PROPOSED METHODOLOGY FOR ESTIMATING THE IMPACT OF HIGHWAY IMPROVEMENTS ON URBAN AIR POLLUTION

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Virginia Highway Research Council
(A Cooperative Organization Sponsored Jointly by the Virginia Department of Highways and the University of Virginia)

In Cooperation with the U. S. Department of Transportation
Federal Highway Administration

Charlottesville, Virginia

July 1971
VHRC 71-R2

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PURPOSE

The aim of this methodology is to indicate the expected change in ambient air quality in the vicinity of a highway improvement and in the total background level of urban air pollution resulting from the highway improvement. Both the jurisdiction in which it is located and groups living adjacent to the proposed improvement should be made aware of the total and relative change to be expected. This change should be related to levels of air pollution which have known effects on human, animal, and crop health, property values, and activity operating costs such as cleaning and air filtering in urban areas. If the construction of a highway network will itself lend to air pollution exceeding established air quality standards, or in conjunction with the land uses it encourages will exceed such standards, the local jurisdictions should be aware of the trade offs between highway and other types of pollution needed to stay below the standards set for the area. In addition the procedure for estimating vehicle emission levels and concentrations on the improvement right-of-way can also be used to estimate the effects of air pollution on driver behavior and highway safety.

USAGE

Estimates of change in air pollution levels should be documented for each corridor or line under consideration where changes in traffic volume or atmospheric conditions warrant.

Estimates can be prepared for a single improvement, or for an entire planned network including analyses of (a) the total pollution change, and (b) the timing of this change or buildup to be expected from the development of the network in a given local community and at an urban wide scale. This estimation of the change in the background in air pollution related to the highway should be combined with estimates of the change in air pollution resulting from activities on the new land use patterns projected for the network to serve. Ideally these estimates should be provided by the local jurisdiction or air quality control agencies. However, such information on changed emissions from new land uses is not likely to be available from these sources in the near future and should be estimated roughly from the Department of Highways or other urban land use plans for each area. With this estimate of total expected air pollution levels and known air quality standards, complete evaluation of the highway network or individual improvement impact can be undertaken by the Metropolitan Transportation Planning and Location and Design Divisions. Because the state of the art is changing rapidly, the environmental study group will have to constantly monitor changes in modeling and projection capabilities, and the air pollution standards set for health and economic impacts by the National Air Pollution Control Administration (NAPCA) and by local air quality control regions. In addition the literature on minimizing air pollution through design and urban planning must be constantly evaluated. With this information the environmental study can indicate the basic state of analysis and the feasible range of trade offs between air pollution, noise, safety and other values both to the public and to Department designers.

DETAIL

The detail of each estimate will depend on the detail available concerning the design and traffic flow characteristics of the improvement, the quality of data available concerning local meteorological characteristics surrounding the improvement and affecting the entire urban area, and the quality of models used to estimate vehicle emissions and simulate air flows and emission diffusion patterns. The state of the art in such estimation is in rapid flux with significant developments anticipated in the next 12 months. This methodology is predicated upon the use of existing technology and the incorporation of better technology as it becomes available.

This study provides considerable detail at a very early stage of planning based on Department designs for traffic mix, speed, volume, and pattern change for an improvement or network. Once these design characteristics are outlined, emissions from the facility can be estimated. As adjacent land uses and urban land use plans are more clearly specified the specific impact of the emissions can be estimated with increasing precision.

rom the point of view of the local jurisdiction and State Air Pollution Control
hat is needed at the network planning stage is an estimate of when and how
e network will contribute to the total allowable air pollution. This total
by air quality standards already established or about to be established.
ormation is needed by the jurisdiction so it can evaluate trade offs between
tation and industrial or other investment programs each contributing to
pollution.

the corridor and location planning stage detail on property and health
f local residents are of concern so that zoning, welfare and health,
ase evaluations can be undertaken. At the final design and operating
al concern should shift to local building code standards and to vegetation
ng maintenance standards along and adjacent to the right-of-way.

PROCEDURE

prepare the estimates of highway induced change in air pollution the
information is needed. This information should be summarized in the
documentation outlined in Appendix I for each alternative considered.

ppendix I sections I and II, title and stage of consideration, are self
ry. Section III is to be provided by the scheduling decisions of the
nt.

emble Data on Existing Local and Urban Wide Physical and Social Conditions.

Local meteorological conditions affecting the ROW.

(1) Air stability, speed and directionality.

(2) Periods of calm, relation of these to peak traffic periods. These data can be collected from the local Weather Bureau and from interviews and impressions of local residents by the environmental study group. They are needed for micro diffusion models.

(3) Specific physical conditions along ROW conducive to air mixing — topography, building and vegetation heights, alignments and proximity to ROW.

These data can be collected by the environmental study group or by the Right-of-Way Division from on site inspection and aerial photos. They are needed for modifying micro diffusion models due to roughness of the environment. A discussion of the literature on microclimatology and urban planning is contained in Rydell, R. P. and Schwartz, G., "Air Pollution and Urban Form: A Review of Current Literature", Journal of American Institute of Planners, March 1968 and in Pelle, W. T., Jr., Bibliography on the Planning Aspects of Air Pollution Control, Summary and Evaluation. HEW - PHS - Washington, D. C., 1964. Certain effects of vegetation on air pollution are discussed in HRB-NCHRP Report 75. A basic urban wide air diffusion model. The Air Quality Display Model, (AQDM), dealing with urban roughness at a city wide scale as a possible improvement to topgraphic information now used in the AQDM model is being developed by Professor Hans Letteau at the University of Wisconsin.

(4) Stability and anamolies of urban wide meterological conditions. These data can be collected from the local Weather Bureau Office and from the Environmental Sciences Services Administration, (ESSA) — Asheville, N. C.

(B) Local Social and Property Characteristics to be Affected by Air Pollution.

(1) Age and health characteristics of adjacent dwellers and of total urban population related to vehicle emissions.

Data to be collected by the ROW Division or environmental study group community survey from community and local health officials. (It is possible that the majority of improvements in a network plan go through areas with highest or lowest susceptibility to air pollution health hazards.)

(2) Construction of adjacent structures, materials, porosity and usage of adjacent structures. Rough estimates for larger zones in urban areas.

Data to be compiled from field inspection by environmental study group for estimating changed levels of pollution inside buildings, and on degradation of building materials. (See (a) Yocum, Clink, and Cote, "Indoor/Outdoor Air Quality Relationships", APCA 70-119 Paper presented at Air Pollution Control Association June 1970; (b) City of New York Environmental Protection Administration, Dept. of Air Resources, "Study of Air Pollution Potential of Various Roadway Configurations" (in Progress NAPCA and BPR Contract, fall 1970 completion date), which measures penetration of pollutants into

adjacent structures by type of structure. The penetration of air pollutants into structures is closely related to the type of construction and the strength of source outside the structure. The little which has been done on degradation of building materials is summarized by Brian Peckman in "Odors, Visibility, and Art: Some Aspects of Air Pollution Damage", NAPCA Division of Economic Effects Research, Durham, North Carolina, April 1969, and in "Recent Literature on the Economics of Air Pollution." NAPCA, Raleigh, North Carolina, October 1969. The effects of vehicle associated air pollution on specific adjacent uses such as rest homes, parks, businesses and industrial processes will have to be evaluated from published health standards, and estimates concerning filtering, cleaning costs, and manufacturing processes effects. Full city estimates can be used to estimate the total impact of change in cleaning, filtering and other urban activities and on health related concerns as vehicle emission buildups are projected.

(3) In coordination with the noise pollution study it is possible that both air and noise pollution may be minimized through air conditioning.

ablish Existing Ambient Levels of Air Pollution Related to Vehicle Emission — , NO_x, SO_2, HC particles, lead by weight.

Within the Right-of-Way.

Emission levels by weight produced by a given stream of traffic at a given speed can be estimated using the formulae developed by Stanford Research Institute in Methods of Evaluating the Effects of Transportation Systems on Community Values, Volume 4 Air and Noise Pollution, Report to Department of Housing and Urban Development Research and Technical Group. (Draft Under Review, Dr. George E. Klein, author, expected to be available from BPR, Ali Sevin, shortly). These formulae estimate the total weight of various emissions produced by a given mix of traffic at a given speed over a given distance.

An alternative set of formulae will be provided by the City of New York Environmental Protection Administration, Department of Air Resources, "Study of the Air Pollution Potential of Various Roadway Configurations" mentioned earlier under review by Mr. Harter Rupert of the BPR. This study deals with speed, mix and emission levels of CO, NO_x, SO_2, HC; particles and lead.

A third procedure, again based on daily vehicle miles traveled and speed, is available to estimate carbon monoxide only and is available in HEW, Public Health Service, Document No. 999-AP-41 Calculating Future Carbon Monoxide Emissions and Concentrations from Urban Traffic Data, June 1967, pp. 2-3.

A final alternative is to acquire or contract for measuring devices that are to be installed in vehicles in the stream of traffic under differing traffic conditions. The document "The Exposure to Carbon Monoxide of Occupants of Vehicles Moving in Heavy Traffic," by Brice, and Roesler, APCA Paper 66-70 HEW, Public Health Service, Annual Meeting Air Pollution Control Association, June 1966, describes such a procedure for carbon monoxide measurement. Other measuring devices for nitrogen, sulfur, hydrocarbons and particles could also be installed and basic data gathered for Virginia circumstances. This is the most expensive approach. The three procedures using DVMT, speed, volume and mix conversions can be calculated simply by the environmental study staff from existing traffic data. What is of concern is the average and peak levels produced.

(B) Adjacent to the Right-of-Way.

Concentrations of vehicle produced emissions adjacent to the right-of-way and their rate of decay outward can again be estimated. Carbon monoxide can be estimated using the procedures described in HEW PHS 999-AP-41 cited above, or in the work of Dr. Robert Funkhouser, NAPCA - Cincinatti, Ohio. Another study aimed at the rapid estimating of carbon monoxide concentrations adjacent to the ROW is being developed by the Stanford Research Institute. "Development of a Practical, Multi-Purpose, Urban Diffusion Model for Carbon Monoxide", Paper by Johnson, Ludwig and Moon at Symposium on Multi-Source Urban Diffusion Models, Chapel Hill, North Carolina, October 1969, and "Proposals for Refinement and Validation of an Urban Diffusion Model Part I, Technical Proposal — for Coordinating Research Council, Inc. by Johnson and Ludwig, SRI, December 1969. This study may provide a highly useful model of air diffusion in the future. However, like the HEW - PHS-999-AP-41 procedure it will have to be modified to successfully model other gaseous and particulate pollutants. At present such modifications for these procedures are not underway. In the near future more precise estimates for the range of vehicle pollutants can be provided by a program to be written as part of the City of New York study cited above. This study is sampling the decline and mixing of pollutants outward from the highways under differing traffic flow and pollutant concentration levels produced by the flow. A model describing decay functions should be available in the late fall of 1970 for the following highway configurations.

a. Open cut sections — deep trench

b. Open cut section — shallow trench

c. Partially covered — cantilevered — (relate to noise pollution)

d. Partially covered — intermittent spans

e. Open at side covered on top (related to multiple use of ROW)

f. Short tunnel

g. Long tunnel

h. Grade tunnel

i. Viaduct

j. Typical city street system

This model(s) should provide rapid estimation techniques of the decay of pollutants outward to background urban levels. With suitable estimates of meteorological and traffic flow characteristics a second model, the TRC model, which will be available in November 1970, is being developed by Dr. Glen Hilst for The Research Corporation of New England. (Dr. Norman E. Bowne, Director of Environmental Sciences, 210 Washington St., Hartford, Connecticut 06106). This model purports to predict concentration buildups of specific pollutants over short periods of time up to two hours from specific sources such as streams of traffic. It could provide useful estimates of rush hour or average period pollutant buildups from traffic flows.

The estimation of a broad spectrum of traffic related pollutants adjacent to the ROW using models of air diffusion is just becoming operational and can be undertaken by the environmental study group given existing traffic flow data. In addition it would be desirable to check these estimates against actual levels produced in order to calibrate the estimating procedures. The range of measuring devices utilized in the New York or advised in the other studies is estimated to cost approximately $100,000 to completely outfit a mobile sampling unit. Such units are apparently not readily available from consultants in the Virginia region and are not available from the Virginia State Air Pollution Control Board. Given experience elsewhere, estimates based on air diffusion models appear to to be reasonable bases for evaluation of air pollution levels. Again the average and peak concentration levels and the periodicity of each are of primary concern.

(C) Through the Urban Area.

Under most atmospheric conditions prevailing over or near the right-of-way, air pollution concentrations generated by traffic flows mix rapidly with and become part of the general ambient air prevailing over the urban area. This mixing occurs over short horizontal and vertical distances. Thus, knowledge of the urban area's total background air pollution level related to vehicle emissions is necessary to evaluate the contribution of new or changed emissions to this background level. Ideally the background level of vehicle related air pollutants should be known. However, in Virginia only two areas, Northern Virginia and the Peninsula Planning District No. 21, have effectively been evaluated. The State Air Pollution Control Board has monitoring stations for suspended particles, dust, and sulfation pollutants for a small number of sites, usually one to a community (see SAPCB's Annual Report and its tri-monthly reports Compilation of Virginia Air Quality Data. Mr. James Watson is SAPCS's Technical Director.) The Board currently does not measure levels of many pollutants needed by this study.

To estimate the background level for an entire urban area a set of techniques are available which can be used by the environmental study group. Two volumes: Ozolins, Guntis, and Raymond Smith,"A Rapid Survey Technique for Estimating Community Air Pollution Emissions",HEW - PHS-999-AP-29, October 1966 and Duprey, R. L., "Compilation of Air Pollutant Emission Factors",HEW-PHS-999-AP-42, 1968 outline procedures for compiling an emissions inventory. With inputs from the SRI or NY Study of vehicle emissions from line sources by traffic flow characteristics, these rapid techniques can be greatly improved.

With these data and data on generalized urban atmospheric conditions available from the local Weather Bureau and Environmental Science Service Administration (ESSA) Asheville, N. C., and the use of the long term atmospheric diffusion model "Air Quality Display Model (AQDM) HEW-PHS-NAPCA November, 1969 (Clearing House Number — PB 189 194), the background concentration of air pollutants generated by vehicle emissions annually through hourly can be estimated for the entire urban area or subareas. The quality of these estimates depends on the quality of input data and the time period for which estimation is desired. To validate these estimates again a mobile unit to sample background air pollution is extremely desirable.

Information on Existing and Acceptable Limits of Highway Related Air Pollutants With Respect to Health and Other Economic Effects.

A) Statement concerning health standards established and existing knowledge concerning air pollution effects on property values and activity operating costs such as cleaning and air filtering.

This information is to be used to compare existing and projected levels of highway related air pollution with established or anticipated health and economic effects standards.

These data can be assembled by the environmental study group from (a) NAPCA's Air Quality Criteria documents, which summarize what is known about the health and economic effects of specific air pollutants.

In addition each state, based on the NAPCA criteria, must establish legal standards for upper limits and time periods for concentrations of air pollutants and a program for controlling or achieving these standards. (HEW-PHS-NAPCA — Guidelines for the Development of Air Quality Standards of Implementation Plans, Washington, D. C., May 1969.) These standards include vehicle contribution to the total level and thus trade offs between transport and other activities may be required to meet the standards. These criteria and standards are revised periodically and provide the most useful base for evaluating air pollution impacts. The State Air Pollution Control Board is currently establishing statewide air quality standards and certain Virginia localities have established their own standards.

Estimates of the health and economic cost of air pollution produced by highways are also discussed, but not rigorously specified, in Brian Peckman, "Recent Literature on the Effects of Air Pollution", cited above.

Air pollution effects on property values are discussed in two papers — Ridker, R. G., and Henning, J. A., "The Determinants of Residential Property Value With Special Reference to Air Pollution", Review of Economic and Statistics, May 1966, and Anderson, R. J., and Crocker, I. D., "Air Pollution and Housing — Some Findings," Paper 264, January 1970, Kraunert Graduate School of Industrial Administration, Purdue University, Lafayette, Indiana.

(B) Statement concerning contribution of existing highway related air pollution to total urban air quality and relation of total urban air quality to standards set or advised.

The documents related to part VI (A) provide a basis for the environmental study group to evaluate the limits which highway network related air pollution may approach in any urban area, and some idea of the economic effects to be anticipated locally near the ROW and at an urban wide level. In general air pollution appears to have a significant affect on property values only when it is very intense or absent (Anderson and Crocker) and on health only when it is intense and continuous. Because most existing traffic flow and land use characteristics in Virginia are characterized by short peak hours and low population densities in surrounding areas, these conditions seldom obtain. However as the size and density of Virginia urbanization increases traffic related air pollution will potentially become a much more important environmental factor.

VII. Estimation of Change in Air Quality Related to Highway Improvement.

(A) Based on improvement design capacity estimate total weight of emissions by type, created by design traffic mix, volume, and speed for peak, extended peak, and average flow periods under alternative emission control standards.

(1) From design standards estimate DVMT and its timing on new facility.

(2) From traffic reallocation study estimate changed traffic on highways surrounding improvement.

(3) From SRI or New York City study formulae estimate weight of new pollutants to be added under differing emission control standards from the new facility and changes on other arteries.

(B) Compare estimated new totals with those estimated to exist currently in the ROW using existing traffic flow data and formulae from VII (A) (3) above.

(C) Sum existing and projected totals from VII (A) or compute new total from VII (A).

(D) Using data from VII (C) and the New York City formulae, or the TRC model cited earlier, (for CO, models developed by SRI or HEW-PHS-999-AP-41 may be used) along with information on micrometeorlogic and physical configuration adjacent to ROW from IV (A), project new concentrations by type, time and emission control standards outward from ROW.

(E) Compare estimated totals with projection outward of existing totals based on figures from V (B).

(F) Use AQDM model with estimated total pollutant data from VII (A), or VII (C), (2) urban wide meteorological data from IV (A) (4), and (3) the procedures outlined in HEW-PHS-999-AP-29 and 42 to estimate changed emissions from new land uses and population patterns estimated from data supplied by other portions of the environmental study. Prepare an estimate of total urban wide diffusion and concentration patterns by type, time, and emission control standards.

(G) Compare projected values from VII (F) with existing values from V (C). These values can all be computed by the environmental study group using models of air flow and land use under development, along with expected emission control and facility design standards for a given target period. This can be done for a facility or all facilities in a network plan, given knowledge of the staging of the plan and associated land uses it is designed to service. With this procedure the timing of buildup from traffic and other land uses can be evaluated.

Expected Impact of Projected Change in Air Quality Related to Improvement.

(A) From data collected in IV, VI, and VII, evaluate health and economic impacts adjacent to ROW and urban wide with respect to air quality criteria and local standards. Statement of anticipated impacts under differing assumptions to be prepared by environmental study group. This statement can be prepared for one improvement or full network at each stage of development to evaluate the total highway related buildup over time.

:) Statements to be sought from state and local officials through reviewing with them the findings of part VIII (A).

D) If agreement on impacts or standards cannot be achieved in step VIII (B) and (C) the steps from redesign of the improvement through VIII (C) should be retraced.

Expected Impact of Improvement Construction on Air Quality.

A) Statement of total weight of dust and other pollutants emitted as a result of improvement construction on and off the ROW.

No estimates are readily available for dust and fume pollution per stage, or length of improvement construction by type of terrain and geologic conditions. Estimates based on standard sampling techniques can be

made by the environmental study group or by an air pollution consultant. Similar estimates of air pollutants from construction associated activities such as rock crusher or asphalt plants can be made.

(B) The estimates from micro and macro diffusion models such as the New York City and AQDM models can be used to estimate diffusion of construction related air pollution.

(C) The percentage contribution to ROW adjacent and urban wide pollution levels can be calculated from the base figure estimates in V (B) and (C).

(D) Statement by environmental group based on data collected in IV, VI and VII as to levels of pollution and relationship to health and economic impact.

(E) Response of local and state officials sought, based on (D) above. Adjustment of construction procedures to be suggested by local and environmental study group if air quality standards not met.

NECESSARY INPUTS TO METHODOLOGY

This methodology requires the following informational inputs.

(1) Estimates of population, land use, and building characteristics adjacent to the completed improvement, which can be provided by the relocation, business change, services and land value portions of the environmental study.

(2) Estimates of traffic patterns including volume, mix, and timing following completion, which can be provided from traffic allocation and design studies.

(3) Urban area land use patterns, current and projected, which can be provided by the study area traffic plan or local city or county plans of the area.

(4) Meteorological characteristics for local and total urban area from weather bureau and local resident sources.

(5) Models to project local and total urban area air flow effects, and local and total urban area land use and location change used by the land value or land use parts of the entire study.

(6) Air flow models for equipment to sample vehicle emissions and construction emissions are needed.

(7) To evaluate different emission control standards and different air quality standards these standards must be specified by law or a priori.

ESTIMATES OF STUDY COSTS

Cost will be incurred in:

1) Acquiring the basic data to support the use of micro and macro air diffusion models. These costs should be common with other parts of the environmental study using projective land use and population models.

2) Models should be free to the Department from BPR and NAPCA but programming and running costs will be incurred.

3) Monitoring equipment to calibrate the models will be needed and can either be purchased by the Department or contracted from air pollution consultants.

4) Calculation and preparation costs will be incurred by the environmental study group.

5) Meteorological consultants and other air pollution consultants will be needed. Once the start up costs of operationalizing the basic models and data have been assessed from existing transportation plans and the Weather Bureau the per study costs should decrease rapidly.

DISCUSSION

his methodology is designed to utilize technology and information anticipated ear future. It will probably take up to a year to operationalize the full re for the first study. As a fall back before this time, the SRI formulae can to estimate local conditions for discussion with the local community of the tions of total and percentage change locally in light of known health, economic, er effects.

APPENDIX I

FOR SUMMARIZING STUDY OF HIGHWAY IMPACT ON AIR QUALITY

le (Project Description) and Location (Jurisdiction)

ge of Project Transport Planning A-95 Intent A-95 Application

ɔation Hearing Design Hearing Construction

ɔected construction period _____ Expected date design capacity will

achieved _____

isting local and urban wide physical and social conditions

Statement on local meteorological conditions affecting ROW

(1) Air speed and directionality stability conditions

(2) Periods of calm, relation to peak traffic periods

(3) Specific physical conditions, along ROW

(4) Urban wide meteorological conditions, stability, anamolies.

Statement on local social and property characteristics to be affected by air pollution adjacent to ROW.

(1) Age and health characteristics of adjacent dwellers, and of total urban population related to vehicle emission

(2) Construction of adjacent structures, materials, porosity and usage of adjacent structures. Rough estimate for longer zones in urban areas activities or processes affected by vehicle emissions

(3) Evaluation of usage of air conditioning and filtering of air to alleviate air and noise pollution problems.

V. Establish existing ambient levels of air pollution related to vehicle emissions — CO, NO_x, SO_2, HC particles, and lead by weight

(A) Within the right-of-way

(B) Adjacent to the right-of-way

(C) Throughout the urban area

VI. Information on existing and acceptable limits of highway related air pollutants with respect to health, operational characteristics, and property values.

(A) Statement concerning health standards established, and existing knowledge concerning effect of air pollution on property values and activity operating costs such as cleaning and air filtering.

(B) Statement concerning contribution of existing highway related air pollution to total urban air quality and relation of total urban air quality to standards set or advised.

VII. Estimation of change in air quality related to highway improvements.

(A) Based on improvement design capacity, estimate additional total weight of emissions by type created by new design traffic mix, volume and speed for peak flow, extended peak, and average flow periods under alternative emission control standards.

(B) Estimated percentage change over existing ROW level by type of emission for peak, extended peak, and average flow periods by differing emission control standards.

(C) Estimated total of existing and new pollution in ROW by type of emissions for peak, extended peak, and average flow conditions by alternative type of emission control standards.

(D) Projected new level of emission concentration by type outward from improvement adjacent to ROW for peak, extended peak, and average flow periods, by type of emission control standards.

(E) Percentage change over existing levels adjacent to the ROW by type of emission for peak, extended peak and average flow periods by type of emission control standards.

F) Projected new level of urban wide background pollution by type of emission peak, extended peak and average flow periods by type of emission control standards.

G) Percentage change in urban wide background pollution level by type of emission for peak, extended peak and average flow periods by emission control standards.

Expected impact of projected change in air quality related to improvement.

A) Estimation of contribution of projected highway improvement and of other land uses to air pollutant concentrations adjacent to ROW and urban wide. Evaluation of the impact of air pollution component related to highway emissions and component related to other urban land uses on known health and economic considerations. Identification of conditions due to construction of network and full development of land use plan where upper bounds of air quality standards would be approached.

(B) Statement of health problems foreseen by State Air Pollution Control Board and by local health officials.

(C) Statement by local jurisdiction concerning priorities for trade off between highway related or other land use related emissions if it is estimated that the limits of air quality standards will be exceeded by planned land use and traffic patterns.

(D) If standards will be exceeded according to projection, then new land use, traffic patterns, and local emission control standards should be proposed both by the jurisdiction and the Department of Highways and steps VII and VIII A through C should be repeated, to achieve results within the standards set.

Expected impact of improvement construction on air quality.

(A) Statement of total weight of dust and gaseous pollutants from construction equipment produced by construction on ROW or associated with construction.

(B) Statement of expected diffusion of pollutants outward adjacent to ROW and at urban wide scale.

(C) Statement of percentage contribution to total pollution level adjacent to ROW and urban wide.

(D) Statement of relationship of pollution levels to air quality standards.

(E) Statement of response of air quality control officials and jurisdiction officials to estimated construction impact on air quality.