



## Open House #2 Summary Report

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APPENDIX D

## Open House #2 Display Boards

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# Project Purpose and Need



## Purpose

Improve traffic flow and safety, accommodate high traffic volumes, and increase multi-modal travel options and connections at the US 6 and Wadsworth interchange and along Wadsworth Boulevard between 4th Avenue and 14th Avenue.

## Needs

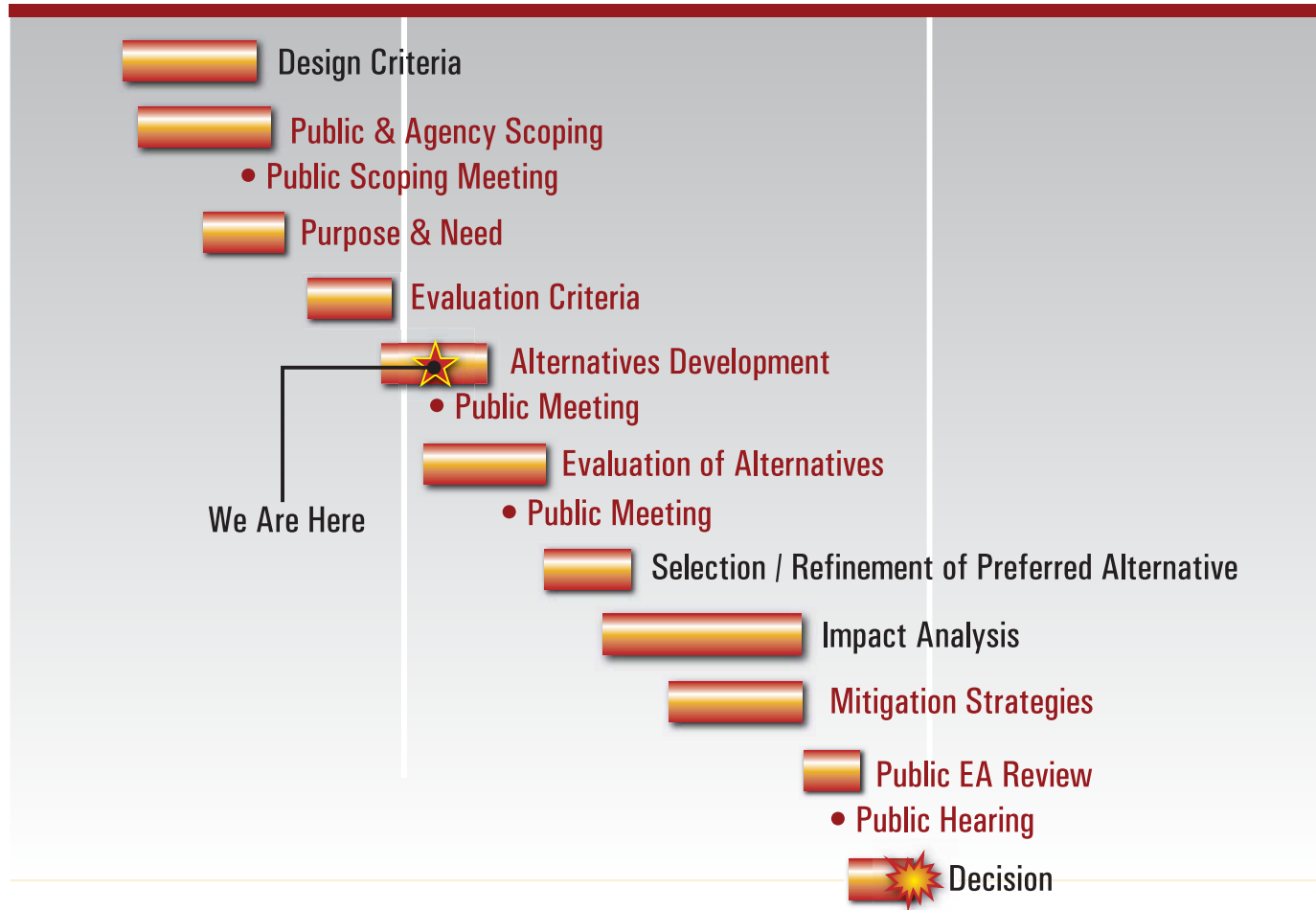
- Improve safety for motorists, pedestrians, and bicyclists
- Correct design deficiencies that contribute to safety concerns and operational inefficiencies
- Increase infrastructure capacity to meet current and future traffic volumes
- Support multi-modal connections



# Key Decision Milestones

2007

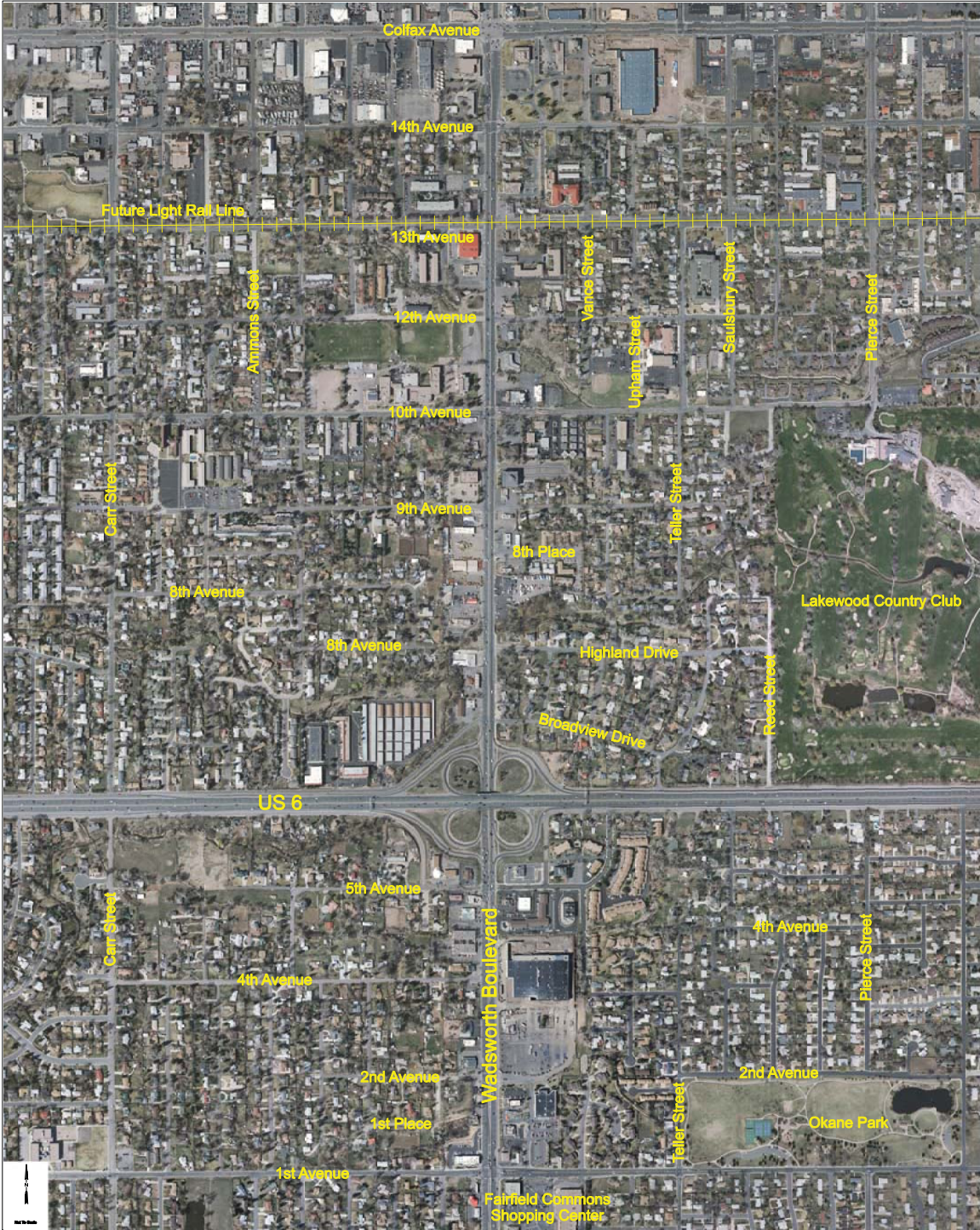
2008



US 6/Wadsworth

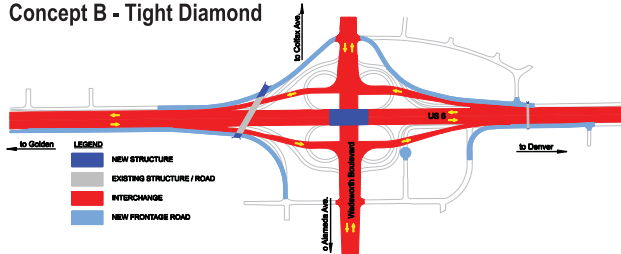


# Vicinity Map



# Interchange Design Concepts Retained for Evaluation

## Concept B - Tight Diamond



I-70 and Federal

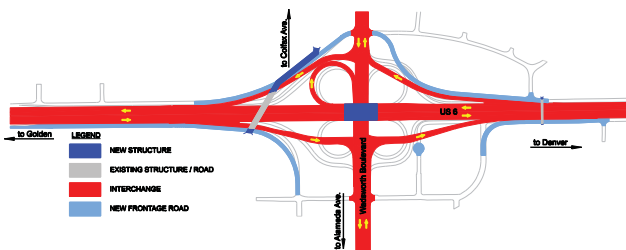
### Pros

- Eliminates weaving conflicts
- Improves pedestrian and bicyclist crossings
- Lower right-of-way requirements than traditional diamond interchange
- Moderate construction costs
- Common interchange type
- Better spacing between ramp terminal and external intersections than traditional diamond interchange

### Cons

- Less capacity for high volume movements
- Does not accommodate heavy left turns well
- Complex signal timing
- Higher number of conflict points
- Two intersections required

## Concept C - Tight Diamond with Loop



I-25 and Colorado

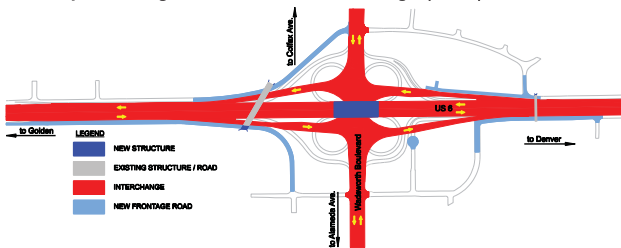
### Pros

- Eliminates weaving conflicts
- Improves capacity over tight diamond without loop
- Better capacity for highest volume movement
- Improves pedestrian and bicyclist crossings
- Moderate construction costs
- Common interchange type

### Cons

- Does not accommodate heavy left turns well
- Two intersections required
- Higher number of conflict points
- Maintains one loop that presents pedestrian and bicyclist conflicts
- Requires more right-of-way than tight diamond without loop

## Concept D - Single Point Urban Interchange (SPUI)



I-25 and University

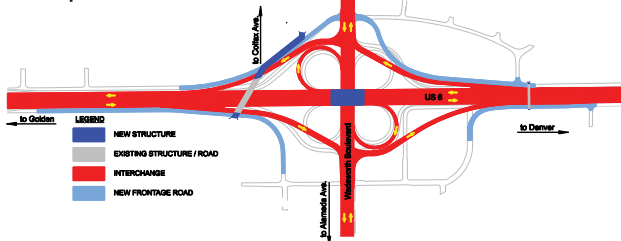
### Pros

- Eliminates weaving conflicts
- Improves capacity by consolidating signals and allowing for increased vehicle storage (as compared with tight diamond interchanges)
- Requires less right-of-way
- Consolidates intersection conflict points
- Improves pedestrian and bicyclist crossings
- Allows opposing left turns to proceed simultaneously (and improves turning radius for trucks)

### Cons

- Higher cost of construction because of longer bridge span and retaining walls
- Wider intersection has longer intersection crossing distance, which can result in more accidents
- Left turns appear "head to head" to turning traffic from the exit ramps (less familiar to drivers)

## Concept E - Partial Cloverleaf



US 36 and Federal

### Pros

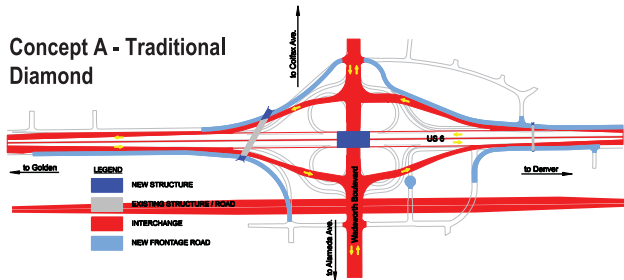
- Eliminates weaving conflicts
- Better capacity for highest volume movement
- Highest capacity interchange (of interchanges recommended for evaluation)
- Reduces left turn conflicts (as compared with other interchange types)

### Cons

- Higher right-of-way requirements, particularly in southeast loop
- Maintains two of four loops that present bicyclist and pedestrian conflicts
- Close spacing between ramp terminals and external intersections

# Interchange Design Concepts Not Recommended for Detailed Evaluation

## Concept A - Traditional Diamond

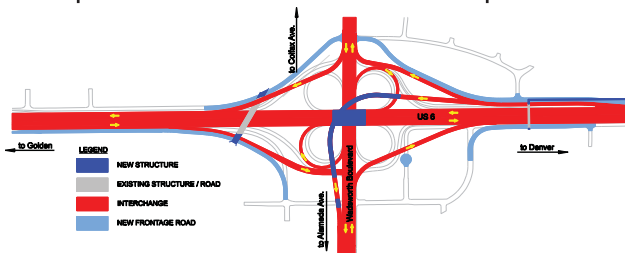


Harmony and I-25

### Reasons for Elimination

- Comparable operational benefits to Concept B - Tight Diamond, which was retained for evaluation
- Higher right-of-way requirements and cost than Tight Diamond with comparable operational benefits

## Concept F- Partial Cloverleaf with Directional Ramp

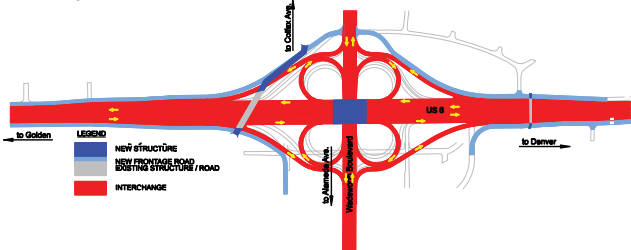


C-470 and I-70

### Reasons for Elimination

- High right-of-way requirements (extending to 4th Avenue)
- Increased noise and visual impacts from elevated ramp
- Reduced access at 5th Avenue
- High cost of construction (directional ramp)
- Directional ramp not well suited for freeway-to-arterial connection (better for freeway-to-freeway system connection)

## Concept G - Cloverleaf with Collector Distributor Roads

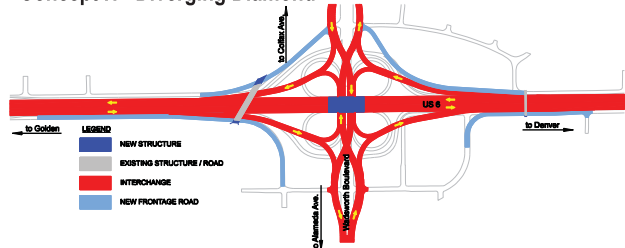


I-25 and SH 34

### Reasons for Elimination

- High right-of-way requirements along US 6 frontage roads and around interchange
- High cost of right-of-way acquisition
- Does not improve pedestrian and bicyclist movement through the interchange
- Not well suited for urban areas with high traffic volumes

## Concept H - Diverging Diamond



Diverging Diamond

### Reasons for Elimination

- Uncommon interchange type that is unfamiliar to drivers
- Requires drivers to briefly drive on opposite side of the road
- Requires significant right-of-way to improve turning angles approaching the intersections
- Reduces speed on Wadsworth Boulevard through the interchange

# Lakewood's Vision - Wadsworth Boulevard Interchange

## Gateway to Lakewood

### Bridge Aesthetics



- Cohesive design
- Multi-colored, natural materials
- Enhanced features such as ornamental signage and lighting

### Walls and Slope Paving Aesthetics



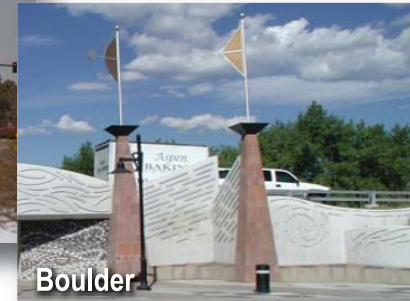
- Cohesive design
- Custom relief pattern/colors
- Natural appearance
- Stepped with landscaping if more than 6 feet in height

### Plants/Landscaping



- Cohesive design
- Varied plant and rock materials
- Low maintenance
- Low water (after established)
- Aesthetically pleasing

### Special Features



- Prominent entry to Lakewood
- Special features such as monuments, ornamental lighting, or public art





# Wadsworth Boulevard Alternative Elements - Medians

- Medians separate opposing traffic lanes and consolidate left turns.
- Medians can be painted or raised.



Painted



Raised

- A raised median can be hardscaped or landscaped.



Hardscape



Landscape

- Median widths can vary.
- Raised medians are recommended for arterials with:
  - Traffic volume of more than 18,000 vehicles per day and future volume projected at more than 24,000 vehicles per day
  - High turning volumes
  - High crash rates
  - Large number of driveways
  - Large number of pedestrian crossings
- Advantages of raised medians:
  - Reduced crash rates and points of conflict
  - Improved traffic flow
  - Pedestrian refuge at crossings
  - Landscaping opportunities provide aesthetic benefits

# Wadsworth Boulevard Alternative Elements - Travel Lanes and Sidewalks

- Travel lanes are the lanes that carry vehicles on a roadway.
- Travel lanes do not include auxiliary lanes, such as left- and right-turn lanes.
- Travel lanes are typically 12 feet wide.



Travel Lanes

- Sidewalks could be used by both pedestrians and bicyclists, depending on their width.
  - Sidewalks that are between 5 and 8 feet wide provide a safe place for pedestrians to travel.
  - Sidewalks that are 8 feet wide or greater safely accommodate both pedestrian and bicycle travel.
- Sidewalks can be attached or detached. Detached sidewalks require more space but are generally considered safer than attached sidewalks.
  - An attached sidewalk lies next to the roadway curb.
  - A detached sidewalk is separated from the roadway by a hardscaped or landscaped buffer.



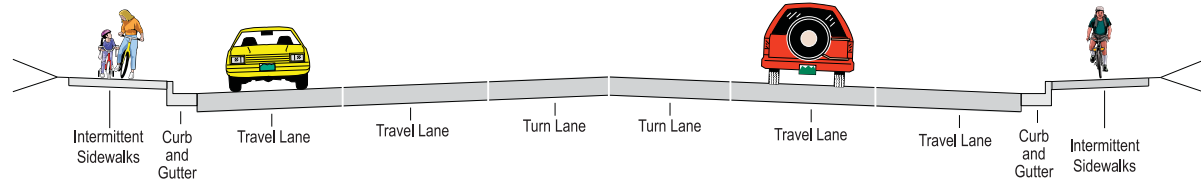
Attached Sidewalk



Detached Sidewalk

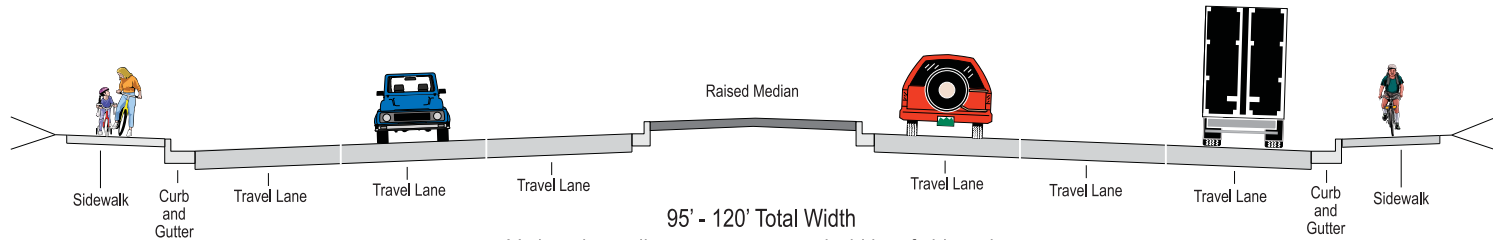
# Wadsworth Boulevard - Existing Conditions and Concept Retained for Evaluation

## Existing North of US 6



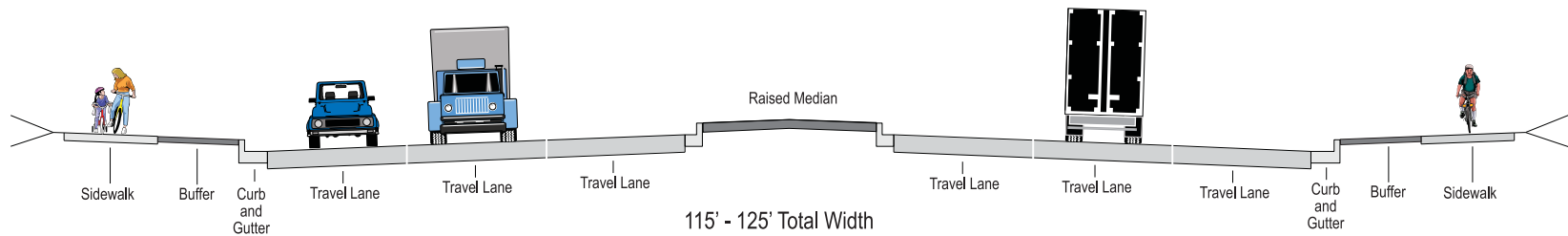
72' - 120' Total Width  
 Varies, depending on presence and widths of sidewalks, medians, and auxiliary lanes

## Existing South of US 6



95' - 120' Total Width  
 Varies, depending on presence and widths of sidewalks, medians, and auxiliary lanes

## Concept 8 - Six Lanes With Median and Sidewalks



115' - 125' Total Width  
 Varies, depending on sidewalk, buffer, and median widths

# Wadsworth Design Concepts Not Recommended for Detailed Evaluation

## Concept 1 - Intelligent Transportation System Strategies Only

Intelligent Transportation Systems (ITS) (also referred to as Intelligent Traffic Systems, Travel Demand Management, and Transportation Systems Management) apply communications and information technology to provide solutions to congestion and other traffic control issues. ITS include such techniques as providing real-time information about traffic conditions, coordinating traffic signals, and operating reverse direction lanes to accommodate commuter traffic.

### Reasons for Elimination

- Four lane section does not have capacity to meet current or future traffic demands
- Does not improve access conflicts
- Does not address safety of left turns
- Does not improve pedestrian and bicycle mobility

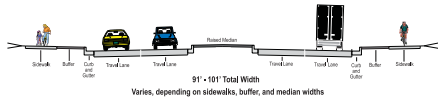
## Concept 2 - Intersection Improvements and Median

Intersection improvements may provide additional or new turning lanes to increase turning capacity, and longer storage lengths to better accommodate queued vehicles.

### Reasons for Elimination

- Four lane section does not have capacity to meet current or future traffic demands
- Does not improve pedestrian and bicycle mobility

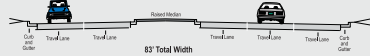
## Concept 3 - Four Lanes With Median and Sidewalks



### Reasons for Elimination

- Four lane section does not have capacity to meet current or future traffic demands

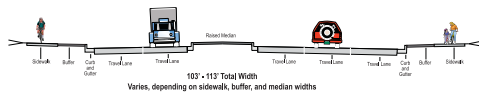
## Concept 4 - Five Lanes With Median and No Sidewalks



### Reasons for Elimination

- Five lane section does not have capacity to meet current or future traffic demands (only handles one peak period)
- Reversible lanes (to handle both AM and PM peak flows) cannot be provided with medians, and medians are needed to control traffic flow and improve safety
- Does not improve pedestrian and bicycle mobility

## Concept 5 - Five Lanes With Median and Sidewalks



### Reasons for Elimination

- Five lane section does not have capacity to meet current or future traffic demands (only handles one peak period)
- Reversible lanes (to handle both AM and PM peak flows) cannot be provided with medians, and medians are needed to control traffic flow and improve safety

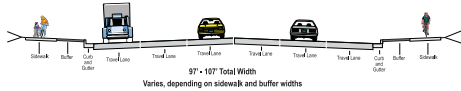
## Concept 6 - Six Lanes With Median and No Sidewalks



### Reasons for Elimination

- Does not improve pedestrian and bicycle mobility

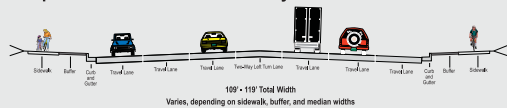
## Concept 7 - Six Lanes With Sidewalks and No Median



### Reasons for Elimination

- Does not improve access conflicts

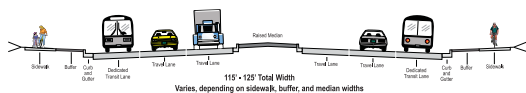
## Concept 9 - Six Lanes With Two-Way Left Turn and Sidewalks



### Reasons for Elimination

- Does not improve access conflicts

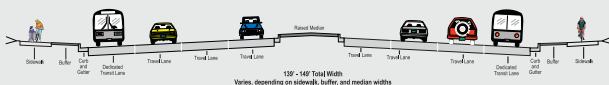
## Concept 10 - Four Travel Lanes and Two Transit Lanes With Median and Sidewalks



### Reasons for Elimination

- Four lane section does not have capacity to meet current or future traffic demands
- Does not meet purpose and need
- No logical origination and destination for transit within the project limits

## Concept 11 - Six Travel Lanes and Two Transit Lanes With Median and Sidewalks



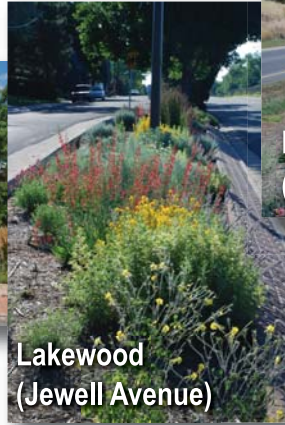
### Reasons for Elimination

- Excessive right-of-way and land use impacts
- High cost of right-of-way acquisitions
- Does not meet purpose and need
- No logical origination and destination for transit within the project limits

# Lakewood's Vision - Wadsworth Boulevard

## Attractive medians and roadway landscaping

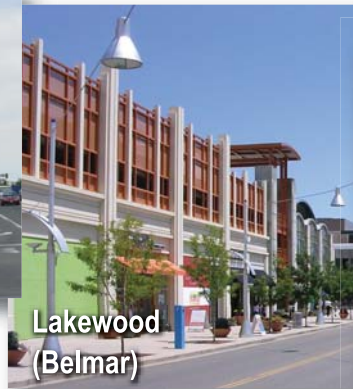
### Median Landscaping and Design



### 16-foot raised bed planter

- Irrigation and subdrain system
- Accent boulders
- Backfill
- Xeric plants
- Median mulch

### Side of the Road Landscaping

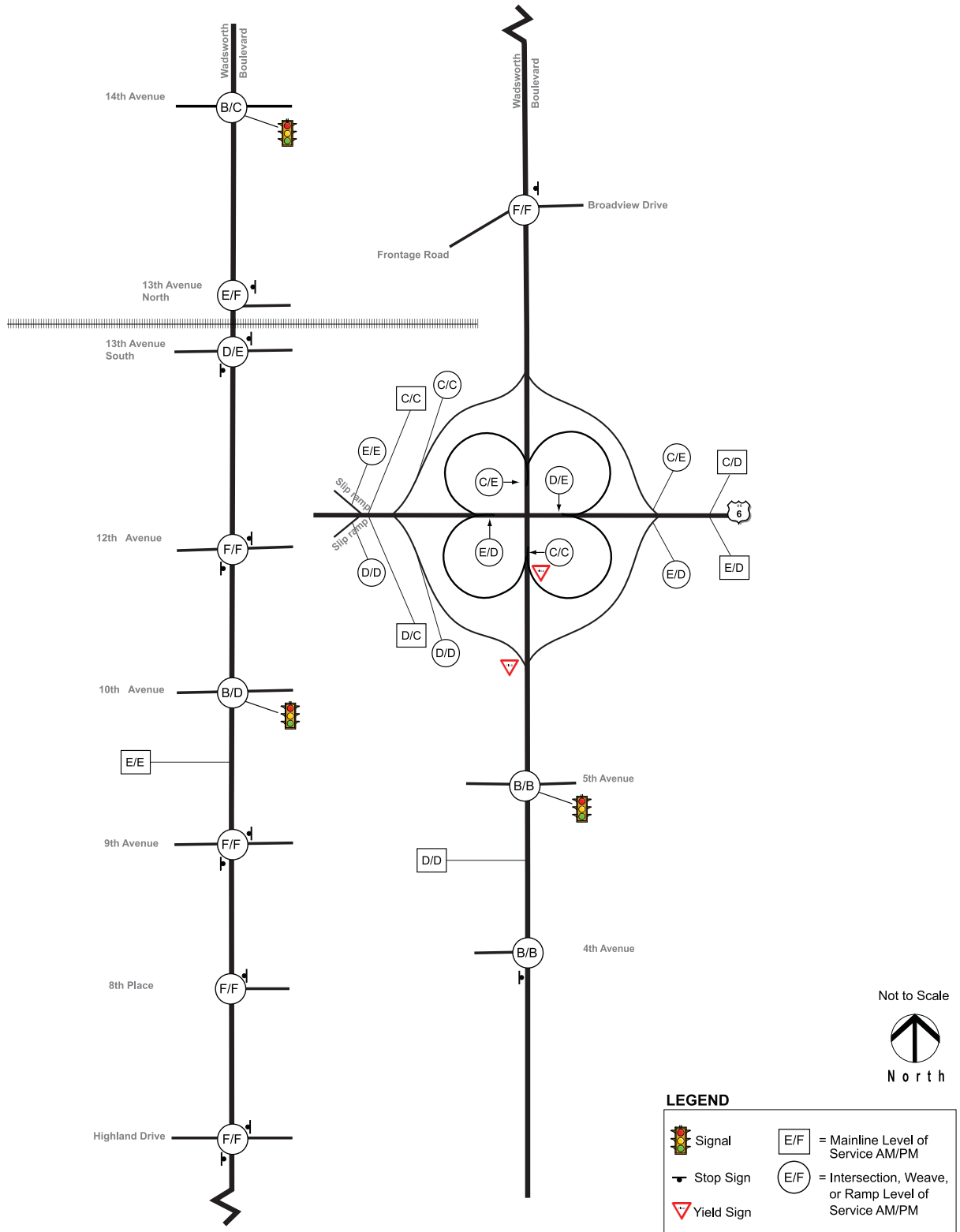


### 7- to 10-foot landscaped buffer

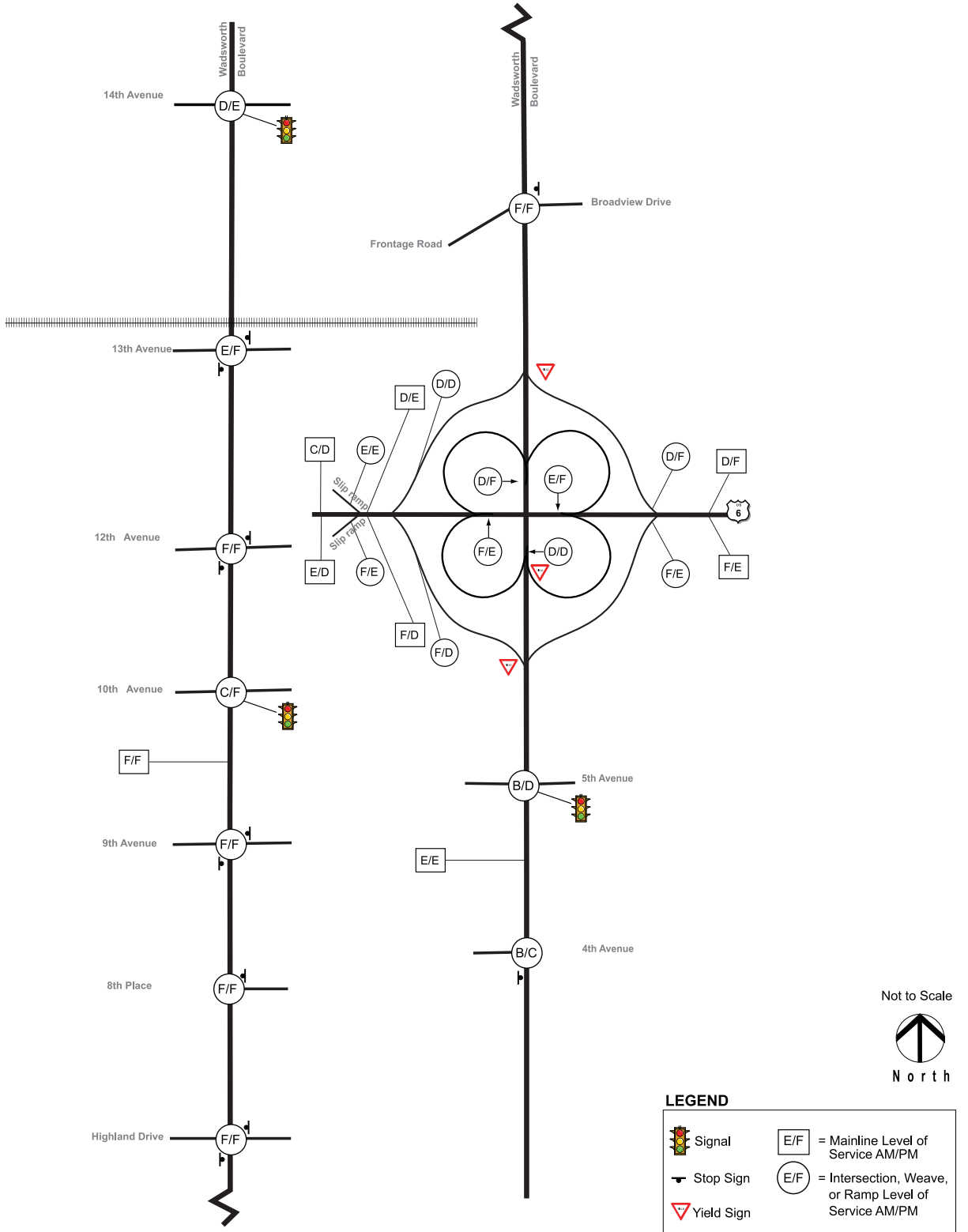
- Columnar trees
- Salt/chemical-tolerant ground cover



# Existing Levels of Service (2007)



# 2035 No Action Levels of Service



# LOS - Levels of Service

LOS is a qualitative measure describing traffic operational conditions. LOS is based on speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience. In addition to travel volume, roadway LOS is affected by number of access points, lane width, number of lanes and percentage of large vehicles. The conditions characterizing roadway LOS are:



- Best operating condition considered free-flow
- Users are unaffected by presence of others



- Reasonably free-flowing conditions
- Some influence by others



- Constrained constant flow below speed limits
- Additional attention required by drivers to maintain safe operations
- Comfort levels of driver decline noticeably



- Approaching unstable flow
- High passing demand, limited passing capacity
- An acceptable condition for arterial and collector roadways in the community



- Unstable flow near capacity
- LOS E often quickly changes to LOS F because of disturbances in traffic flow



- Worst conditions with heavily congested flow, traffic demand exceeding capacity
- Poor travel time, low comfort and convenience



# Environmental Resource Areas to Be Analyzed

- Air Quality
- Environmental Justice  
(Low-Income or Minority Populations)
- Floodplains
- Hazardous Materials/Wastes
- Historic Properties
- Land Use
- Noise
- Relocation / Right-of-Way
- Socioeconomics
- Visual Resources / Aesthetics
- Water Quality and Wetlands
- Wildlife and Vegetation



US 6/Wadsworth



Environmental  
Assessment

# Water Quality

## Dry Detention Pond



### Description:

A shallow depression designed to treat a specific volume of runoff. The stormwater runoff is temporarily stored in the pond and drawn down over a period of time (minimum drain time is 40 hours) through an outlet structure or spillway.

### Pros

- Efficient pollutant removal for good range of suspended solids and heavy metals.

### Cons

- Requires a large amount of land to configure the pond geometry correctly.
- May become an eyesore, and standing water may be present sometimes.
- May require fencing around the perimeter.
- Must be located near project stormwater outfalls.

## Constructed Wetlands



### Description:

Artificial wetlands constructed to simulate natural biological and chemical processes to treat runoff.

### Pros

- Efficient filters for suspended solids, heavy metals, and organic matter, and are effective transformers of nitrogen.

### Cons

- Requires a constant base flow of water.
- Pollutant removal efficiencies vary significantly depending on site design and conditions.
- Requires large, shallow, flat locations.
- Sediment pond or forebay is required.
- Requires monthly maintenance until vegetation is established. Inspection and nuisance species removal must be performed annually.
- May take longer than one season to establish vegetation
- May require fencing around the perimeter.
- Must be located near project stormwater outfalls.

## Vegetated Swales



### Description:

Open channel drainageway with grass or other vegetation to provide conveyance and to filter pollutants.

### Pros

- Enhance stormwater quality and reduce peak runoff.
- Swales without an underdrain system have shown water quality benefits and are endorsed by FHWA for urban applications.

### Cons

- Design flows may limit effectiveness.
- Dry swales with an underdrain system are susceptible to clogging.
- Requires the establishment of vegetation; temporary irrigation may be required, and CDOT does not typically irrigate.

## Catch Basin Inserts



### Description:

Hang from the opening of a curb inlet or below the grate of an inlet. Designed to capture sediment and other debris.

### Pros

- Best suited as a pretreatment for sediment and debris removal before flows are conveyed to downstream flows.

### Cons

- Frequent maintenance of inserts (every two to three major storms) may not be possible.

## Subsurface Sand Filter



### Description:

Underground concrete vault designed with distinct chambers designed for various levels of treatment. Layers of sand are used to filter stormwater runoff.

### Pros

- Useful in space-limited areas.
- Most effective in treating runoff from small storms or early stages of larger storms.
- Less effect to surface land use.

### Cons

- Subject to clogging if moderate to high levels of silts and clays flow into facility.
- Cannot be used while construction is in progress.
- Further evaluation would be necessary to consider for space limited locations in Colorado.

## Underground Systems



### Description:

Premanufactured stormwater treatment devices designed to be installed underground. Use vortex-motion, particulate setting, and/or filtration treatment mechanisms.

### Pros

- Useful in space-limited areas.
- Internal bypass system built in (no pretreatment required).
- Can be used in a treatment train with other systems.
- Less visual impact to existing corridor.
- Less effect to surface land use.

### Cons

- Can not treat large drainage areas.
- Require a vacuum truck to remove accumulated sediment.
- Frequent maintenance and/ or replacement of filters may be needed.
- Limited long-term monitoring data. More monitoring and performance data may need to be considered to determine suitability for CDOT projects.