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Philip J. Wuest

Portland State University

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Exurban Development, Transportation Infrastructure and Access Management

Philip Wuest
Center for Urban Studies
Portland State University
Phil@upa.pdx.edu

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Center for Urban Studies
Portland State University
Portland, Oregon 97207-0751
(503) 725-4020

Abstract

This paper explores the changing role of state highway corridors in an era of continued urban growth and decentralization. Its primary focus is on the impact of exurban development on state highway corridors and on the policy of access management to control or limit those impacts. The role of access management in distributing the benefits and costs of access to public facilities is outlined. As urban areas expand at the fringe, it is important to clarify to what extent the public good of roadways is diminished by direct corridor access by the private sector. This work is timely and relevant because it deals with how to preserve infrastructure investment in an era of reduced funding and how to meet the need for transportation infrastructure at the urban fringe. Specifically, this paper seeks to answer the question: who (and to what extent) should bear the cost of access to highway corridors--a developer, municipality or the state?

The paper begins with a summary of the trends driving change in urban and regional form. This will include a discussion of changes in residential patterns, commercial and industrial activities, and travel behaviors. The role of demographic shifts and changes in work force participation will also be briefly discussed. Next, the paper will address various policy responses to these trends and to the role of access management within this larger picture. I hope to frame the issue in terms of benefits and costs of access, to whom they accrue and how access management is one essential tool in protecting public investment.

Introduction

It is widely acknowledged that both residences and employment in the US over the past thirty years have developed disproportionately at the urban fringe. Changes in patterns of automobile ownership, commuting patterns and trip organization for households have contributed to increased traffic volumes on semi-rural state highway corridors. These corridors now take on the role of development strips between urban areas, their suburban fringes, and the exurbs in outer counties that increasingly fill the gaps between larger urban areas. State highway corridors face increasing use for daily JTW commutes and are increasingly used for recreation traffic and non-JTW trips. As these corridors are more heavily traveled, they provide access between passing traffic and adjoining areas. This encourages development along the corridor, further exacerbating higher traffic volume with increased turning movements and slowing due to frequent access and egress. The attractiveness of accessibility to manufacturers and commercial enterprises, and the use by households of exurban highway corridors for all types of daily trips all lead to increased congestion, likelihood of accidents, and a slowing of commercial through traffic.

In response to these trends, state DOTs have stressed policies of access management to limit direct access to state highway corridors so that their viability as through highways can be maintained. These policies have been implemented with only limited success. This paper specifically seeks to explore the issue of the cost of access. For background information we are interested in the changing nature of urban form with regard to fringe development of residential, manufacturing and tertiary activity. In addition, the changing function of state highway through corridors to uses of day to day commuting and other trip purposes and the increasing use of corridors as extended avenues for exurban residents will be reviewed. Finally, I will explore a method to

determine the relative benefits and costs of access to state highway facilities and to whom they accrue. In the end, I hope to further strengthen the argument for stronger protection against direct access and to expand on the role of access management as a tool to control and protect the state's highway investment.

Part One: Fringe Area Development, the elements and the issues

“Considering the extent of American freeways and major highways, it is conceivable that households may be able to locate upwards of 100 miles or more from the city center and still be within commute range of urban employment opportunities. (Nelson and Dueker: 1992)

“The term *exurbia*, although it escapes precise definition, has come to apply to the zone lying beyond the continuously built-up suburbs of a central city but within a larger functional urban region. The outer bounds of exurbia may be delimited by such criteria as the extent of an urban area's commuting field and the territory which serves as its recreational and seasonal home hinterland. Correspondingly, an exurbanite is one who lives in the country and has functional ties to a nearby urban area.”(Lamb: 1983)

“Some of the worst congestion today can be found on the fringes of America's fast growing cities.” (Cevero: 1986)

The above quotes outline the significant trend of increasing exurbanization. The forces that have led to this situation merit some discussion. There are three main components to the changes that have been noted above: 1) the growth of exurban residential development, 2) the growth of suburban and exurban employment and, 3) larger demographic trends associated with the aging boomer cohort.

Suburbs and Exurbs: residential change

Davis, Nelson and Dueker (1994) describe two primary kinds of exurban households; rural households and those that live in or around small towns and villages. Both heavily affect the use of state highway corridors for daily journey to work trips. The key to understanding exurbia is to realize that they rely on functional ties to the larger urbanized region. According Davis and Nelson and Dueker, over 70% of all rural households and nearly 60% of all small-town exurbanite households still travel to within the metropolitan area. to work. The result of these trends are longer commutes, a high proportion of SOV use and more trip chaining. There are two important components that relate to trip chaining. Small town residents actually trip-chain less than their rural counterparts, but this may, in part, still cause increase congestion to state facilities within city boundaries. On the other hand, exurban rural households have a higher propensity to form trip chains and so exacerbate existing congestion during peak-hour travel times. Finally, an analogy to the suburban experience can be drawn. It is likely that as more households choose to move to the exurbs, tertiary and then commercial and industrial activities will follow. These are well-established trends.

One other reason for exurban expansion is “excess” capacity on existing farm to market roads (Davis, Nelson, Dueker 1994). This raises a fundamental question regarding the allocation of corridor resources as public goods. To what extent is this

excess capacity available to private developers to market as access and capitalize into land values? What is the most efficient level of trade-off between through-flow of traffic and accessibility to fringe development along state highway corridors? These forces increase the burden on state resources in maintaining highways as through corridors. In a time of decreased financial resources for infrastructure investment, increasing demand for facilities and increasing costs to build and maintain that very same infrastructure it calls into question the extent to which public investment is diminished by private access.

As localities compete for residences and business, to what extent do they have real incentive to maintain state highways as through corridors. It is in sense the classic tragedy of the commons scenario--while all communities benefit from an efficient and well-maintained throughway, each locality has incentive to underinvest in roadway infrastructure and to use the "excess" capacity found along the existing state facility. Local jurisdictions have incentive to grant variance that allows highway access. This can encourage development of the full range of tertiary services that exurbanites are accustomed to consuming. To what extent should localities be able to rely on the state facility to handle daily point to point internal trips?

Exurbs: commercial and manufacturing growth

Dueker and Nelson (1992) note that the exurban phenomenon is fueled by a steady increase in the number of employment opportunities in the suburban ring. This same trend is documented by Cervero (1984, 1986) who expands to say that lower land costs and development expenses make land at the urban fringe a better deal for many commercial enterprises. In addition aggressive suburban communities compete for business by offering subsidy to on public services. Finally, the existing network of interstate freeways and secondary state highways provide excellent infrastructure upon which growing businesses and communities can tap into to grow up around. This has led to lower employment densities and an increasing share of jobs and commuter going from suburb to suburb. While there is one school of thought that has this decentralization and clustering in the suburbs to lead to more efficient commutes, Cervero (1996) argues that this is not the case. Growing employment in the suburban ring has led to higher levels of congestion, higher VMT per capita and as a result a higher level of negative externality levied on urban regions as a whole.

Cervero notes (1986) that "the individual effects of increasing densities, designing complexes for convenient carpool and transit access and intermixing land uses may appear modest, collectively they can shave rush-hour commuting by 5% to 10% that often can be the difference between gridlock and restored conditions. Access management seeks to enhance and support other strategies. There is an important caveat to mention here. As clustered development progresses at higher densities due to land use policy and access management strategies, it is likely that new investment and development will beget yet further development exacerbating the very problems the policies set out to fix in the first place. Therefore it should be noted that this paper's primary focus is on maintaining the viability of state highway throughways and should not be considered a solution to community and region-wide growth-induced problems. It is an argument for more restrictive allocation of state facilities; the fundamental

argument is that private land owners and localities should bear the burden of developing their own internal infrastructure rather than relying on “excess” state resources for growth related infrastructure needs. It is yet another argument for concurrency; another call for growth to fund itself rather than relying on public subsidy. Access management thrusts the responsibility for maintaining adequate flow back to the community level, back to the level at which most land-use and infrastructure decisions are made.

Because right of way is often more readily available along suburban corridors, there are generally more opportunities for expanding capacity than along more urbanized routes. This leads to more development at the urban fringe. These same trends make it difficult for the state to maintain an effective policy of purchasing rights of way, as speculation drives prices out of the range of state agencies bidding on the open market.

Exurban growth and demographic trends

Finally, the above outlined forces should be understood in the context of larger demographic trends. Land and housing are normal goods, which means that as income goes up people will consume more of them. With the babyboom generation reaching their maximum earning potential, and with a life-cycle status that seems to encourage movement to newer homes, it is likely that the trend to exurbanize will continue at a rapid pace. Especially if you consider the exurban area to include the recreation shed of urban households. This cohort will increasingly seek travel in their free time--travel through and throughout the exurban fringe. This will intensify existing trends towards clogging up state highway throughways--both through the initial effect of more cars on the road and through the secondary effect of tertiary activities springing up along the corridors to skim excess disposable income from the recreation seeking boomer population.

Summary of Part 1

Lamb (1983) states “Linear or strip development poses special problems along major thoroughfares. The 55 mph rural commuting route enjoyed by early exurbanites may gradually evolve into a low-speed, hazardous and unsightly highway as linear development erodes the roadway’s original function of carrying high-speed traffic. In utilizing the road for both arterial and local-access functions users satisfy neither objective very well. Residential areas suffer from traffic hazards and noise. Commercial uses, in unconfined by local zoning, tend to be scattered along such routes by generating additional local traffic, adding to safety problems and changing the aesthetic qualities of the area. These problems can be minimized by local land use controls such as road frontage requirements, site design standards, and zoning, but the adoption and enforcement of controls is spotty and inconsistent.”

Part II--State DOT Response: Access Management

The effects of each of the above trends is to heighten problems of access, congestion and safety along state highway corridors; as through-travel corridors are transformed into corridors of commercial, residential and recreational access. Access

management has been one policy response. The Intermodal Surface Transportation and Efficiency Act of 1991 raises access management responses to these problems to a policy level. "Access management provides access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity and speed. It extends the concept of access control to arterial roadways by defining driveway spacing standards and by establishing the necessary legislative authority to implement these standards." (Levinson, 1994) Essentially access management attempts to balance the functions of movement and access.

Balance is a charged word in policy parlance, especially when it comes to the nature of public goods. In this case balance means limiting access to the state highway facility in order to maintain its integrity as a through corridor. This means higher initial costs for developers and higher costs to municipalities that are forced to invest in internal road systems. This includes frontage roads and additional facilities that can accumulate and distribute traffic efficiently as it interacts with the protected state facility. Access management has been applied by various levels of government and has been implemented using a variety of methods. This paper now turns to the question of strategies for implementing access management programs and how effective they may be in the public policy context.

The state has various means for developing and implementing access management. These have been outlined by Levinson in 1984 and include: Control by a transportation agency, deed, land use ordinances, geometric design, and driveway regulation. Each of these methods institutes control slightly differently. For each method, a different motivation and base of power are needed for implementation. Access control by deed is the most effective strategy. Purchasing the right of way for all highway corridors however is often unrealistic because of the prohibitive cost, especially along existing corridors. State DOTs vary in their ability to implement access controls; this is often specifically spelled out by enabling legislation and by the state courts. Land use ordinance, including design standards that define setback, access, and parking is also a strong tool used to implement access management, although it should be noted that there is some inherent contradiction in implementing these at the local level. Finally, geometric design standards and driveway regulations both serve to enhance access management. The distinction between these two strategies is essential. Geometric design standards are somewhat flexible in implementation. Driveway regulations on the other hand are implemented by agencies and operate under specific statutory authority. Essentially, this is where the debate on the level of public good in through corridors is raised: regulations can regulate access rights in a reasonable and justifiable manner, but they cannot take these rights from private property owners.

In Oregon, the Land Development and Conservation Commission adopted the landmark Transportation Planning Rule which mandates integration of statewide transportation planning goals across jurisdictions. This means that local government plans have to be consistent with adopted state goals which define functional class categories and access level-of-service standards. In addition, the Transportation Planning Rule mandates that local land use decisions are consistent with adopted state transportation plans. This is a strong enabling mandate for access management in Oregon. In effect, it puts the public good of right of way and through travel ahead of the

more private good of corridor access. At the same time, it encourages clustered development to foot the bill for the higher cost of developing feeder road systems and facilities to enhance through corridor safety and speed. This is not the case in all states. Historically, the courts have placed a larger burden on the public sector in denying rights to abutting property owners. In these cases it is up to the property owner to prove that the denial of access poses undue exaction on the owner.

This brings to the fore the most important question of this paper. To what extent is access to public thoroughways capitalized into private property? It is a question, not so much of stated policy, but rather revealed patterns encountered along state highway corridors. It is the sum of each individual property owner's petition to have access that may clog state arterials. There is incentive on the local level to grant variance. Development on the state facility can enhance the local economy; this can indirectly benefit local politicians at the expense of state policy. Access can further the goals of a community as they compete for a larger share of the region's business and residential growth.

The history of litigation shows that unless the state is able to prove that denying access does not impose undue burden on the abutting landowners property, it is impossible to maintain a strong access management program. What is needed is a clear estimation of the cost of access to society as a whole. It is possible that by measuring individual cases of variance for access, the cumulative externality on society is not taken into account. For each variance application considered there is no clear accounting for the additional marginal cost of roadway safety and increased travel time for all users and all purposes. It is to this marginal accounting that this paper now turns. For without a means of calculating the cost to society of access, there is no way to prove in court (no way for local land use authorities, or state authorities for that matter) to illustrate the benefits and costs of access management. Once the precedent is set, it is difficult to deny access to other property owners. At what point is the integrity of corridors seriously affected? At what point does the sum of all access to a corridor in a given location warrant the construction of a new facility? Can we identify a single point, or is it better to have a system that measures the true marginal cost of access and regulate access accordingly. I argue for strong protection of state highway corridors on this basis.

Part 3: Consideration of the marginal benefit and cost of access

Currently, a landowner need only prove that the cost of denied access is too great to bear; to prove that the implicit exaction that occurs when access is denied is greater than the cost of allowing that access. But is this a good yardstick? Local authorities have incentive to encourage growth.

NCHRP Synthesis 233 emphasizes the importance of administrative flexibility in implementing any access management policy. That is to say that variances, exceptions, waivers and slight changes to design standards must be considered regularly, consistently and rapidly in the face of growth. Flexibility is without a doubt important, but may mean the end of an effective policy if not carefully implemented. Administering these programs necessitates closer coordination between various levels of government in

implementing a consistent policy across jurisdictions. The report recommends a parallel review process or combined review committee when an exception is applied for along a state corridor. This is an essential element of a strong state program. States must be able to enforce access limitation over local interests. This is difficult to accomplish outside of the case where the state has purchased all necessary right of way.

Also included in the Synthesis 233 report is a summary of general guidelines of takings and compensation commonly applied by the courts:

- complete loss of access is always necessary to demonstrate a taking;
- a substantial loss of access to private property may result in a taking and warrant compensation, although no physical appropriation of property has occurred;
- loss of the most convenient access, or increase in circuitry of access, is not usually compensable where other suitable access continues to exist;
- governmental actions that diminish traffic flow on an abutting road, such as installation of a raised median, are not a taking; damages must be peculiar to that property and not common to the public at large for compensation to be paid; recoverable damages are limited to the reduction in property value caused by the loss of access, but if the property is landlocked the entire parcel may have to be purchased.

In Oregon, the legislature created a right to compensation based on change of grade if the alternative access is not 'reasonably equal' to the access denied. Again, this policy encourages localities to make exceptions at the expense of the state facility.

Ways to think about the value of access

While the costs of access to state highway corridors can be calculated consistently based on expected trip generation rate by land use, the value of access will vary by land use. For example, commercial (tertiary) owners that are catering to trip chaining activities will see a larger proportion of their business affect by limited access than will either residential or industrial uses. This will be caused by the increased friction to stops generated by limited access. Some trip makers will choose to bypass stop if it is too inconvenient. In this case it is clear that consistent and even-handed land-use policy could aid in "leveling the playing field" with regards to access management. If land use policy encourages clustered development, and access management forces commercial enterprises to share access resources, then all businesses will be operating on the same metric. Existing businesses and those that are able to win an exception will have a marketing advantage over those in the higher friction location. This makes even-handed and consistent carrying out of policy absolutely essential in a successful access management program.

The financial impact of access management on industrial land uses should be some measure of the increase in travel time for employees and also any increase in travel time or inconvenience in the shipping of raw materials or finished product. It would seem that for manufacturing and industrial land uses, the implementation of a consistent statewide access management program would generate enormous benefits in the form of reduced shipping costs--less congestion, fewer accidents and likely lower insurance premiums. Likewise, residential property is likely to benefit from increased access management. This may initially raise the price of homes as the policy of concurrency

dictates the need for higher levels of initial infrastructure, but the long-term cost again of relatively shorter travel times and lower accident rates would seem to outweigh any rise in initial price. Further the long-term maintenance of state corridors makes more land available for development at the urban periphery. It is these kind of long-term benefits that I argue the commercial property owners are skimming when they vie for warrants that compromise effective access management programs.

How is the value of access management measured versus the needs of commercial property owners? One possible strategy would be to perform a hedonic analysis that controls for all other factors to get some idea of the relative value of access to commercial properties. Assuming however, that a good model could be specified, there would be a gaping question with regard to what was measured. In the current policy context land owners can apply for variances or exceptions. It may be that any change in value from accessible to non-accessible properties could reflect the additional cost of applying for and receiving a waiver. If land owners, especially land owners within city limits, along state highway corridors have the expectation that they will be able to win variance, the change in value will not necessarily represent the true value of access. So the true financial benefit of access is the sum of the costs of variance and the difference in land value between lots with preexisting access to those with none.

The cost side is more complicated yet. The costs of access have to be determined using the estimated impact of a particular land use on trip generation. Trip generation then must be tied to an estimated per vehicle value of congestion and accident costs. The cost of congestion include lost commuting time for residences, lost shipping time for businesses, pollution due to decrease speeds and more idle-time, and increased safety costs. Once these estimates were parceled out on a per vehicle basis, a total impact, including negative externalities could be generated for each proposed project.

This, however is an onerous process due to varying interpretations of benefits and true externalized costs. A more effective policy would be to make the granting of waivers and exceptions to be equal to the true societal cost of increased access. Only a firm commitment from the state, with enabling legislation that would protect both the state and localities from liability to landowners who claim to be bearing an undue share of the public burden in maintaining through corridors is the only effective policy option. The alternative is for the public to bear the burden of increased congestion, accidents and the cost of building new facilities at the expense of the success of commercial enterprises who benefit from location on a public facility.

Conclusions

The most effective policy for limiting access to state highway corridors is to purchase right of way along the corridors, but this is often prohibitively expensive. Further, there is a history of litigation that has established a policy that measures the rights of abutting property owners to access by measuring the burden they will have to bear when access to the public facility is denied. The question then arises as to the value of access. To what extent is public investment in through corridors capitalized into private land values when access to a state facility is granted? And, the related question,

to what extent do tax payers in general subsidize abutting land owners when access impedes through traffic, increases the likelihood of accidents and necessitates other costly investments in right of way for new facilities? This paper has outlined the trends that have put growing pressure on state highway corridors, and outlined the factors which must be considered in any evaluation of an access management program. Access management is a necessary policy to protect state investment in through corridors; but its implementation is problematic as it relies on local jurisdictions to work, at times, against their own self-interest.

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