Tujunga Watershed Project

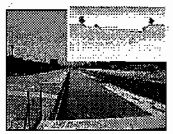
Existing Conditions Modeling

Process and Projects to Date

Tujunga Watershed Project

TODAY'S AGENDA

- 6:00 - Introductions
- 6:10 - Agenda review & announcements
- 6:15 - Presentation of Existing Conditions Modeling
- 6:40 - Presentation of Proposed Projects - verify GPS points
- 7:00 - Review and discuss results of the Rough-cut for Project selection
- 7:20 - Break
- 7:30 - Review & discuss Data Gaps
- 8:20 - Next Steps
- 8:25 - Meeting Evaluation



Existing Conditions Modeling

OBJECTIVES

Increase storm water retention

Increase ground water recharge

Improve water quality

Restore hydrologic function while maintaining public safety

Existing Conditions Modeling

METHODS TO ACHIEVE OBJECTIVES

- Increase storm water retention
  - Modify operation of existing dams/reservoirs
  - Construct retention basins (e.g., gravel pits)
- Increase ground water recharge
  - Percolate retained surface water behind existing dams
  - Percolate retained surface water in new retention basins
  - Increase infiltration in streams through concrete removal
- Improve water quality
  - Plant vegetation to increase uptake
  - Construct retention basins (e.g., small parks) to trap sediment
  - Remove concrete to allow sediment microbial activity
- Restore hydrologic function while maintaining public safety
  - Maintain levees and culverts as appropriate
  - Remove levees and culverts as appropriate
  - Plant native vegetation for stabilization

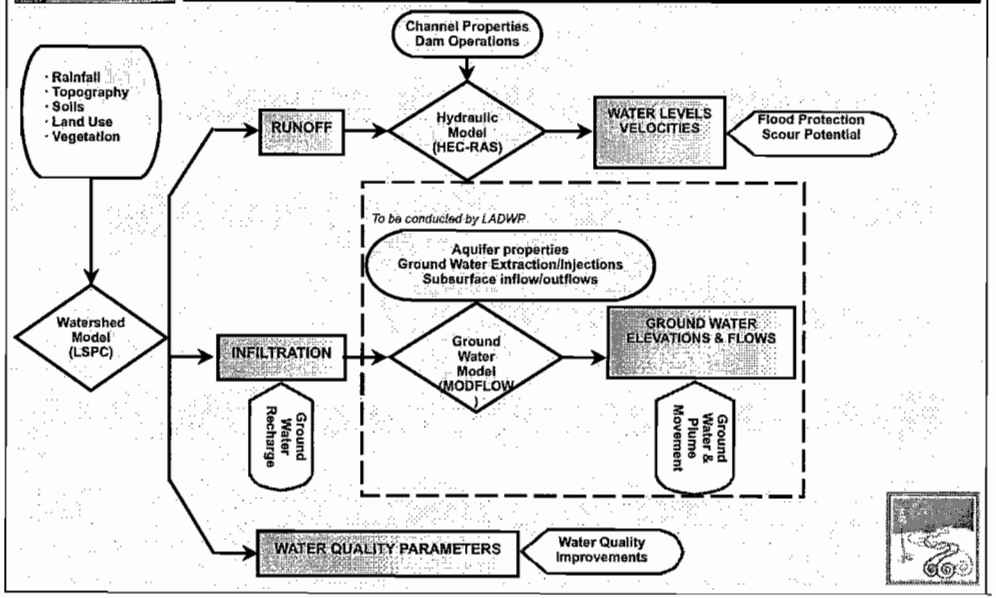
Existing Conditions Modeling

ANALYSIS METHODS

- Increase storm water retention
  - Use hydraulic model to assess diversion methods
- Increase ground water recharge
  - Use surface water runoff model to evaluate water storage increases
- Improve water quality
  - Use water quality model to analyze water quality improvements
- Maintain flood protection
  - Use hydraulic model to estimate water elevations and velocities
  - Use also to assess retention basin and concrete removal

Existing Conditions Modeling

MODELING APPROACH



Existing Conditions Modeling

SURFACE WATER RUNOFF & WATER QUALITY

Watershed Model

Loading Simulation Program in C++

Developed by USEPA

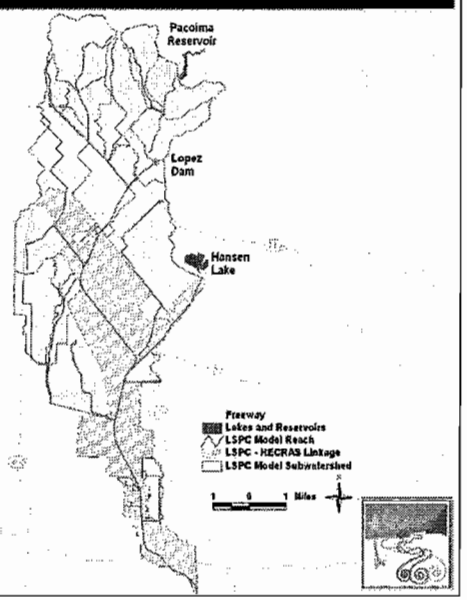
Applied to most of the LA Region:
- LA River
- San Gabriel River
- LA Harbor watersheds to support TMDLs

Application in Tujunga

Input to HECRAS model

Watershed hydrology and flow in model reaches

Metals loading from the land surface and transport in the reaches



Existing Conditions Modeling

LSPC METHODOLOGY

Model Configuration

- Delineated subwatersheds (existing boundaries, topography, possible project locations)
- Reclassified SCAG 2005 land use
- Hydrology parameterization based on calibrated LA River model

Major Assumptions

- Exclusion of Lopez Dam (data gap)
- Input flows from Pacoima Dam & Hansen Dam discharge (data gaps = average monthly flow)
- 30% upstream flow lost to Pacoima Diversion Channel

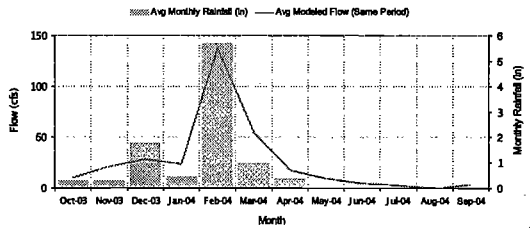
Existing Conditions Modeling

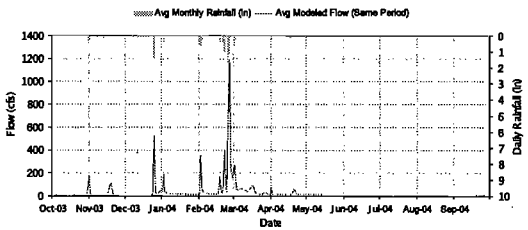
LSPC DYNAMIC FLOW SIMULATION

Model predicts flows from each subwatershed

Model simulates 10 years of hourly flows

Output can be evaluated at various time scales





Existing Conditions Modeling

PROJECT REPRESENTATION IN MODEL

Projects can be divided into two major categories

Land Based – Reduces surface runoff through increased infiltration on the land. Examples include:

- Land use conversion
- Reduction of impervious area\

Structural BMP – Diversion and infiltration of flows within centralized facility. Examples include:

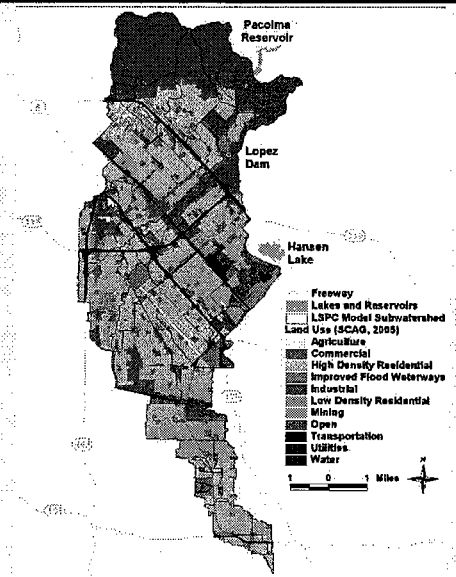
- Spreading grounds
- Detention pond/cistern

Each category includes specific assumptions for project evaluation of hydrologic benefits

Existing Conditions Modeling

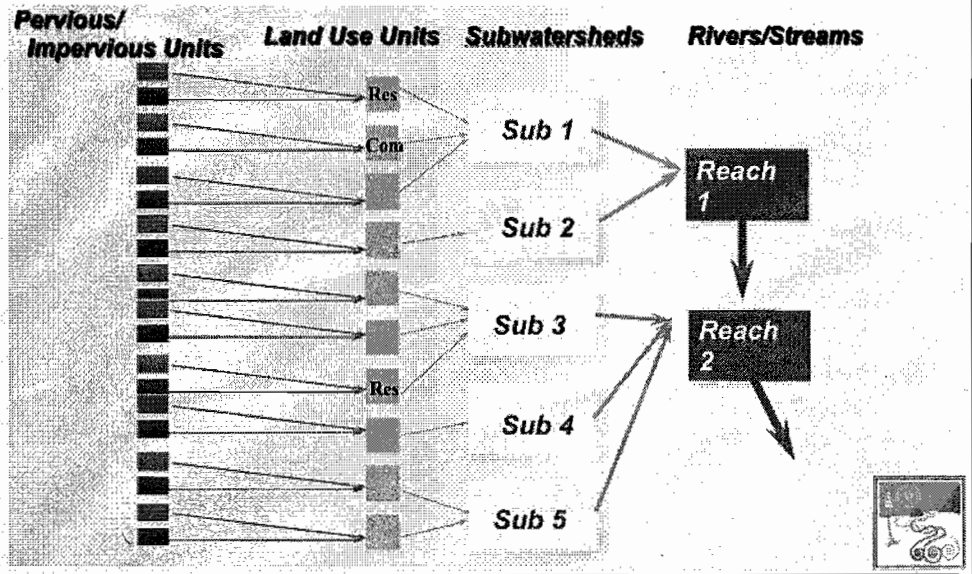
LAND USE

LAND USE	PERCENT OF TOTAL AREA
Agriculture	0.7%
Commercial	11.2%
High Density Residential	48.4%
Improved Flood Waterways	3.4%
Industrial	4.7%
Low Density Residential	4.3%
Mining	0.4%
Open	22.5%
Transportation	4.1%
Utilities	0.3%
Water	0.05%



Existing Conditions Modeling

MODEL ASSUMPTIONS FOR LAND COVER

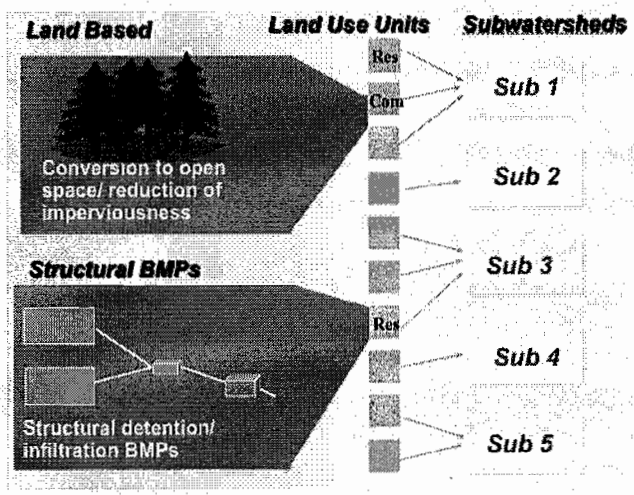


Existing Conditions Modeling

REPRESENTING PROJECTS

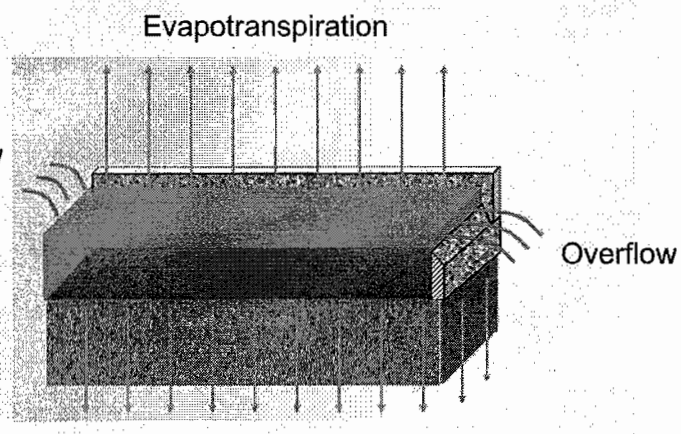
Assumptions Required:
- Area of project
- Soil infiltration rate
- Land use
- New conditions
  - New land use
  - New % impervious

Assumptions Required:
- Watershed area/ inflow assumptions
- Design considerations



Existing Conditions Modeling

STRUCTURAL DETENTION/INFILTRATION BMPs

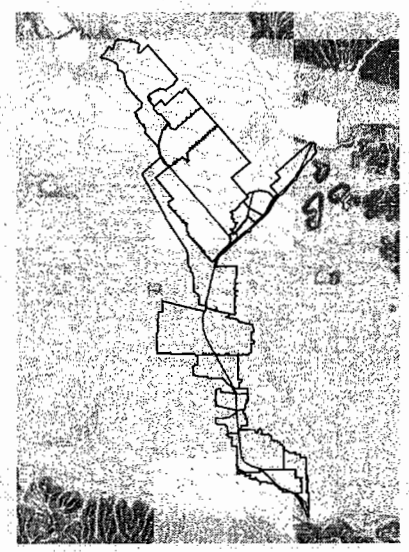


Design Assumptions for Structural BMPs:
- Depth
- Infiltration rate
- Surface area
- Watershed area/ inflow assumptions

Existing Conditions Modeling

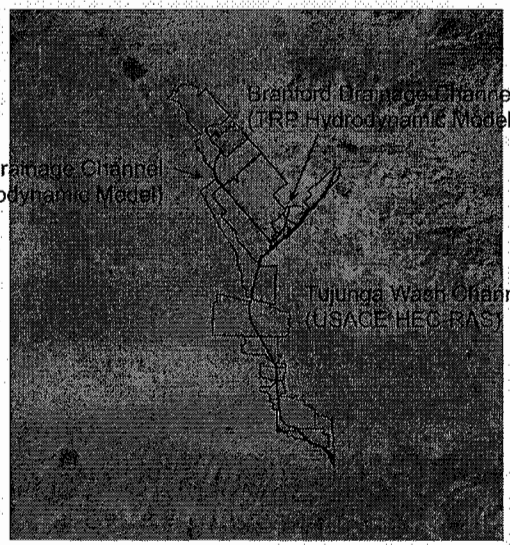
HYDRAULIC (HEC-RAS) MODELING

Existing Conditions – Topography



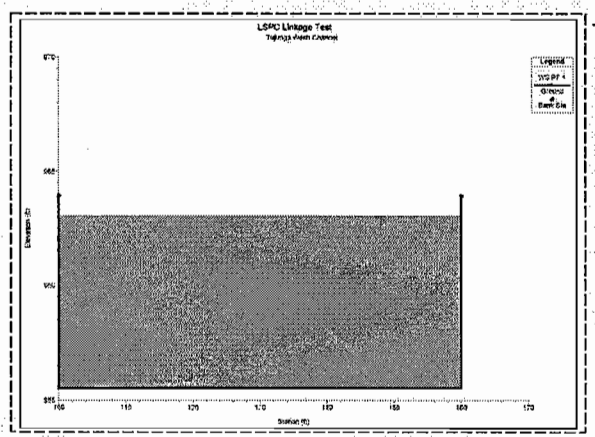
Existing Conditions Modeling

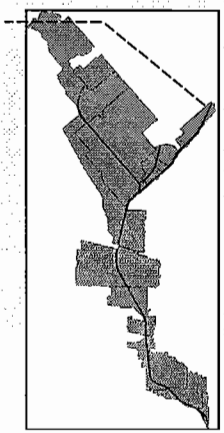
HEC-RAS MODEL SETUP



Existing Conditions Modeling

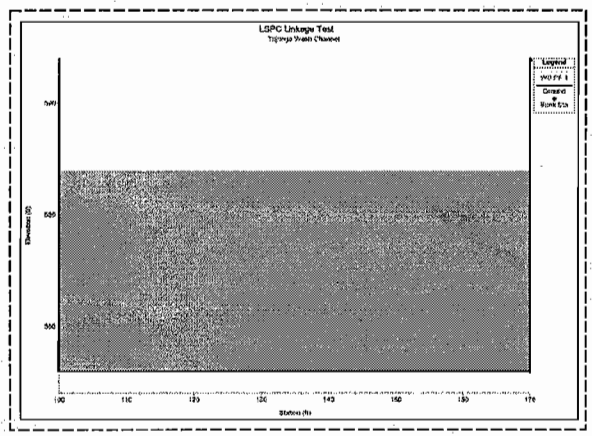
TUJUNGA WASH CHANNEL WIDTH = 60 ft

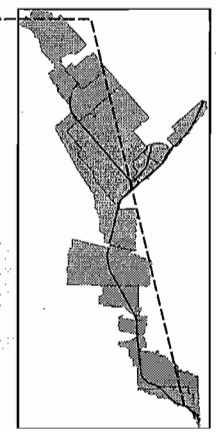




Existing Conditions Modeling

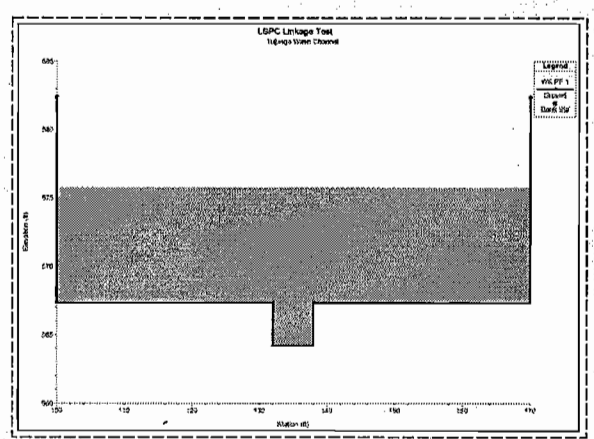
TUJUNGA WASH CHANNEL WIDTH = 70 ft

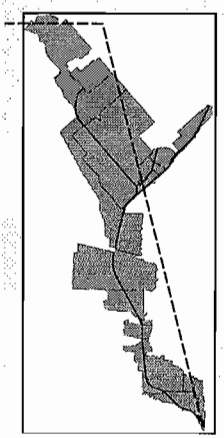




Existing Conditions Modeling

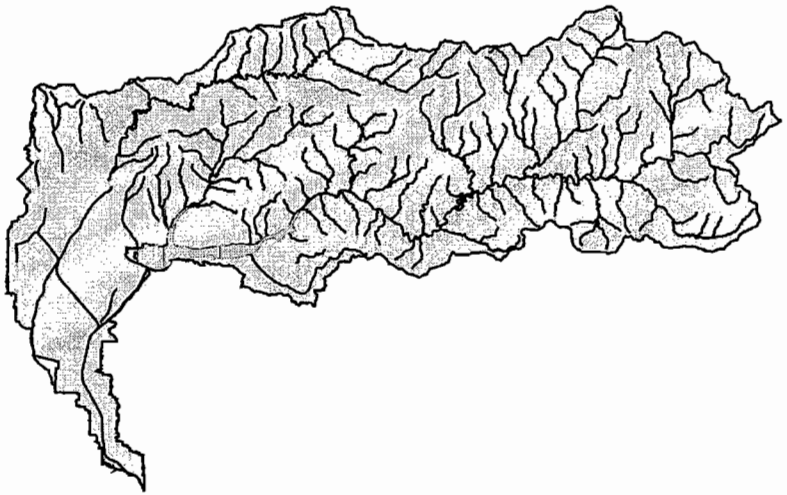
TUJUNGA WASH CHANNEL w/ LOW FLOW





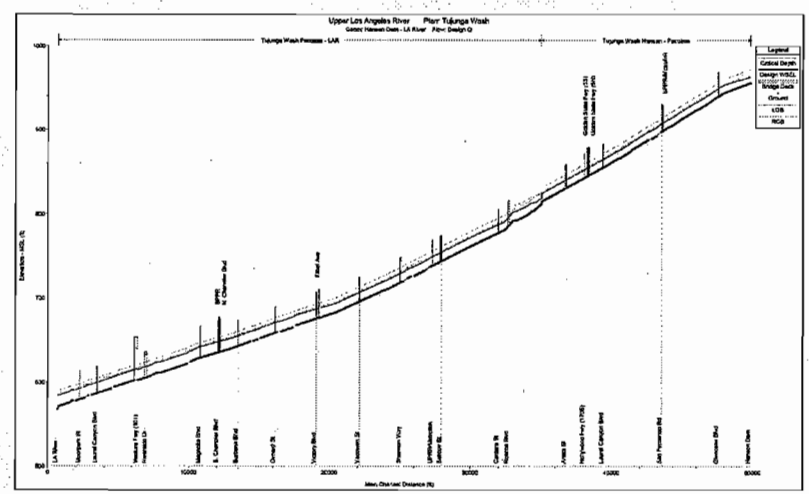
Existing Conditions Modeling

FEMA ZONE A (Per GIS Database)



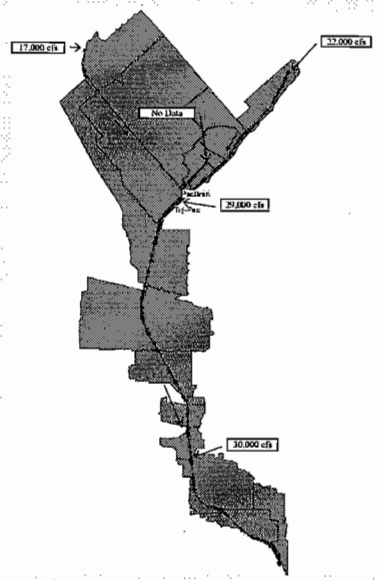
Existing Conditions Modeling

USACE FLOOD PROFILE



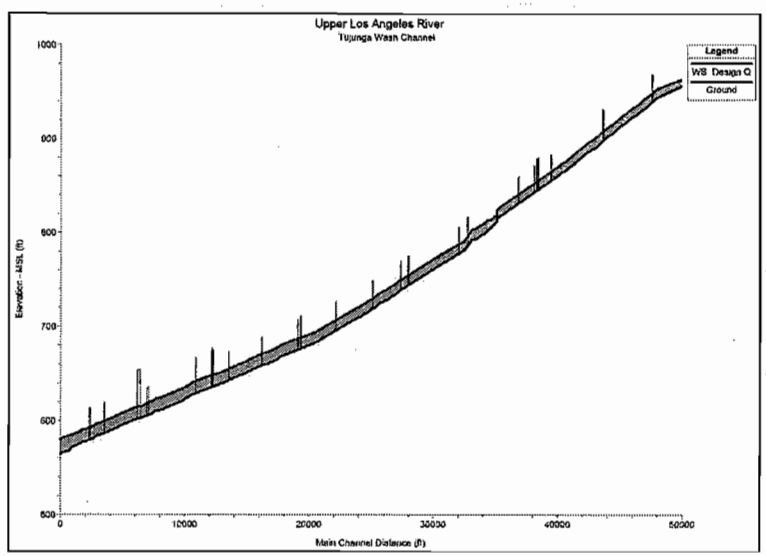
Existing Conditions Modeling

DESIGN FLOWS (per USACE, 2005)



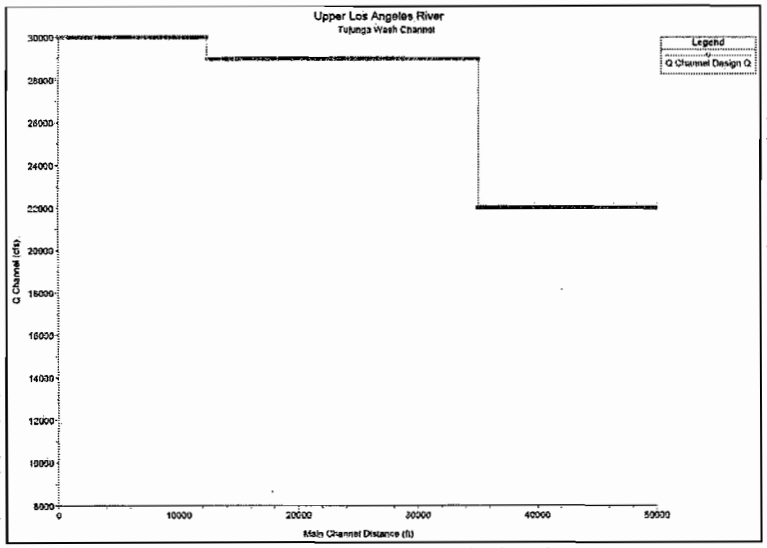
Existing Conditions Modeling

DESIGN FLOW - ELEVATIONS



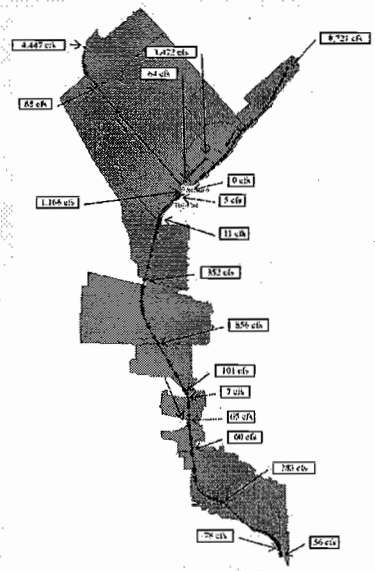
Existing Conditions Modeling

DESIGN FLOW - DISCHARGES



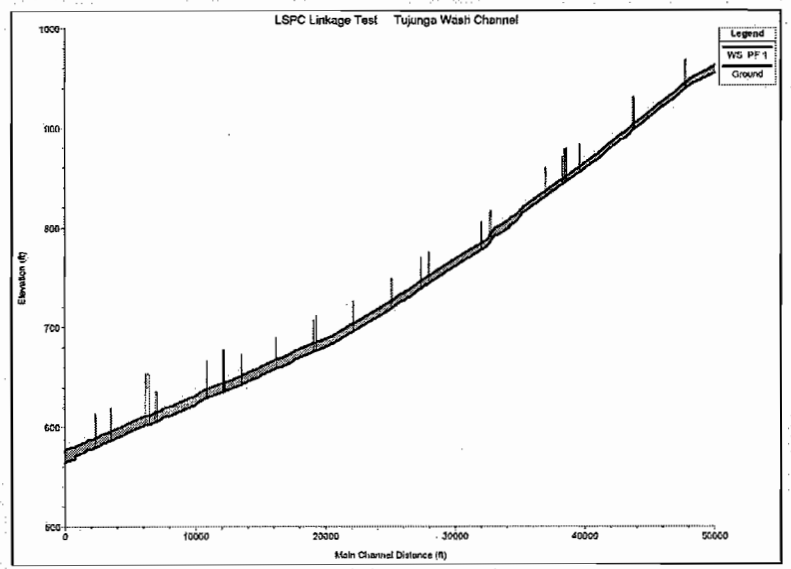
Existing Conditions Modeling

LSPC INCREMENTAL FLOWS



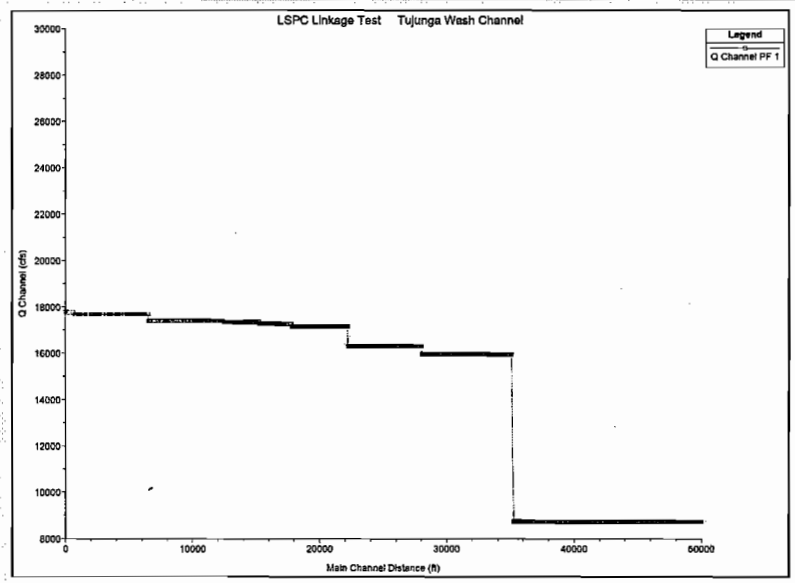
Existing Conditions Modeling

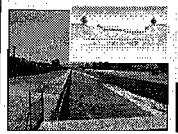
LSPC FLOWS - ELEVATIONS



Existing Conditions Modeling

LSPC FLOW DISCHARGES





Existing Conditions Modeling

QUESTIONS???

Proposed TWP Projects

Process and Projects to Date

Decision Support System (DSS)

Development of DSS

Decision support system (DSS):

A process for identifying potential and proposed projects and programs likely to achieve the goals and objectives of the Tujunga Watershed Project

Decision Support System (DSS)

Development of DSS

Technical Advisory Committee (TAC)

- Inform and guide development of DSS

Steering Committee

- Further refinement of and consensus on DSS

Team Tujunga

- Organizational and analytical contributions

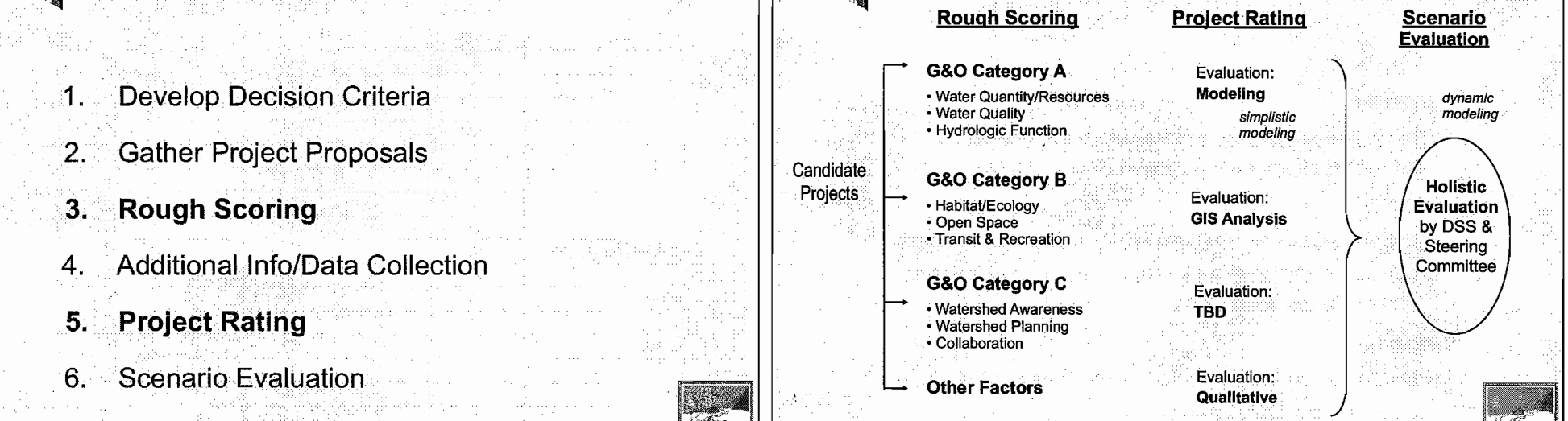
Decision Support System (DSS)

OUTLINE OF DSS

1. Develop Decision Criteria
2. Gather Project Proposals
3. **Rough Scoring**
4. Additional Info/Data Collection
5. **Project Rating**
6. Scenario Evaluation

Decision Support System (DSS)

DIAGRAM OF PROCESS



Decision Support System (DSS)

DECISION CRITERIA

Goals and Objectives

Category A, Category B, Category C

Other Factors

feasibility, cost/benefit, visibility, innovation, synergy

Decision Support System (DSS)

PROJECT PROPOSALS

Project Proposal Sources:

Steering Committee, neighborhood councils, agencies, TRP, other stakeholders

Project Survey Forms

essential information requested

Decision Support System (DSS)

ROUGH SCORING

Purpose

initial first-cut project ranking; for use in prioritizing analytical efforts during Project Rating phase

Method

project reviews by TAC; expertise in key subject areas

evaluated 139 proposals utilizing rough scoring forms and guidance documents

Results

see tables on wall by Project # and Rough Score Rank

summary by group (next slide)

Decision Support System (DSS)

ROUGH SCORING

Category	Total	Top 50		Bottom 50	
Greenway	2	2	100%	0	0%
New Park - Pocket Park	11	9	82%	1	9%
Right of Way	3	2	67%	1	33%
New Park	14	9	64%	2	14%
Trails/Bike paths	18	8	44%	6	33%
Hansen Dam	8	3	38%	2	25%
Channel Retrofit	8	3	38%	2	25%
Street Retrofit	12	4	33%	5	42%
Spreading Grounds - Gravel Pits	12	3	25%	5	42%
Habitat	4	1	25%	1	25%
Parking Lot Retrofit	10	2	20%	4	40%
Park Retrofit	21	4	19%	9	43%
Big Tujunga Dam	4	0	0%	3	75%
Other	3	0	0%	3	100%
Freeway BMP	7	0	0%	5	71%
School Retrofit	2	0	0%	1	50%

Decision Support System (DSS)

ADDITIONAL INFO/ DATA

Essential information **not** received for most projects

Team Tujunga does not have sufficient resources

Need assistance from Steering Committee

... neighborhood councils, agencies, TAC, other SHs

... all project proponents!

If missing data not acquired, rough score stands

Decision Support System (DSS)

PROJECT RATING

Modeling

Projects Ready Now = **5**

Key Missing Data

expected infiltration benefit, area estimates (from GIS)

Projects Ready w/ KMD = 5 + 16 = **21**

GIS –> for Modeling and for GIS

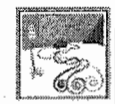
Projects Feasible* Now = **60** (upon creation of shapefile)

Key Missing Data

project locations, individual shapefiles

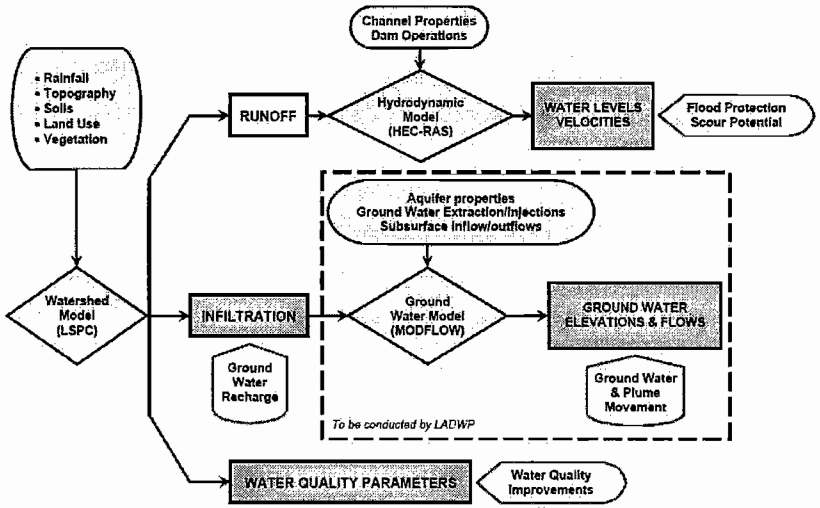
Projects Feasible* w/ KMD = 60 + 42 = **102**

** dependant on GIS analyst, prioritized by Rough Score*



Decision Support System (DSS)

MODELING

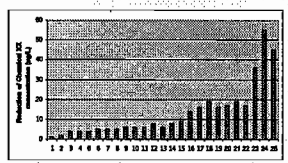


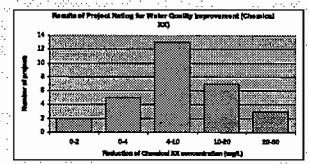
Decision Support System (DSS)

PROJECT RATING

Project Rating

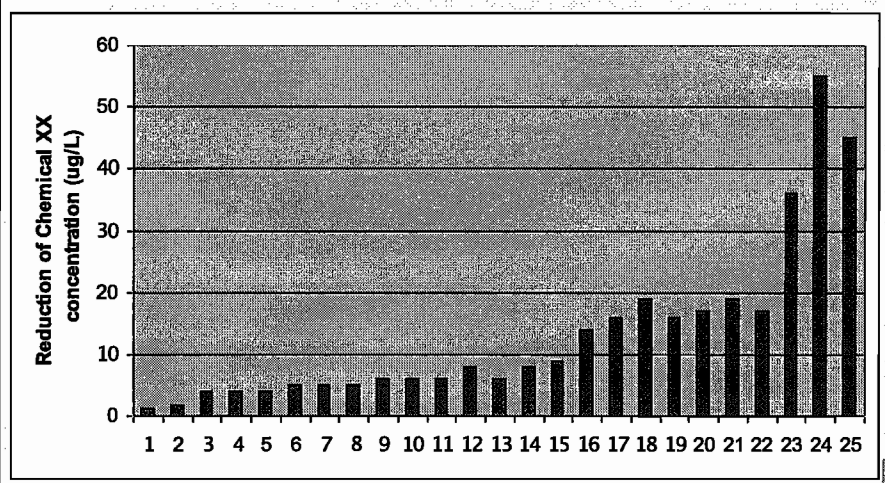
- quantitative results from model and GIS
- same criteria as Rough Scoring
- ranked on a bell curve, scored 0-4





Decision Support System (DSS)

PROJECT RATING



Decision Support System (DSS)

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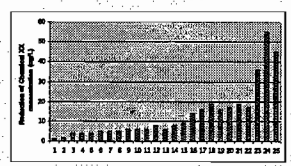
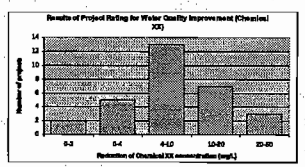
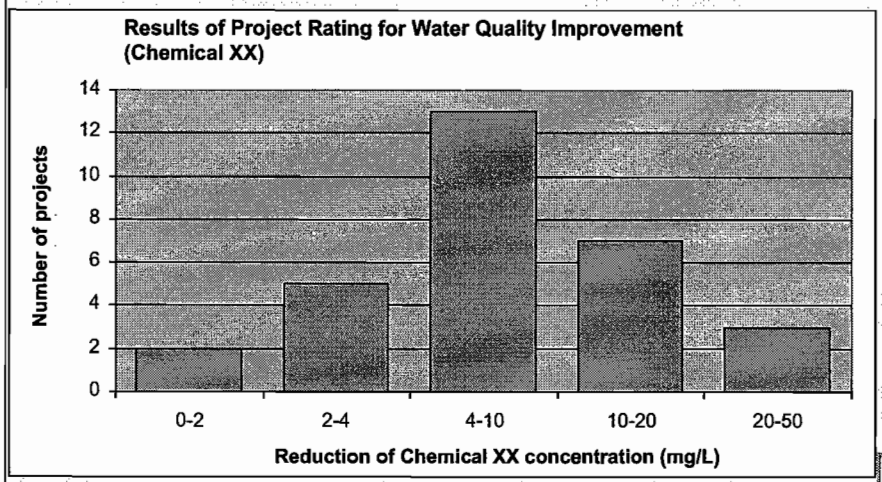




Decision Support System (DSS)

PROJECT RATING



Decision Support System (DSS)

SCENARIO EVALUATION

Evaluate Scenarios with different collections of projects, according to multiple priority schemes

Sum ranking points for projects in each scenario

Dynamic modeling of top 1-3 scenarios

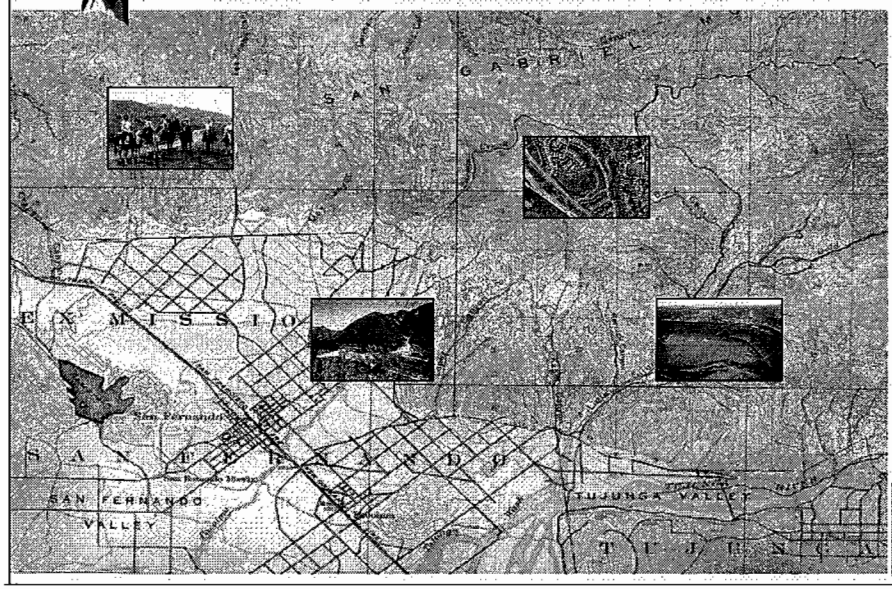
Decision Support System (DSS)

PROCESS

QUESTIONS??

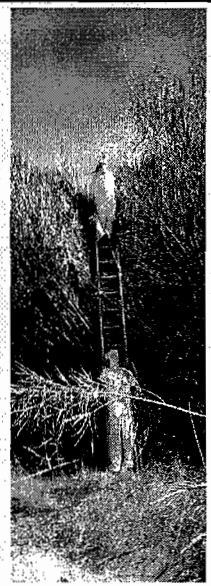
Decision Support System (DSS)

ADDITIONAL GIS MEASURES



Decision Support System (DSS)

ADDITIONAL GIS MEASURES



HABITAT ENHANCEMENTS

- Restored or Daylighted Streams (length in ft)
- Invasive Plants Removed (in acres)
- Native Vegetation Planted (sq.ft.)

Decision Support System (DSS)

ADDITIONAL GIS MEASURES

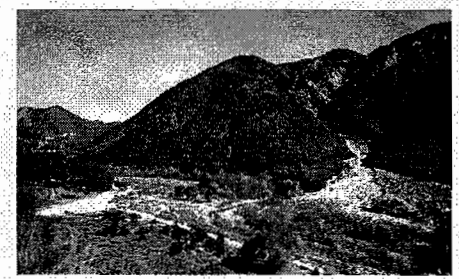
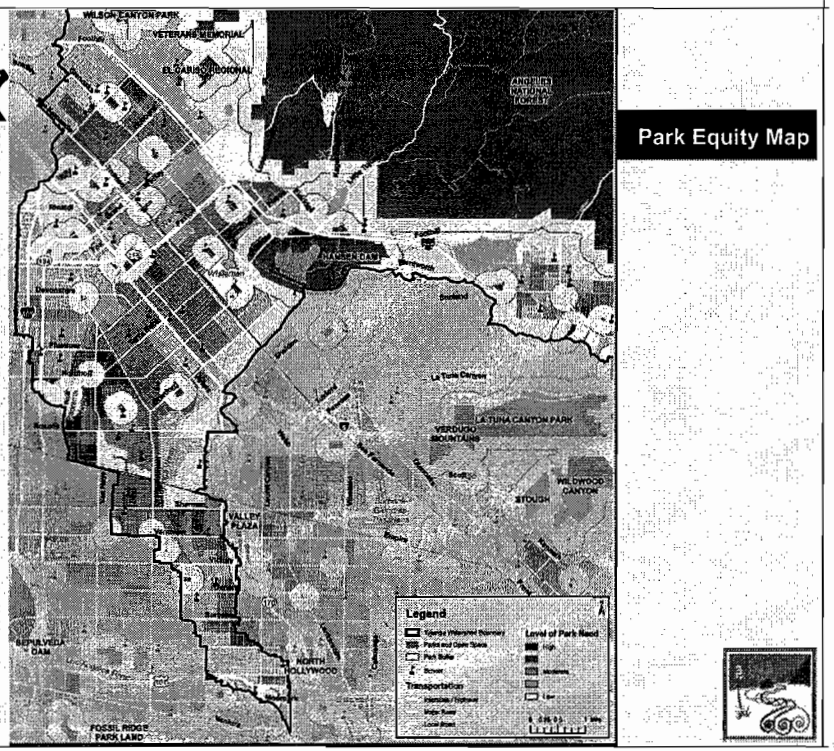


Photo courtesy of Mario Acevedo, LADWP

IMPROVEMENTS ON THE NETWORK OF PARKS

- Habitat corridor linkage (Y or N)
- Park/Open Space Creation or Preservation (in acres)
- Number of linkages w/ existing trails
- Park needs assessment (Send to TPL Greenprinting Model)



Park Equity Map

Decision Support System (DSS)

ADDITIONAL GIS MEASURES

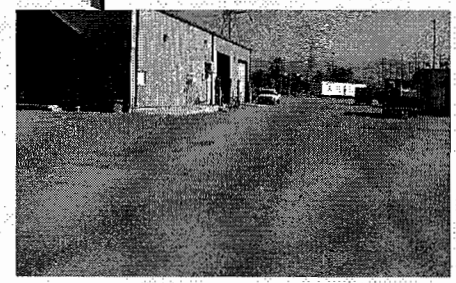


Photo courtesy of Mario Acevedo, LADWP

REDUCTION IN H2O IMPORTS

- Infiltration potential (in/hr)
- Size of drainage area (sq.ft.)
- Impervious to pervious conversion (sq.ft.)
- Median/curb retrofits (linear ft)

Decision Support System (DSS)

ADDITIONAL GIS MEASURES

TRAILS CONNECTIVITY

- Number of existing trail linkages
- Number of park/open space connections
- Trail length (km)
- Trail length through underserved communities (km)

Decision Support System (DSS)

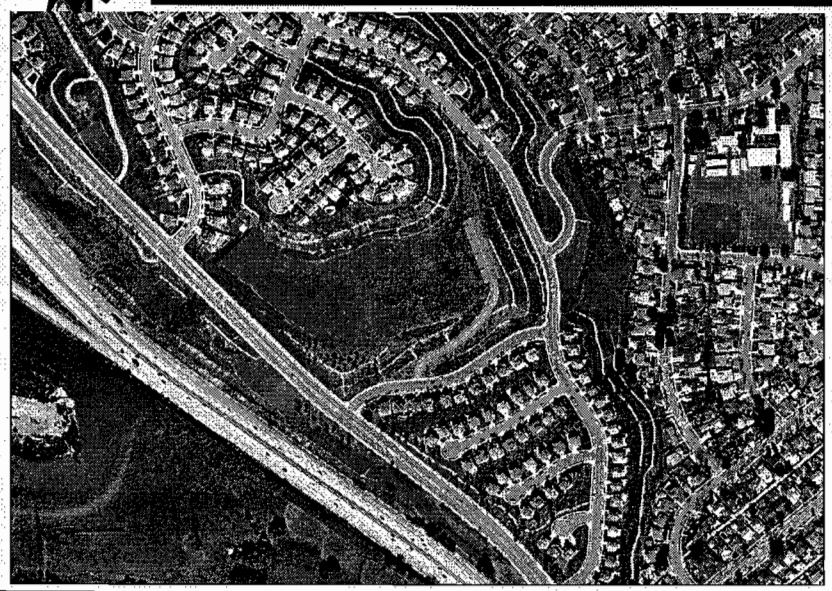
ADDITIONAL GIS MEASURES

Photo courtesy of Mario Acevedo, LADWP

EXAMPLE 1: Water Retention/Infiltration Project

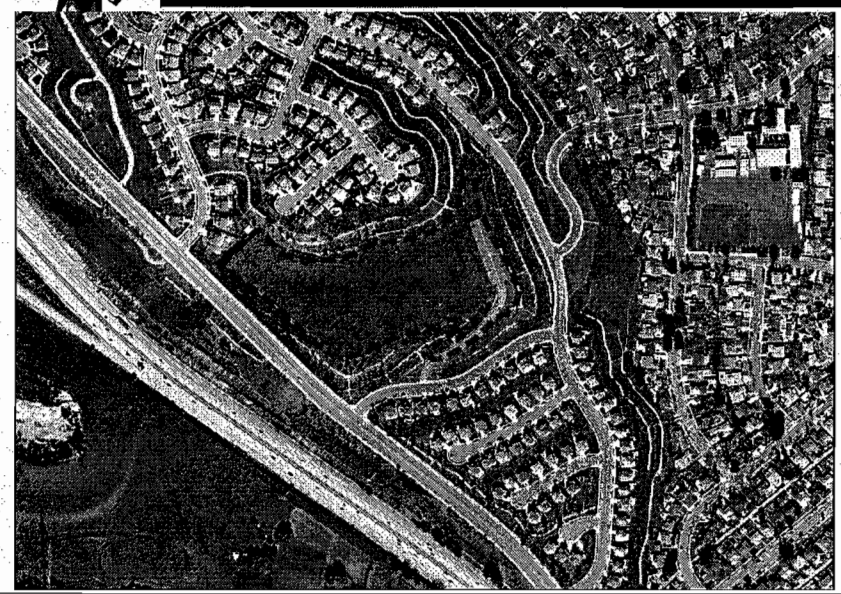
Decision Support System (DSS)

ADDITIONAL GIS MEASURES



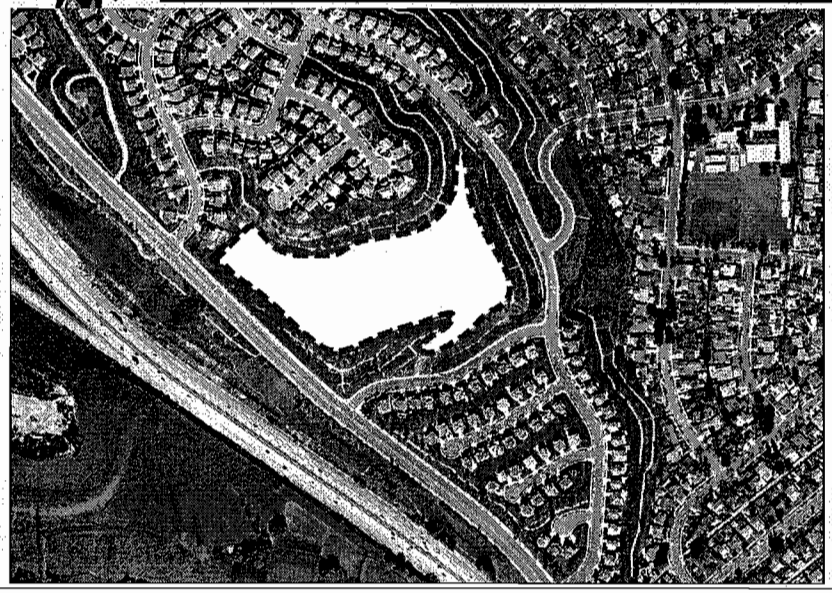
Decision Support System (DSS)

ADDITIONAL GIS MEASURES



Decision Support System (DSS)

ADDITIONAL GIS MEASURES



Decision Support System (DSS)

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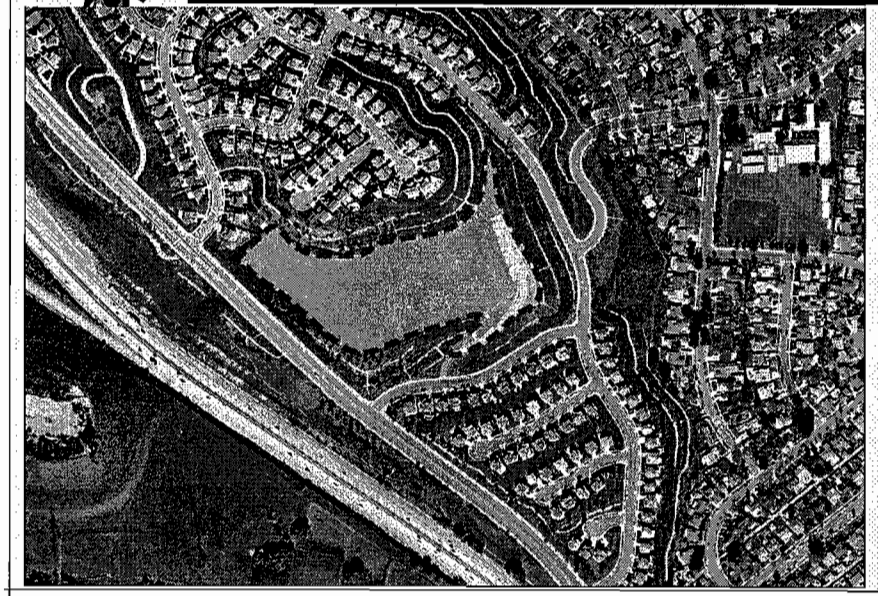

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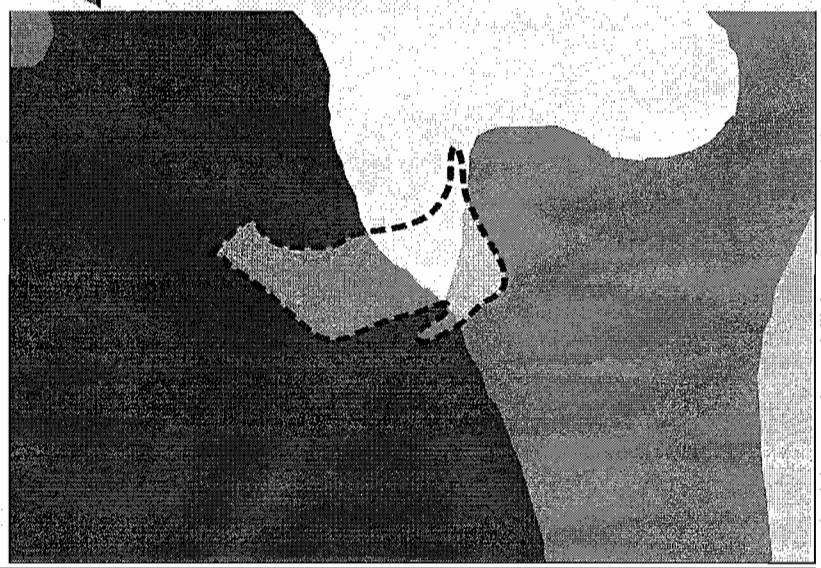

Decision Support System (DSS)

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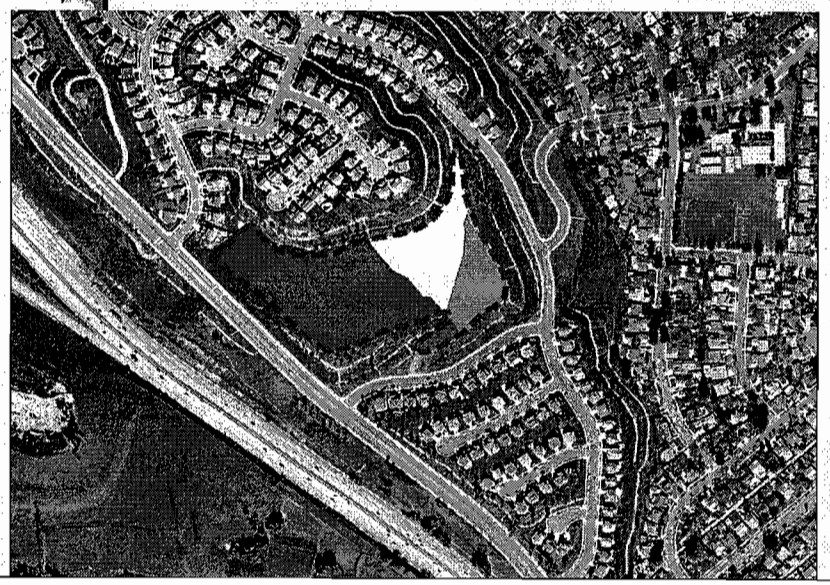

Decision Support System (DSS)

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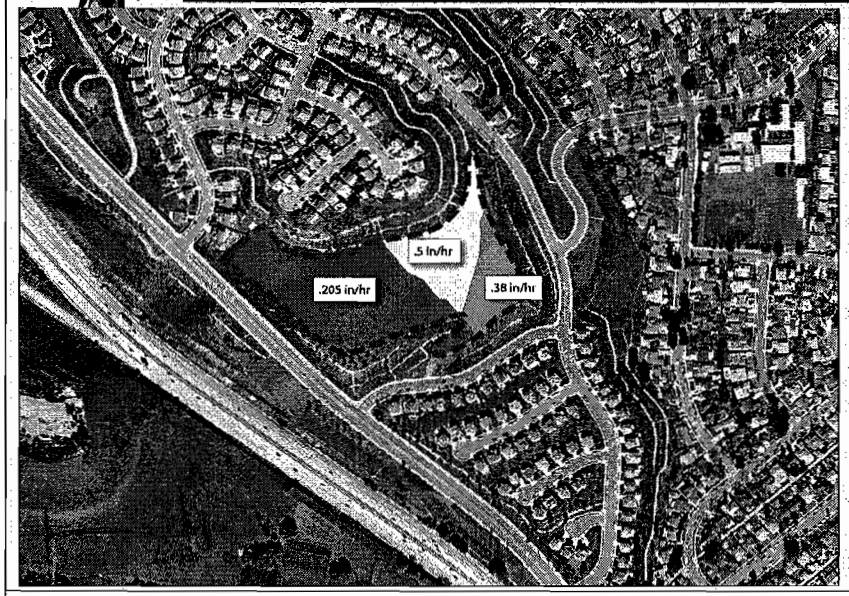

Decision Support System (DSS)

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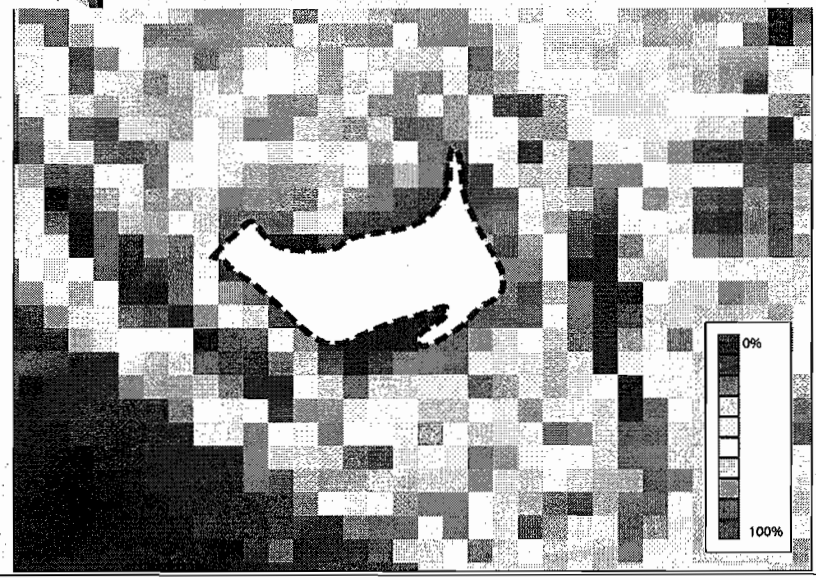
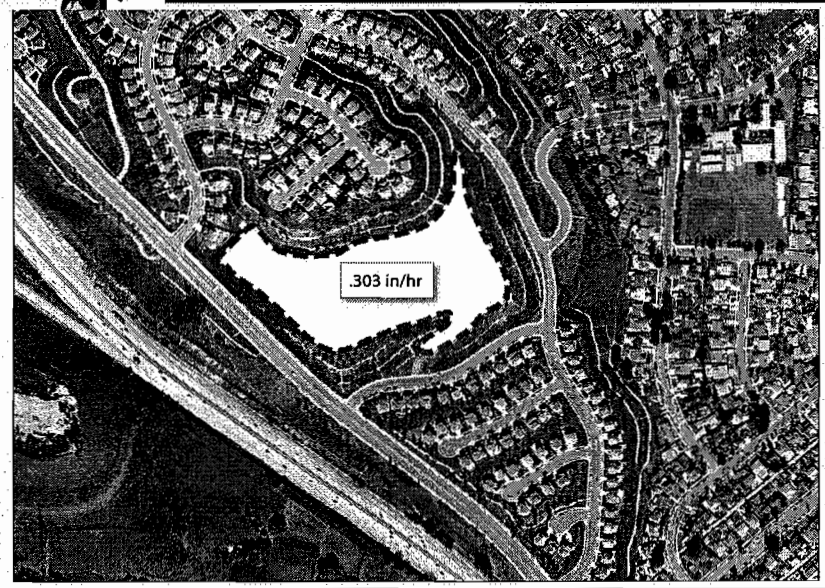


Decision Support System (DSS)

ADDITIONAL GIS MEASURES

Decision Support System (DSS)

ADDITIONAL GIS MEASURES



Decision Support System (DSS)

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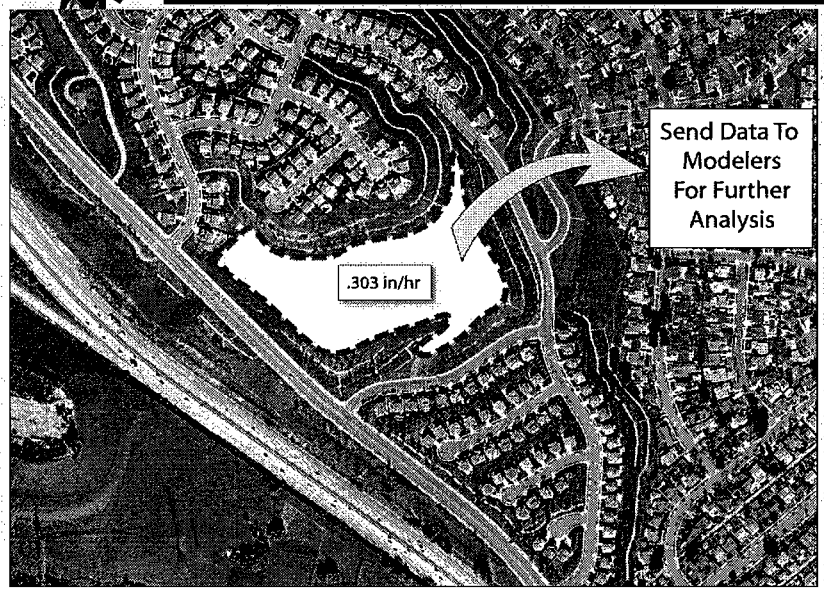


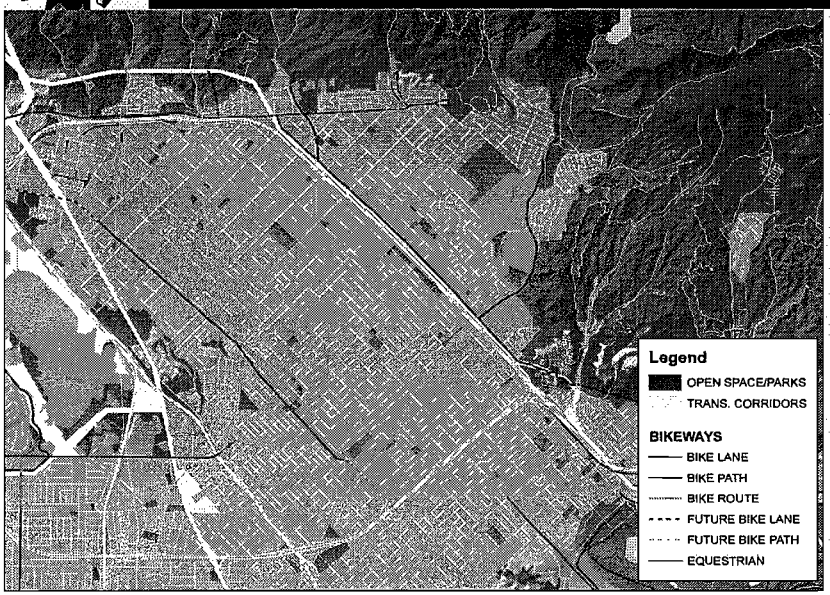
Decision Support System (DSS)

ADDITIONAL GIS MEASURES

EXAMPLE 2: Bikepath Development Project

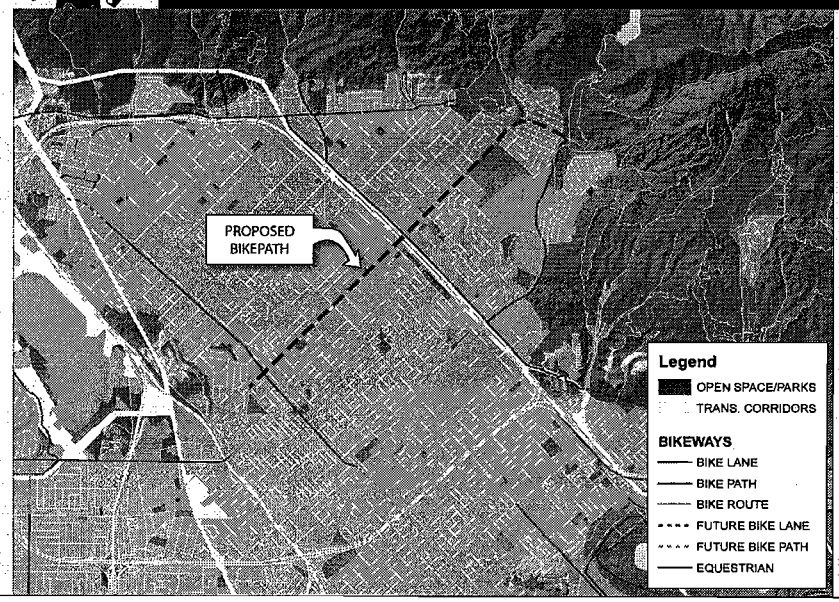
Decision Support System (DSS)

ADDITIONAL GIS MEASURES



Decision Support System (DSS)

ADDITIONAL GIS MEASURES



Decision Support System (DSS)

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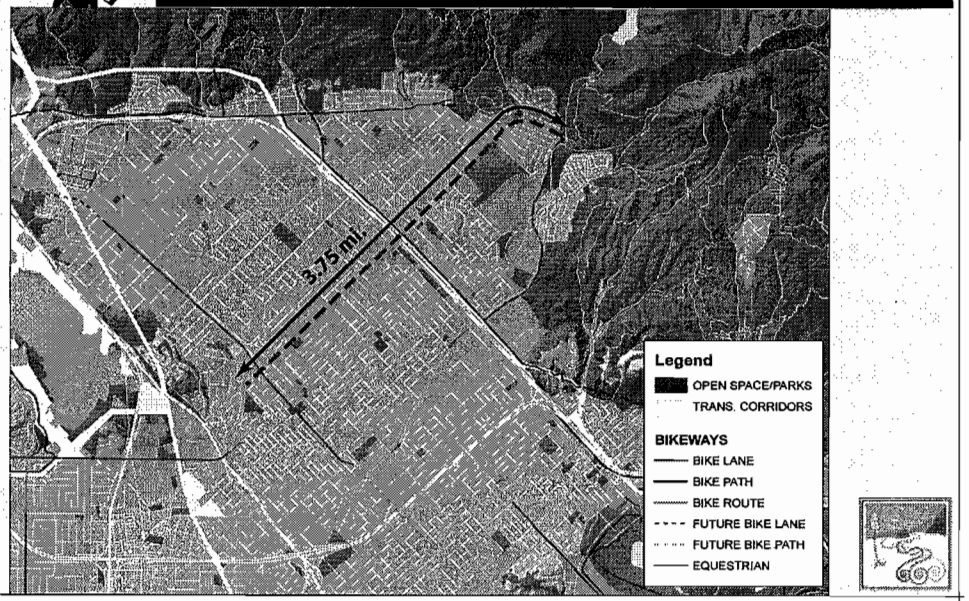

Decision Support System (DSS)

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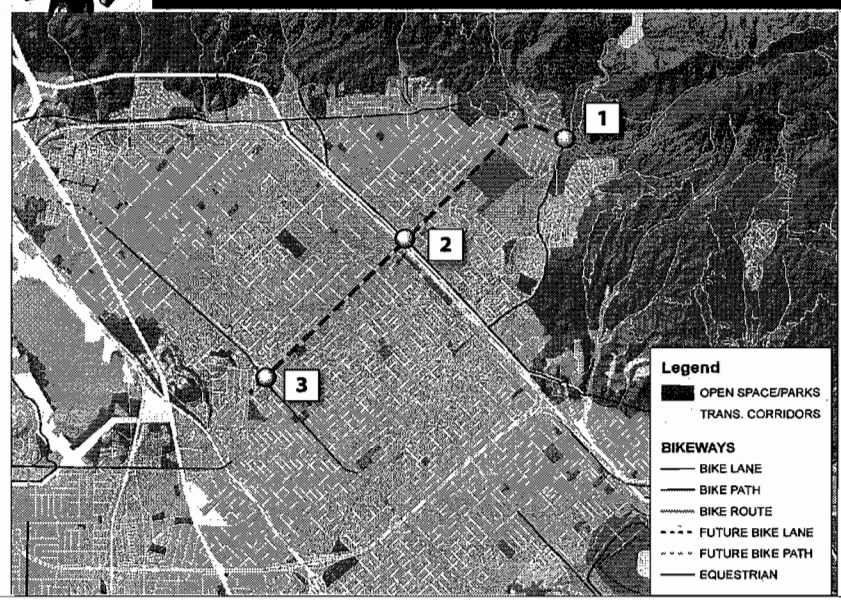

Decision Support System (DSS)

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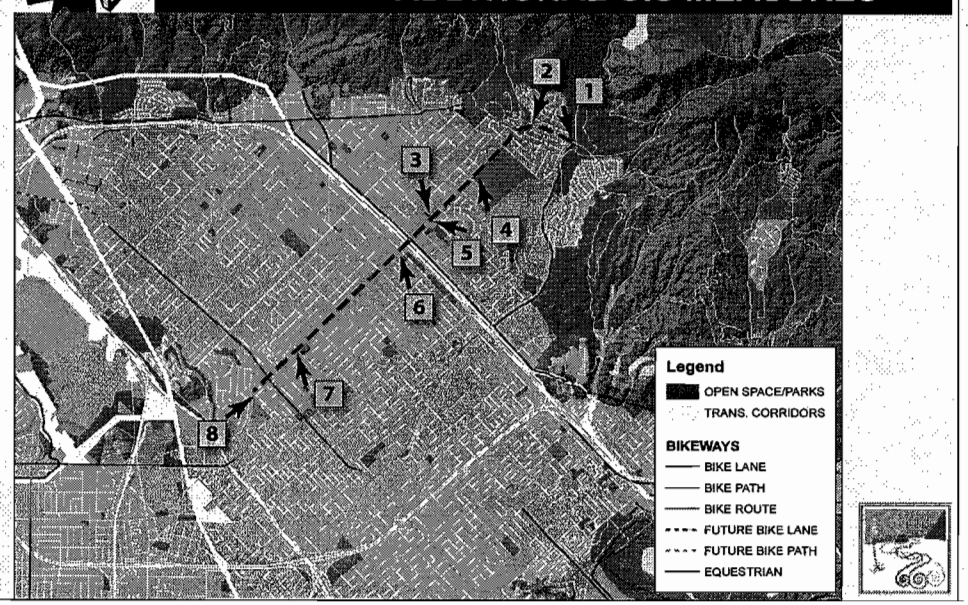

Decision Support System (DSS)

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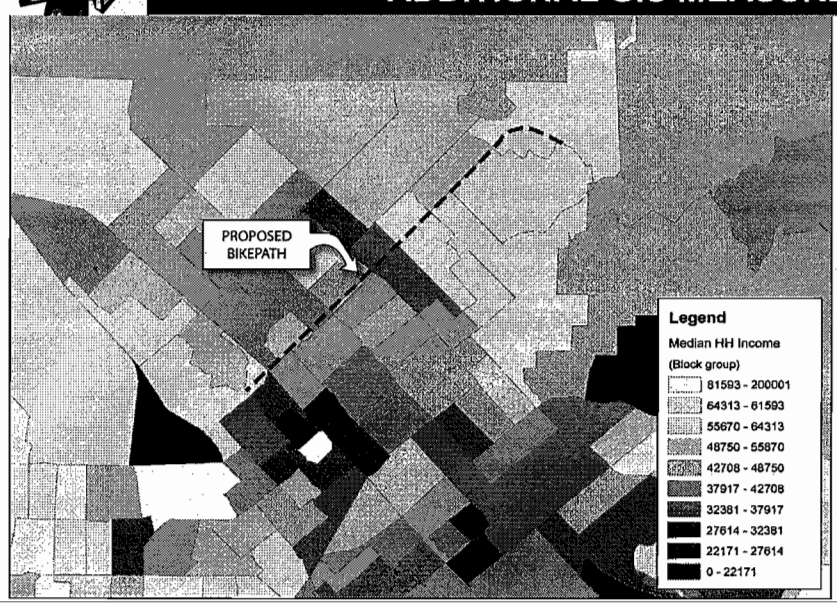

Decision Support System (DSS)

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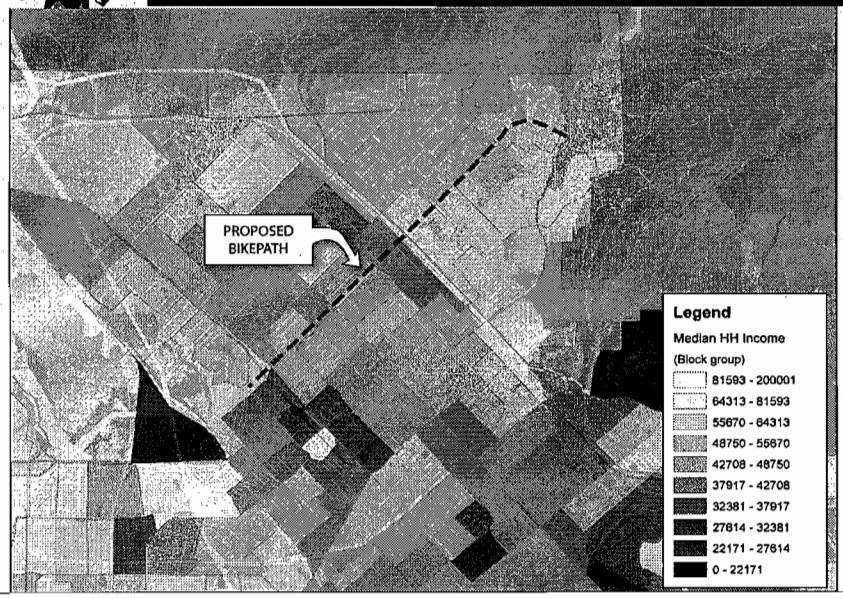
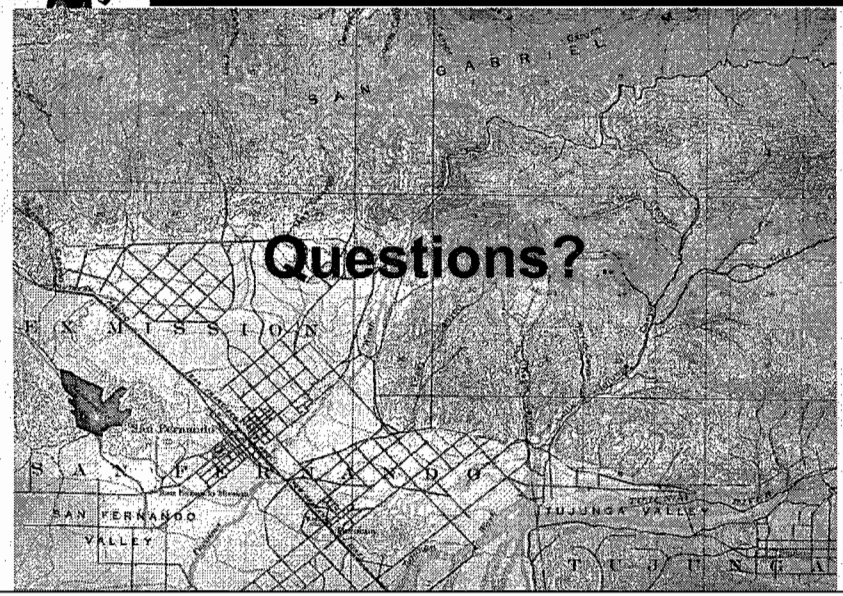


Decision Support System (DSS)

ADDITIONAL GIS MEASURES



Questions?

Next Steering Committee Meeting

March 6 2007

Tujunga Watershed Project

Tujunga Watershed Project