



The Ds: Smart Growth Project Evaluation

An innovative land use and transportation planning service from Fehr & Peers

The Fehr & Peers' Ds method (commonly known as the 4Ds, although later expanded to include more than four built environment factors) allows us to evaluate the transportation effects of Smart Growth development, and to identify potential site-plan refinements that will further reduce its traffic impacts. The methods are based on a substantial library of research on the relationship between travel and the built environment, which has been distilled to a single set of numerical values by a panel of national experts. If desired, locally-tailored measurements using The Ds can be developed through statistical analysis of the region's household travel survey data.

The Ds predict the degree to which a planned development's trip generation will increase or decline with changes to the plan's:

- **Density** - residential and non-residential development per acre
- **Diversity** - mix of residential, retail and employment land uses on the site
- **Design** - connectivity and walkability of the site's transportation networks
- **Destination Accessibility** - location relative to major regional attractions, as infill sites generate fewer and shorter vehicle trips than fringe area development
- **Distance to Transit** - as residents and employees within ¼ to ½ mile of premium transit generally have higher transit choice and lower automobile use

The Ds provide quick-response plan evaluation, whether used in conjunction with conventional transportation models or as a stand-alone analysis. Without The Ds adjustments, most travel demand models are too aggregate in scale to capture the effects of Smart Growth plans. We have applied analysis from The Ds with a number of different regional four-step modeling packages, including TRANSCAD, TP+ and Voyager. The heart of The Ds methodology is a set of elasticities, based on surveys of actual travel behavior, that adjust vehicle trip rates and vehicle miles traveled (VMT) in response to variations in development density, diversity, design, destinations, and distance from transit.



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- **Who needs this?**

Regional Planning Organizations

Metropolitan Planning Organizations, Councils of Governments, Regional Transportation Planning Agencies, County governments or cooperatives engaged in collaborative visioning and planning processes. The Ds are especially beneficial in large scale planning efforts that involve scenario planning, such as Salt Lake City's Envision Utah, and Sacramento's Regional Blueprint.

Land Use Planners and Developers

Planners attempting to create a smart growth, sustainable development project benefit from The Ds ability to objectively measure the effectiveness of the plan at reducing traffic impacts and associated quality of life and emissions impacts. The Ds can work effectively with LEED-ND to measure key criteria such as percent of regional average vehicle miles traveled (VMT).

Environmental Planners

At both the regional and project-specific scale, The Ds can quantify the degree to which a project design increases or decreases its generation of vehicle trips and VMT. These factors directly tailor the analysis to accurately reflect the traffic impacts and required mitigation measures, as well as emissions, carbon footprint and global warming impacts. We suggest The Ds be used in EIR's and EIS's to supplement conventional analyses providing comparative assessments and counterpoint to ITE-based or travel-model impact estimates. The results should be accompanied by a discussion of how application of The Ds may improve upon the results from standard methods.

Local Jurisdictions

Local jurisdictions benefit from having studies performed for development planning, project review and impact assessment based on objective, quantitative methods that are also tailored to capture the unique characteristics of each project. This is especially valuable when the unique project characteristics are associated with sustainability, impact minimization and related community benefits.

- **How is it better than what I already have?**

A July 2007 report by Caltrans concludes that most regional and local travel models in California lack the ability to account for smart growth characteristics of large scale plans and individual development projects. The report recommends that The Ds be added to such models to improve their sensitivity to smart growth.

Impact assessment methods designed for evaluating individual development projects, including ITE trip generation methods, have very limited ability to quantify the effects of a project's site design, location and transit proximity.

We have conducted several tests comparing the ability of The D-enhanced methods with state-of-practice travel models and ITE techniques. We found that incorporating The Ds into the analysis improves the validity of other methods.

- **Who else is using it?**

Over twenty regional planning agencies and non-governmental organizations have used The Ds method through the EPA Smart Growth INDEX tools. Fehr & Peers developed and applied The Ds technique directly for clients such as SACOG (Sacramento), SLOCOG (San Luis Obispo), Met Council (Minneapolis/ St Paul), US EPA (Atlanta), CCTA (Contra Costa County), FresnoCOG (Fresno County), COMPASS (Boise), FHWA (Salt Lake City), and several major developers.

