § 1508.20 (must consider mitigation that “avoid[s] the impact altogether” and “compensating for the impact by replacing or providing substitute resources or environments”).

In addition to avoiding adverse environmental impacts, NEPA also requires consideration of “reasonable alternatives which would enhance the quality of the human environment.” 40 CFR § 1502.1. This obligation implements the statutory directive that the Federal Government “use all practicable means ... to the end that the Nation may – (2) assure for all Americans safe, healthful, [and] productive ... surroundings; ... and (6) enhance the quality of renewable resources.” 42 U.S.C. § 4331(b). Consideration of alternatives that enhance the human environment serve the Congressional declaration that the “purposes” of NEPA include “promot[ing] efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man....” 42 U.S.C. § 4321.

In this case, public health in the communities adjacent to I-70 is being impaired by exposure to air pollutants from highways. The proposed project provides an opportunity to reduce those impacts on human health by either 1) removing traffic and traffic-related pollution from the neighborhoods that are suffering from adverse health outcomes without interfering with regional mobility by redirecting through traffic around north Denver onto I-76 and I-270, or 2) offering to buy out residents in the zone of adverse health impacts to allow them to move to safe and healthful surroundings. The SDEIS does not consider either of these alternatives.

B. Environmental Impacts of Project Not Evaluated under Special Criteria Enacted for Highway Projects.

Section 109(h) of the Federal-Aid Highway Act, enacted one year after NEPA, supplements the general procedures applicable to all major federal actions under NEPA by requiring a three-step evaluation of air quality impacts and mitigation measures to ensure that “final decisions on the project are made in the best overall public interest.” 23 U.S.C. § 109(h). The first step is to determine the “possible adverse economic, social and environmental effects relating to any proposed project.” *Id.* The second step is to determine “the costs of eliminating or minimizing such adverse effects and ... (1) air...pollution.” *Id.* The third step is to weigh “the costs of eliminating or minimizing such adverse effects” together with “the need for fast, safe and efficient transportation” to make a final decision whether the project is “in the best overall public interest.” *Id.* FHWA’s implementing regulation further requires that any measures necessary to mitigate these adverse effects be incorporated into the project. 23 C.F.R. § 771.105(d).

The SDEIS fails to include consideration of any of these factors for the adverse effects of air pollution. There is no consideration at all of the potentially severe health effects of exposure to the mix of criteria pollutants and MSATs that will be emitted from the Project, not to speak of the costs of eliminating or minimizing the adverse health effects of community exposure to these pollutants. Indeed, the administrative record is devoid of any mention of section 109(h) and the factors that it requires FHWA to consider.

Importantly, § 109(h) adds a requirement that before it can sign a ROD, FHWA must document the “adverse economic [and] social effects relating to any proposed project,” and weigh these effects in deciding whether the Project is in the “best overall public interest.” These are in addition to the environmental factors made relevant under NEPA. These include the economic costs of 1) adverse health effects, including loss of life, and 2) loss of value in homes that will be imposed on residents in neighboring communities by the emissions from the project. This provision also requires that FHWA and CDOT document the social effects that result from disruption to families after the loss of a parent from pre-mature death or hospitalization for the diseases of air pollution, and the effects on childhood development that are caused by impaired lung development and asthma attacks that interfere with school attendance and slow educational advancement among children.

Under this provision, FHWA must also determine “the costs of eliminating or minimizing such adverse effects and ... (1) air...pollution.” To eliminate the adverse effects of air pollution, emissions must be reduced to levels not expected to harm local residents, or local residents must be given the option to receive the value of their homes and move to a location outside the zone exposed to dangerous concentrations of air pollution. So long as FHWA and CDOT treats the expansion of I-70 as a preferred alternative, the evaluation of Project costs must include the cost of purchasing the homes of nearby residents within the zone of exposure to harmful levels of air pollution emitted from the Project.

FHWA must also explain how it weighs these factors in making the public interest determination required by FAHA. The SDEIS omits any discussion of the factors made relevant by the Act, and contains no explanation of how these factors are to be weighed in determining whether the Project is in the “best overall public interest.”

Finally, the ROD for the Project must provide for the implementation of all mitigation measures that are relied upon to determine that the transportation benefits of the Project outweigh the adverse effects.

C. SDEIS Does Not Include a Proposed CAA Conformity Determination.

The SDEIS discusses the tests that must be satisfied for the Project to be found in conformity under section 176(c) of the CAA, but does not propose to make a finding that the Project meets all of those tests and conforms. Instead, the AQ Technical Report asserts that a conformity determination is not necessary because the Project is not a “project of air quality concern.”

1. I-70 is Project of Air Quality Concern.

EPA’s Hot Spot conformity rule does not establish numeric criteria for exempting highway projects from the conformity requirement. When it revised the Hot Spot rule in 2006, EPA explained that “Clean Air Act section 176(c)(1)(B) is the statutory criterion that must be met by all projects in nonattainment and maintenance areas that are subject to transportation conformity.” 71 F.R. 12,471(March 10, 2006). The I-70 Project is subject to transportation conformity because it is a source of PM-10 in a maintenance area for PM-10.¹⁴

¹⁴ 42 U.S.C. § 7506(c)(6).

EPA explained that the Hot Spot rule requires that "all projects that have the potential to impact the air quality standards will be analyzed using appropriate methods before they receive Federal funding or approval." 71 F.R. 12,472 (March 10, 2006). In the case of I-70, the modeling for the Project makes clear that this Project has the potential to violate the NAAQS for PM-10 because all alternatives, except one build alternative and the No-build alternative, will cause the NAAQS to be violated. This modeling evidence demonstrates that the Project is a "project of air quality concern."

EPA did recognize authority under the Act to exempt projects from Hot Spot analyses, but EPA recognized that only it has that authority, and that it must be exercised through rulemaking.

EPA also believes it has discretion to not require analyses of localized impacts of projects if we have scientific evidence that PM2.5 and PM10 hot-spots are not a concern with respect to the standards. That is, even under the statutory standards of section 176(c)(1)(A) and (B), if EPA determines through rulemaking that certain types of projects will not cause or contribute to violations of any standard or delay attainment, EPA concludes that we have the authority to determine through the conformity rule that no additional analysis would be necessary to meet section 176(c)(1)(A) and (B).

71 F.R. 12,481(March 10, 2006). EPA has not adopted a rule exempting major interstate expansion projects from Hot Spot analysis, nor has it authorized transportation agencies to exempt projects from Hot Spot analysis on a case-by-case basis.

The Hot Spot rule also recognizes a procedure whereby the State, through its SIP, may exempt projects from hot spot analysis for PM-10. "40 CFR 93.109(k) already allows PM10 areas with insignificant regional motor vehicle emissions to demonstrate, when appropriate, that individual projects will not create new localized violations or make existing violations worse. Projects in such cases would not require PM10 hot-spot analyses." 71 F.R. 12,489 (March 10, 2006). But Colorado has not made any finding that regional motor vehicle emissions are "insignificant" with respect to PM-10.

In the AQ Technical report, FHWA claims that it may exempt projects that do not involve a significant increase in diesel trucks. But that is not the test that EPA provided in the Hot Spot rule. The rule requires projects with a "significant number of diesel vehicles" to be analyzed for impacts on the NAAQS.

Section 93.123(b)(1) of today's final rule requires PM2.5 and PM10 hot-spot analyses for the following projects of air quality concern:

Section 93.123(b)(1)(i): New or expanded highway projects that have a *significant number of* or a significant increase in diesel vehicles." [Emphasis added.] 71 F.R. 12,490 (March 10, 2006).

EPA described an example of a highway expansion project that may be found not to be a "project of air quality concern":

Projects that do not meet the criteria under Sec. 93.123(b)(1), such as any new or expanded highway project that primarily services

gasoline vehicle traffic (i.e., does not involve a significant number or increase in the number of diesel vehicles).

71 F.R. 12,491 (March 10, 2006). A project with a significant number of diesel vehicles, regardless of whether the project causes that number to increase, is a project of air quality concern.

An example of a project considered to have a significant number of diesel vehicles is a "highway or expressway that serves a significant volume of diesel truck traffic, such as facilities with greater than 125,000 annual average daily traffic (AADT) and 8% or more of such AADT is diesel truck traffic." *Id.* Such a project has 10,000 diesel vehicle trips per day. The AADT data posted by CDOT for current traffic on I-70, *see* p. 6 above, shows that I-70 currently carries over 13,000 trucks per day. The proposed Project is expected to carry at least 30% more traffic, or approximately 16,000 trucks per day. The total number of trucks is significant, and the Project is a "project of air quality concern" that must be analyzed for conformity.

2. Conformity Determination Must be Included in SDEIS for Public Review and Comment.

The Conformity Determination required by the CAA must be included in, and addressed by the review of the Project under NEPA. "EIS shall state how alternatives considered in it and decisions based on it will or will not achieve the requirements of ... other environmental laws and policies." 40 CFR 1502.2(d). *See* 40 CFR §§ 1501.6, 1502.25.

The information developed to determine that one of the build alternatives (basic managed lane alternative) will not contribute to violations of the NAAQS has not been disclosed. In other project reviews, FHWA has made available information such as the inputs to MOVES to estimate emissions, and inputs to the dispersion model, and outputs from dispersion modeling to show receptor locations used for modeling, and the concentrations predicted at receptor locations. These kinds of information have not been provided in this SDEIS, or AQ Technical Report. Commenters request pursuant to NEPA and the Freedom of Information Act that all input and output files prepared for, or used in, the modeling analyses be made available for review by the public.

IV. Assessment of Alternatives and Mitigation to Avoid Adverse Health Impacts and NAAQS Violations is Absent.

The SDEIS is fundamentally flawed under NEPA and FAHA because it omits any assessment of alternatives and mitigation measures that can 1) reduce the adverse health impacts likely to result from exposure to increased air pollution, and 2) reduce emissions to the levels needed to prevent NAAQS violations.

The SDEIS is also deficient for its failure to mitigate emissions from heavy duty diesel equipment used during construction.

A. Alternatives to Reduce Pollutant Exposures in the I-70 Corridor.

At a minimum, two alternatives should be considered to reduce emissions and pollutant exposures in the neighborhoods adjacent to I-70:

1) re-signing I-70 to route the 40% of traffic that is "through" traffic out of the neighborhoods where dense urban development and elementary schools are located within a few hundred meters of I-70 onto I-76 and I-270; and

2) routing all truck traffic off of the current alignment between Washington Street and Colorado Blvd which would require through truck traffic to use I-76 and I-270, and local truck traffic to disperse on local streets leading to their local destination rather than concentrating on the current alignment next to schools and houses along the highway.

These alternatives are reasonable because they will add mobility for traffic traveling through the metro area, without significantly increasing the cost of mobility, while at the same time providing health benefits for communities along the current I-70 alignment. These alternatives have not been evaluated in prior NEPA documents.

Consideration of these alternatives should include traffic modeling and air quality modeling to answer the following questions for decisionmakers and the public:

a) how much reduction in traffic emissions within the I-70 Project study area could be achieved by diverting truck traffic away from the segment of I-70 where NAAQS violations are expected by requiring that trucks use I-76 and I-270?

b) would the reductions in PM emissions achieved by a truck diversion rule be sufficient to ensure attainment of every applicable NAAQS for mobile source-related pollutants (PM-10, PM2.5, NO2 and CO)?

c) would the diversion of trucks from I-70 and onto I-76/I-270 increase emissions enough in those corridors to cause NAAQS violations?

(d) if the diversion of truck traffic would not be sufficient to ensure that attainment of any NAAQS will not be maintained in the Project study area, would the diversion of through traffic from the current I-70 alignment onto I-76 and I-270 be sufficient to ensure attainment during the life of the Project?

(e) how much of the traffic expected to use the current I-70 alignment in 2035 would be through traffic (i.e., not expected to exit or enter between the Mousetrap and Colorado Blvd)?

(f) if through traffic were diverted onto I-76 and I-270, would emissions from those highways cause any NAAQS to be violated along those alignments?

(g) if any NAAQS violations are predicted at receptor locations along those highways, are any of those receptors in a location which EPA defines as "ambient air," 40 CFR § 50.1, i.e. a location outside the right-of-way owned by CDOT where the general public has access?

Without answers to these questions, informed decisions about these alternatives cannot be made.

CDOT Director Hunt has stated during public meetings that CDOT cannot limit truck or car access to segments of the interstate system, and that therefore the alternatives proposed here for evaluation are not permissible. This is an incorrect understanding of the law. CDOT may not have authority to limit vehicle access under statutes that it has authority to implement, but the State clearly has authority under the CAA to limit vehicle access if necessary to attain or maintain a NAAQS for mobile source-related pollutants. For example, the State may adopt

measures pursuant to an indirect source review program to prevent a highway from attracting mobile sources, the emissions from which will cause or contribute to violations of a mobile source-related NAAQS. 42 U.S.C. § 7410(a)(5). When necessary to attain a mobile source-related NAAQS in a nonattainment area, or maintain a NAAQS in an attainment area, the State may also adopt directly into its SIP any of the transportation control measures authorized by CAA section 108(f)(1), including "(vii) programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration particularly during periods of peak use."

An EIS shall include reasonable alternatives not within the jurisdiction of the agency proposing the action. 40 CFR 1502.14(c). Thus the traffic diversion strategies described above should be considered in the EIS because Congress has delegated authority to the State to adopt such alternatives into its SIP as control measures.

B. Alternatives to Allow Residents to Move from the Pollution Danger Zone.

For comparison of health benefits, improved air quality and costs under § 109(h), an alternative that invests resources to allow residents to protect themselves from the pollution danger zone by moving away must also be evaluated. This alternative allows residents to reduce their exposure to emissions from the highway to zero, and to avoid any adverse health impacts. This option is the kind of mitigation contemplated by 40 CFR § 1508.20(e) by providing a substitute environment for the residents adversely affected by exposure to pollution from the Project.

Together, the failure to investigate the impacts that Project emissions will have on air pollution standards, on community health, and to consider options that could prevent adverse air quality impacts and improve local health outcomes makes the SDEIS inadequate under NEPA. In addition, the failure to consider and adopt mitigation puts Denver at risk of becoming nonattainment under the CAA for PM_{2.5}, and possibly for NO₂ as well. There is no discussion of the regulatory burdens that such an outcome will have on sources of PM_{2.5} in the region, on regional transportation planning and transportation funding, and on the City.

CONCLUSION.

The SDEIS is not adequate to satisfy the requirements of NEPA, FAHA or the CAA for the reasons discussed above. A ROD for the proposed I-70 Project may not be signed, or the project funded or approved until a revised SDEIS is prepared that remedies the described deficiencies and is made available for public review and comment.

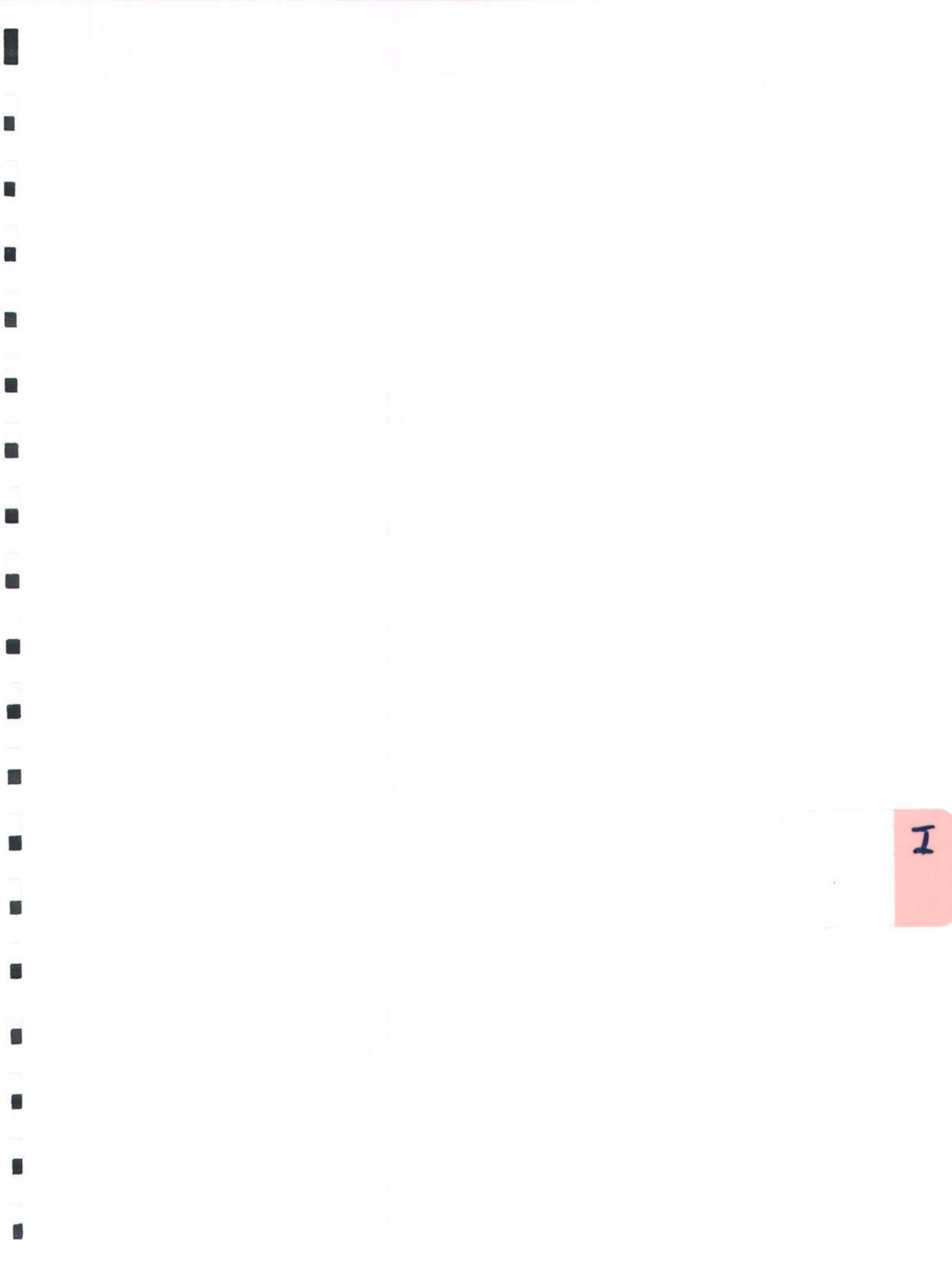
Respectfully submitted,

Robert E. Yuhnke
Robert E. Yuhnke and Associates
(303) 499-0425
Colorado Attorney (#012686)

Joanne Spalding
Attorney, Sierra Club Law Program

85 Second Street
San Francisco, CA 94105
(415) 977-5725

JD MacFarlane
2080 Bellaire St.
Denver, CO 80207
303-377-0490
jdmac55@comcast.net



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demonstrably improves the health and wellness of residents beyond conditions that exist today – that is, a solution that results in measurably better health conditions for residents, school children, workers and visitors to these neighborhoods. We request a solution that improves mobility and accessibility of residents of these neighborhoods, that does not continue to rely on fossil fuel technology, and provides instead new investments in transit, sidewalk completion, separation of railways, and bicycle connections. We request a solution that focuses foremost on improved connectivity within these neighborhoods and repairing the damage caused by locating I-70 here more than 50 years ago.

We strongly affirm that investing in making these communities more complete, more vibrant, and healthier should be the city and state's priority, not damaging them further through this misguided proposal.

Respectfully submitted,

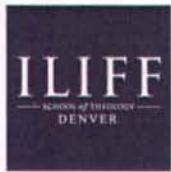
Dr. Miguel De La Torre, Iliff School of Theology
Dr. George "Tink" Tinker, Iliff School of Theology

A REQUEST TO THE FAITH COMMUNITY

**SOCIAL
JUSTICE**

- HELP GIVE VOICE TO THE DISADVANTAGED NEIGHBORHOODS IN NORTH DENVER
- JOIN OTHER FAITH LEADERS IN LETTING STATE AND CITY OFFICIALS KNOW THAT RESIDENTS OF ELYRIA AND SWANSEA MATTER – THEY ARE NOT SECOND-CLASS CITIZENS
- AND THAT THESE NEIGHBORHOODS SHOULD NOT BE DESTROYED

SOCIAL JUSTICE, ENVIRONMENTAL JUSTICE AND THE WIDENING OF I-70



*Iliff School of Theology's Program for Social Justice hosted a Forum on September 27, 2014 to get information on the proposed widening of I-70 through Elyria and Swansea. We learned that the State of Colorado has a preferred alternative to widen the highway about **3 times its current** width removing substantial portions of two minority and low-income neighborhoods: Elyria and Swansea.*

Elyria is a 120-year old neighborhood with approximately 150 families focused on a 14-block area. The highway megaproject would displace more than 50 families. I-70 is already a major source of air pollution and greenhouse gas emissions in these residential areas, and widening the highway will result in even more pollution.

At the forum, social justice and policy statements from various faith traditions were made available and discussed. There are common themes of protecting those with lesser means and the disenfranchised. There are common themes relating to curbing fossil fuel use and taking action on climate change.

[Link to information from the Iliff Forum on I-70 \[LINK\]](#)



Colorado Council of Churches
Walking together in faith, working together for justice.

Religious leaders at Iliff, in partnership with the Colorado Council of Churches, have prepared a statement asking the State of Colorado to develop an alternative which (a) does not further damage these neighborhoods, (b) maintains all existing housing and businesses, and (c) reduces exposure to pollution and results in measurably improving the health of residents.

WE INVITE YOU TO JOIN OTHER RELIGIOUS LEADERS & SIGN THE STATEMENT

<http://www.unitenorthmetrodenver.com/faithcommunitypetition>



We also invite you to provide comments directly to the Colorado Department of Transportation and request that an I-70 alternative be developed, based on social justice and environmental justice.

<http://www.i-70east.com/comment-form.html>



A New Direction

**Our Changing Relationship with Driving
and the Implications for America's Future**

CoPIRG
Foundation

FRONTIER GROUP

A New Direction

Our Changing Relationship with Driving
and the Implications for America's Future

CoPIRG Foundation
Frontier Group

Tony Dutzik,
Frontier Group
Phineas Baxandall,
U.S. PIRG Education Fund

Spring 2013

Executive Summary

The Driving Boom—a six decade-long period of steady increases in per-capita driving in the United States—is over.

Americans drive fewer total miles today than we did eight years ago, and fewer per person than we did at the end of Bill Clinton's first term. The unique combination of conditions that fueled the Driving Boom—from cheap gas prices to the rapid expansion of the workforce during the Baby Boom generation—no longer exists. Meanwhile, a new generation—the Millennials—is demanding a new American Dream less dependent on driving.

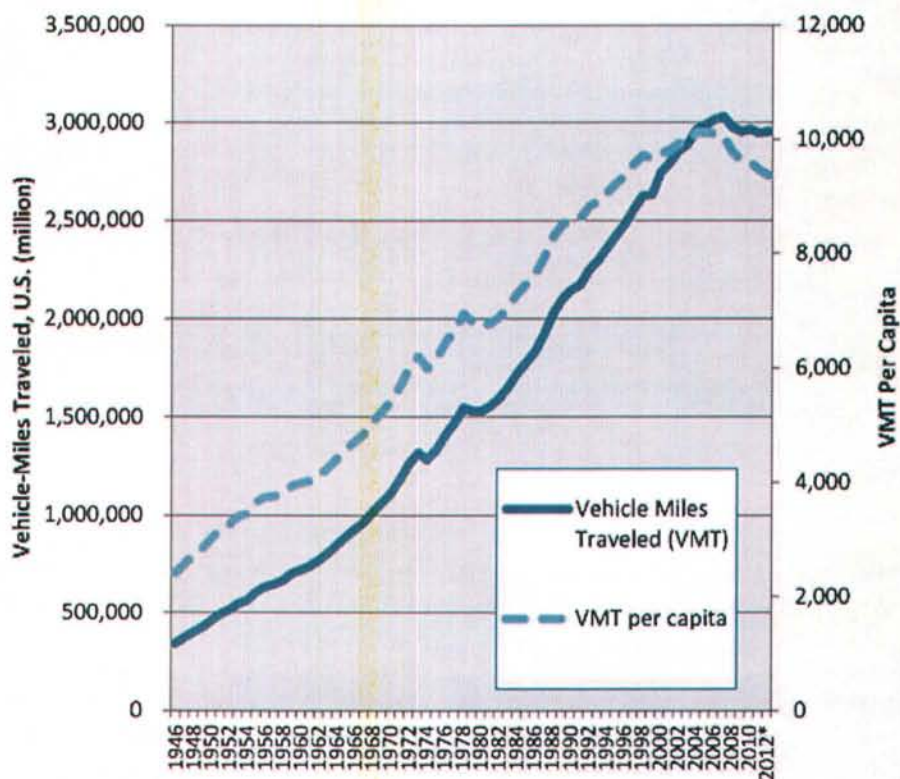
Transportation policy in the United States, however, remains stuck in the past. Official forecasts of future vehicle travel continue to assume steady increases in driving, despite the experience of the past decade. Those forecasts are used to justify spending vast sums on new and expanded highways, even as existing roads and bridges are neglected. Elements of a more balanced transportation system—from transit systems to bike lanes—lack crucial investment as powerful interests battle to maintain their piece of a shrinking transportation funding pie.

The time has come for America to hit the “reset” button on transportation policy—replacing the policy infrastructure of the Driving Boom years with a more efficient, flexible and nimble system that is better able to meet the transportation needs of the 21st century.

The Driving Boom is over.

- Americans drove more miles nearly every year between the end of World War II and 2004. (See Figure ES-1, next page.) By the end of this period of rapid increases in per-capita driving—which we call the “Driving Boom”—the average American was driving 85 percent more miles each year than in 1970.
- Americans drive no more miles in total today than we did in 2004 and no more per person than we did in 1996.
- On the other hand, Americans took nearly 10 percent more trips via public transportation in 2011 than we did in 2005. The nation also saw increases in commuting by bike and on foot.

Figure ES-1. Total and Per-Capita Vehicle-Miles Traveled, U.S.



* 2012 data from U.S. Department of Transportation's (U.S. DOT) *Traffic Volume Trends* series of reports; data from previous years from U.S. DOT's *Highway Statistics* series of reports.

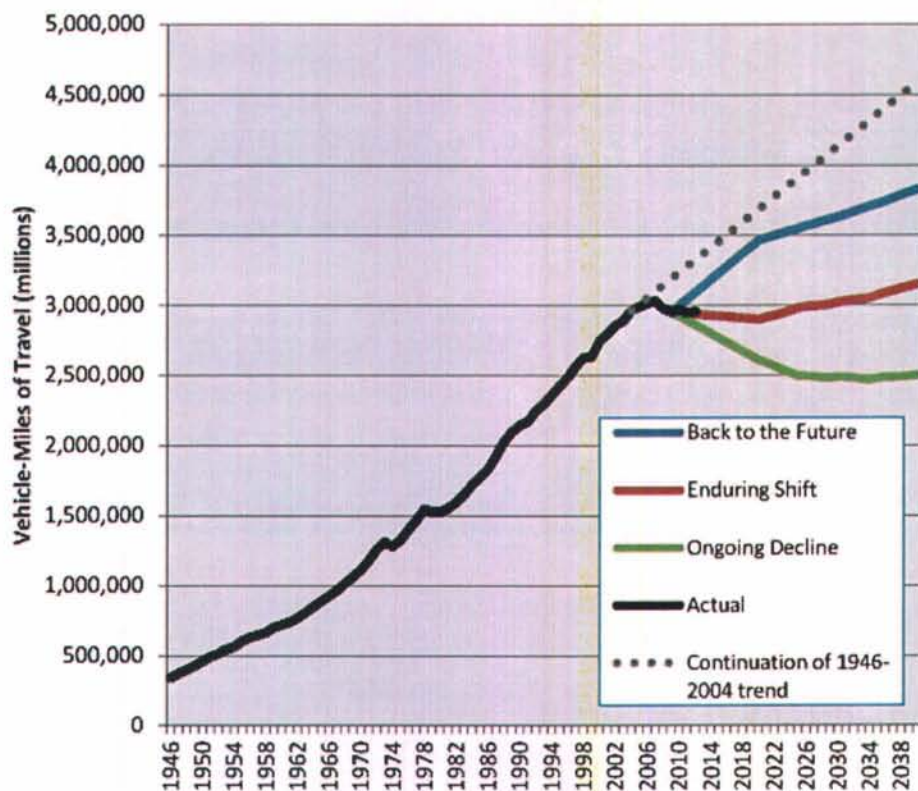
- A return to the steady growth in per-capita driving that characterized the Driving Boom years is unlikely given the aging of the Baby Boom generation, the projected continuation of high gas prices, anticipated reductions in the percentage of Americans in the labor force, and the peaking of demand for vehicles and driver's licenses and the amount of time Americans are willing to spend in travel.

The Millennial generation has led the recent change in transportation

trends—driving significantly less than previous generations of young Americans. Millennials are already the largest generation in the United States and their choices will play a crucial role in determining future transportation infrastructure needs.

- The Millennials (people born between 1983 and 2000) are now the largest generation in the United States. By 2030, Millennials will be far and away the largest group in the peak driving age 35-to-54 year old demographic, and will continue as such through 2040.

Figure ES-2. Aggregate Vehicle-Miles Traveled in the United States under Several Scenarios of Future Travel Growth, 1946-2040



- Young people aged 16 to 34 drove 23 percent fewer miles on average in 2009 than they did in 2001—a greater decline in driving than any other age group. The severe economic recession was likely responsible for some of the decline, but not all.
- Millennials are more likely to want to live in urban and walkable neighborhoods and are more open to non-driving forms of transportation than older Americans. They are also the first generation to fully embrace mobile Internet-connected technologies, which are rapidly spawning new transportation options and shifting the way young Americans relate to one another, creating new avenues for living connected, vibrant lives that are less reliant on driving.
- If the Millennial-led decline in per-capita driving continues for another dozen years, even at half the annual rate of the 2001-2009 period (illustrated by the *Ongoing Decline* scenario in Figure ES-2 above), total vehicle travel in the United States could remain well below its 2007 peak through at least 2040—despite a 21 percent increase in population. If

Millennials retain their current propensity to drive less as they age and future generations follow (*Enduring Shift*), driving could increase by only 7 percent by 2040. If, unexpectedly, Millennials were to revert to the driving patterns of previous generations (*Back to the Future*), total driving could grow by as much as 24 percent by 2040.

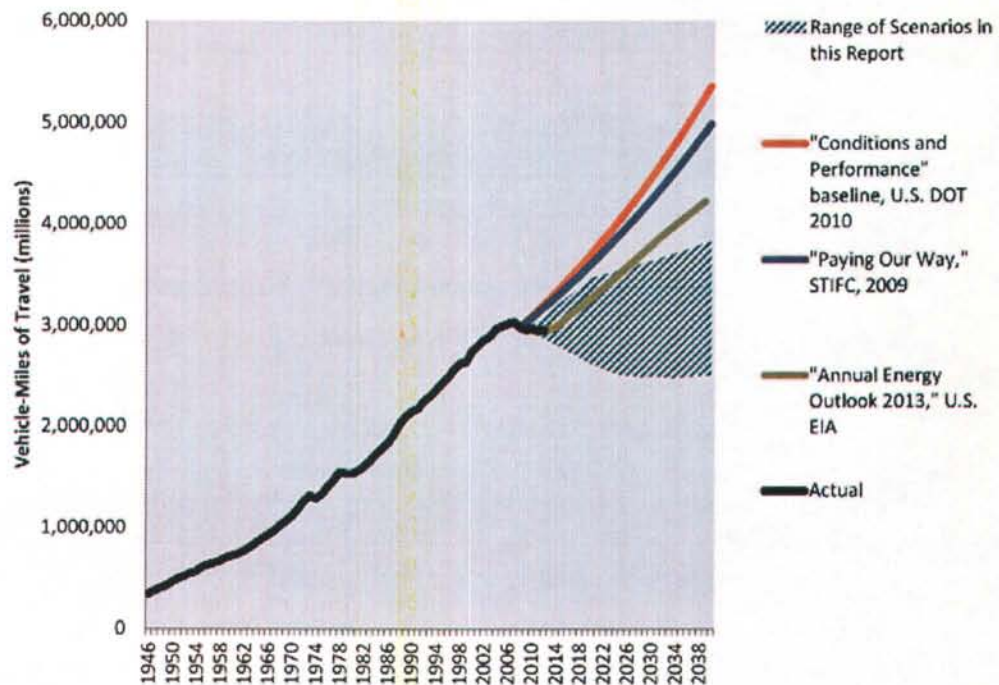
- All three of these scenarios yield far less driving than if the Driving Boom had continued past 2004. Driving declines more dramatic than any of these scenarios would result if future per-capita driving were to fall at a

rate near that of recent years or if annual per-capita reductions continue through 2040.

- Regardless of which scenario proves true, the amount of driving in the United States in 2040 is likely to be lower than is assumed in recent government forecasts. This raises the question of whether changing trends in driving are being adequately factored into public policy. (See Figure ES-3.)

The recent reduction in driving has already delivered important benefits for

Figure ES-3. Recent Official Forecasts of Vehicle Travel Compared to Range of Scenarios, 1946-2040



U.S. DOT = U.S. Department of Transportation
 STIFC = Surface Transportation Infrastructure Financing Commission
 U.S. EIA = U.S. Energy Information Administration

the nation, while raising new challenges. Future driving trends will have major implications for transportation policy and other aspects of American life.

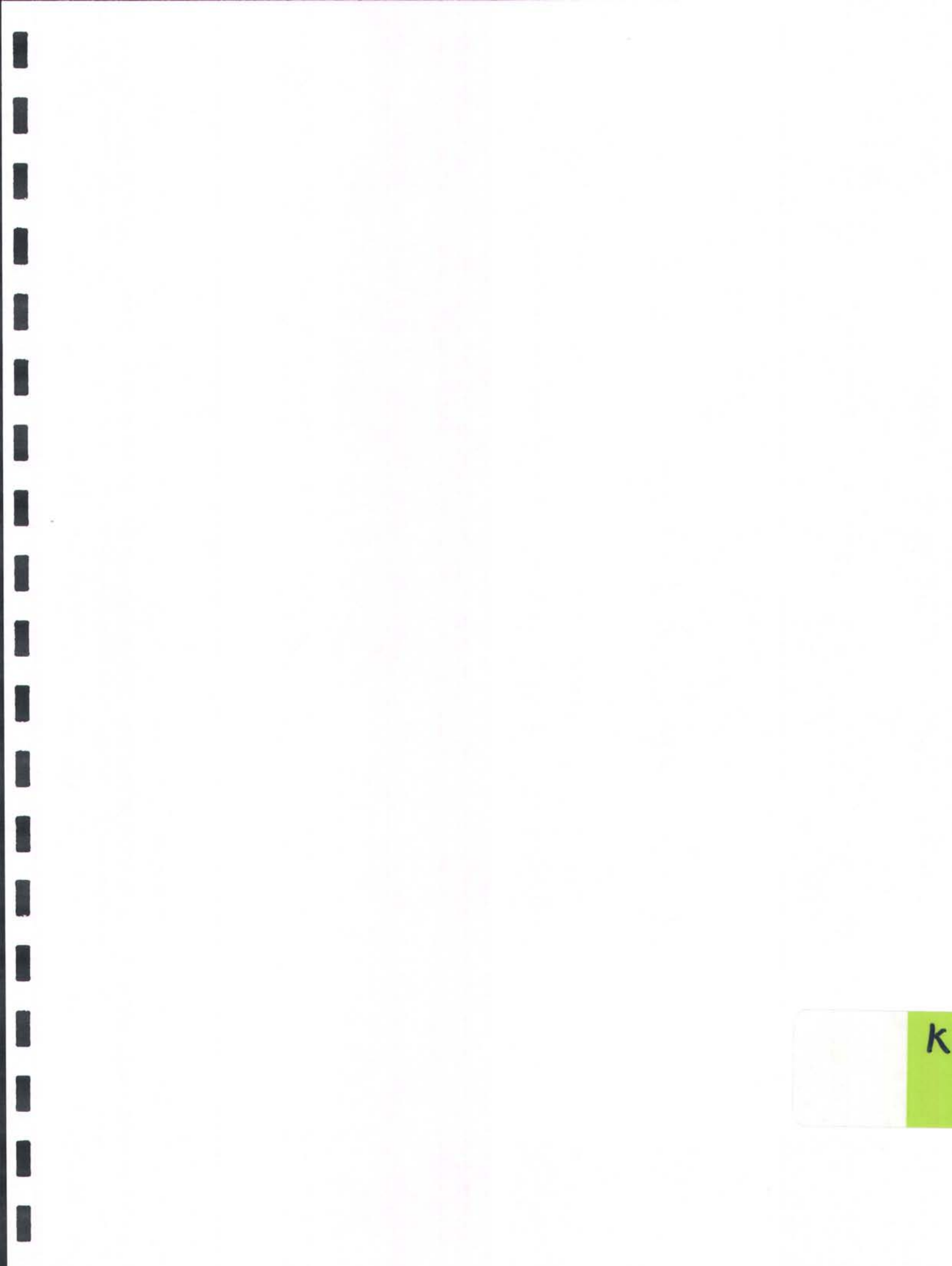
- **Traffic congestion has fallen.** According to data from the Texas Transportation Institute, Americans spent 421 million fewer hours stuck in traffic in 2011 than they did in 2005. Further reductions in driving could lead to additional easing of congestion without massive investments in new highway capacity, as long as roads are maintained in a state of good repair.
- **America is less dependent on oil.** In 2011, gasoline consumption for transportation hit a 10-year low. Further reductions in driving consistent with the *Ongoing Decline* scenario—coupled with expected vehicle fuel economy improvements—could result in the nation using half as much gasoline or other fuels in our cars and trucks by 2040 as we use today.
- **Our roads are getting less use ... but the gas tax is bringing in less income.** Reduced vehicle travel (particularly in large trucks) reduces the wear and tear on our nation's roads, reducing maintenance needs. Reduced driving, however, also reduces the amount of revenue brought in by the already-strained gasoline tax.

The recent reduction in driving and embrace of less auto-dependent ways of living by Millennials and others creates a golden opportunity for America to adopt transportation policies that use resources more efficiently, preserve our existing infrastructure, and provide support for Americans seeking alternatives to car travel.

A new vision for transportation policy should:

- **Plan for uncertainty.** With future driving patterns uncertain, federal, state and local transportation officials should evaluate the costs and benefits of all transportation projects based on several scenarios of future demand for driving. Decision-makers should also prioritize those projects that are most likely to deliver benefits under a range of future circumstances.
- **Support the Millennials and other Americans in their desire to drive less.** Federal, state and local policies should help create the conditions under which Americans can fulfill their desire to drive less. Increasing investments in public transportation, bicycling and pedestrian infrastructure and intercity rail—especially when coupled with regulatory changes to enable the development of walkable neighborhoods—can help provide more Americans with a broader range of transportation options.
- **Revisit plans for new or expanded highways.** Many highway projects currently awaiting funding were initially conceived of decades ago and proposed based on traffic projections made before the recent decline in driving. Local, state and federal governments should revisit the need for these “legacy projects” and ensure that proposals for new or expanded highways are still a priority in light of recent travel trends.
- **Refocus the federal role.** The federal government should adopt a more strategic role in transportation policy, focusing resources on key priorities (such as repair and maintenance of existing infrastructure and the expansion of transportation options) and evaluating projects competitively on the basis of their benefits to society.

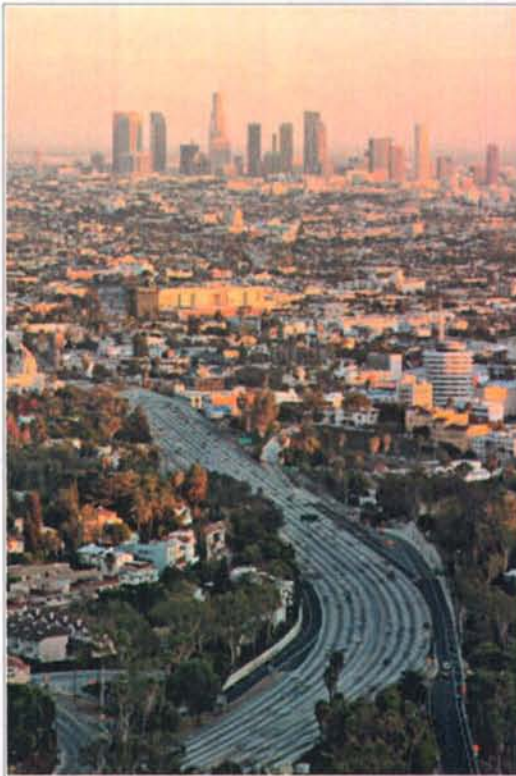
- **Use transportation revenue where it makes the most sense.** Transportation spending decisions should be based on overall priorities and a rigorous evaluation of project costs and benefits—not on the source of the revenue.
- **Do our homework.** Federal and state governments should invest in research to evaluate the accuracy and usefulness of transportation models and better understand changing transportation trends in the post-Driving Boom era.



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URBANISTS NEED TO FACE THE FULL IMPLICATIONS OF PEAK CAR

by Aaron M. Renn 11/25/2014

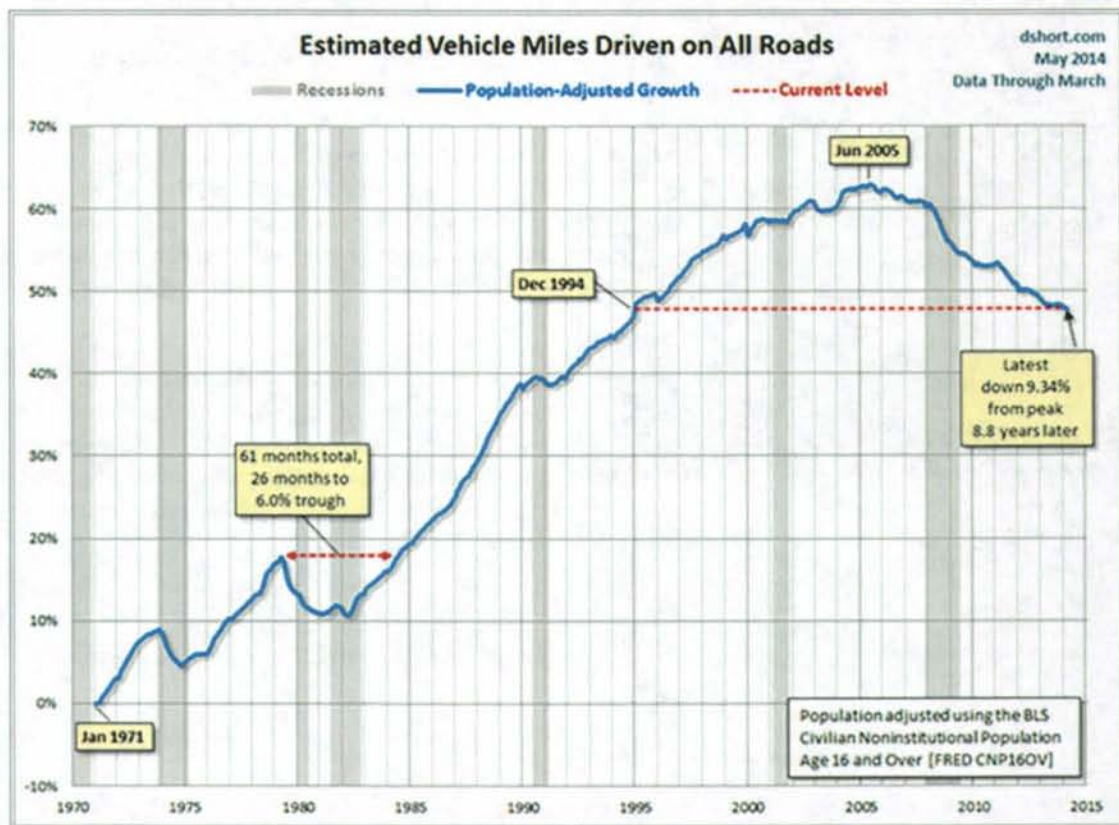


As traffic levels decline nationally in defiance of the usual state DOT forecasts projecting major increases, a number of commentators have claimed that we've reached "peak car" – the point at which the seemingly inexorable rise in vehicle miles traveled in America finally comes to an end. But while this has been celebrated, with some justification in the urbanist world as vitiating plans for more roads, the implications for public policy haven't been fully faced up to.

Indeed, the "peak car" is antithetical to the reigning urbanist paradigm of highways known as "induced demand." Induced demand is Say's Law for roads: supply of lanes creates its own demand by drivers to fill them. Hence building more roads to reduce congestion is pointless. But if we've really reached peak car, maybe we really can build our way out of congestion after all.

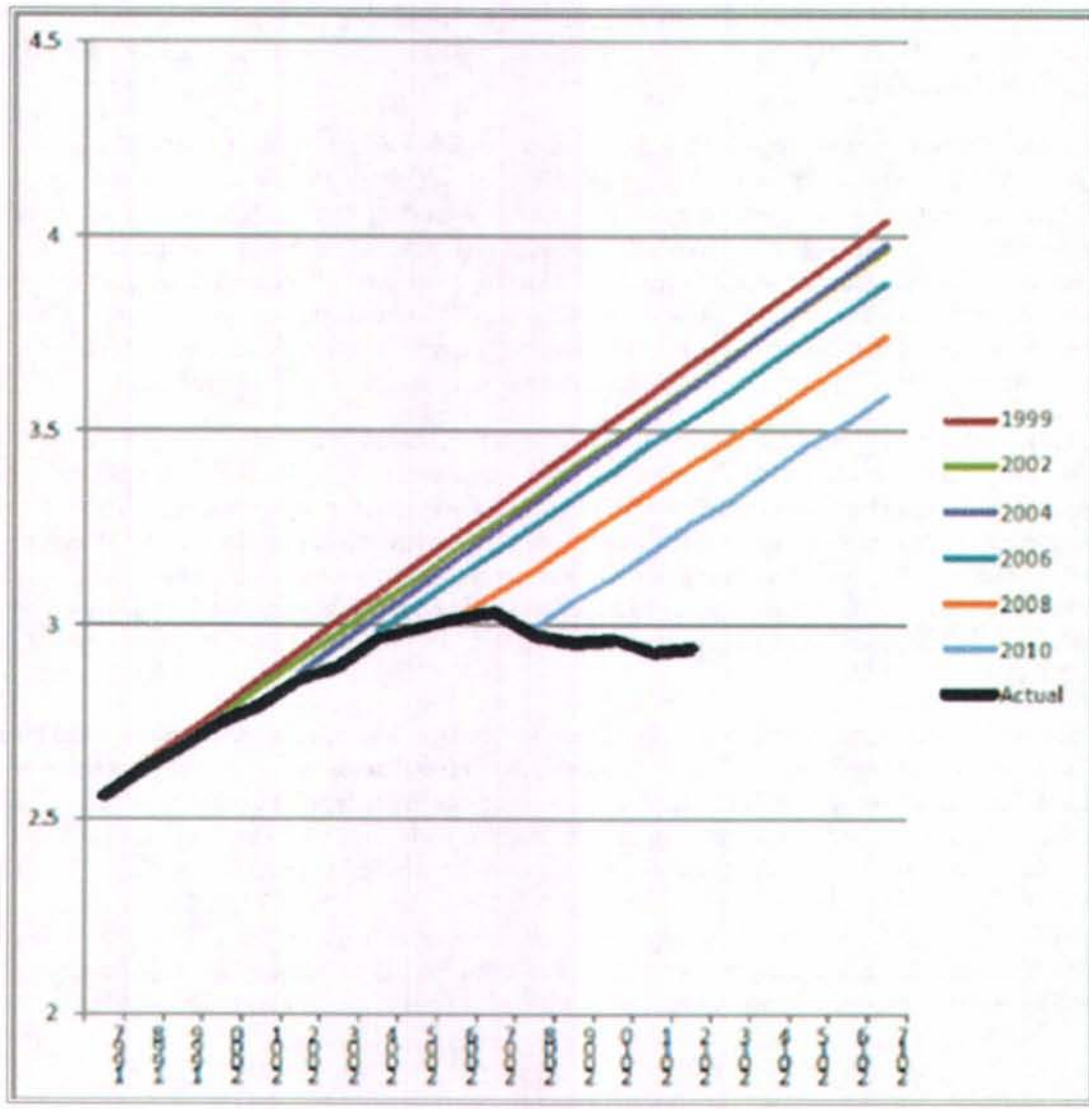
Traffic levels have stabilized or even fallen in recent years. According to [analysis by economist Doug Short featured in Streetsblog](#), aggregate auto travel peaked on a per capita basis in 2005 and has fallen since. Per capita traffic levels are

now back to 1994 levels, a two decade rollback in traffic increases.



Population adjusted traffic growth. Image via Doug Short

Even looking at total, not per capita travel shows a marked reversal. The State Smart Transportation Initiative, a pro-environmental transport advocacy group, put together a graph showing how high the US DOT's traffic projections have turned out to be:



VMT forecasts vs. actual. Source: SSTI

This data is complemented by a slew of recent stories about the poor financial performance of toll roads, resulting in part from traffic falling far below projections. For example, the concessionaire operating the Indiana Toll Road recently went bankrupt. [Streetsblog reported](#) that while projections forecasted traffic level increase of 22% in the first seven years, traffic actually fell 11% in the first eight.

Recent traffic declines are a reversal of a long running trend of Vehicle Miles Traveled (VMT) increases at above growth in population. Some of this is no doubt due to the poor macro-economy. But there are reasons to believe we may be in a new era of traffic growth or lack thereof. Many of the trends that drove high growth have largely been played out: household size declines, suburbanization, the entry of women into the workforce, one car per driver, etc. That's not to say these will necessarily reverse. But we've reached the point of diminishing returns in terms of how many more women, for example, will join the labor force given that there's already 57% female participation and their [labor force participation rate is projected to decline](#) in the future.

This is potentially very good fiscal news, especially given tight budgets. Clearly many of the freeway expansion projects on the books that have been driven by speculative demand should be revisited. For example, the state of Wisconsin has massive investments planned in Milwaukee area freeway system even though the metro area is very slow growth in population. Are these really necessary? Projects in more rapidly growing boomtown regions in places like Dallas, Houston or Charlotte may well continue to make sense. From top to bottom, engineers need to recalibrate their forecasting models to better correspond to reality. And to revisit highway plans accordingly.

So the idea that we need to build fewer roads than we thought is sound. But less attention has been paid to the flip side implications of this. To repeat, the induced demand theory says that there is a more or less infinite supply of traffic, thus any new roadway capacity will be used up shortly, leaving congestion as bad as the status quo ante. Despite peak car, articles touting induced demand as a reason not to build roads continue unabated, including recent ones in Wired ("[What's Up With That: Building Bigger Roads Actually Makes Traffic Worse](#)") and Vox ("[The 'fundamental rule' of traffic: building new roads just makes people drive more](#)"). In a world of peak car, where traffic levels are flat to declining on a per capita basis, induced demand no longer holds court, certainly not to the level claimed by those who believe it's pointless to build roads.

In fact, what peak car means is that while speculative projects may be dubious, there may be good reasons now to build projects designed to alleviate already existing congestion. Places like Los Angeles remain chronically congested, which has great economic and social consequences, not the least of which is the value of untold hours lost sitting in traffic. While individual projects there might indeed be boondoggles, maybe it's worth building some of the planned freeway expansions there in light of peak car. In short, in some cases peak car strengthens the argument for building or expanding roads.

On the other hand, many of the regional development plans designed to promote compact central city development and transit may be predicated on an analysis that assumes large future traffic increases in a "business as usual" scenario. Not just highways but all aspects of regional planning are dependent on traffic forecasts. That's not to say that such plans are necessarily wrong, but clearly revised traffic reality needs to be reflected in all plans, not just highway building ones.

It's not clear how this will all play out, but urbanists and policy makers of all stripes need to think about the full implications of peak car. At a minimum, the traditional "you can't build your way out of congestion" rhetoric should be supplanted, at least in most areas, by a more nuanced approach that neither overestimates demand, nor ignores the problems caused by rapid growth in some regions and pockets of congestion in others.

Aaron M. Renn is an independent writer on urban affairs and the founder of Telestrian, a data analysis and mapping tool. He writes at [The Urbanophile](#).