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Funding Analysis and Estimates

10. FUNDING ANALYSIS AND ESTIMATES

10.1 INTRODUCTION

The successful development and implementation of IVHS as a means to improve mobility within Orange County will be largely dependant upon the availability of funds to cover the costs of such systems. This chapter discusses the available funding sources and presents the order of magnitude costs for each of the programs presented in the “IVHS Master Plan”

Beyond the initial funding for program implementation, a critical factor to the success of IVHS in Orange County, and throughout the country, will be the continued availability of funding for operations and maintenance. The implementation of IVHS elements for the detection, surveillance, and management of transportation will necessarily increase the operations and maintenance demands of those agencies responsible for transportation. Often, this demand will be beyond the financial capacity of the responsive agency.

While the opportunity to fund operations and maintenance is either explicitly allowed or implied within the terms of a number of funding sources as is noted later in this chapter, funding practices have shown that these expenditures don’t compete effectively with the construction or implementation of new projects when funds are limited. Therefore, it is suggested that in order to ascertain that funds are allocated to the operations and maintenance of transportation programs, funding programs specifically appropriate monies to these areas. The achievement of this appropriation will necessitate lobbying of all agencies/groups involved in the mechanics of the dissemination of funds, including federal, state, and regional government together with public interest groups.

10.2 FUNDING ANALYSIS

10.2.1 - Overview

The successful implementation of any transportation program is a combination of several factors such as sound design, well managed implementation and competent operation and maintenance. A common thread through all these activities is the availability of adequate funding

for every stage of the project.

This section provides some insight into pursuing the funding for the programs identified in the IVHS Master Plan. The section starts with an overview of general aspects of the pursuit of funds. It is followed by a description of those funding sources identified by the study as being applicable to the implementation, operation, and maintenance of IVHS programs.

The funding sources are categorized as:

- **Local**
- **State**
- **Federal**

10.2.2 - Funding Preparation

The projects envisioned under the IVHS Master Plan comprise diverse system elements. Thus, it will be important for a number of funding opportunities that the overall transportation management improvements are stressed as opposed to identifying these programs only as IVHS programs. By referring to the programs as “Integrated Transportation Management System” (ITMS)-based, it can be made clear that both IVHS and non-IVHS funds are applicable.

10.2.2.1 - Development of an Action Plan

The IVHS programs will be comprised of either multiple system components, in many cases implemented by multiple agencies. It is inevitable, therefore, that the design and implementation of the programs will not occur in one major step, but in an incremental fashion. Individual agencies or groups of agencies will get separate funding and individual or groups of components may come on-line independently. It is essential, however, that there exists an overall implementation plan which forms the blueprint for IVHS implementation.

It is also recommended that, in the case of multi-agency projects, one agency takes a lead role in managing the overall IVHS implementation and coordinating activities. This may be very much a secretarial role in arranging meetings, setting agendas and distributing minutes of meetings but these provide an essential framework for project implementation. Excellent

examples of this are the implementation phase of the Santa Monica Freeway Smart Corridor project and the Katella Avenue Signal & Coordination Project.

10.2.2.2 - Phased Implementation

As discuss in the Master Plan, both the complexity of IVHS elements and, typically, the limited availability of funding, demand that a phased implementation approach is followed. This means that system components are identified which can be implemented and brought on-line independently. In this way, component functionality is confirmed prior to integration. Any problems arising during integration are automatically reduced in complexity.

An additional advantage is that the incremental benefits of the system components can be experienced as they are implemented. Through phased implementation, the IVHS programs will progress as a series of successful steps; this will generate support for the project as a whole and help support the securing of funds for successive stages of the program.

10.2.2.3 - Targeted Applications

Successful funding applications are those which are targeted at the most appropriate funding source for the project element to be funded so that the application can score highly against the selection criteria. This basic fact is often overlooked under the pressure to secure funds and submit applications on time.

10.2.2.4 - Leveraging

It will likely prove difficult or even impossible to totally fund the entire IVHS Network because of the magnitude of the program and the diversity of system elements, hence there is a need to target individual elements for implementation. However, as it can be shown that any given element forms part of a coherent, integrated plan, funding from one source can be used as leverage to gain funding from another.

Consider the case of an agency which has access to a limited amount of local funds, e.g., \$100,000 of City monies which could be used to fund a small element of the IVHS Action Plan

This can be used to support an application for State funds and gain an advantageous position by asking for a reduced State match, for example \$400,000 at an 80:20 State to local match. The total \$500,000 can then be used as leverage for a similar Federal matching arrangement, resulting in a total funding of some \$2 million depending upon the Federal matching requirements.

10.2.2.5 - Local Considerations

10.2.2.5.1 - Application Processes

Two of the major funding sources identified in the following section as being applicable to the funding of IVHS and Traffic Management projects are Measure “M” and the Intermodal Surface Transportation Efficiency Act (ISTEA). It is recommended that these funding opportunities be considered in conjunction with one another.

For example, for FY1992-93, LACMTA (Los Angeles County Metropolitan Transportation Authority) consolidated the application process for local sales tax funds (in Los Angeles County, Proposition C) and ISTEA funds into one simplified application process. The objective of this approach is to enable the agencies to more efficiently match local funds against Federal funds.

This process has been carried one step further by LACMTA for FY1993-94 as part of the Regional Transportation Improvement Program (TIP). A Call for Projects issued early in the year requires agencies to submit applications in accordance to a process which addresses the distribution of funds from the following sources:

- Los Angeles County Proposition C
- Transportation Development Act (TDA)
- State Transit Assistance Program
- Transit Capital Improvement Program
- ISTEA
 - Surface Transportation Program (STP)
 - Congestion Air Quality Program (CMAQ)
- Transportation Enhancement Funds
- Flexible Congestion Relief Funds
- State TSM Funds

Of special importance to IVHS deployment is the commitment of FY1993-94 State Traffic Systems Management Program funds (TSM) to act as matching funds for ISTEAs programs.

A similar consolidation of the funding application process by the OCTA would be of considerable benefit to the local agencies in Orange County. OCTA has been active in providing assistance through its Technical Advisory Committee and Signal Roundtables. This process should be expanded through the dedicated OCTA coordination staff that is recommended for the administration of IVHS programs in the County.

10.2.2.5.2 - The Congestion Management Program (CMP)

Two significant State funding sources for IVHS and traffic management improvements are the Flexible Congestion Relief (FCR) and Traffic Systems Management funds (TSM). These are described in detail in the next section. It is important to note that there is a relationship between these funds and the County's Congestion Management Program (CMP). The CMP is a program enacted by the State Legislature with the passage of Assembly Bill 471 (1989) and amended by Assembly Bills 1791 (1990) and 3093 (1992). Proposition 111, which provided for a nine cent increase in the state gas tax, made the CMP effective.

As required by statute, the CMP has the following five elements:

- A system of highways and roadways with minimum level of service performance standards designated for highway segments and key roadway intersections on this system.
- Transit standards for frequency and routing of transit service and coordination between transit operators.
- A trip reduction and travel demand management element promoting alternative transportation methods during peak travel periods.
- A program to analyze the impacts of local land use decisions on the regional transportation system, including an estimate of the costs of mitigating those impacts.
- A seven-year capital improvement program of projects that benefit the CMP system.

State programming statutes require that projects competing for state FCR and TSM funds be consistent with the CMP. As is shown later in this report, these funding sources are of particular importance to IVHS deployment and so agencies should be sensitive to the inclusion in the CMP network of key routes in their jurisdiction. (All roadways identified in the IVHS network are also identified in the CMP network.)

10.2.3 - Funding Sources

This section presents details of funding opportunities for IVHS and traffic management projects at the local, state and federal level. Where possible, indications have been given of likely funding levels. Agencies are recommended to use the designated representatives in the OCTA to determine current funding levels at any given time as these will likely change on an annual basis.

10.2.3-1 - Locally and Regionally Generated

10.2.3.1.1 - Measure M

Measure M, a one-half cent local tax was passed by Grange County voters in November 1990. This sales tax is expected to generate \$3.1 Billion over its 20 year lifetime. The revenue generated by this source is administered by OCTA. Funding is distributed into four categories:

- 43% to Freeway Projects
- 25% to Transit Projects
- 21% to Local Streets and Roads Projects and
- 11% to Regional Streets and Roads Projects.

These expenditure categories are further broken down into seven specific funds. Elements of IVHS are technically eligible for several Measure M Programs, including Superstreets, Signal Improvement and TDM/TSM.

The OCTA plans to review the incorporation of IVHS as an eligible category for the Signal Improvement Program in mid-1993. At that time, revised guidelines will be developed and a four-year call for projects will be issued.

Clearly, Measure M funds are an ongoing, available source for funding IVHS. This year provides a critical opportunity to define IVHS's place within the Measure M Program schemes for the next four years.

However, the overall role of Measure M funds in the implementation of IVHS is undefined. If this source is to become truly viable, mom guidance within the Combined Transportation Funding Programs is needed. As stated above, OCIA will be evaluating IVHS eligibility criteria this year. As Measure M is the most significant local source of transportation funding, it is necessarily competitive. For this fund to play a significant role in IVHS development, consensus regarding its use for this purpose will be indispensable.

10.2.3.1.2 - AB 2766 Discretionary Funds Program

Assembly Bill 2766 provided that 30% of the additional vehicle registration fees collected under the bill be placed by the South Coast Air Quality Management District (SCAQMD) into a discretionary fund. Generally, projects must demonstrate the potential for eliminating or reducing vehicular emissions. Projects to be funded are selected by the SCAQMD's Mobile Source Reduction Review Committee.

In general, this source may present an opportunity to fund a portion of the IVHS which results in the elimination or reduction of mobile source emissions.

However, the funds are very competitive with proposals usually outnumbering selected projects almost 3 to 1. Moreover, any proposal under this program should clearly demonstrate the projects potential for air emission reductions and these reductions should be the focal point of the application rather than any applicability of the program to the IVHS Master Plan.

10.2.3.1.3 - Transit-Related Funds

Several sources fund OCTA transit services, including the Local Transportation Fund (LTF-sales tax proceeds from 1/4 of the \$.065 per dollar collected from retail sales in Orange

County), Measure M and federal grants. Although there are numerous programming needs to be met using these funds, there may be an opportunity to use a moderate amount of funds for transit-related IVHS components. The most current OCTA Short-Range Transit Plan also indicates that several federal grants (some dating back to 1985) should be reevaluated for continuation. Depending on the nature of the grant, there may also be a possibility to redirect unused grant funds to IVHS development. As an additional example, OCTA also receives state funding to implement a ride share program for Orange County. To the extent that a component of IVHS (such as a transit related traveler information system) could be defined within the eligibility of the state's funding guidelines, such funds could provide partial funding for IVHS transit elements.

Transit-related funding provides some opportunity to pay for transit-related IVHS components. Further evaluation of specific sources would be required to fully determine this potential.

Funding for transit is limited. Utilization of any transit-related funds for IVHS would necessarily impact other priorities. Additionally, depending on the nature of the proposed use of funds, eligibility impediments may be encountered.

10.2.3.1.4 - Transportation Corridor Agencies (TCAs)

The TCAs have been established to construct three "toll road" facilities within Orange County. Funding for construction is to come from two primary sources, dedicated developer fees and tolls. After the facilities are constructed, they are to be turned over to Caltrans for operation and maintenance. The TCA projects are to be implemented over the next 7-8 years. While there is some uncertainty with funding due to the historic slow down in development over the last several years, the projects are moving forward toward construction.

The TCA facilities will include complete traffic operations systems and HOV lanes. The toll collection system is also to emphasize automated collection using AVI technology. A number of IVHS components are planned for incorporation in the TCA facilities, and TCA funds will be directed toward this purpose.

At the same time, however, TCA funds cannot be used for infrastructure outside their roadways. Moreover, to ensure the inclusion of IVHS elements which are compatible with the

rest of the County's IVHS network in the corridor projects, specific agreement on the type and extent of IVHS system architecture must be reached concurrent with design and construction timetables. Specific parameters for linking the corridors to other system architecture must also be defined and funded.

10.2.3.1.5- Privatization Projects (Toll Roads and Other Facilities)

There are two "privatization" toll roads being developed in Orange County, one parallel to SR91 and another extending SR57 south along the Santa Ana River to I-405. The developer of the SR91 project has received environmental clearance and project approvals and is currently negotiating financing. The developer of the SR57 is seeking equity participation to fund the requisite Environmental Impact report (EIR) for the project.

As with the TCAs, there is an opportunity to incorporate certain IVHS components into the privatized facilities construction by directing funds dedicated to these project toward IVHS components. This would require early consultation with the project developers regarding common objectives concerning IVHS.

10.2.3.1.6- Local Motor Vehicle Registration Fee

In 1990, the California Legislature passed a motor vehicle registration fee increase (Sher-AB 2766), to be assessed to drivers in the South Coast Air Basin, to provide funding for mobile source air quality mitigation programs within that area. Beginning April 1991, an add-on fee of \$2.00 per vehicle was assessed annually, with the fee being increased to \$4.00 in 1992. \$40% of this revenue is allocated to the South Coast Air Quality Management District (SCAQMD), 30% to local governments on a per capita basis, and the remaining 30% toward a "discretionary fund." Any type of project, whether sponsored by government or by the private sector, having some direct connection with air quality would be able to compete for the revenues within this discretionary fund.

With the direct relationship between the traffic signal improvements and air quality, there should be a strong case for pursuing the discretionary element of these funds. There is also a possibility that authorization will be given to local agencies to increase these fees. Consideration

may also be given to establishing an annual fee dedicated to supporting continuing operation and maintenance of signal systems.

To summarize, these funds could be used for implementation of the IVHS Programs, especially where a direct benefit to air quality is apparent. Further, given the continuing nature of the funds, opportunities may exist for funding of a portion of the continuing operations costs. However, the funding levels are not large, given the likely demands. Also, a clear tie to air quality improvement (ideally carbon monoxide emissions) must be made.

10.2.3. - State Funding Sources

10.2.3.2. State Tax Funds

The State of California levies a gas tax on each gallon of fuel sold. The gas tax is dedicated to transportation improvements, with Caltrans and local agencies as the recipients. The tax has recently been raised from nine cents per gallon to a programmed eighteen cents per gallon. Five cents of the new tax increment is in effect and an additional cent will be added each year until the full value is reached. The new tax increment includes special funding for TSM and Congestion Relief programs which are discussed below.

The gas tax fund has classically been the major source of funding for the California freeway system. It is used to “match” Federal funds for selected major. It is also the funding source for continuing operations and maintenance. Prior to the recent the funds were stretched to the limit to provide continuing operations and maintenance and to match federal funds.

State gas taxes go towards two funding sources of particular significance to the implementation of IVHS and traffic management programs: the Traffic System Management (TSM) Program and the Flexible Congestion Relief (FCR) Program. The TSM program is wholly funded by state gas tax contributions, while FCR monies are derived from several sources.

Traffic Systems Management (TSM) Program

The recently established TSM Program of the gas tax fund has already been of considerable use in supporting IVHS and traffic management system implementation. The TSM Program Guidelines that were established by the California Transportation Commission (CTC) in October 1989, define the appropriate uses of these funds to be "those projects designed to increase the number of person-trips which can be carried on the highway system without significantly increasing the design capacity of the highway system." According to the CTC guidelines, eligible project types specifically include "traffic flow improvements such as computerized synchronization of traffic signals and intersection improvements on conventional arterial roads and TV surveillance, computerized message signs, and traffic operations centers on freeways;" also mentioned are "traffic metering systems, including meters on freeway on-ramps, freeway-to-freeway connectors, and freeway mainlines. "Further, "demonstration projects to implement research and development in the field of traffic operations control systems" are also identified as an appropriate use.

The TSM application process, which is intended to make between \$50 million and \$100 million available for eligible projects per year, is carried out on an annual basis. Traditionally, applications were submitted via Caltrans Districts during the month of August. The amount of funding available, and the ability of the agencies to meet deadlines for various stages of the design and construction of the project determined the number of projects actually funded from the list.

This process changed for Fy1993-94. The passage of Senate Bill 1435 linked the TSM program with the Federal ISTEA of 1991 by using the TSM funds to match Surface Transportation Program (STP) and Congestion Management and Air Quality (CMAQ) program. STP and CMAQ funds are through the Metropolitan Planning Organizations (MPO's) such as the OCTA. In order to ensure that the state TSM and regional STP and CMAQ programs are compatible, the TSM program for FY 1993-94 has been canceled and funding will be apportioned through the February 1993 Call for Projects which consolidates the application of funding from several sources (see Section 9.2.5.1). TSM funds through 1993-94 will most likely be exhausted in meeting mandated match requirements for federal CMAQ and STP funds. Beginning in 1994-95, TSM projects will be drawn from project priorities that are developed by

Caltrans District 12 in cooperation with the OCTA. Toward this end, District 12 is developing a three-year plan to target approximately \$18.7 million in TSM funds for fiscal years, 1994-95, 1995-96 and 1996-97. In the future, funding targets will be issued by OCTA for a four year period. Within those limits, OCTA will establish a project priority list with Caltrans.

TSM funds will continue to be a major source for IVHS deployment and their use as leverage for larger federal funds only adds to the funds utility. However, there is significant competition for TSM funds. They have also been the principal source for Caltrans operational elements such as Traffic Operations Centers and system improvements such as ramp metering, changeable message signs, closed circuit television and communications. Senate Bill 1435 added HOV lanes and park and ride facilities to the list of eligible projects. TSM funds may not be used for operations and maintenance activities. Because of the nature of the TSM Program, many IVHS elements will qualify under TSM, plus Federal ISTEA (CMAQ and STP) programs. It is therefore important that District 12 and OCTA work together closely to develop joint programming strategies covering all three statewide process to a District-based multi-year evaluation process, the need for well-coordinated implementation scheduling and financial planning is critical for the best utilization of this source.

10.2.3.2.2 - Flexible Congestion Relief (FCR) Program

Flexible Congestion Relief funds are derived from a variety of state and federal sources which include state gas tax, rail bonds and ISTEA. These funds are collected in the State Highway account and allocated according to prescribed formulae for each county. FCR funding is estimated to be at the level of approximately \$300 million per year.

Eligible projects under the FCR program include new roadways, transit guideways, expansion of existing roadways and rail transit. The efficient addition of capacity to a corridor is the prime intention of these funds. Hence, traffic signal projects face significant competition for these funds and are at a disadvantage due to competition from major freeway projects. One significant advantage that the IVHS projects do have, however, is cost-effective capacity enhancement. For example, in Los Angeles County, some \$2.55 million of FCR funds have been allocated for the first phases of a multi-agency signal coordination project and Smart Corridor conceptual design for the northern San Gabriel Valley.

Operations and Maintenance are not eligible for funding under the FCR program.

10.2.3.2.3 - Caltrans IVHS Research

Caltrans has allocated funding to conduct IVHS research projects and has requested proposals from the various districts. District 12 and the University of California at Irvine led a multi-agency team and submitted a program for the region. The project, oriented toward a Test Bed for IVHS, is receiving strong support and several million dollars are programmed for funding Over a three year period. The project includes elements that can support expanded signal operations and interties to other agencies. The project will also provide some traffic system infrastructure in the test bed area. Funding in the FY 1992-93 has been made available by Caltrans to local universities, and further funds are forthcoming under the IVHS Corridors program (see Section 9.2.3.3.5) for equipment deployment While research is the prime target, such test beds are useful to test and evaluate emerging technologies and establish their utility in traffic signal operations.

10.2.3.2.4 - Petroleum Violation Escrow Account (PVEA)

Under existing Federal law, funds in the Petroleum Violation Escrow Account (PVEA) have been dispersed to the State by the Federal government and deposited in the Federal Trust Fund PVEA monies have been used in the past to fund statewide programs to relieve traffic congestion, such as vanpool grants and loans. Existing state law, however, does not provide for optimized signal timing and corridor demonstration projects. Recently specific bills have been formulated to require county transportation authorities, using funds allocated by the California Transportation Commission (CTC), to coordinate Smart Corridor demonstration projects on the state highway system. The bills would further require local transportation commissions to report on these projects to the Legislature.

In the 1992-93 legislative session, two such bills went before the State senate for the appropriation of over \$6 million of these PVEA funds to the CTC for allocation to these corridor demonstration projects. Unfortunately, competition for PVEA funds resulted in only \$1 million being allocated.

While future proposals could be formulated to provide some funds for implementing suitable corridor projects which might include IVHS elements, it should be recognized that PVEA funds are almost exhausted. This, combined with competition from other urban counties will limit PVEA funding availability for IVHS Programs in the County.

10.2.3.2.5 - State and Local Transportation Partnership Program (SLTPP)

This Caltrans program consists of funding local projects which are ready for construction with a minimum of review. Eligible projects are those which increase capacity, extend public transportation service to a new area, or rehabilitate existing facilities. As discussed with FCR projects, IVHS and traffic management projects can be shown to increase capacity. SLTPP funds are available only for actual construction costs, as well as State and Local-furnished materials. The funds do not cover preliminary and construction engineering. The maximum state share is 50%. In the first three years (cycles), the state match is 21.47%, 30.2% and 21.6% respectively. Projects nominated by local agencies are selected by Caltrans annually. A one year application period begins on July I. Project reimbursement proceeds after the final match ratio and list of eligible projects is published 13 months after the application deadline. \$200 million is available annually statewide.

10.2.3.3 - Federal Highway Administration Funds (FHWA)

10.2.3.3.1 - Intermodal Surface Transportation Efficiency Act (ISTEA)

In December 1991, the Intermodal Surface Transportation Efficiency Act (ISTEA) became law. While retaking more traditional funding programs for Interstate maintenance and bridges with minor modifications, the ISTEA restructured the federal aid highway program by creating broad funding categories. Within this new structure, the emphasis of the ISTEA for highways is on preservation, operation and better management of existing transportation facilities. As such, several funding programs are compatible with the objectives associated with developing an IVHS.

ISTEA comprises several funding programs ranging from Air Transportation to Research. The Act includes several sources which are of direct interest to the funding of ITMS:

- Surface Transportation Program
- National Highway System
- Congestion Mitigation and Air Quality Improvement (CMAQ)
- Intelligent Vehicle Highway Systems Act
- Discretionary Grant Opportunities

These funding opportunities are discussed below. It should be emphasized that project readiness is a key requirement for Federal funds. The availability of ready-to-go projects will put an agency in an advantageous position where demands to deliver on the program are made.

10.2.3.3.2 - Surface Transportation Program (STP)

Section 1007 of ISTEA describes the STP. Eligible projects include operational improvements as well as capital and operating costs for traffic monitoring, management and control facilities and programs. Funds lapse four years after they are available and competition for available funds is introduced into the obligation process annually. The definition of operational improvements includes capital improvements that will improve or enhance the operational efficiency of a highway. This includes traffic signals and systems.

The STP provides funds directly to the County. In Change County, a portion of these funds is directly apportioned to the Cities and the County for eligible users. These are the STP Local or Guaranteed Funds. In Fiscal Year 1993-94, Orange County received approximately \$19.8 million in regional STP funds.

Total funding for the STP is \$23.9 billion over the six years of ISTEA with \$246.3 million currently allocated to California annually. Funds are distributed to states based on their share of all funding made available to the states between FY87 and FY91. Following distribution to the states, allocation is as follows:

- a. 10% - safety construction
- b. 10% - transportation enhancement
- c. 50% - to urban areas over 200,000 on the basis of population
- d. 39% - for use anywhere in the state

IVHS and Traffic Management projects are not eligible under categories a and b, above, and while STP funding for ETA projects requires a local match of at least 20%, traffic projects require only 11 1/2% local matching funds. State TSM funds will provide a local match in the future (see Section 9.2.2.1.1 above).

While there is obvious application of STP funding to capital expenditure for IVHS and traffic management projects, its application to operations and maintenance is not so well defined. While there is provision at the Federal level making such expenditure eligible, current local guidelines are that local agencies provide funding for operations and maintenance.

10.2.3.3.3 - National Highway System (NHS)

ISTEA designates a new highway system of approximately 155,000 miles to be known as the National Highway System (NHS). The NHS is funded at \$21 billion over the six years of ISTEA, apportioned in the same fashion as the STP. An additional \$17 billion is authorized for Interstate Highway system upkeep making a total of \$38 billion. States can, at their discretion, transfer up to half of their NHS funds to the STP and may transfer up to 100% with DOT approval. Through FY95, all principal arterials are to be considered eligible for NHS funds.

Under the NHS, “start-up” funding for traffic management and control for up to two years can be provided. As with the STP definition of operational improvements, start-up costs includes those for traffic signals and systems. Also, eligible projects include operational improvements to the NHS and operational improvements to non-NHS highways in a NHS corridor. Clearly, therefore, NHS provides a major opportunity for IVHS funding on principal arterials and corridor systems. However, using NHS funds for operations and maintenance may be viewed as reducing the funds for NHS construction for which these funds are the support

NHS funds are managed by the State Departments of Transportation and contribute to the FCR program described in Section 9.2.2.2.

10.2.3.3.4 - Congestion Mitigation and Air Quality Improvement (CMAQ) Program

The Congestion Mitigation and Air Quality Improvement (or CMAQ) Program directs \$6 billion over the life of ISTEA to urban areas not in compliance with the Clean Air Act. Funds are distributed to states based on each state's population in non-attainment areas. Areas with very poor air quality are given greater weight in the formula. The Los Angeles/Orange County area is a non-attainment area and therefore will receive a significant allocation of the funds.

Projects which help to attain air quality standards, or contribute to air quality attainment, through reduction in vehicle miles travelled (VMT), fuel consumption or other factors, are eligible. Traditionally, IVHS and traffic management programs have been viewed as being effective in reduction in fuel consumption and pollution, although their effect on VMT is still to be established.

The Federal share for most eligible activities is 80% or 90% if used for certain activities on the Interstate System. Some activities, including traffic control signalization and certain transit related IVHS elements may be eligible for funding at 100%.

CMAQ funds are allocated by the OCTA but have been apportioned for the next two years toward interchange reconstruction projects. Therefore, CMAQ funds would not be available for IVHS and traffic management use in Orange County until FY1995-96. Clearly, because of the broad array of projects eligible under CMAQ, use of these funds for IVHS will necessarily compete with numerous alternative funding requests. Moreover, it will be important to establish IVHS strategies as an effective use of funds early in the CMAQ program lifecycle. Specifically, the air quality benefits to be derived for IVHS should be demonstrated in the early years of the program. As it is likely that this source will be attractive to several regional initiatives, consensus regarding the use of CMAQ funds for IVHS purposes will be required on a countywide basis.

10.2.3.3.5 - Intelligent Vehicle Highway Systems (IVHS) Act

The IVHS Act falls under Title VI: Research of ISTEA while STP/NHS/CMAQ funds all come under Title I: Surface Transportation and establishes \$660 million of funding for IVHS over the life of ISTEA. This is divided into \$501 million for an IVHS Corridors program and

\$158 million for other IVHS research and development.

These funds are not to be used to create infrastructure but are targeted at operational tests for the evaluation of emerging technologies. The FHWA, which administers these funds and directs them to individual projects, has identified five priority corridors in ozone non-attainment areas to receive funds under the Corridors program. The I-5 corridor through Los Angeles and Orange counties was originally defined as one of the priority corridors. Following discussions with local agencies, this definition was amended to incorporate an Integrated Corridors program for Orange County.

Initial allocation of FY1993-94 funding has been done through a request for proposals; 102 proposals were received by the FHWA. Of the 16 projects chosen for funding, 3 were projects with relevance to IVHS deployment in Orange County. These tests include the following:

- Adaptive Traffic Signal Control System Test - City of Anaheim
- Integrated Freeway Ramp Metering and Adaptive Arterial Signal Control Test - Caltrans/City of Irvine
- Mobile Surveillance System Test - Caltrans/Anaheim/Irvine

It has been estimated that Orange County can expect to be allocated between \$6 million and \$10 million per year under these funds which makes them small in comparison to Title I funding opportunities for Traffic Management projects. However, the funds can be usefully expended to be of use in defining future technologies for IVHS programs and giving local agencies first hand experience with them. This puts those agencies in a stronger position when seeking larger funding for full-scale deployment following successful testing.

10.2.3.3.6 - Discretionary Grant Opportunities

ISTEA created 20 discretionary grant programs. Included in the act were programs for \$158 million over 6 years for intelligent vehicle highway research and planning, and \$501 million over 6 years for intelligent vehicle highway corridors. The applicable federal share for these categories is 80%.

The IVHS Corridors Program provides for long-term operational test sites which will serve as showcases for implementation of IVHS technologies. The U.S. Department of Transportation will designate 3-10 priority corridors that would especially benefit from IVHS technology. Among the criteria specified in the ISTEA for designating the priority corridors are traffic density above the average, severe or extreme non-attainment and an inability to significantly expand capacity, making the southern California area an eligible priority corridor venue. Eighty-six million dollars (\$86 M) of funding is available each year for fiscal years 1993 through 1997. At least 50% of this money must be spent in priority corridor areas, which would include Orange County. Under the IVHS planning and research program, \$27 million of funding is available each year for fiscal years 1993 through 1997.

In fiscal year 1992, Caltrans applied for three grants under the IVHS planning program, and was awarded \$2.8 million for automatic vehicle and roadway powered electric vehicle demonstrations. Caltrans expects to apply for another \$11.9 million in 1993. Caltrans applied for and was awarded \$150,000 for an early development corridor study. Caltrans has applied for \$13.1 million more for corridor projects but grants have not yet been awarded.

On a statewide basis, Caltrans is supportive of aggressive pursuit of discretionary funding programs. As Caltrans has initiated funding applications within the two above programs, there is an opportunity for further coordination with Caltrans at both the District and State level, for the development, testing and implementation of the more innovative IVHS elements such as expert systems. The opportunity for use of these funds is also augmented by the fact that Orange County is included in a priority corridor area.

However, these funds are competitive on a national basis. Moreover, funding a certain portion of funding for any given year will be used to support previously funded projects. Therefore, the feasibility of tapping this fund source decreases somewhat over time. Lastly, close coordination with Caltrans to identify grant opportunities in Change County is a recommended precursor to pursuing these funds.

10.2.3.4 - Transit Funding

The following summarizes transit funding availability from a number of sources, including federal ISTEA funding, State funds, and countywide Measure M funds.

10.2.3.4.1 - Federal Transit Funds

ISTEA included \$31.5 Billion nationally in transit funding over the 6 year period of the Act Potentially applicable funding to IVHS includes: Section 9 Formula Programs; Section 3 Capital Program and Planning and Research Programs.

Section 3: This section of the Act includes a capital grant program for innovative techniques and practices “in the management and operation of public transit services.” Approximately \$10 million in available nationally within the Section 3 bus capital grant program. OCTA has traditionally used Section 3 funds for the acquisition of buses. The OCTA Short-Range Transit Plan (SRTP) anticipates approximately \$177 million in Section 3 funding between 1993 and 1999 pending a current grant application approval. Much of these funds are planned to acquire express coaches and help construct the I-405/SR55 transitway connector. These funds require a 20% local match.

Because these funds are competitive on a national basis they provide a limited opportunity for IVHS funding. Moreover, current OCTA capital planning assumes that Section 3 will provide the significant portion of HOV Transitway funding.

Section 9: The section 9 formula grant program makes funds available on the basis of a statutory formula to all urbanized areas in the country. Operating expenses are an eligible expenditure under this program. OCTA anticipates receiving \$134 million in Section 9 funds over the 1993-1999. This program provides significant revenues to OCTA’s operations and capital acquisition program, \$63.5 million and \$71.4 million respectively.

Although both capital and operational aspects are technically eligible under this program, diversion of these funds to IVHS purposes would necessarily curtail alternate application of these funds.

Planning and Research Funds: Approximately \$378 million nationally is available over the next six years for transit technology development. These funds are distributed through a new Transit Cooperative Research Program through calls for projects and through the National Planning and Research Program. Because of the emphasis on technological advancement, these funds are potentially available for the more advanced aspects of IVHS.

10.2.3.4.2 - State Transit Funds

OCTA receives transit operating and capital revenues from several state sources including

the Local Transportation Fund (1/4 of the \$.065 collected per dollar as sales tax in Orange County); State Transit Assistance Fund (STAF); and various other sources (such as State Rideshare funds). Transit elements of IVHS would be eligible expenditures under these sources. Application of any portion of these funds to such use would, of course, impact other transit expenditures plans. Moreover, state fiscal conditions' make these sources vulnerable to invasion to balance the state budget.

OCTA projects receive \$10.6 million per year in state rideshare funds between 1993 and 1999. This source may contain some potential for application toward development of HOV programs as defined in the IVHS Master Plan.

10.2.3.4.3 - Measure M

Twenty-five percent (25%) of Measure M funds are devoted to transit, including rail and guideway development. The current SRTP allocates \$8.3 million toward transit for the 1993-1999 period. To the extent that IVHS components are transit-related, Measure M funds could be applied for these purposes.

10.2.3.5 - Private Sector Role

The nature of IVHS, due to its inclusion of the vehicle as a "smart" system element, involves the development of privately-developed technologies. Thus, technological vendors and investors could be considered partnership sources of private funds for IVHS implementation.

Further exploration of the potential for private investment in IVHS technologies to be applied in Orange County is needed. There may be other federal sources to "seed" public/private ventures which advance IVHS technology.

The private projects may be financially sensitive to any additional cost components. The extent of potential participation cannot be determined without significant discussions with these private entities.

Candidate private-public joint ventures may include in-vehicle navigation systems (implementation and support), development of new technologies for collection and dissemination of data, and various control system elements.

10.3 ORDER OF MAGNITUDE COSTS

The rough order of magnitude costs for the programs identified in the IVHS Master Plan are presented in Exhibit 10.1. Costs are presented for each program, program area (e.g., traveler information, monitoring and data systems), and for the entire recommended system (minus Advanced Vehicle Control Systems which are anticipated to be developed outside of the Master Plan's twenty year horizon). It is estimated that the program total for the IVHS Master Plan is \$602 million.

The cost estimates are based on 1993 prices and have been largely derived through a review of costs of similar projects JHK and Associates has been involved in. Many of the field-based costs have been estimated based on known roadway mileage within Grange County in combination with the recommended frequency of elements on these roads. It should be noted that these figures may be affected by both inflation and cost decreases due to further developments of various technologies, therefore, these estimates should be considered rough order of magnitude costs only.

In addition to costs, Exhibit 10.1 presents the time frame in which the individual programs could be implemented. These time frames are based upon the availability of necessary technologies and estimated construction times. They do not consider the availability of funding nor the availability of resources to manage the projects. These concerns will be explicitly considered in the Action Plan and appropriate project staging will be developed.

Exhibit 10.1
ORANGE COUNTY IVHS MASTER PLAN
TRAVELER INFORMATION PROGRAMS

	<u>Description</u>	<u>Quantity</u>	<u>Cost</u> (\$000's)	<u>Extension</u> (\$000's)	<u>Installation Cost</u> (\$000's)	<u>Annual Maintenance/ Contracts</u> (\$000's)	<u>Time Frame</u>	
Universal Traveler Information Program (UTIP)	Traveler Information Center (TIC)	1	2,000	2,000	100	200	2 years	
	Traveler Information Database	1 (software + hardware)	3,000	3,000	150	300	5 years	
	<u>Information Servers</u>							
	CATV Broadcast	8	50	400	20	40	2 years	
	Local Kiosks	15	50	750	36	75	2 years	
	Private Kiosks	Privately Funded					5 years	
	Traveler Advisory Telephone	1	300	300	15	30	5 year	
	Bulletin Board Server	1	46	46	2	5	2 years	
	In-vehicle Interface	1	100	100	5	10	10 years	
	Personal/Portable TIS	Privately Funded					5 years	
Radio Data Systems	Privately Funded					5 years		
Silent Radio	Privately Funded					2 years		
Sub-total				6,596	590	880		
Interagency Transportation Information Exchange (INTERTE)	Sub-Regional Node Processors (Hubs)	(Software Development) 15 each	400 30	400 450	20 23	40 45	5 year 5 years	
	Local Node Processors	(Software Development) 37 each	100 30	100 1,110	5 56	10 111	5 years 5 years	
	Communications Unks	52 each	200	10,400	520	1040	5 year	
	Sub-total			12,460	623	1,246		
Public Info Campaign	In-House or Contracted	Lump Sum (Annually)				40	Duration	
Sub-total				0	0	40		
Freeway MIS	CMS	42	250	10,500	525	1050	5 year	
	Low Power HAR	250	7	1,750	88	175	5 years	
Sub-total				12,250	613	1,225		

Arterial MIS	Full -Matrix CMS	20	200	4,000	200	400	5 year
	Trailblazers	542	50	27,100	1,355	2,710	10 years
	Mobile CMS	20	50	1,000	50	100	2 years
	Low Power HAR	350	10	3,500	175	350	5 years
Sub-total				35,600	1,780	2,580	
In-vehicle Information Support Infrastructure for On-Street Navigation (INVISION)	In-Vehicle Devices	Privately Funded					
	Data Server	1	240	240	12	24	10 years
	Vehicle-Roadway Communications-freeway	3,700 beacons	7	25,900	1,295	2,590	5 years
	Vehicle-Roadway Communicaitons-Arterials	7,000 beacons	7	49,000	2,450	4,900	10 years
	Trunk Communications Links	1100 miles	106	116,600	5,830	11,660	10 years
Sub-total				191,740	9,587	19,174	
TOTAL -- Traveler Information Programs				258,646	12,932	25,905	

**ORANGE COUNTY IVHS MASTER PLAN
MONITORING AND DATA COLLECTION PROGRAMS**

	<u>Description</u>	<u>Quantity</u>	<u>Cost</u> (\$000's)	<u>Extension</u> (\$000's)	<u>Installation Cost</u> (\$000's)	<u>Annual Maintenance/Contracts</u> (\$000's)	<u>Time Frame</u>
AVL	AVL for Transd AVL for Other Public Fleets (e.g., paratransit, rail, CHP, etc.) AVL for Private Fleets/Private Vehicles	see HOV Programs, APTS Smart Bus 480 Privately Funded	4	1,920	96	192	10 years 20 years
Sub-total				1,920	96	192	
Freeway Instrumentation	System Detectors CCTV VIDS	562 155 20	54 45 60	30,348 6,975 1,200	1,517 349 60	3,035 698 120	5 years 5 years 5 years
Sub-total				38,523	1,926	3,852	
Arterial Instrumentation	CCTV Cameras VIDS System Detection	750 188 600	40 60 50	30,000 11,280 30,000	1,500 564 1,500	3,000 1,128 3,000	5 years 5 years 5 years
Sub-total				71,280	3,564	7,128	
Detector Maintenance Program	Contracted Maintenance	Annually				200	Duration
Sub-total						200	
TOTAL -- Monitoring and Data Programs				111,723	5,586	11,372	

**ORANGE COUNTY IVHS MASTER PLAN
TRAFFIC MANAGEMENT PROGRAMS**

	<u>Description</u>	<u>Quantity</u>	<u>Cost</u> (\$000's)	<u>Extension</u> (\$000's)	<u>Installation</u> <u>Cost</u> (\$000's)	<u>Annual</u> <u>Maintenance/</u> <u>Contracts</u> (\$000's)	<u>Time</u> <u>Frame</u>
TOC/TMCs	Catrans TOC	1	7,100	7,100	355	710	5 years
	TMCs	11	1,500	16,500	825	1,650	10 years
Sub-total				23,600	1,180	2,360	
Agency Traffic Operations Support	OCTA Technical Liaison	1 (Annual)				70	Duration
	Maintenance Support (Contracted)	1 (Annual)				300	Duration
Sub-total						370	
Decision Support Systems	Smart Corridor Expert Systems	6 Smart Corridors	2,500	15,000	750	1,500	10 years
Sub-total				15,000	750	1,500	
Emergency Priority System (EPS)	Signal Pre-emption Testbed	1	250	250	13	25	5 years
Sub-total				250	13	25	
Rapid Incident Clearance (RIC)	Tow Truck Deployment on Freeways	56 vehicles	Annually			1,120	Duration
	interface with TIS	1	100	100	5	10	5 years
	Mobile Data Terminal Interface with TIS	1	50	50	3	5	5 years
	Accident Investigation Sites	140	250	35,000	1,750	3,500	10 years
Sub-total				35,150	1,758	4,635	
Adaptive Signal Control and Signal Synchronization	Adaptive Control Software	1 (software)	1,100	1,100	55	110	5 years
	Signal Synchronization -- Upgraded	2270	9	20,430	1,022	2,043	5 years
Sub-total				21,530	1,077	2,153	

Corridor Ramp Metering	Additional Ramp Meters Software Development	134 1(software)	75 150	10,050 150	503 8	1,005 15	5 year 5 years
Sub-total				10,200	511	1,020	
Integrated Signal/Ramp Meter Control	Software	1 lump sum	700	700	35	70	5 years
Sub-total				700	35	70	
TOTAL -- Traffic Management Programs				106,430	5,322	12,133	

**ORANGE COUNTY IVHS MASTER PLAN
HOV PROGRAMS**

	<u>Description</u>	<u>Quantity</u>	<u>Cost Extension</u> (\$000's)	<u>(\$000's)</u>	<u>Installation Cost</u> (\$000's)	<u>Annual Maintenance/Contracts</u> (\$000's)	<u>Time Frame</u>
Public Transit / Smart Bus	Automatic Vehicle Monitoring (location, passengers, mdntenance, etc.)	457	10	4,570	229	457	5 years
	Trandt Operations Center	1	1,500	1,500	75	150	5 years
	□ ectionlo Ticketing System	457 vehicles	7	3,199	160	320	10 years
	Trandt TIS	1	t 500	1,500	75	150	2 years
Sub - total				10,769	534	1,077	
Interactive Rideshare Program (INTER-RIDE)	Rideshare Database	1	500	500	25	50	5 years
	Interactive Telephone System	1	50	50	3	5	5 years
	Integation with TIS	1	50	50	3	5	5 years
Sub - total				600	30	60	
Real-time Intermodal Travel Advisory (RITA)	Softwae Integated with TIS	1	150	150	6	15	5 years
Sub - total				150	6	15	
TOTAL -- HOV Programs				11,519	576	1,152	

**ORANGE COUNTY IVHS MASTER PLAN
VEHICLE CONTROL SYSTEM PROGRAMS**

	<u>Description</u>	<u>Quantity</u>	<u>(\$000's)</u>	<u>Cost Extension (\$000's)</u>	<u>Installation Cost (\$000's)</u>	<u>Annual Maintenance/ Contracts (\$000's)</u>	<u>Time Frame</u>
Support AVCS Development	In-vehicle Controls Communication Servers	Privately Funded 1 lump sum	5,000	5,000 *	250	500	20 years
	AVCS Operations System	1 lump sum	2,000	2,000 *	100	200	20 years
	Infrastructure Support I	20 miles	10,000	200,000 *	10,000	20,000	20 years
Sub-total				207,000	10,350	20,700	

* Costs not included In IVHS Cost Summary.

ORANGE COUNTY IVHS MASTER PLAN
SUMMARY OF COSTS

	<u>Capital costs</u> (\$000'S)	<u>Installation costs</u> (\$000's)	<u>Annual costss</u> (\$000's)
TOTALS	438,313	24,416	50,552 Excludng AVCS Elements
Sub-total (Capital + Installation Costs)		512,734	
Engineering		87,897	
Program Total		600,631	