



## **Boulder Parks & Recreation**

### **Advisory Board**

**TO:** Parks and Recreation Advisory Board

**FROM:** Yvette Bowden, Director, Parks and Recreation Department  
Ali Rhodes, Deputy Director  
Jeff Haley, Planning, Design and Community Engagement Manager

**SUBJECT:** Matters from the Department

**DATE:** September 26, 2016

#### **A. Scott Carpenter Pool Concept Development Update**

##### **Background**

Located in a neighborhood park that supports a wide variety of recreation opportunities, the Scott Carpenter 50-meter outdoor pool is a unique amenity that supports many aquatic recreation needs of Boulder. Based on the recommendations of the 2015 Aquatics Feasibility Plan (AFP), the department's Capital Investment Strategy, and what is known about the condition of the outdoor pool, staff hired a consultant team to develop a comprehensive concept design for the renovation of the facility.

The overall goal of the project is to develop a conceptual design for the pool redevelopment that meets or exceeds the needs of the community including:

- Balancing lap swimming capacity with open swim availability;
- Providing amenities that are multi-generational and multi-use;
- Providing a renovated bathhouse to support the pool use;
- Exploring partnership opportunities to leverage current funding; and
- Incorporating sustainability measures where feasible.

##### **Planning and Community Outreach**

The project began in May 2016 and a multi-disciplinary project team has been working with the consultants to develop plans. The purpose of this coordination has been to refine program elements for the Scott Carpenter Pool based on what was learned during the AFP and what is known about the facility. These meetings guided the development of three conceptual design alternatives [**Attachments A, B, and C**] that were shown to the community at an open house on Wednesday, September 14.

The intent of the open house was to gather input from the community on the importance of various pool amenities and to provide feedback that will influence the development of a final concept for the pool replacement. In addition to the three concept plans, the consultant team prepared informational material that conveyed the history of Scott Carpenter Pool [**Attachment D**], an inventory of site features and an analysis of the opportunities and constraints of these site features [**Attachments E, F, and G**], architectural and site visioning boards [**Attachments H and I**] and an informal preference survey [**Attachment J**].

The September 14 open house achieved the anticipated outcomes and was well attended by approximately 40 to 50 people. A summary of the feedback that was received from the open house can be found in **Attachment K**.

### **Next Steps**

Following the September 14 community meeting, staff will conduct targeted outreach to children and youth in order to incorporate these perspectives in the plans. Staff will seek feedback from families with children at each of the recreation centers and during upcoming library story-times. Staff will also present the plans to the Youth Opportunities Advisory Board (YOAB) in early October. Previous research conducted by Growing Up Boulder (GUB) will also be reviewed to identify opportunities for the final plan for Scott Carpenter Pool.

Staff will provide the PRAB with a discussion item at the October business meeting related to the draft concept plan. Staff will then present the plan at a second community open house planned in early November. The final preferred plan will then be presented to the PRAB for review and consideration in December. Pending recommendations from the PRAB, this preferred plan will proceed to final design in 2017 with construction anticipated in 2018.

- Attachment A:** Site Plan Concept Plan A
- Attachment B:** Site Plan Concept B
- Attachment C:** Site Plan Concept C
- Attachment D:** Scott Carpenter History
- Attachment E:** Existing Site Features / Amenities
- Attachment F:** Site Opportunities and Constraints
- Attachment G:** Site Access
- Attachment H:** Pool Feature Theming Board
- Attachment I:** Architectural Visioning Board
- Attachment J:** Informal Preference Sheet
- Attachment K:** Summary of Comments Efforts

### **B. Boulder Creek Underpass Update**

See Matters **Attachment AA**, Boulder Creek Underpass  
Presentation by Melanie Sloan, Transportation Planner

### **C. PRAB Retreat Update (verbal update)**

## SCHEMATIC SITE PLAN



\* Plans and drawings are conceptual only and represent general sizes and amenity options for prioritization.

## BENEFITS

- New Bathhouse with focal point entry
- More efficient parking layout
- Better pool orientation
- New 6 lane 50 meter pool
- 1 new slide (higher and longer)
- New splash pad
- Leisure pool with amenities for all ages
- 1 meter boards and safe diving depth
- Shade from structures and trees
- View to pools from 30th St. and from parking entry
- Restrooms close to playground and park
- Larger concessions and shaded picnic area
- More grass area

## TRADE OFFS

- Loss of some grass space
- To preserve notable trees, pool must be shifted south, resulting in the playground being moved

## 3D CHARACTER DRAWING



## CONCEPT VISION IMAGES



## SCHEMATIC SITE PLAN



\* Plans and drawings are conceptual only and represent general sizes and amenity options for prioritization.

## BENEFITS

- Focal point entry & drop off zone
- Remodel and addition to the existing bathhouse
- More efficient parking layout
- Better pool orientation
- 8 Lane 50 meter pool
- 2 new slides
- Leisure pool with zero depth entry
- Shade from structures and trees
- Public restrooms close to playground
- Larger concessions and shaded picnic area
- More grass area

## TRADE OFFS

- Loss of some grass space
- To preserve notable trees pool must be shifted south, resulting in the playground being moved
- Loss of some trees at the north for parking
- Skate park relocation is unfunded and for future phase

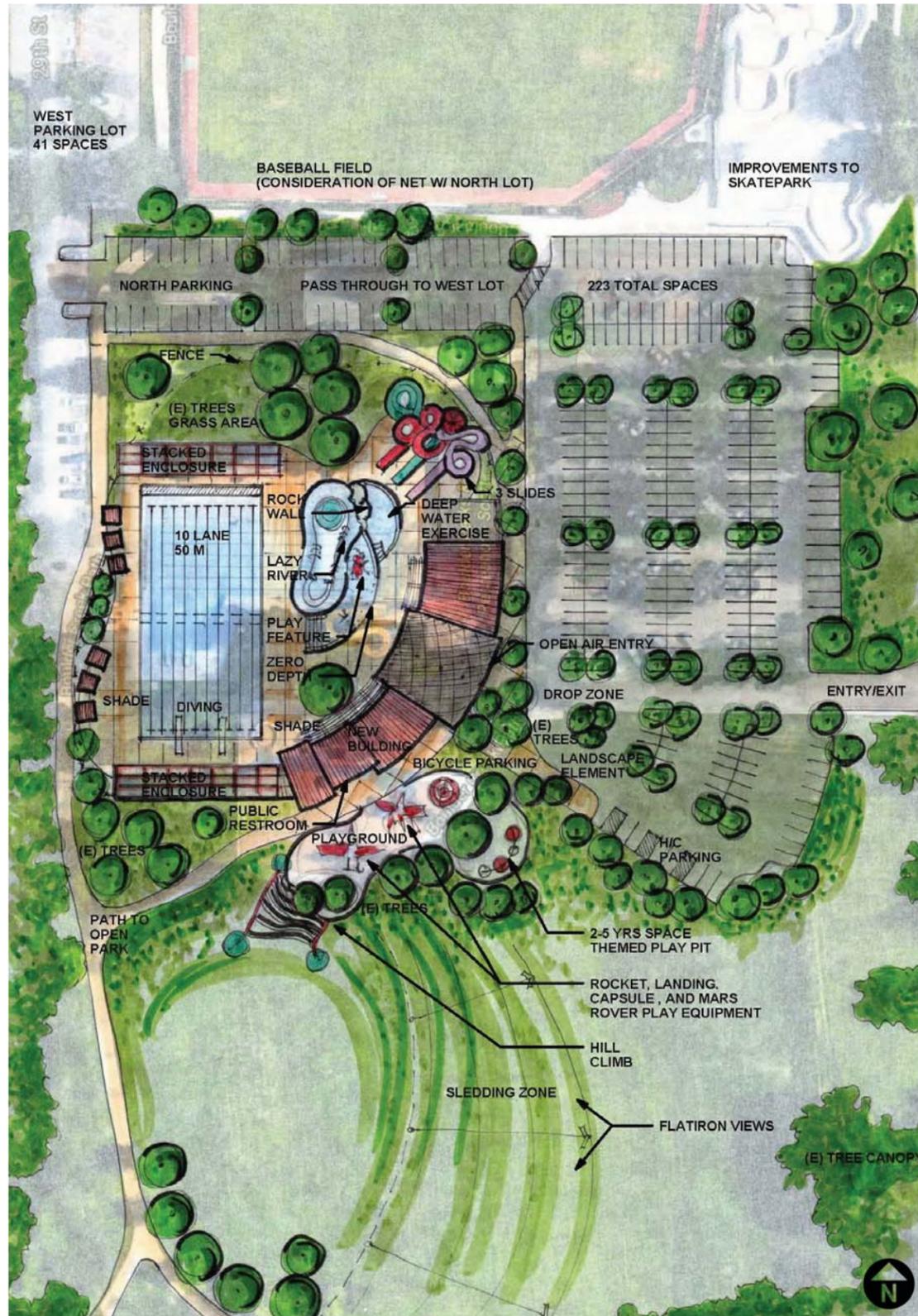
## 3D CHARACTER DRAWING



## CONCEPT VISION IMAGES



## SCHEMATIC SITE PLAN



\* Plans and drawings are conceptual only and represent general sizes and amenity options for prioritization.

## BENEFITS

- New Bathhouse
- Entry drop off zone
- Parking connection between east and west lots
- More efficient parking layout
- Retractable roof allowing for year round use
- 10 lane 50 meter pool w/ better orientation
- 2 or 3 slides
- Splash pad
- Leisure pool with Lazy river, deep water exercise, and rock climbing wall
- Shade from structures, retractable roof, and trees
- Improvements to skate park

## TRADE OFFS

- Loss of some grass space
- Loss of north trees for parking
- Pool must be shifted south resulting in the playground being moved
- Cost of retractable structure
- Capital and operating expenses for year round facility approx. \$500,000

## 3D CHARACTER DRAWING



## CONCEPT VISION IMAGES



SCREENING & SHADE STRUCTURES



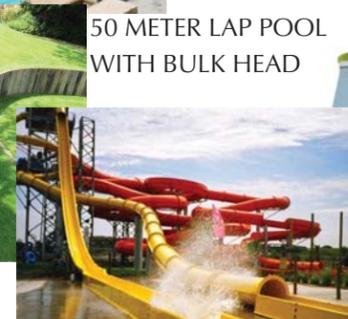
RETRACTABLE ROOF CLOSED



RETRACTABLE ROOF



SOFT EDGES WITH USABLE GREEN SPACE



50 METER LAP POOL WITH BULK HEAD

3 SLIDES



LAZY RIVER WITH NATURAL ROCK FEATURES



PATTERNED NATURAL LIGHTING



TRANSLUCENT SLIDE



SPACE THEMED WATER WALK

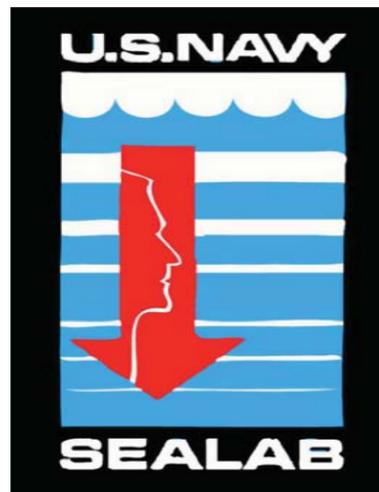
## Mercury Mission

### HISTORY

- Scott Carpenter was born in 1925 and raised in Boulder
- Graduated from CU with a degree in aeronautical engineering
- Served in the US Navy
- One of the “Original Seven” Mercury Astronaut’s
- In 1962 he was the second American to orbit the earth
- Scott then worked for NASA on the Apollo mission



## SeaLab II Mission

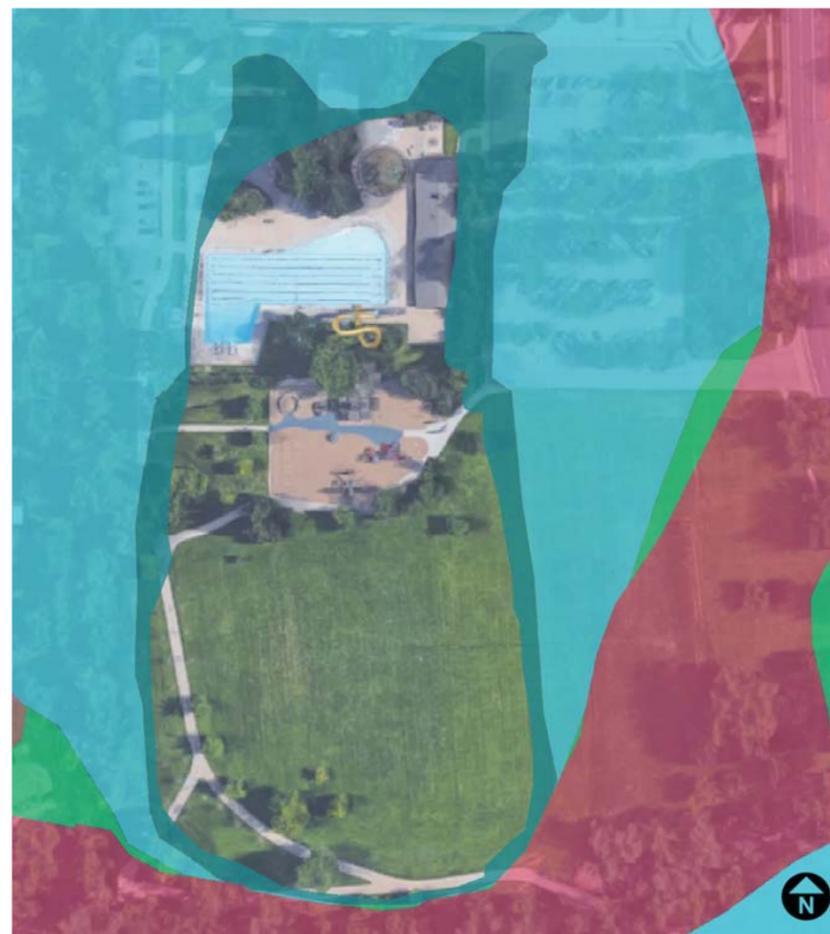


- His next mission was as an aquanaut where he served in the SeaLab Mission
- The SeaLab Mission took him 205 ft. under the sea for 45 days
- Scott received the Legion of Merit medal
- He was the first astronaut and aquanaut across the globe
- The City of Boulder originally dedicated the park to Scott Carpenter in 1962 and then rededicated it in 2011.

## EXISTING PARK IMAGES



## DEVELOPMENT CAPACITY/LIMITS



### FLOOD ZONES LEGEND

- 500 YEAR FLOODPLAIN  
This zone is safe to build in.
- 100 YEAR FLOODPLAIN  
This zone can be built in with caution.
- HIGH HAZARD ZONE  
This zone cannot be built in.
- CONVEYANCE ZONE  
This zone cannot be built in.

## SITE ZONES



### SITE LEGEND

- Baseball Field
- Park Area
- Parking Area
- Skate Park
- Playground
- Aquatic Facility
- Views to Flatirons
- Boulder Creek

## SITE OPPORTUNITIES



The circulation access within the park and along the Boulder Creek Path, allows for multiple modes of transportation, such as biking, walking, and skateboarding. Creating an opportunity to promote alternate means of transportation.



There are multiple bus routes along the east side and north sides of the park.



Shared parking with other businesses could allow for less infrastructure to be required while still serving the needs of the site users.



There are multiple entry points to the site. This allows more people to utilize and enjoy the area.



There are beautiful views throughout the site to the Flatirons.



There is a dense, mature tree canopy on the site.



## SITE CONSTRAINTS



The parking lot is poorly laid out. Future parking needs cannot be met solely with the existing parking lot.



There is some noise pollution along 30th St. Especially at the skate park, and along the east side.



This line indicates the required zoning setbacks. 25' At the front and back is required. There is also a height limit of 35'.



This line shows the highly separated areas of the site. There is little connection between functions other than the circulation paths.



This line indicates a private irrigation ditch located on the site.

Other constraints include:

- The landfill that runs beneath the site, restricting cut and fill possibilities.
- The flood plain puts some restriction on where things can be placed on the site.
- This is a small site with many uses. There is a limit to the amount of program that can be supported here.

## BICYCLE PARKING POSSIBILITIES



## ACCESS GOALS

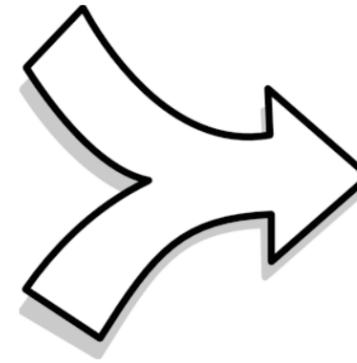
- Promote the use of alternate transportation methods.
- Provide bicycle parking to promote riding to the facility.
- Provide the minimum amount of asphalt to preserve the park.
- Provide enough parking for the pool, playground, park, skate park, and baseball field.
- Create shared parking options with adjacent properties.
- Provide optional deferred parking for future needs.

## REGIONAL PARKING ANALYSIS

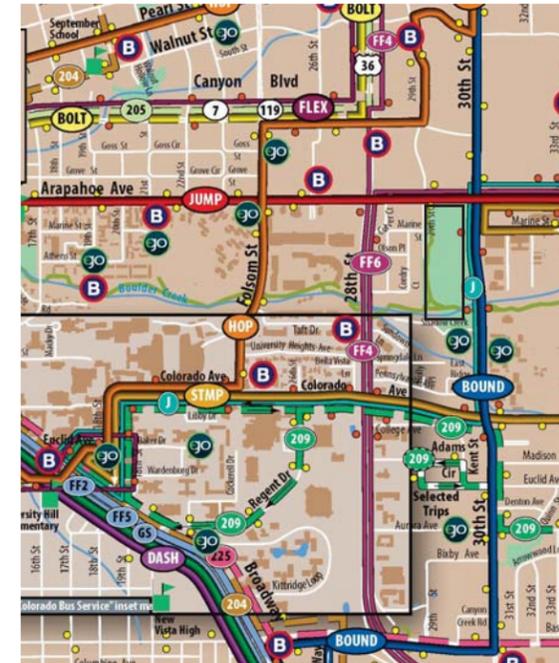
- A parking study was done based on 4 existing aquatics parks in the northern region.
- Parking for the site is based on square footage and varies between jurisdictions.
- The current site has 128 spaces and will need between 215 and 290 spaces.

## BICYCLE PARKING

- Provide bicycle parking based on the City of Boulder requirements.
- Provide shaded bicycle parking.
- Provide bicycle parking for family chariots.



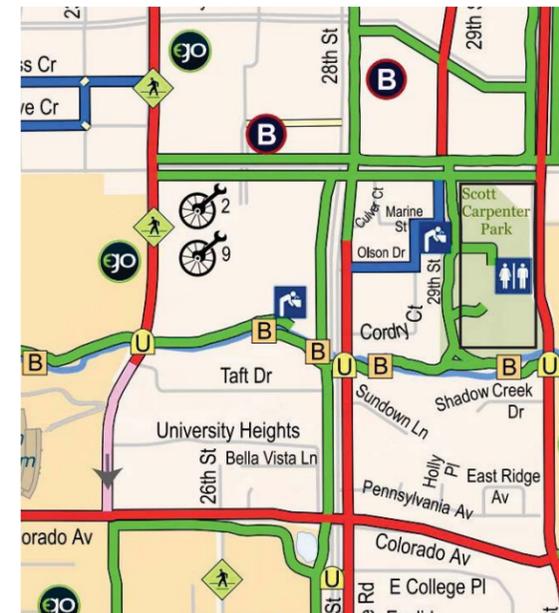
## TRANSPORTATION ACCESS



There are multiple local and regional bus stops on and around the site.

Buss Routes Include:

- Bound
- FF4 and FF6
- 206
- J
- Jump



There are numerous foot and bicycle paths around the site.

- Boulder B-cycle Location
- Bike Shop
- eGo Car Share Location
- Water Fountain
- Restroom and Water Fountain
- Enhanced Pedestrian Crossing
- Bridge
- Underpass
- Designated Bike Route
- Multi-Use Path
- On-Street Bike Lane

AQUATICS THEMING



SPACE THEMED WATER PLAY STRUCTURE



TRANSLUCENT FEATURES IN SLIDE



SPACE SHUTTLE SLIDE



PLANET SPRAY SPHERE



50 METER LAP POOL WITH BULK HEAD



SPACE THEMED PLAY EQUIPMENT



INTERACTIVE FEATURES



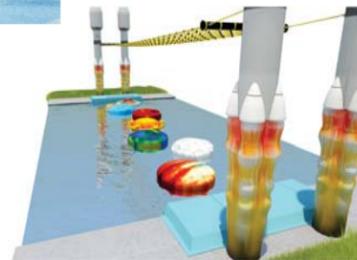
NATURAL ROCK INTERACTIVE FEATURES



EDUCATIONAL GROUND FEATURE



SPACE THEMED INTERACTIVE EQUIPMENT



SPACE THEMED WATER WALK



WATER FEATURE BUILT INTO NATURAL AND ARCHITECTURAL ELEMENTS



LAZY RIVER WITH NATURAL ROCK FEATURES



SPACE SHIP SLIDE



DOUBLE SLIDE FROM BUILDING TOWER



TRIPLE SLIDE—SOLID COLORS



NATURAL ROCK & WATER FEATURES

ARCHITECTURAL MATERIALS



METAL SIDING WITH WOOD DETAIL



RETRACTABLE ROOF FOR FULL YEAR OPERATIONS



SLOPING WATERFALL ROOF



FOCAL POINT ENTRY ELEMENT



OPEN BREEZEWAYS WITH GREEN WALLS



SCREENING AND SHADE STRUCTURES



NATURAL DAYLIGHTING IN BLOCK WALL



NATURAL DAYLIGHTING



CONSTELLATION DAYLIGHTING



WOOD AND CONCRETE



VOIDS AND SOLIDS WITH NATURAL MATERIALS

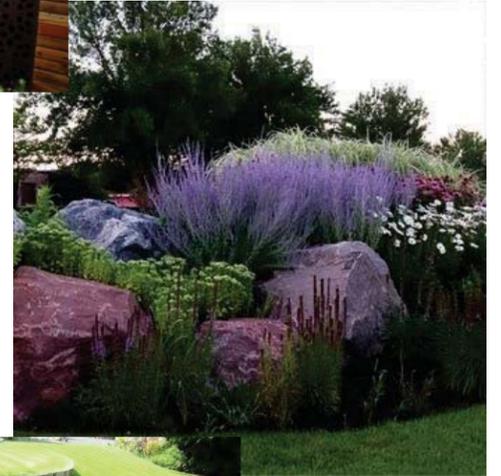


WOOD AND CONCRETE

SITE CHARACTER



WOOD WALL WITH METAL AND GREEN DETAILS



GREEN SPACES



OPEN BREEZEWAY



OPEN BREEZEWAYS & FRONT ENTRY FOCAL POINT



MESSAGE FOUNTAIN & FOCAL POINT

SOFT EDGES WITH USABLE GREEN SPACE



PRIVACY SCREEN WITH SITE LINES



SHADE STRUCTURE CONNECTED TO THE BUILDING



BUILT IN BENCHES

WHAT IS EXISTING?	1 SLIDE 			50 M 6 LANE 	DATED 	SMALL 	DATED 	
AMENITY OPTIONS	 SLIDE	 SPLASH PAD	 LEISURE POOL	 LAP POOL 50 M	 BUILDING	 PLAY GROUND	 SKATE PARK	Survey Directions:
OBTAINABLE POSSIBILITIES	 1 New \$150,000 <input type="checkbox"/>	 1,000 SF \$300,000 <input type="checkbox"/>	 3,000 SF \$800,000 <input type="checkbox"/>	 6 Lanes w/ 50M \$1,800,000 <input type="checkbox"/> 8 Lanes w 50M \$2,400,000 <input type="checkbox"/>	Remodel 6,000 SF Addition 1,500 SF \$2,100,000 <input type="checkbox"/>	No changes w/ current budget...  But, let's dream 		These options are obtainable with the current budget.  Pick options that total up to approximately \$5,000,000.
LET'S DREAM	 2 New \$240,000 # _____  3 New \$360,000 # _____	 1,500 SF \$450,000 # _____	 7,000 SF With Lazy River \$1,600,000 # _____	 10 Lanes with North-South orientation \$3,200,000 # _____	New 6,000 SF \$2,300,000 # _____ New 7,500 SF \$2,600,000 # _____ Retractable Roof 21,000 SF \$2,500,000 # _____	 Playground Improvement \$300,000 to \$400,000 # _____	 Skate Park Improvement \$150,000 to \$300,000 # _____	These are options that could be incorporated if there is an increase in the budget.  Please number your top 5 choices in order from 1 to 5 (1 being the most desirable) by filling in this space:  # _____



## **Scott Carpenter Pool Renovation 14 September Open House Comments and 16 September Staff Comments**

### **Summary of written comment cards from 9/14 Open House**

- 50-meter lap lanes are essential
- Alternatives to chlorine should be explored
- Consideration needs to be given to the skate park. There may be opportunities for some quick wins at the skate park if more substantial changes are not possible. Skate park gets year round use for much of a given day. Many skate boarders travel out of town to use more up to date facilities.
- Pool lanes should take precedence over other improvements.
- There were a number of comments about the facility needing to function as a competitive venue.
- Change in pool orientation is not necessary
- Character of the facility does not need to be changed. (There were several comments about brick building and trees)
- Year round pool is desirable.
- Did not seem to be a consensus on whether or not the pool should be covered. But there seemed to be a consensus for year-round swimming.
- Retain a diving well.
- Rocket ship in the playground needs to stay.
- Pool options for multiple uses (therapy, lap swimming, accessibility, teaching)

### **Summary of Informal Survey Matrix from 9/14 Open House**

Obtainable Possibilities based on the forms received

1. 8 lanes, 50-meter pool
2. Remodeled pool house with an addition
3. One new slide
4. 3,000 leisure pool
5. 1,000 sf splash pad / water-tainment

'Let's Dream' scenarios

1. Updated skate park
  2. Retractable roof structure
  3. 10 lanes, 50-meter lap pool
  4. New 7,500 sf building
  5. 7,000 sf lazy river
  6. 3 new slides
  7. 2 new slides
  8. New 6,000 sf building
-



9. New playground / renovations
10. Splash pad

### **Summary of YSI / EPAND, Forestry, Operations, Athletics Workgroups Comments from 9/16 Meeting**

- The existing skate park is old and dated
- If the historic sewerage treatment plant is to remain, thought needs to be given to its use/function and how it ties into the rest of the project. Fencing may be an issue.
- The condition of the trees in the parking lot may not be an issue with respect to the design of a new parking lot. A lot will be determined by what needs to happen in the parking lot. The design and engineering may preclude saving any trees. A decision will need to be made about what is more important.
- Forestry should be involved in future meetings related to plan development.
- There are a lot of ash trees along the Boulder Creek corridor on the east side of 30<sup>th</sup>. They will more than likely die off over the next several years as they are on CU property and to our knowledge have not been treated. This may result in the appearance of a huge loss of trees along the corridor.
- A net is needed along the right field line (and possibly the whole field) regardless of what happens with the design.
- Current parking lot design is difficult for snow removal
- In a 6 or 8 lane scenario, how are diving boards accommodated?
- Non-potable water could be used for park irrigation if ditch option with CU is viable.
- Flood waters came north from the creek and almost came to the parking lot.
- Maintain wide access points along the western edge of the park.
- Any type of drop-off round-a-bouts need to be well thought out and engineered.
- Find ways to streamline maintenance activities and buildings. They are scattered currently.

### **Summary of Executive Team Meeting 9/20**

- Design team should complete an analysis of what amenities can realistically be achieved considering current budget, pool orientation, need for more lap lane capacity, possible use for BVSD. This analysis needs to explain costs, benefits, and trade-offs.
  - Selected facility amenities need to be multi-use and multi-generational. There are a number of ways to accommodate youth and young adult related amenities within the larger pool.
  - More lanes (preferably 10) are desirable from BVSD for the period of time when school is in session. Area for diving is desirable.
  - Steps should be taken to better understand the structural integrity and condition of the bathhouse in to understand the extent that reuse of the existing facility can be realized
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- Design team needs to better understand the historic significance, if any, of existing structures
- A lazy river can be a multi-generational, multi-use pool amenity

**Summary of e-mail comments received as of 9/16.**

- Diving boards were a valued amenity before being removed
- Existing trees around the pool are a valued amenity
- Deeper pool depths are preferred



**INFORMATION PACKET  
MEMORANDUM**

**To:** Members of Parks and Recreation Advisory Board

**From:** Michael Gardner-Sweeney, Director of Public Works for Transportation  
Gerrit Slatter, Principal Transportation Projects Engineer  
Bryant Gonsalves, Transportation Project Manager  
Melanie Sloan, Transportation Planner

**Date:** September 12, 2016

**Subject:** **Brief: Community and Environmental Assessment Process (CEAP) brief for the Boulder Creek & Arapahoe Underpass (Arapahoe & 13<sup>th</sup>) Project**

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**EXECUTIVE SUMMARY:**

The City of Boulder has initiated planning and design for the Boulder Creek & Arapahoe Underpass (Arapahoe & 13<sup>th</sup>) project to provide a safer, more accessible and less flood prone underpass along the Boulder Creek Path at Arapahoe Avenue, near 13th Street. The planning and design process began in early 2016 and is anticipated to continue through summer, 2016. This project is utilizing the city's Community and Environmental Assessment Process (CEAP) to select the preferred design alternative.

The purpose of this memo is to introduce to and receive feedback from the board on the planning and design process, current proposed design alternatives and proposed evaluation characteristics, which will be used to identify the preferred design alternative. Because this project impacts both transportation and parks and recreation facilities, the project CEAP requires public hearing and approval by both the Transportation Advisory Board (TAB) and the Parks and Recreation Advisory Board (PRAB) in a joint board hearing and so we invite the board to participate in a joint TAB-PRAB meeting (date to be determined) for official review and recommendation of the CEAP process and preferred alternative selection. Additional detail on the project background, planning and design status, timeline, community involvement role and opportunities and current proposed design alternatives are included below.

## BACKGROUND:

The City of Boulder initiated planning and design for the Boulder Creek Arapahoe and 13th Underpass Project (Arapahoe Underpass project) for several reasons. The width of the Boulder Creek Path within the existing underpass is too narrow (10') for the volume of users and does not meet the city's standard for minimum width (14'). The grades of the approaches are steeper (8% on the north approach and 14% on the south approach) than the Americans with Disabilities Act standard (less than 5%) and the city's standards for recreational paths (8%). The steepness of the paths creates a barrier to some potential users while also contributes to faster bicycle and skateboard speeds entering into the underpass which creates opportunity for conflict. The visual and physical approaches to the underpass are poor due to tight turns at the entrances, which is especially true for the south approach. Lighting is poor, including during daylight hours, which creates the potential for collisions or close calls and causes some users to avoid the underpass because they do not feel safe. The underpass also closes regularly during high water flows of Boulder Creek. During 2015, the underpass was closed due to high water for three months (May through July). High water closures divert more pedestrians and bicycles to the on-street crossing at Arapahoe Avenue and 13th Street increasing the opportunity for collisions.

The voter-approved 2014 Community, Culture, and Safety Tax (CCS) ballot initiative provides \$2.5 million in project funds. Construction funded by CCS must be completed by the end of year 2018. Current cost estimates for all proposed design alternatives considered for this project are greater than \$2.5 million.

The project is undergoing the Community and Environmental Assessment Process (CEAP), a formal review process to consider the impacts of public development projects and to assess potential impacts of conceptual project alternatives in order to inform the selection of desired elements and the refinement of a preferred alternative.

Concurrent to the Arapahoe Underpass project, the proposed Arapahoe Avenue Reconstruction project from Broadway to 15<sup>th</sup> Street will reconstruct the on-street crossing at Arapahoe Ave and 13<sup>th</sup> St. How the on-street crossing on Arapahoe Ave at 13<sup>th</sup> St is designed and connects to adjacent paths and sidewalks also impacts the goals of the Arapahoe Underpass project. Because of this, the on-street crossing and associated connections have been included in the Arapahoe Underpass project planning and design and CEAP work.

### Status of Planning & Design

In early 2016, the project team began reviewing the existing conditions, collected data and related city plans and developed conceptual design options. These initial project concepts were assessed and narrowed to two proposed underpass, north path connection and south path connection design alternatives and four on-street crossing design options based on project goals; geometric site constraints from Boulder Creek, Civic Area Central Park and Arapahoe Avenue; historic, observed and collected pedestrian and bicycle data and movements; relevant master and sub-area plans; engineering, drainage and floodplain considerations and feedback from the public and relevant boards.

### Data & Plans

The Arapahoe Underpass project area serves a high volume of pedestrians and cyclists within a complex system of eleven potential origin/destination points (Figure 1). To understand these movements better, the project team conducted site visits, reviewed historic bicycle count data for the Boulder Creek Path and multi-use path to the south and hired a consultant to collect pedestrian and bicycle counts and their travel routes within the project area.

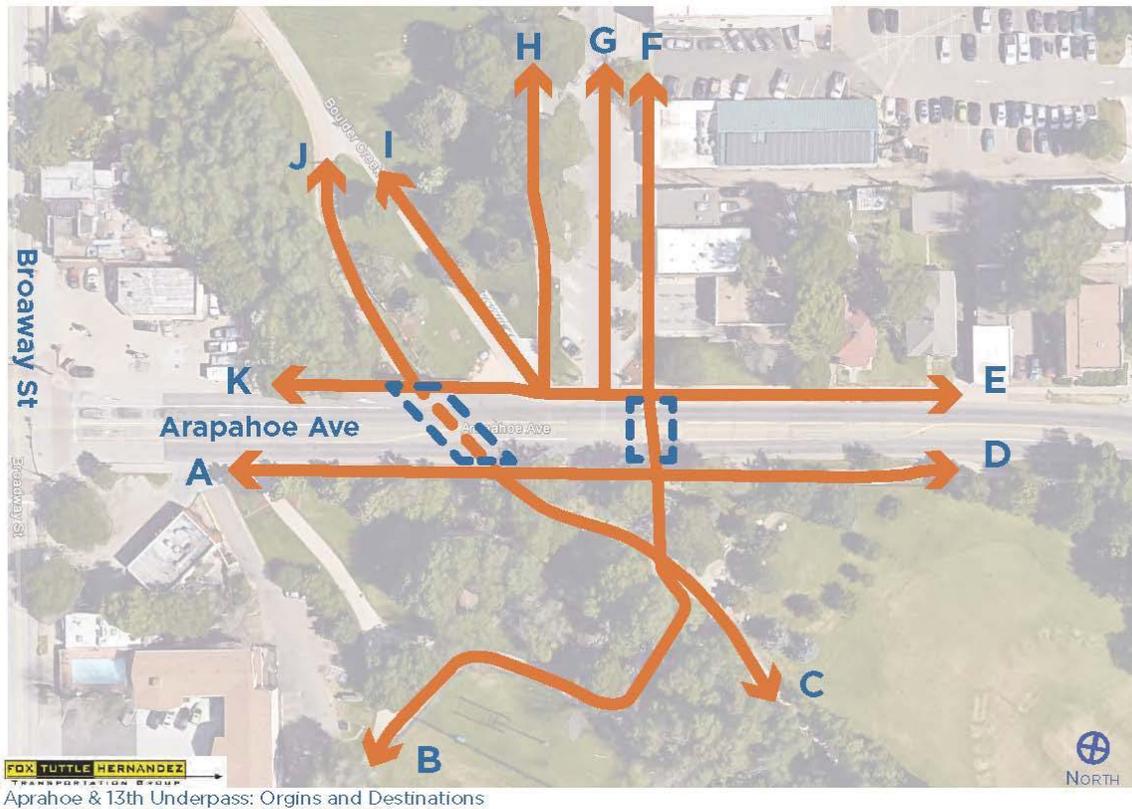


Figure 1: Eleven potential origin/destination points within the project area.

The consultant collected data on two weekdays (April 19, 2016 and July 21, 2016) over three observation periods: 7:15 a.m. – 8:30 a.m.; 11:00 a.m. – 1:00 p.m.; and 3:00 p.m. – 5:00 p.m. These time periods captured the typical morning, lunch and evening peak travel periods, including the arrival and departure periods of adjacent schools (April 19, 2016 count).

Table 1: Data collection counts by observation period and mode

Time Period	Pedestrians		Bicycles & Skateboarders		Total	
	April	July	April	July	April	July
7:15 – 8:30 AM	156	200	96	213	252	413
11:00 AM – 1:00 PM	562	327	182	329	744	656
3:00 – 5:30 PM	511	357	303	448	814	805
Total:	1,229	884	581	990	1,810	1,874

Around 1,800 travelers were observed on each of the two days of data collection. Pedestrians represented 68% of observed travelers in April and 44% in July. Bicyclists and skateboarders represented 32% of observed travelers in April and 53% in July.

On both data collection days (Table 2), about 30% used the on-street crossing on Arapahoe Ave at 13<sup>th</sup> St (30% in April and 28% in July). However, the percentage of people who traveled east-west along Arapahoe Ave but did not cross it decreased from April to July (40% to 22%) while the percentage of those who used the existing underpass increased over the same time period (30% to 50%).

Table 2: Proportion of movement along or across Arapahoe Avenue

	On-Street Crossing, Arapahoe Ave & 13 <sup>th</sup> St	Existing Underpass	Did Not Cross Arapahoe Avenue	Total
<i>April 19, 2016</i>	548 (30%)	538 (30%)	724 (40%)	1,810
<i>July 21, 2016</i>	532 (28%)	932 (50%)	412 (22%)	1,874

The decrease in use of the on-street crossing is likely due to the April data collection occurring during the adjacent schools' academic year and the July collection when the schools were on summer break, resulting in less students walking through the project area. The increase in use of the underpass between the April and July counts is likely due to the higher number of bicyclists and skateboarders observed in July combined with that count occurring in the peak recreational cycling season.

Figure 2 illustrates the pedestrian and bicycle/skateboard crossing volumes and movements during the observed travel periods. On both data collection dates, the largest volume of pedestrians, bicyclists and skateboarders were along the Boulder Creek Path. (The full reports for the two days of data collection can be found in the attachments).

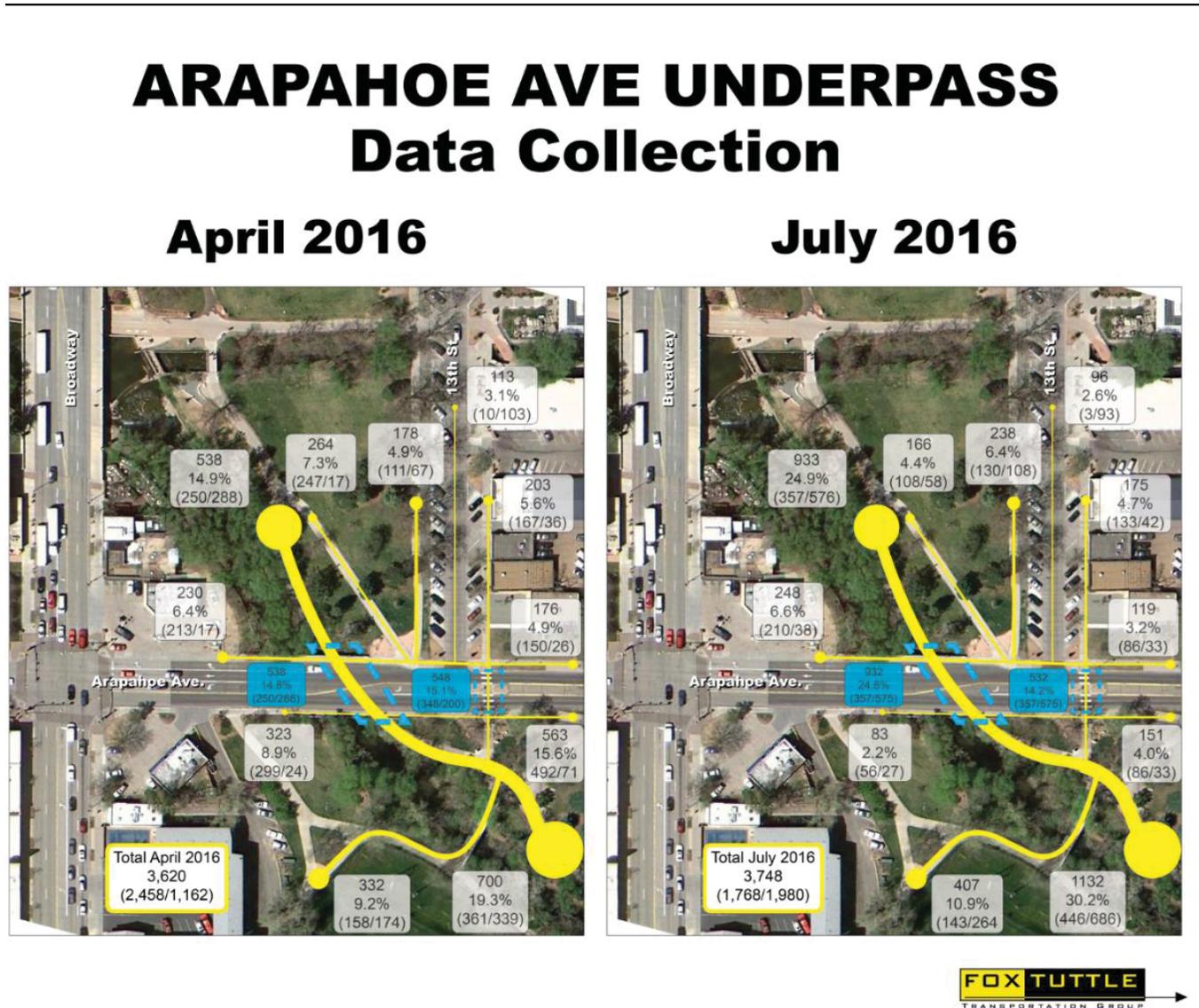


Figure 2: Pedestrian and bicycle/skateboard counts by origin/destination, April 19 & July 21, 2016

Between 2009 and 2015, a total of 21 crashes within the on-street crossing on Arapahoe Avenue at 13<sup>th</sup> Street were reported (Table 3). Within this same time period, one bicycle-bicycle collision within the existing Arapahoe Underpass was reported. Sixteen of these 21 crashes were rear-end collisions at the on-street crossing on Arapahoe Ave at 13<sup>th</sup> St. The data observation reports note several, likely unreported, near misses at this location.

*Table 3: Crashes in crossing at Arapahoe Ave and 13<sup>th</sup> Street, 2009 – 2015*

<i>Type of Crash</i>	<b>Number (2009 – 2015)</b>
<i>Vehicle-Bicycle</i>	4
<i>Vehicle Skateboarder</i>	1
<i>Vehicle-Vehicle (rear-end collisions from stops for bicycles/pedestrians)</i>	16
<b>Total:</b>	<b>21</b>

A single transit stop is located within the project area on the northwest corner of Arapahoe Avenue and 13<sup>th</sup> Street. This stop serves 190 alighting and 40 boarding passengers each day (as of January, 2015).

A B-cycle station is located on the northwest corner of Arapahoe Avenue and 13<sup>th</sup> Street. This station is the fifth-most-popular station in the Boulder B-Cycle 40-station system. An average of 30-40 checkouts and returns (combined) occur at this station each day.

## Master Plans

The Arapahoe Underpass project is guided by several adopted city plans, specifically the Boulder Valley Comprehensive Plan (BVCP), the Transportation Master Plan (TMP), the Civic Area Master Plan, the Boulder Civic Area Vision Plan and the Greenways Master Plan.

The BVCP calls for creating an accessible multimodal transportation system with safe travel options and connections. The proposed design alternatives, path connection options and on-street crossing options support this goal through the improvement of existing facilities for travelers of all modes and abilities.

The proposed design alternatives also support the TMP goals of creating an accessible multimodal transportation system with safe travel options and connections, improving facilities for all modes, decreasing single-occupant vehicle use thus reducing and minimizing the use of non-renewable energy resources and greenhouse gas emissions and the Toward Vision Zero safety goal of preventing fatal and serious injury crashes.

The Civic Area Master Plan calls for continued improvement to the existing bicycle and pedestrian experience and amenities of the civic area, and calls for resolution of the conflict and connectivity along the Boulder Creek Path, identified as a significant transportation route and recreational amenity, and reducing the barrier-effect of Arapahoe Avenue. The project helps achieve these goals by providing a safer, more accessible and less flood prone underpass along the Boulder Creek Path at Arapahoe Avenue near 13th Street.

The Civic Area Vision Plan is the founding document for the re-design and activation of Boulder’s Civic Area. The Arapahoe Underpass project supports several Vision Plan goals, including supporting the activation of Civic Area Central Park and of 13<sup>th</sup> Street, maintaining the ability to host events and programs within Civic Area Central Park and 13<sup>th</sup> Street, a pedestrian scale 13<sup>th</sup> Street, expansion of the Boulder County Farmer’s Market and is supportive of the outcomes of the Market Hall Feasibility Study.

The Greenways Master Plan (2011) provides a summary of existing conditions along Boulder Creek. The riparian habitat was evaluated based on the quality of vegetation (native or non-native), the vegetative structure and the quality of the habitat based on the presence of bird species. Each stream reach was rated for each of these criteria, with a rating of very poor to excellent. Habitat restoration ranked high in the reach of the project area, based on the average ranking of the existing habitat and the ability to easily

replace and enhance the existing vegetation. Water quality was ranked high for the potential the project area offers for improving storm water outfalls, sediment collection and removal and non-point source pollution filtering. Recreation ranked high in recognition of the opportunities the Boulder Creek Path and the Civic Area Central Park offer within the project area. Flood ranked high due to the project area being within the 100 and 500 year floodplains. The project will include habitat restoration, water quality improvements and recreation opportunities where feasible.

The Arapahoe Underpass project also helps achieve the city's Climate Change goal of reducing greenhouse gas emissions by 80 percent by 2050 through encouraging residents and employees of Boulder to increasingly use non-vehicular means of transportation.

This project helps the city achieve its social sustainability goals by improving the transportation options for all members of the community and by improving public safety with underpass improvements that address the visual (sightlines) and physical approaches to the underpass, improving accessibility for users of all abilities by meeting Americans with Disability Act guidelines, improves lighting and reduces the flood risk of the underpass.

## Community Involvement

It is important that the planning and design process for the Arapahoe Underpass project is conducted with the community and that feedback received from multiple project stakeholders is incorporated throughout the planning process. The proposed design alternatives have been shared with the community this spring and summer at three public meetings, youth outreach, two community walks, an open house and presentations to community advocacy groups and as an informational item to TAB. Information on the project, including open house presentation boards and public comment form, is also available on the project webpage (<https://bouldercolorado.gov/pages/boulder-creek-arapahoe-and-13th-underpass>). The current design options for the underpass, north and south path connections and on-street crossings were influenced by the feedback received through this outreach.

## Process Timeline

Planning and preliminary design is anticipated to be completed by the first quarter of 2017. The project team will identify the preferred alternative through combination of the presented options using the evaluation criteria (a draft list of evaluation criteria can be found in the attachments). In early fall, the final CEAP will be reviewed by the city's CEAP Committee and a joint boards meeting between TAB and PRAB to provide official review and recommendation of the CEAP process and preferred alternative selection. When the official recommendation is received by these committee and boards, the Arapahoe Underpass CEAP will be sent to City Council for potential call-up. Once this process is complete, the project will begin the permitting process (wetland and floodplain).

To comply with the CCS' deadline for the completion of construction (end of 2018) and for coordination to occur with nearby projects (Arapahoe Avenue Reconstruction, Civic Area Vision Plan, Boulder Creek Path & Lighting Improvements projects and the University of Colorado proposed convention center and hotel (Grandview Avenue near Broadway)), the Arapahoe Underpass project is currently scheduled to begin construction in winter, 2017 and be completed in spring, 2018. Extending the project construction schedule risks possible increased costs due to year-over-year construction cost inflation (greater than 10% in 2016).

## Proposed Design Alternatives

The following design alternatives can be found in the attachments.

### Underpass

Two proposed underpass design alternatives have been identified. Option 1 would make changes to the existing crossing under the Arapahoe Avenue at Boulder Creek vehicular bridge that would shift the Boulder Creek Path closer to Boulder Creek. This option is shown in the attachments with the north path connection option 1 & south path connection option 1 as an example.

Option 2 would construct a new underpass between the vehicular bridge and 13th Street. With this option, the existing underpass would be removed and this section of the Boulder Creek embankment would be restored. The existing structure that carries Boulder Creek would remain in place for flood conveyance

purposes. This underpass option may impact existing ditch utilities within Civic Area Central park. This option is shown in the attachments with the north path connection option 1 and south path connection option 1 as an example.

Two options for connecting the paths on the north and on the south side of the underpass to the underpass and to the on-street crossing and four options for how the on-street crossing will be re-constructed during the Arapahoe Avenue reconstruction are presented below. Each of these connection and crossing options could be combined with either underpass option.

### North Path Connections

North Path Connection 1 (NPC1) is similar to the existing connections of the Boulder Creek path and the path connection to the Arapahoe Ave and 13<sup>th</sup> St intersection. This option would use a series of tiered retaining walls to accommodate the slope between the two paths which provides opportunity for more landscaping.

North Path Connection 2 (NPC2) would move the path connection to the Arapahoe Ave and 13<sup>th</sup> St intersection closer to the Boulder Creek Path and would provide more space within the Civic Area Central Park for events and programming. This option would require a single, tall retaining wall with a handrail to accommodate the greater elevation difference between the underpass entrance and the path connection to the Arapahoe Ave and 13<sup>th</sup> St intersection. The tall retaining wall face provides an integrated public art opportunity.

### South Path Connections

South Path Connection 1 (SPC1) is similar to the existing multi-use paths and connections on the south side of the underpass. To achieve the project goal of reducing the approach to the underpass to a grade of 5% or less, the convergence of the paths and the existing pedestrian and bicycle bridge over Boulder Creek would move downstream. This option does not change the current north-south mobility for pedestrians and bicyclists.

South Path Connection 2 (SPC2) would change the convergence of the paths on the south side of the underpass. The existing pedestrian and bicycle bridge over Boulder Creek would be replaced and moved upstream. This new pedestrian and bicycle bridge crosses over Boulder Creek and the Boulder Creek Path connecting the multi-use path on the south to the on-street crossing on Arapahoe Ave at 13<sup>th</sup> St. The Boulder Creek Path would remain at creek level further downstream to provide clearance under this new pedestrian and bicycle bridge.

### On-Street Crossing

During the proposed Arapahoe Avenue reconstruction, the on-street crossing at Arapahoe Ave and 13<sup>th</sup> St will be widened from eight to a minimum of 10 feet. The sidewalk on the northeast corner of Arapahoe Ave and 13<sup>th</sup> St is proposed to be detached further from the road, from four feet to eight feet. These changes are proposed to better accommodate the volume of pedestrian and bicycle traffic, bicycle turning movements and to provide greater visibility between those crossing Arapahoe Avenue and vehicles travelling along it.

On-Street Crossing 1 (OSC1) would re-construct the existing on-street crossing and pedestrian refuge median.

On-Street Crossing 2 (OSC2) would re-construct the existing pedestrian refuge median to include a z-crossing, where the crossing is offset on either side of the median to turn those crossing Arapahoe Avenue to face oncoming traffic to increase visibility across modes.

On-Street Crossing 3 (OSC3) would remove the existing pedestrian refuge median and re-construct the intersection of Arapahoe Ave and 13<sup>th</sup> St as a raised intersection crossing. This crossing would accommodate diagonal crossing through the intersection.

On-Street Crossing 4 (OSC4) would remove the existing pedestrian refuge median and re-construct the intersection of Arapahoe Ave and 13<sup>th</sup> St as a raised intersection and reduce Arapahoe Avenue from three to two lanes through incorporation of a curb extension from the south side multi-use path.

## Design Similarities

Each alternative will:

- Have an underpass traveling surface width of 24 feet;
- Increase the Boulder Creek Path width to 15 feet (6' pedestrian path, 9' bike path);
- Increase lighting;
- Reduce curves and flatten the grades of the north and south approaches;
- Reduce the number of high water closure days through flood walls, berms and a pump system designed to accommodate creek flow levels experienced during the extended 2015 closure;
- Replace and widen the pedestrian and bicycle bridge over Boulder Creek south of the underpass;
- Re-construct the on-street crossing at Arapahoe Ave and 13<sup>th</sup> St;
- Remove the existing seating area on the south side of the underpass;
- Remove mature trees and vegetation;
- Incorporate public art;
- Take approximately one year to construct (including the Arapahoe Avenue reconstruction);
- Not reduce the current flood carrying capacity of Boulder Creek and
- Not require new property acquisition.

## Design Differences

To assess the two underpass, two north path connection, two south path connection and four on-street crossing options in order to ultimately identify a preferred design alternative, a draft list of evaluation characteristics were identified by the CEAP and project team (attached). A final list of evaluating characteristics will be developed using input received from the public and relevant boards. This final list of evaluation characteristics will be used to identify the preferred project alternative by evaluating how each design alternative supports the project goals; improves safety, accessibility and mobility of all modes; impacts the environment and the user experience; impacts infrastructure; supports city projects and plans; and its cost-benefits.

## Request to the Board

The project team requests feedback from PRAB on (1) the planning and design process, (2) the current proposed design options and (3) the proposed evaluation characteristics. Feedback received from TAB and PRAB will inform the selection of the preferred alternative through combination of the presented options, the next step in the CEAP. This is also the opportunity for the board to request additional information from the project team.

Additionally, we ask for the board to participate in a joint TAB-PRAB meeting (November, 2016--date to be determined) for official review and recommendation of the CEAP process and preferred alternative selection.

# Attachments

**MEMORANDUM**

**To:** Bryant Gonsalves

**From:** Bill Fox

**Date:** September 2, 2016

**Project:** Arapahoe and 13<sup>th</sup> intersection area bicycle and pedestrian origin/destination counts

**Subject:** Summary of April and July counts

At your request the Fox Tuttle Hernandez completed a detailed set of bicycle and pedestrian counts in the vicinity of the intersection of Arapahoe Avenue and 13<sup>th</sup> Street intersection on weekdays in both April and July. In this area there is not only the roadway intersection, but also the intersection of the Boulder Creek Path and the Broadway Path, and the underpass of the Creek Path beneath Arapahoe Avenue. A sidewalk connects the two multi-use paths to the 13<sup>th</sup> Street crossing at-grade across Arapahoe Avenue, and finally, there are east/west sidewalks along both sides of Arapahoe. This complicated intersection area includes eleven different entry or exit points for the bicyclists and pedestrians that are traveling along or across Arapahoe Avenue. These access points (labeled A – K) are illustrated on the attached Base Map. The net result is that there are a total of 121 possible origin/destination pairs for pedestrians and bicyclists traveling through this area.

The pedestrians and bicycles traveling through this area were observed on April 19<sup>th</sup>, while both CU and Boulder High School were in session, during the time periods listed below. The weather started off cool but was generally sunny and seasonal.

- 7:15 AM to 8:30 AM
- 11:00 AM to 1:00 PM
- 3:00 PM to 5:00 PM

These time periods captured the typical AM, Noon, and PM peak travel periods. The counts in April also included the arrival and departure periods for the adjacent Boulder High School. The

results of the April observations were summarized in a memorandum and set of origin/destination figures in a memo dated May 4, 2016.

This same data, during these same time periods was again collected on July 21<sup>st</sup>, capturing the summer season while both Boulder High School and CU were not in regular session.

The breakdown of users by travel mode and time period was as follows:

Time Period	Pedestrians		Bicycles and Skateboards		Total	
	April	July	April	July	April	July
7:15 – 8:30 AM	156	200	96	213	252	413
11:00 AM – 1:00 PM	562	327	182	329	744	656
3:00 – 5:30 PM	511	357	303	448	814	805
Total:	1,229	884	581	990	1,810	1,874

It was noted that of the 1,810 travelers observed in April:

- 548 (30%) crossed Arapahoe Avenue at-grade in the marked crosswalk on the east side of 13<sup>th</sup> Street
- 538 (30%) crossed Arapahoe using the path underpass along Boulder Creek
- 724 (40%) moved through the study area but did not cross Arapahoe Avenue.

It was noted that of the 1,874 travelers observed in July:

- 532 (28%) crossed Arapahoe Avenue at-grade in the marked crosswalk on the east side of 13<sup>th</sup> Street
- 932 (50%) crossed Arapahoe using the path underpass along Boulder Creek
- 410 (22%) moved through the study area but did not cross Arapahoe Avenue.

It is interesting to note that a surprisingly similar total number of travelers (pedestrians and bicyclists combined) were observed in April and July, and a similar number of travelers were observed crossing Arapahoe at grade. However, a number of key differences were observed between April and July:

- When Boulder High School is not in session, the number of east/west sidewalk users that moved through the study area without crossing Arapahoe was significantly lower;
- High School students resulted in significantly more pedestrians than bicyclists being observed in April;
- Far more bicyclists were observed in July than in April, and a much higher percentage of all travelers used the underpass to cross Arapahoe in July than in April.

Detailed July Observations:

Figure 1 includes an illustration of the detailed arrival and departure patterns for all 1,874 travelers that were observed throughout the day in July. It shows the total number of travelers who arrived or departed at each of the eleven access points and also provides the percentage of the total access that occurred at each station. The remaining Figures 2 – 12 illustrate the travel pattern to/from the individual access points. The weight or width of the lines in each figure represent the proportional amount of travel in each area.

At this point the attached figures illustrate the travel pattern for pedestrians, bicyclists and skateboarders combined over the entire day. Data is available to provide this same information for each time period separately, and for bicyclists and pedestrians separately within each time period, but this would result in 60 additional figures, which would likely be too much information.

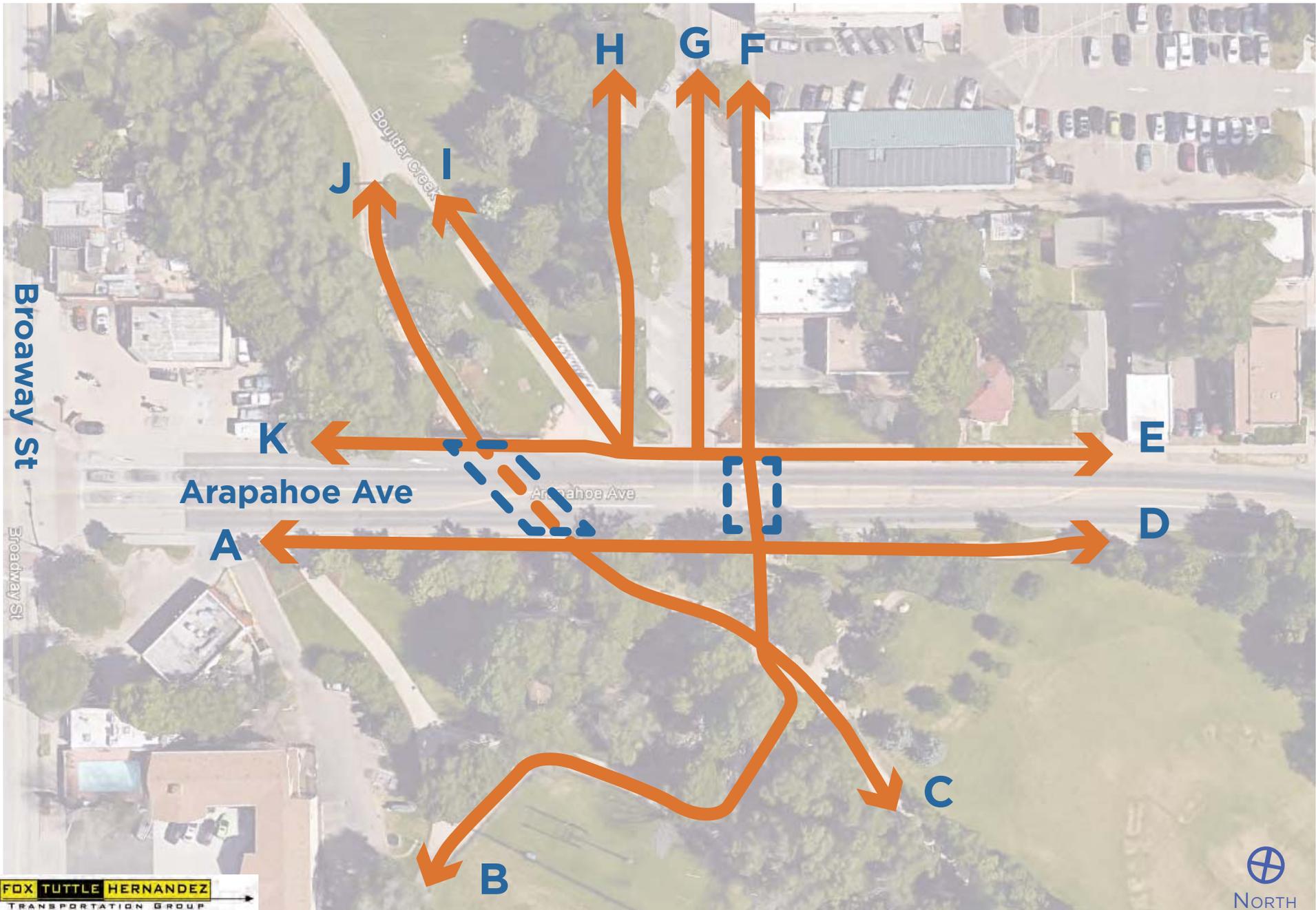
Some significant observations include:

- As was observed in April, most of the northbound bicyclists who crossed Arapahoe in the crosswalk were accessing the crosswalk from the Boulder Creek Path (C) or the Broadway Path (B), and many arrived at the south edge of the crosswalk at a speed well in excess of a walking speed. This speed coupled with the poor sight distance between motorists and approaching bicyclists resulted in many motorists having to abruptly yield to the crossing bicyclist. Most motorists appeared alert and ready to yield at the crosswalk if needed, but a number of “near misses” in the crosswalk were observed.
- The most predominant movement through the study area was the travel along the Boulder Creek Path between accesses C and J, which accounted for 41% of all travelers observed.

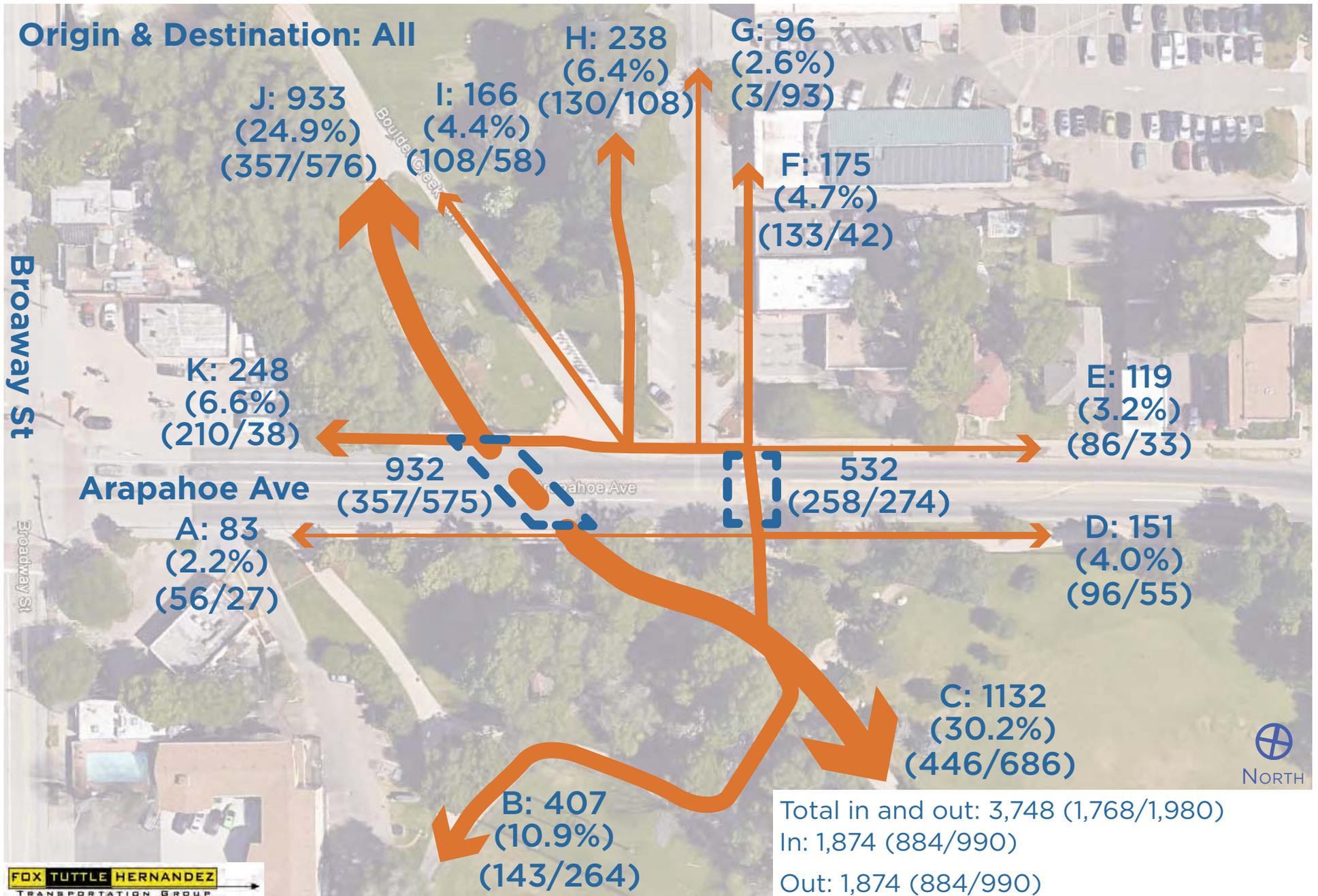
Please review this summary and let me know if you have any questions.

BF/

Attachments:           Base Map  
                              July Figures 1 – 10  
                              Excel spreadsheet with detailed data tabulations for reference

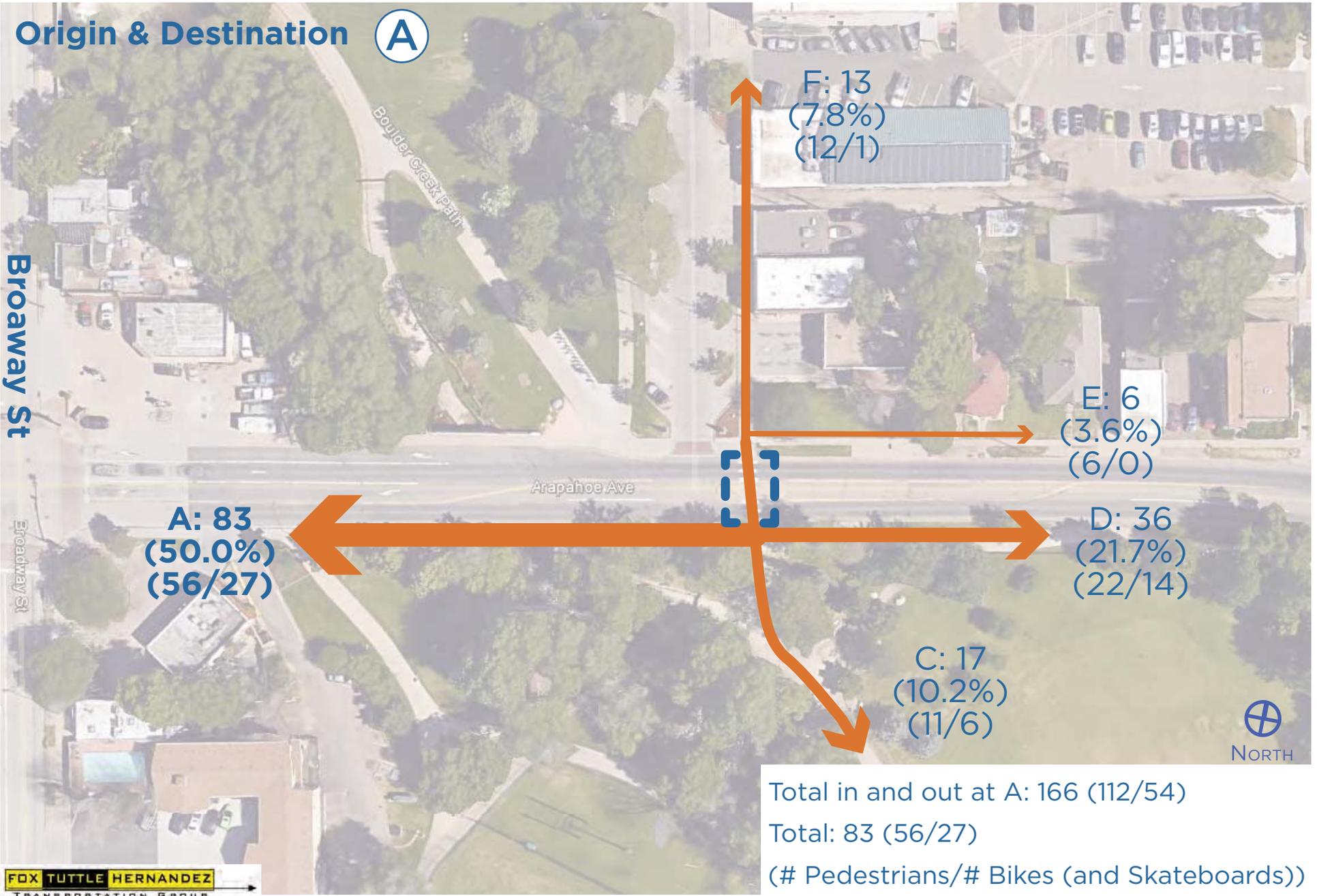


Aprahoe & 13th Underpass: Orgins and Destinations



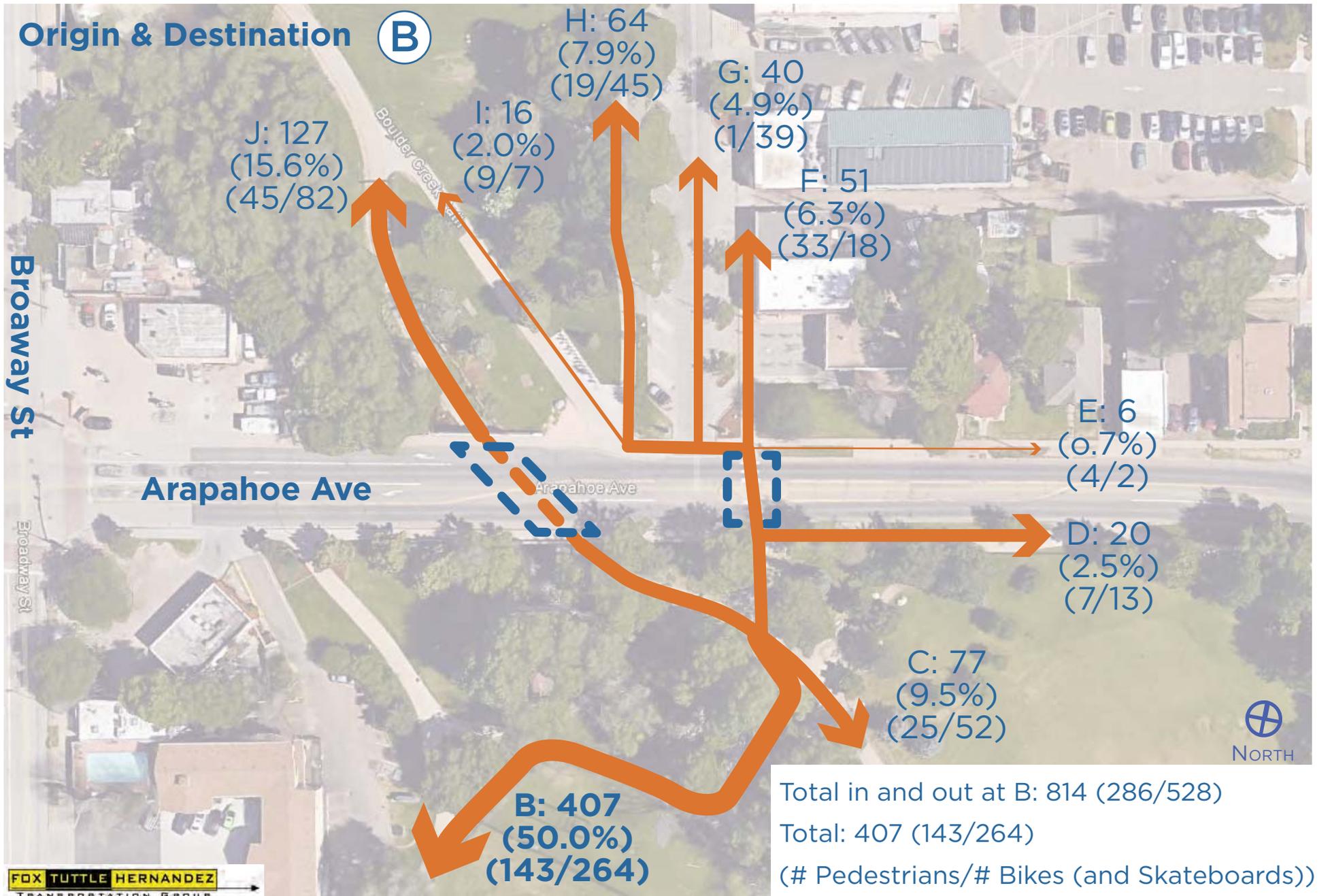
Aprahoe & 13th Underpass: Orgins and Destinations  
 All Trips



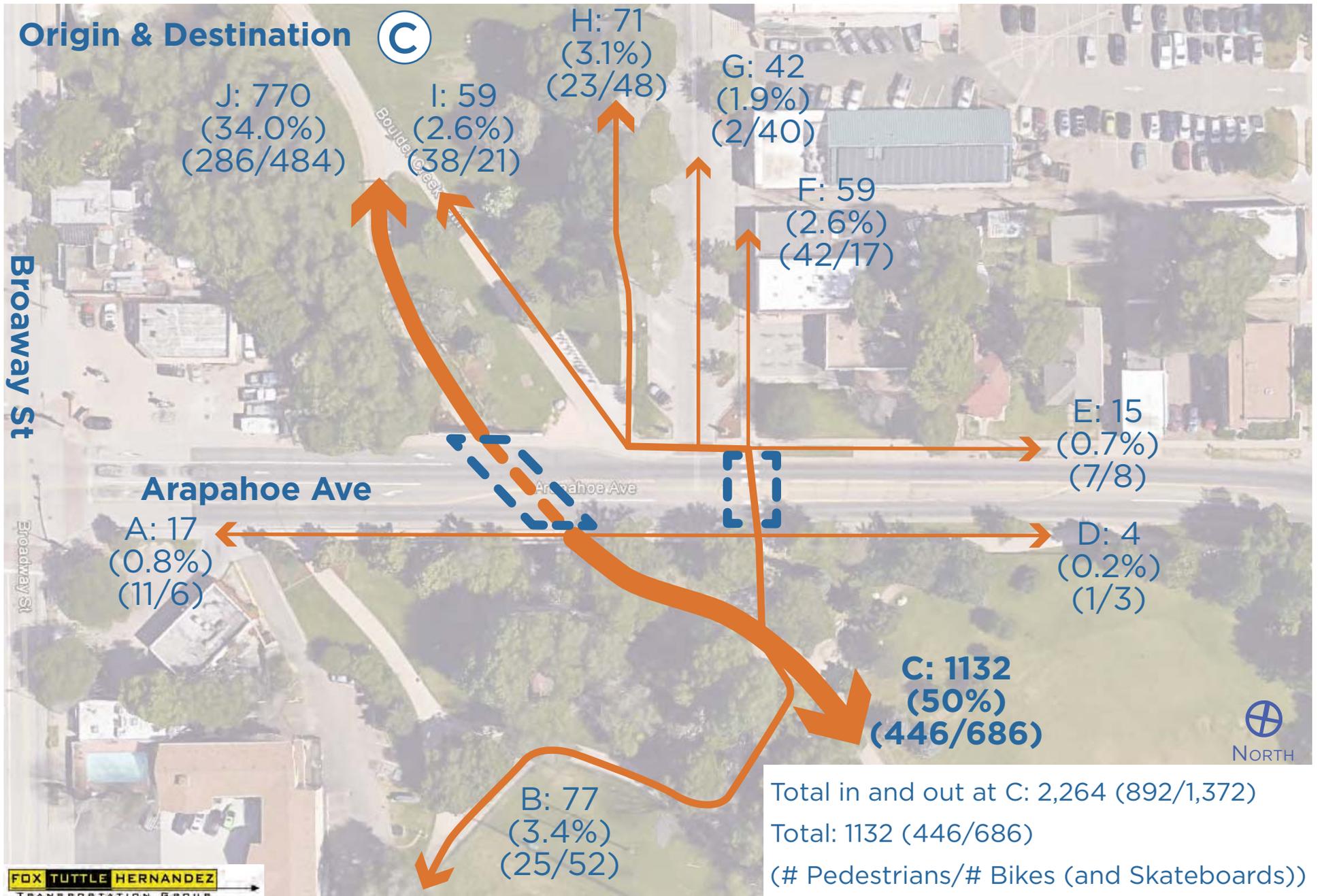


Aprahoe & 13th Underpass: Orgins and Destinations  
 Trips in and out of "A"

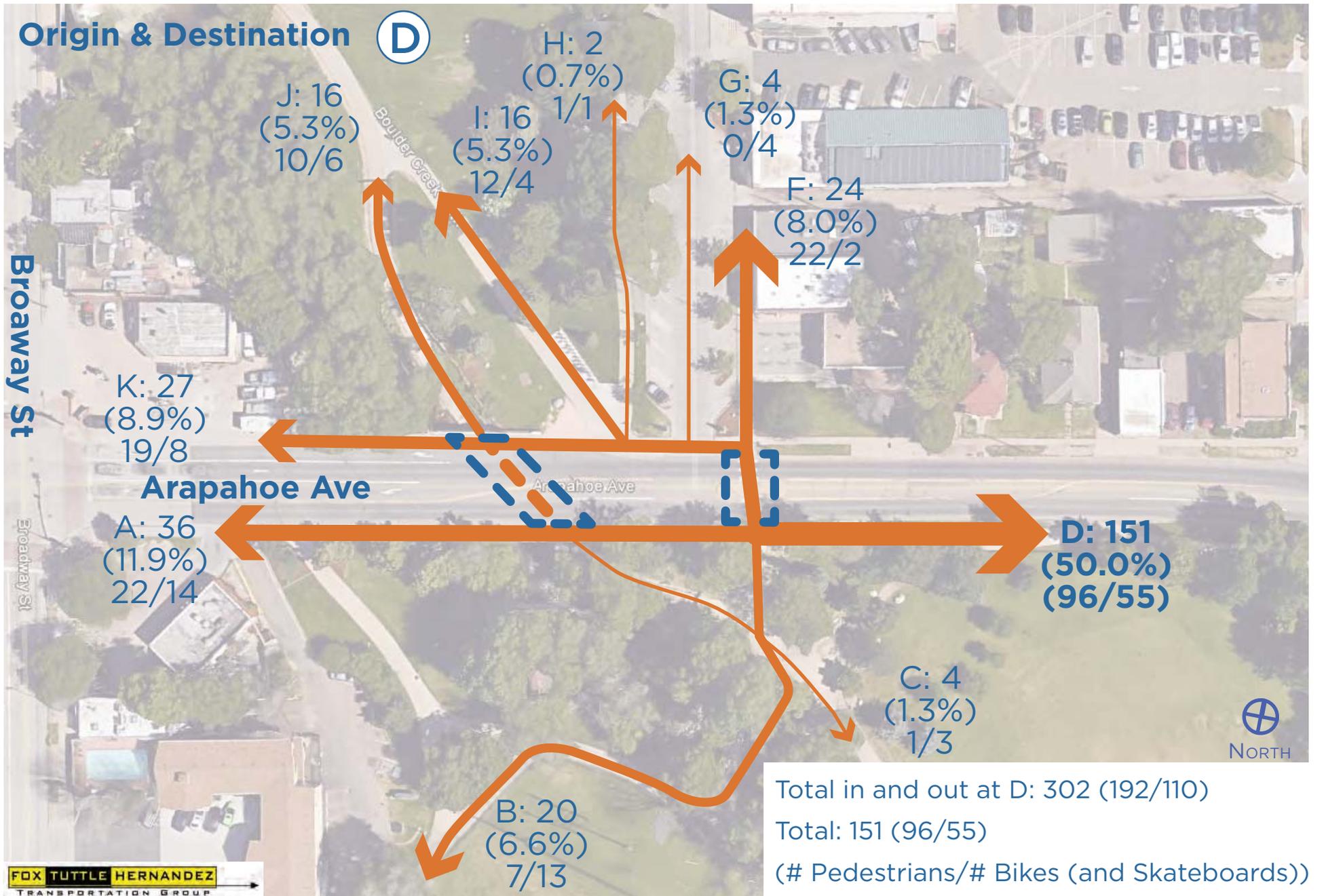




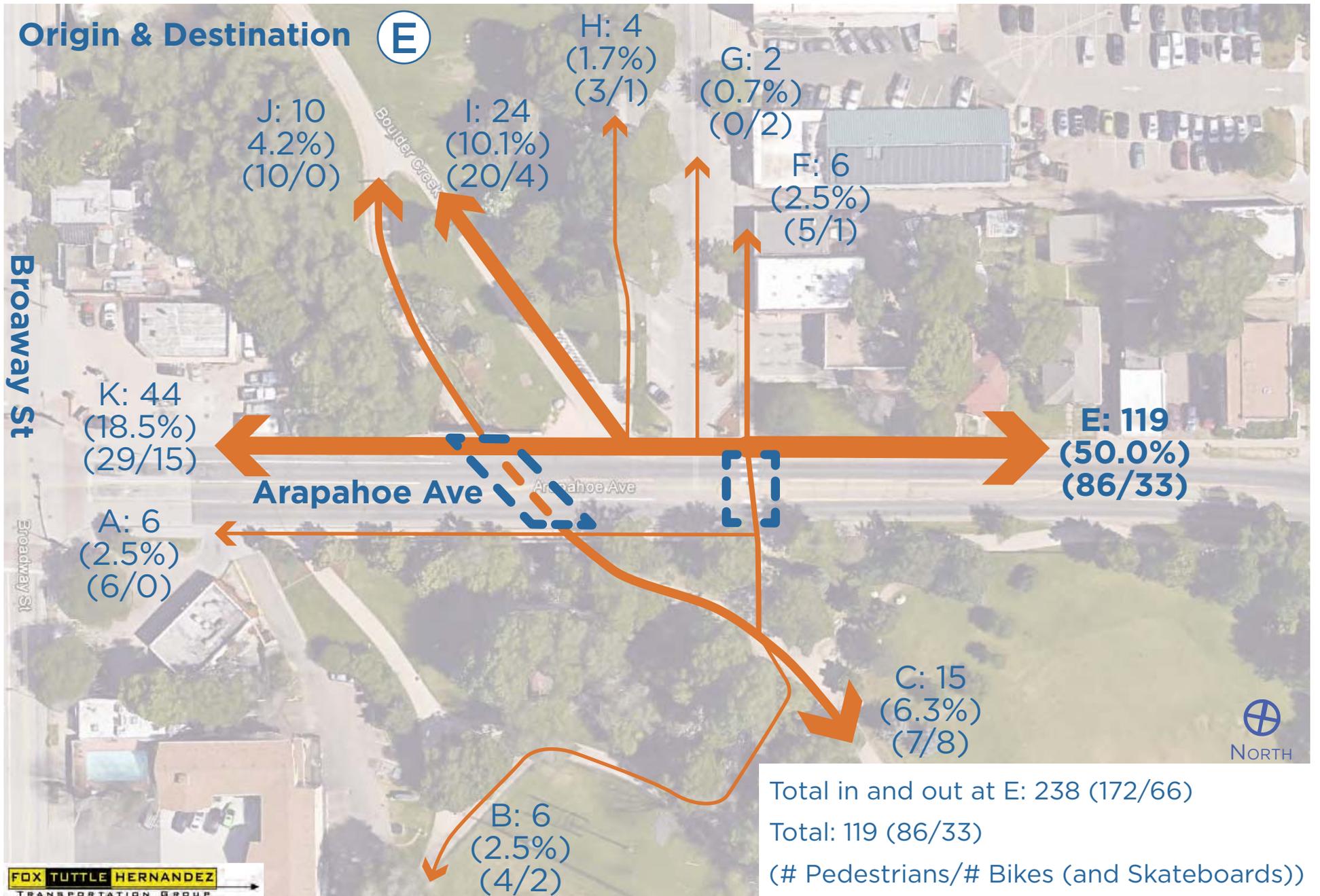
Arapahoe & 13th Underpass: Origins and Destinations  
Trips in and out of "B"



Arapahoe & 13th Underpass: Origins and Destinations  
 Trips in and out of "C"



Aprahoe & 13th Underpass: Orgins and Destinations  
 Trips in and out of "D"



Arapahoe & 13th Underpass: Origins and Destinations Trips in and out of "E"

**Origin & Destination**

**F**

**Broadway St**

**Brookway St**

*Boulder Creek Path*

Arapahoe Ave

**F: 175  
(50.0%)  
(133/42)**

**E: 6  
(1.7%)  
(5/1)**

**K: 14  
(4.0%)  
(14/0)**

**Arapahoe Ave**

**A: 13  
(3.7%)  
(12/1)**

**D: 24  
(6.9%)  
(22/2)**

**C: 59  
(16.9%)  
(42/17)**

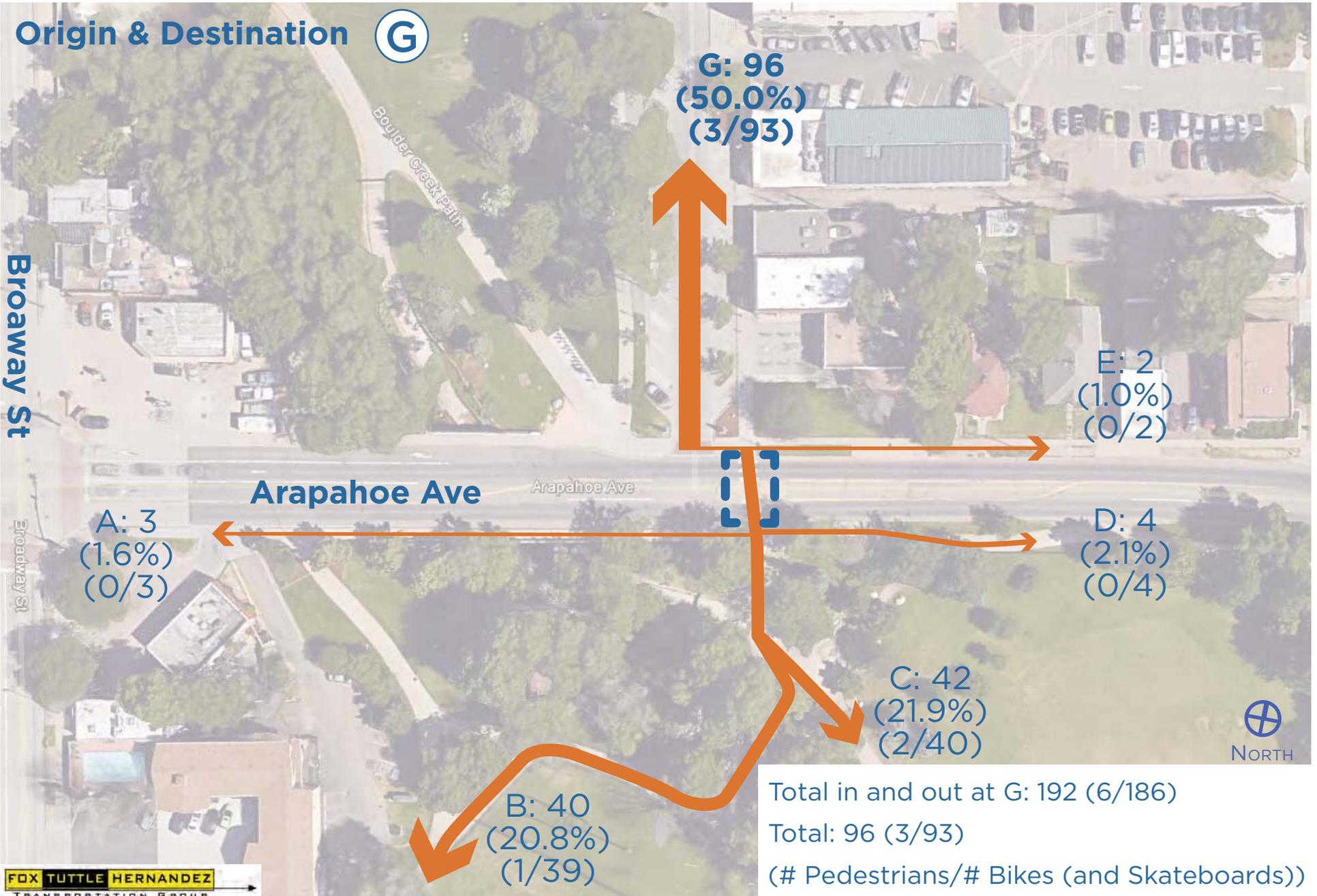


**B: 51  
(14.6%)  
(33/18)**

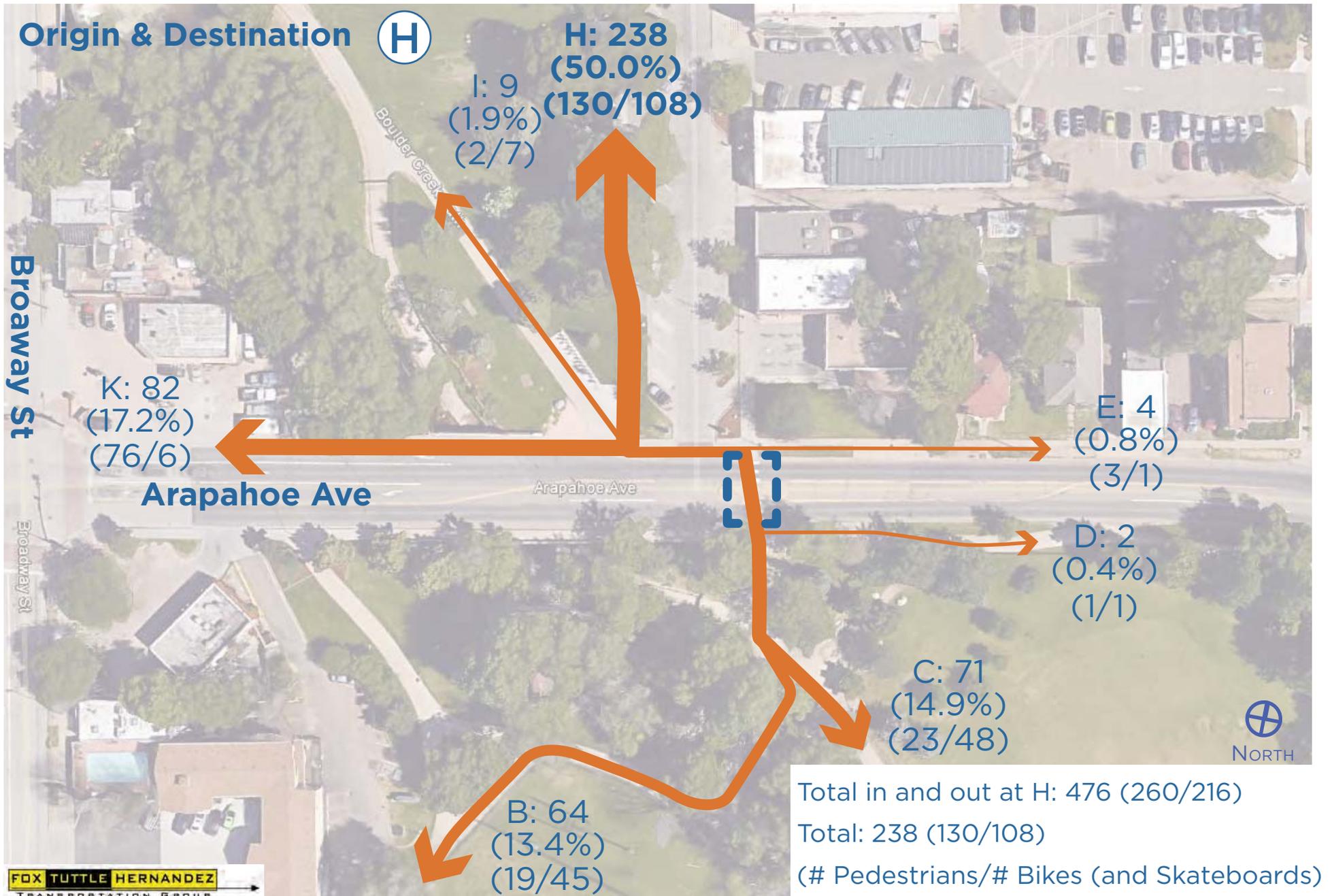
Total in and out at F: 350 (266/84)  
Total: 175 (133/42)  
(# Pedestrians/# Bikes (and Skateboards))



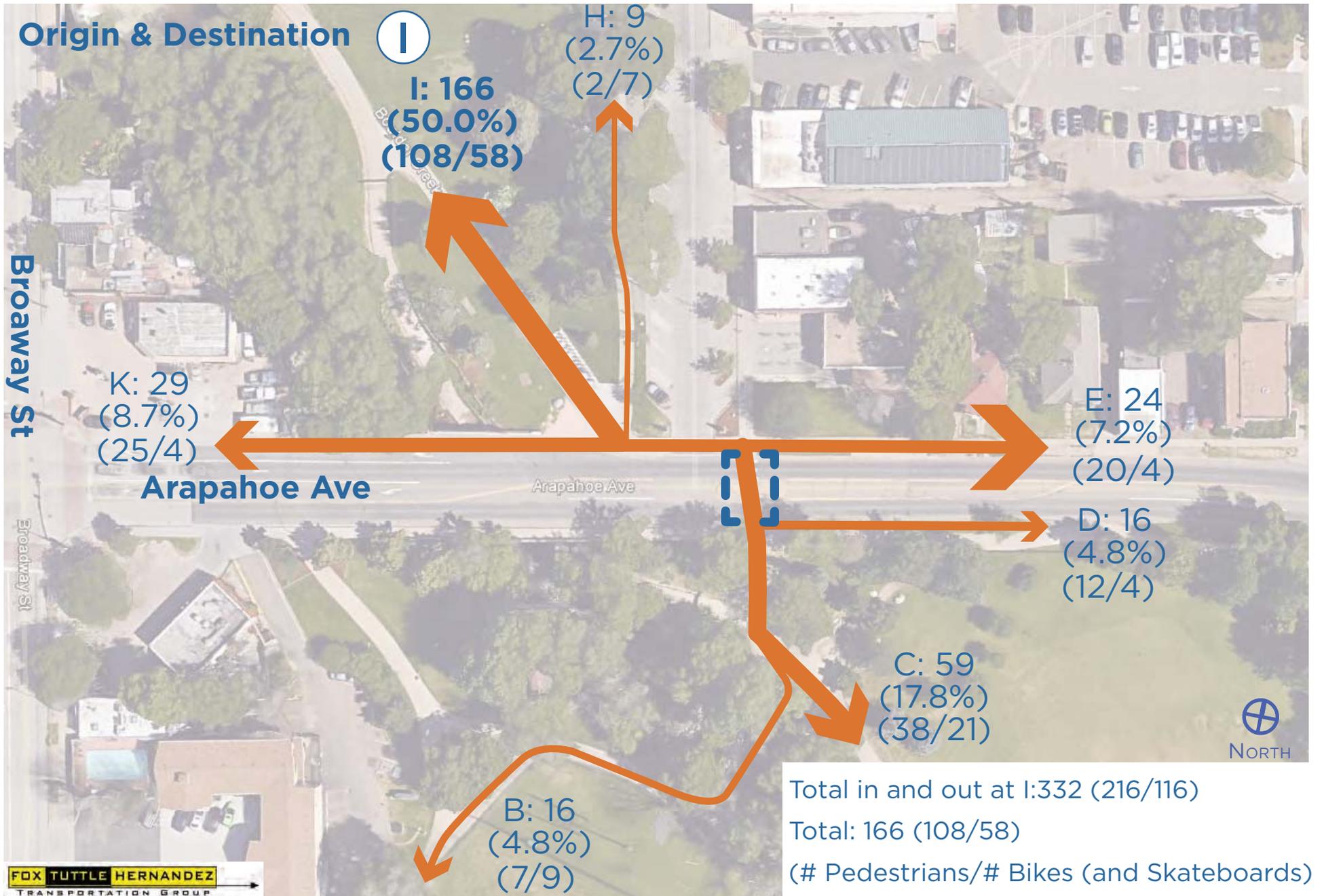
Arapahoe & 13th Underpass: Origins and Destinations  
Trips in and out of "F"



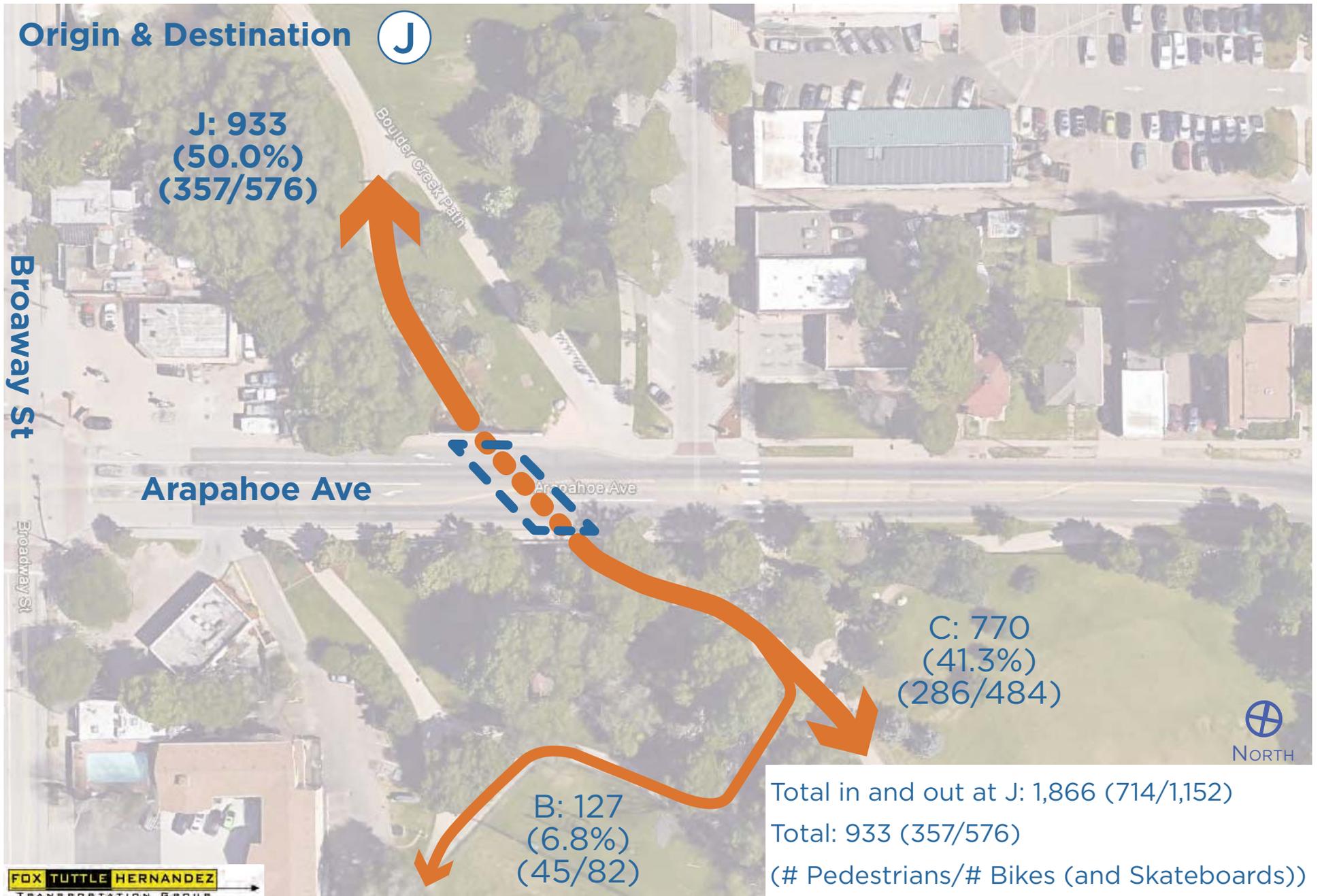
Arapahoe & 13th Underpass: Origins and Destinations  
Trips in and out of "G"



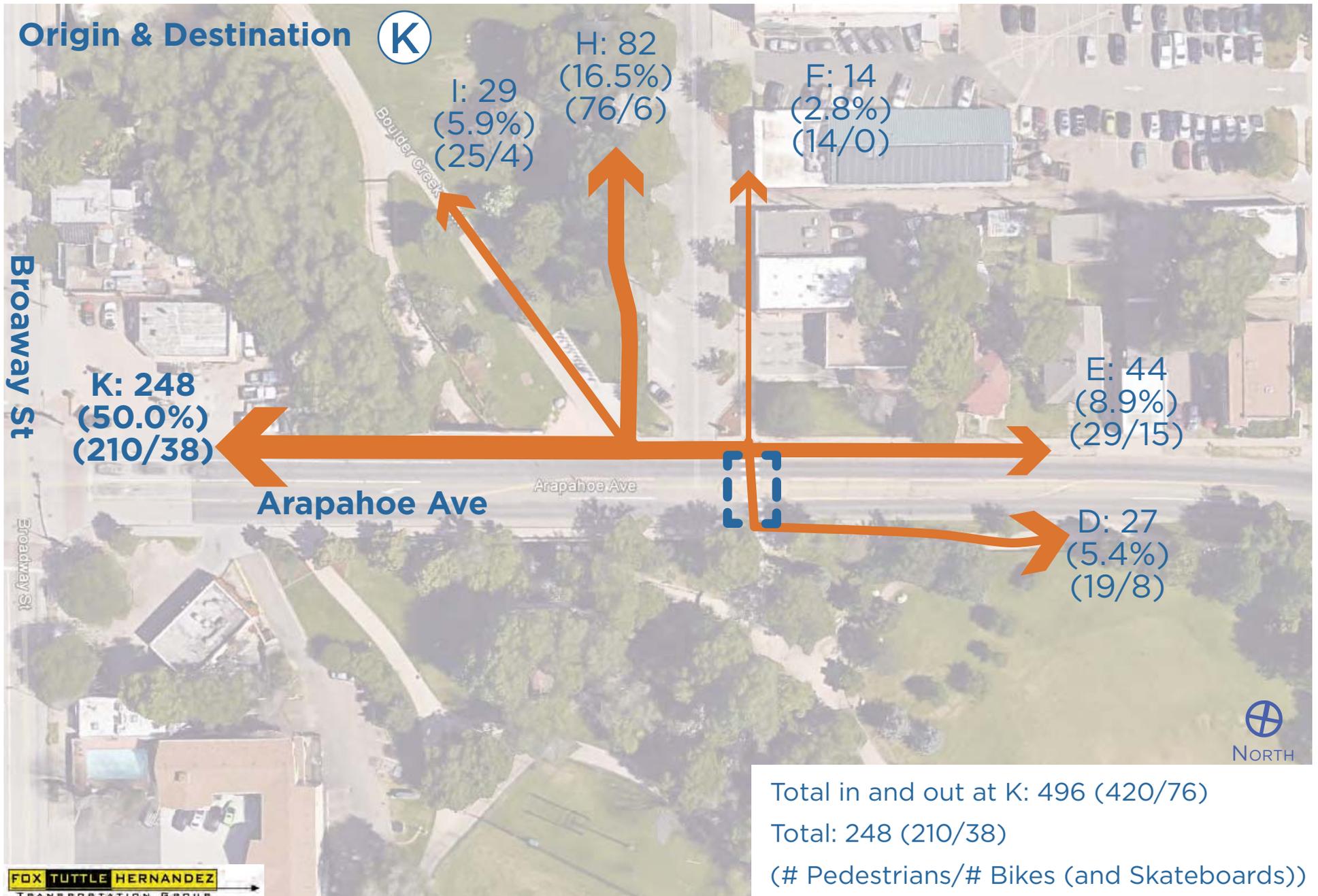
Arapahoe & 13th Underpass: Origins and Destinations  
 Trips in and out of "H"



Arapahoe & 13th Underpass: Origins and Destinations  
 Trips in and out of "I"



Arapahoe & 13th Underpass: Origins and Destinations  
Trips in and out of "J"



Arapahoe & 13th Underpass: Origins and Destinations  
Trips in and out of "K"

**MEMORANDUM**

**To:** Bryant Gonsalves

**From:** Bill Fox

**Date:** May 4, 2016

**Project:** Arapahoe and 13<sup>th</sup> intersection area bicycle and pedestrian origin/destination counts

**Subject:** Preliminary data summary

At your request the Fox Tuttle Hernandez completed a detailed set of bicycle and pedestrian counts in the vicinity of the intersection of Arapahoe Avenue and 13<sup>th</sup> Street intersection. In this area there is not only the roadway intersection, but also the intersection of the Boulder Creek Path and the Broadway Path, and the underpass of the Creek Path beneath Arapahoe Avenue. A sidewalk connects the two multi-use paths to the 13<sup>th</sup> Street crossing at-grade across Arapahoe Avenue, and finally, there are east/west sidewalks along both sides of Arapahoe. This complicated intersection area includes eleven different entry or exit points for the bicyclists and pedestrians that are traveling along or across Arapahoe Avenue. These access points (labeled A – K) are illustrated on the attached Base Map. The net result is that there are a total of 121 possible origin/destination pairs for pedestrians and bicyclists traveling through this area.

The pedestrians and bicycles traveling through this area were observed on April 19<sup>th</sup>, while both CU and Boulder High School were in session, during the time periods listed below. The weather started off cool but was generally sunny and seasonal.

- 7:15 AM to 8:30 AM
- 11:00 AM to 1:00 PM
- 3:00 PM to 5:00 PM

These time periods captured the typical AM, Noon, and PM peak travel periods, and also included the arrival and departure periods for the adjacent Boulder High School. The breakdown of users by travel mode and time period was as follows:

Time Period	Pedestrians	Bicycles	Skateboarders	Total
7:15 – 8:30 AM	156	93	3	252
11:00 AM – 1:00 PM	562	176	6	744
3:00 – 5:30 PM	511	294	9	814
<b>Total:</b>	<b>1,229</b>	<b>563</b>	<b>18</b>	<b>1,810</b>

It was noted that of the 1,810 travelers observed:

- 548 (30%) crossed Arapahoe Avenue at-grade in the marked crosswalk on the east side of 13<sup>th</sup> Street
- 538 (30%) crossed Arapahoe using the path underpass along Boulder Creek
- 724 (40%) moved through the study area but did not cross Arapahoe Avenue.

Figure 1 includes an illustration of the detailed arrival and departure pattern for all 1,810 travelers that were observed throughout the day. It shows the total number of travelers who arrived or departed at each of the eleven access points and also provides the percentage of the total access that occurred at each station. The remaining Figures 2 – 10 illustrate the travel pattern to/from the individual access points (excluding G and H since they had relatively low access traffic). The weight or width of the lines in each figure represent the proportional amount of travel in each area.

At this point the attached figures illustrate the travel pattern for pedestrians, bicyclists and skateboarders combined over the entire day. Data is available to provide this same information for each time period separately, and for bicyclists and pedestrians separately within each time period, but this would result in 60 additional figures, which would likely be too much information.

Some significant observations include:

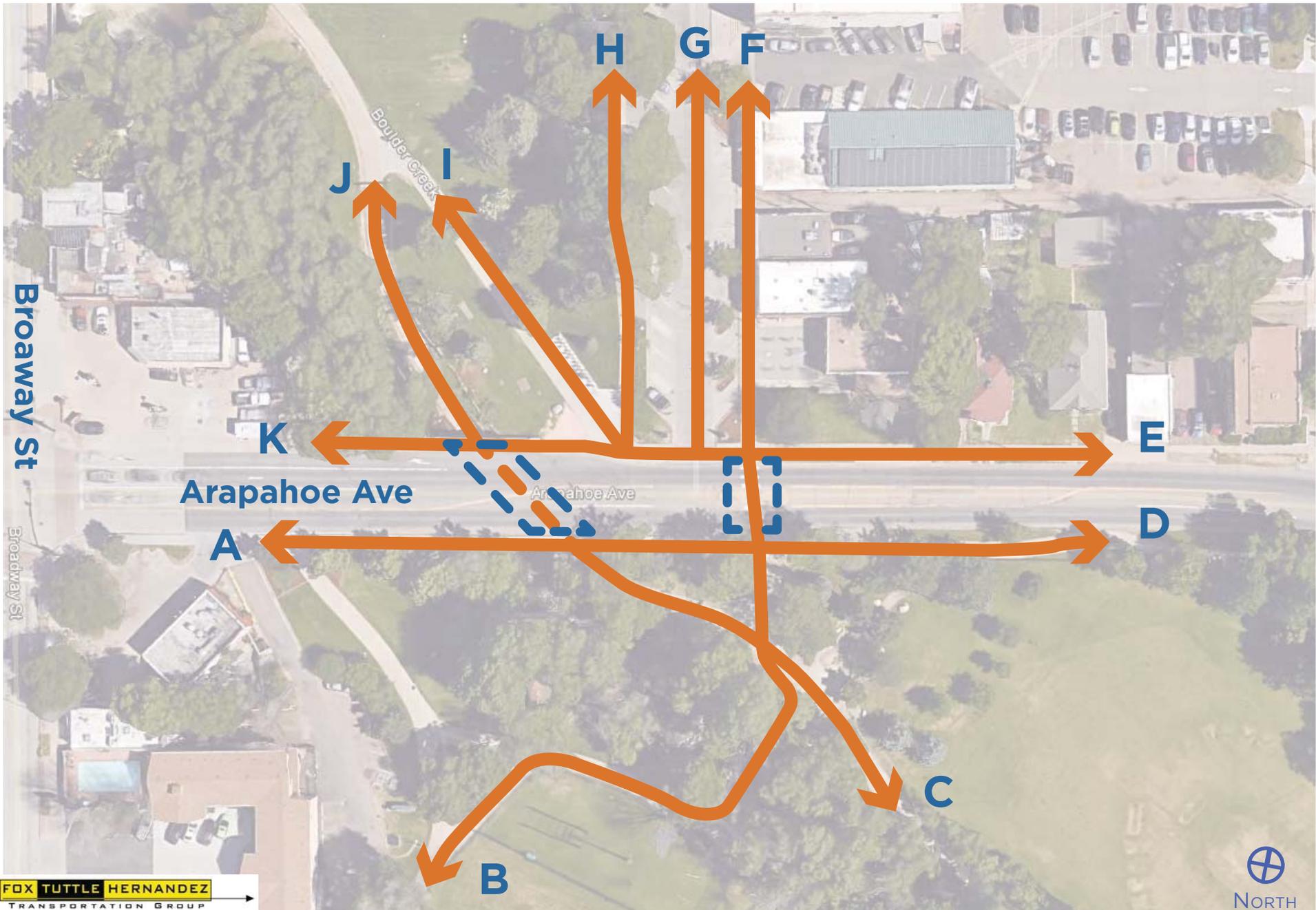
- Most people traveling along Arapahoe on the north or south sidewalks did not cross the street. However, there was a pattern of high school students traveling between accesses D and I, using the crosswalk at 13<sup>th</sup> Street as part of their route to/from school. This is likely influenced by the location of the transit stop adjacent to the Civic Park on Broadway just south of Canyon Boulevard.
- Most of the northbound bicyclists who crossed Arapahoe in the crosswalk were accessing the crosswalk from the Boulder Creek Path (C) or the Broadway Path (B), and many arrived at the south edge of the crosswalk at a speed well in excess of a walking speed. This speed coupled with the poor sight distance between motorists and approaching bicyclists resulted in many motorists having to abruptly yield to the crossing bicyclist. Most motorists appeared alert and ready to yield at the crosswalk if needed, but a number of “near misses” in the crosswalk were observed.

- 
- During the mid-day period there was a significant amount of pedestrian traffic traveling along the south sidewalk between accesses A and D. Most pedestrians appeared to be high school students traveling to/from Alfalfa's Market for lunch.
  - The most predominant movement through the study area was the travel along the Boulder Creek Path between accesses C and J.

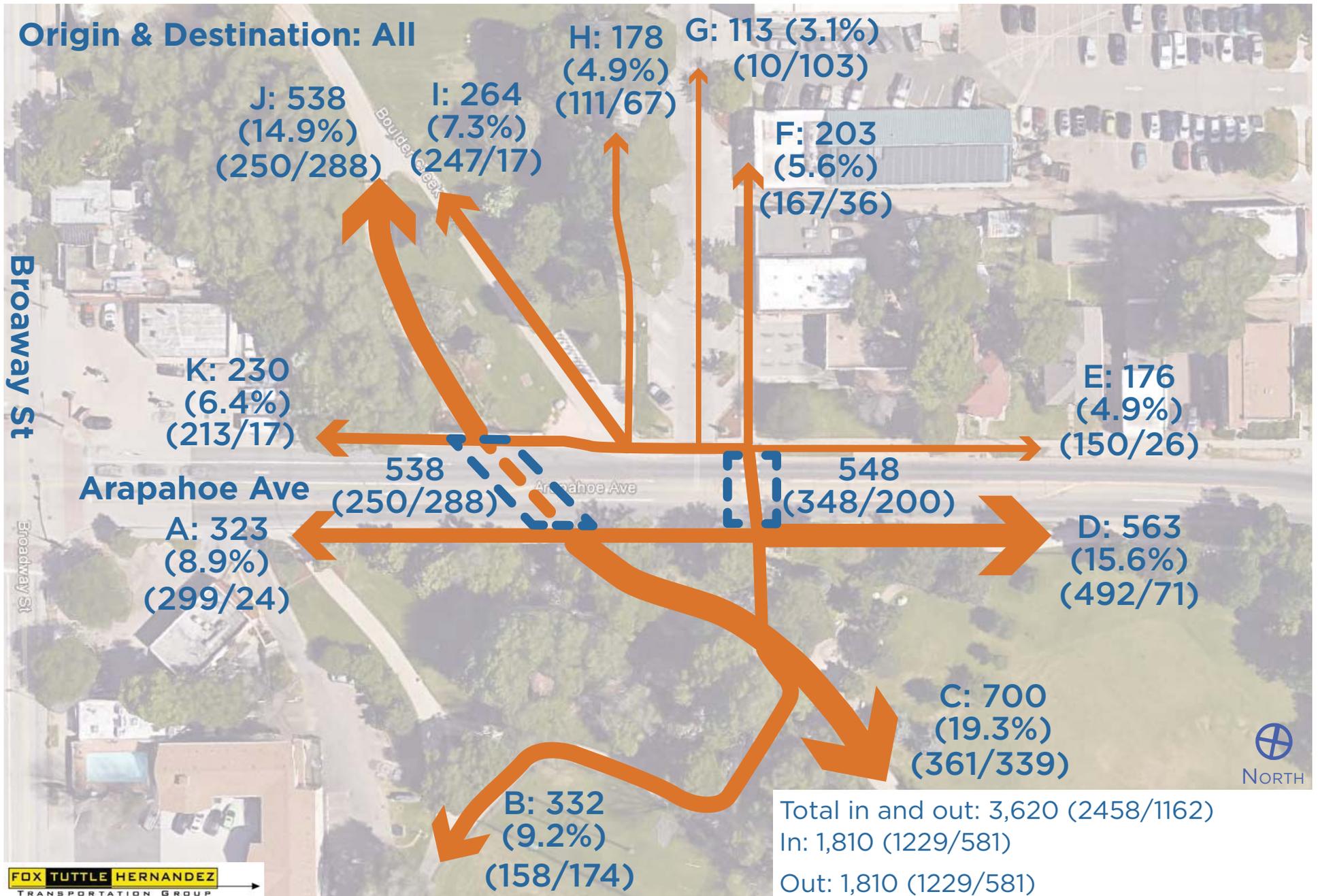
Please review this summary and let us know if this answers the questions you have regarding future underpass and sidewalk alignments. And let us know if we can be of further assistance reviewing the data and helping to determine the best alignment of these facilities in the future.

BF/

Attachments:           Base Map  
                              Figures 1 - 10



Arapahoe & 13th Underpass: Origins and Destinations



Aprahoe & 13th Underpass: Orgins and Destinations  
 All Trips

# Origin & Destination

**A**

**Broadway St**

**Broadway St**

**A: 323  
(50.0%)  
(299/24)**

**F: 22  
(3.4%)  
(19/3)**

**E: 9  
(1.4%)  
(8/1)**

**D: 270  
(41.8%)  
(252/18)**

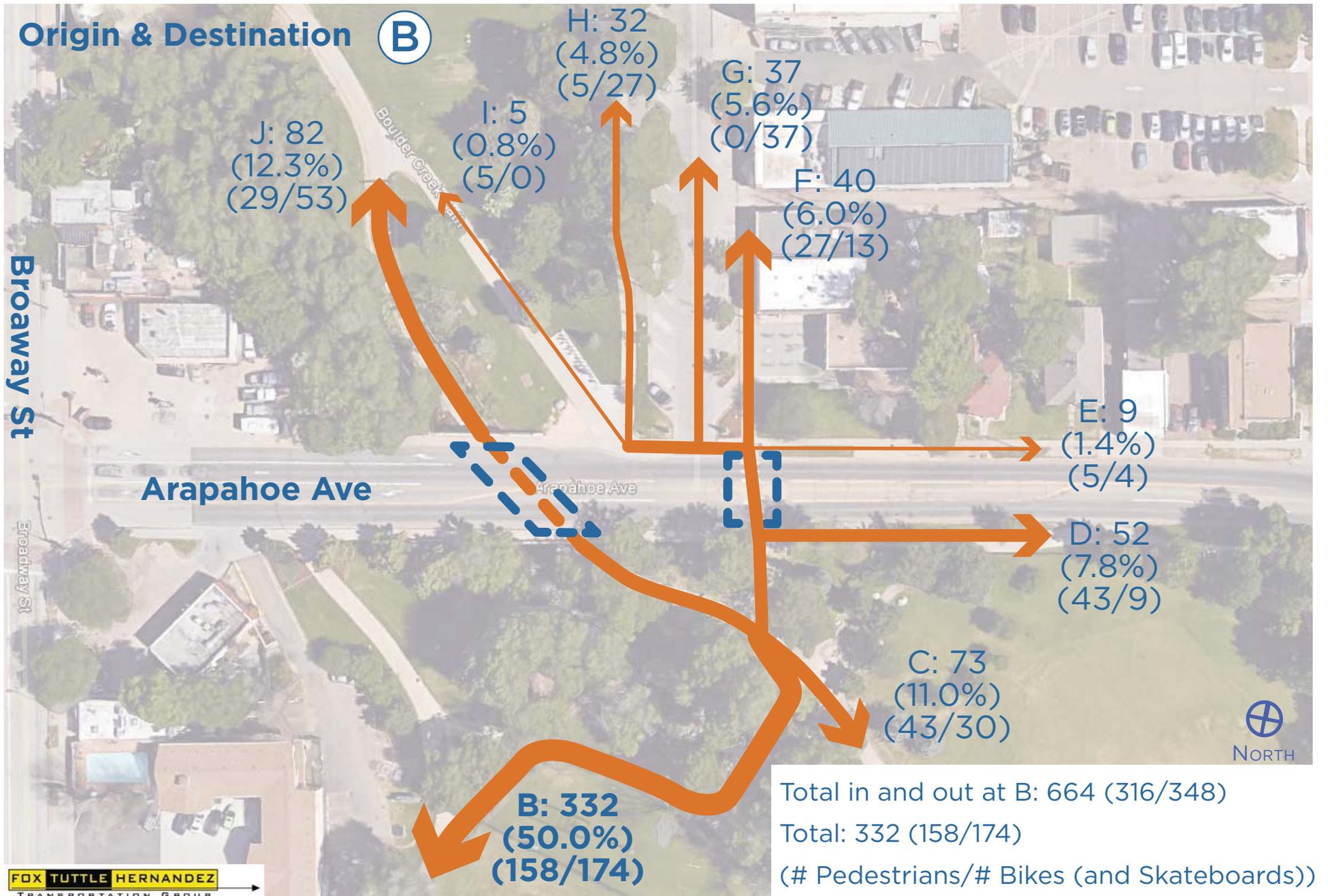
**C: 15  
(2.3%)  
(15/0)**



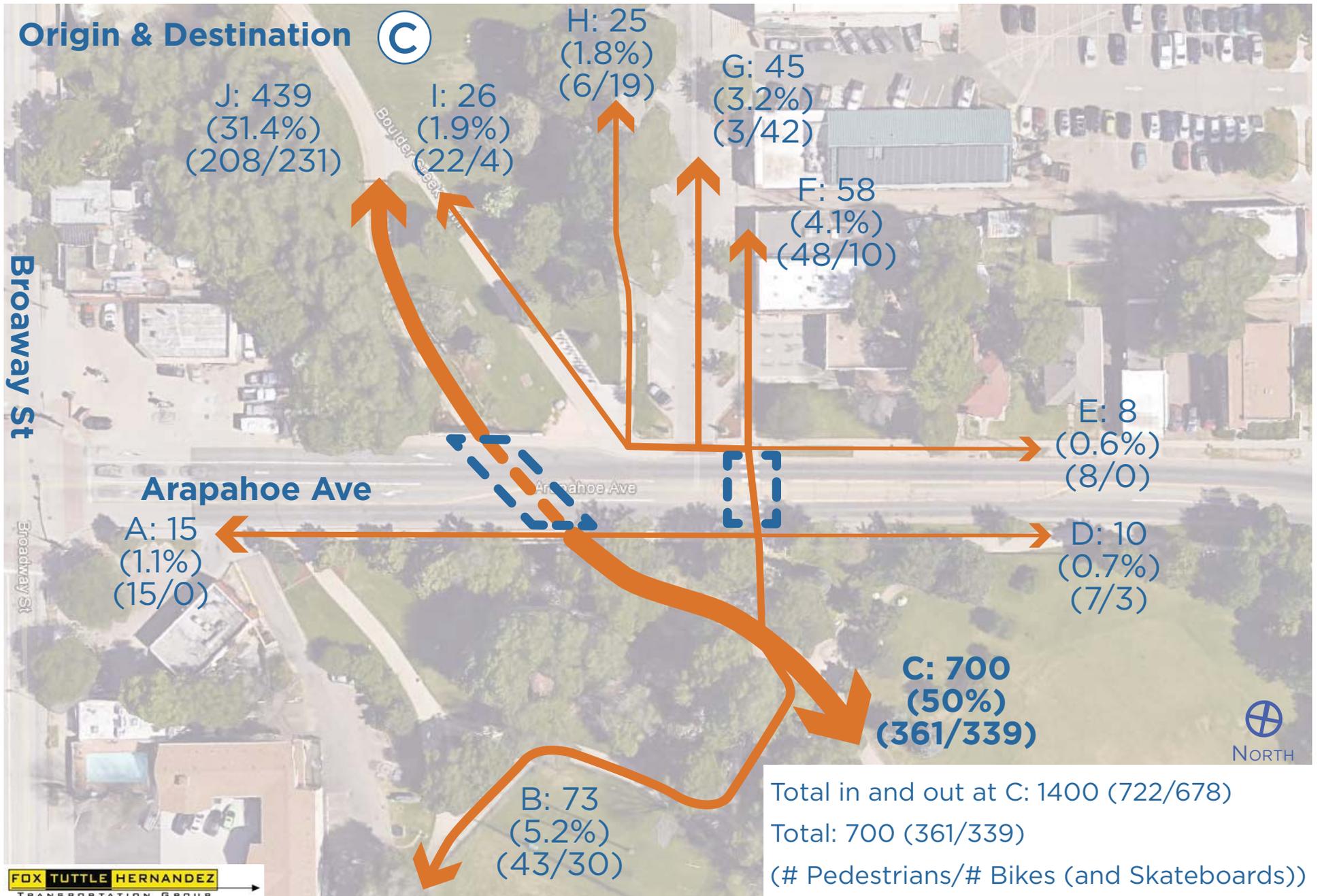
Total in and out at A: 646 (598/48)  
Total: 323 (299/24)  
(# Pedestrians/# Bikes (and Skateboards))



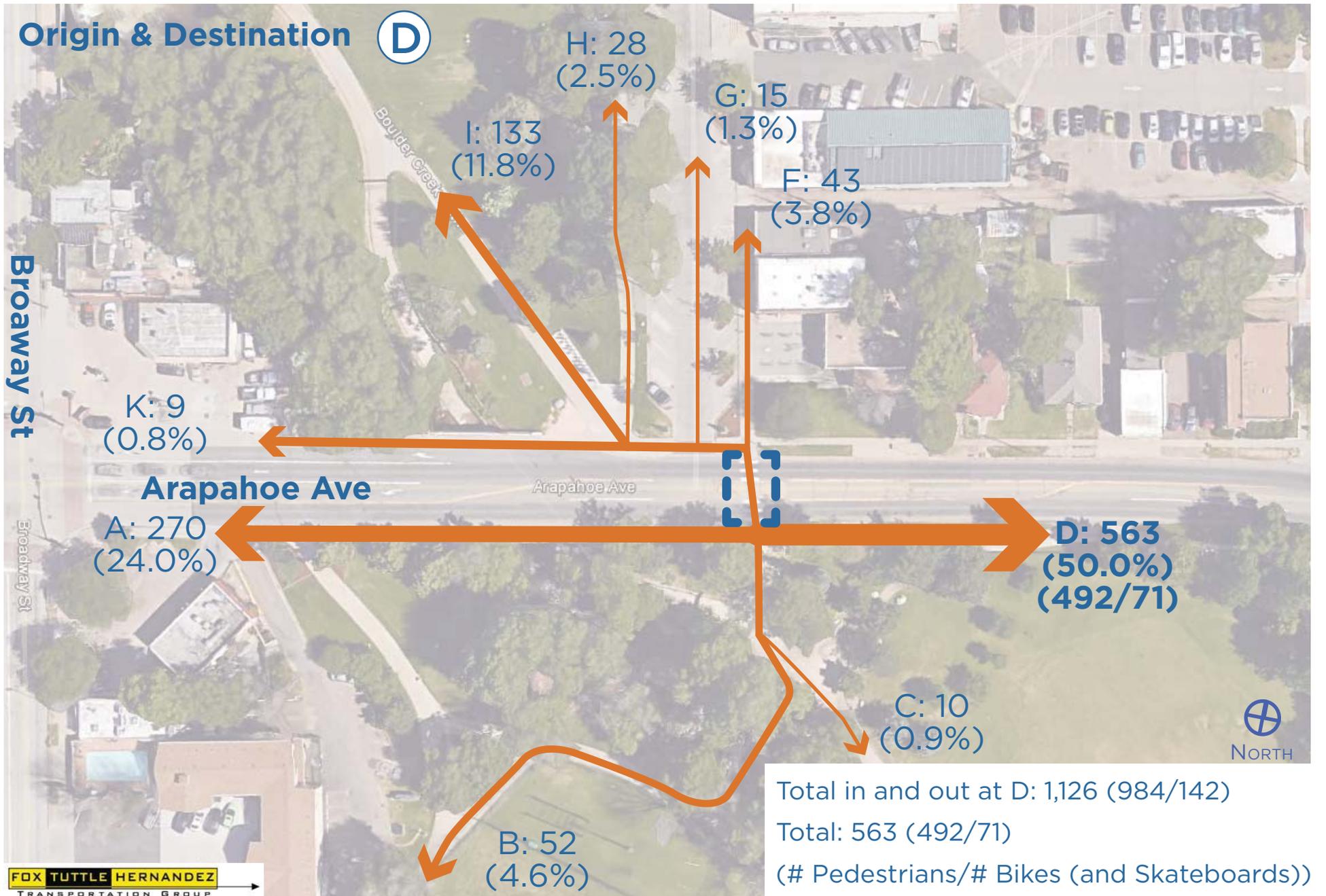
Arapahoe & 13th Underpass: Origins and Destinations  
Trips in and out of "A"



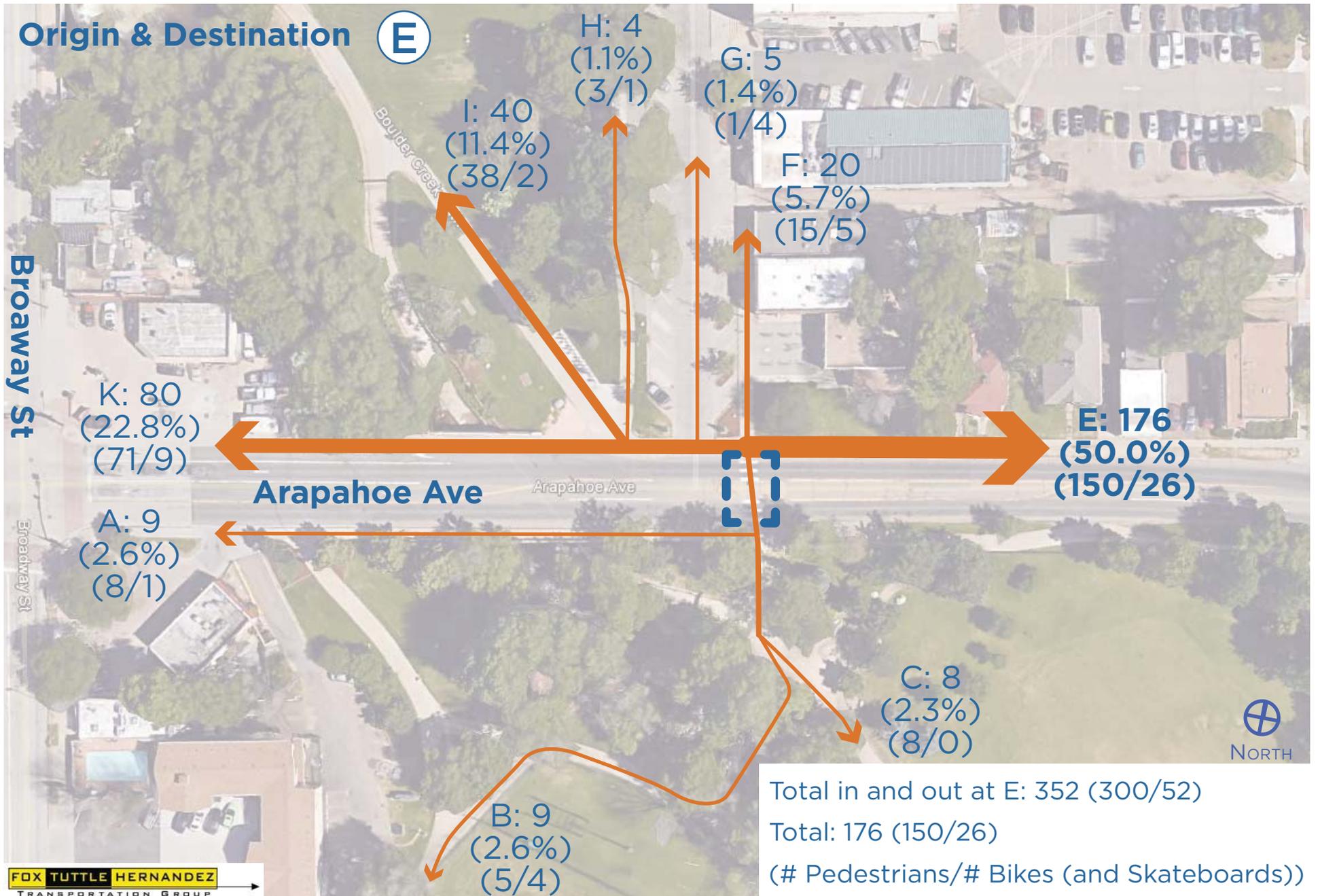
Arapahoe & 13th Underpass: Origins and Destinations  
 Trips in and out of "B"



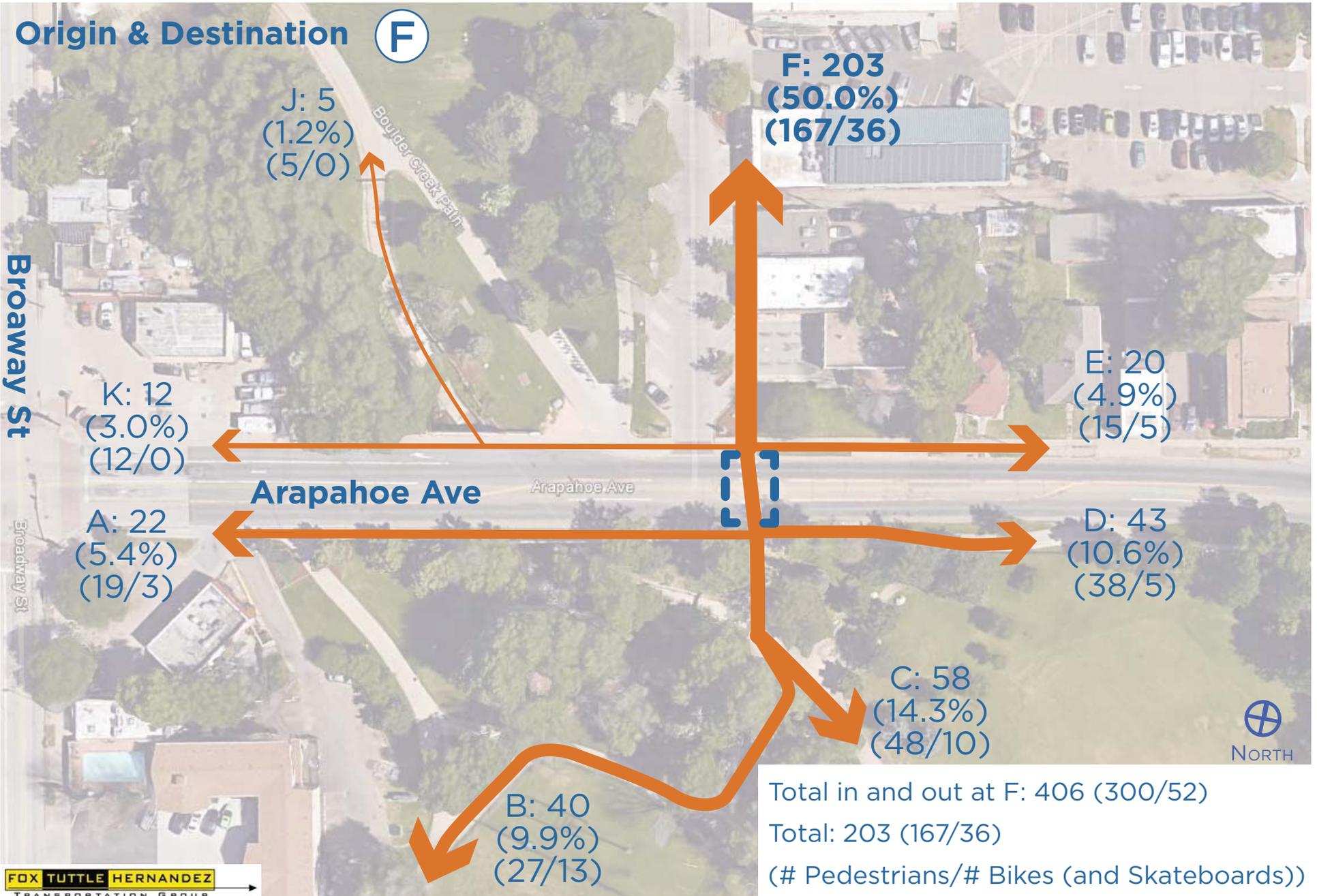
Arapahoe & 13th Underpass: Origins and Destinations  
 Trips in and out of "C"



Arapahoe & 13th Underpass: Origins and Destinations  
 Trips in and out of "D"

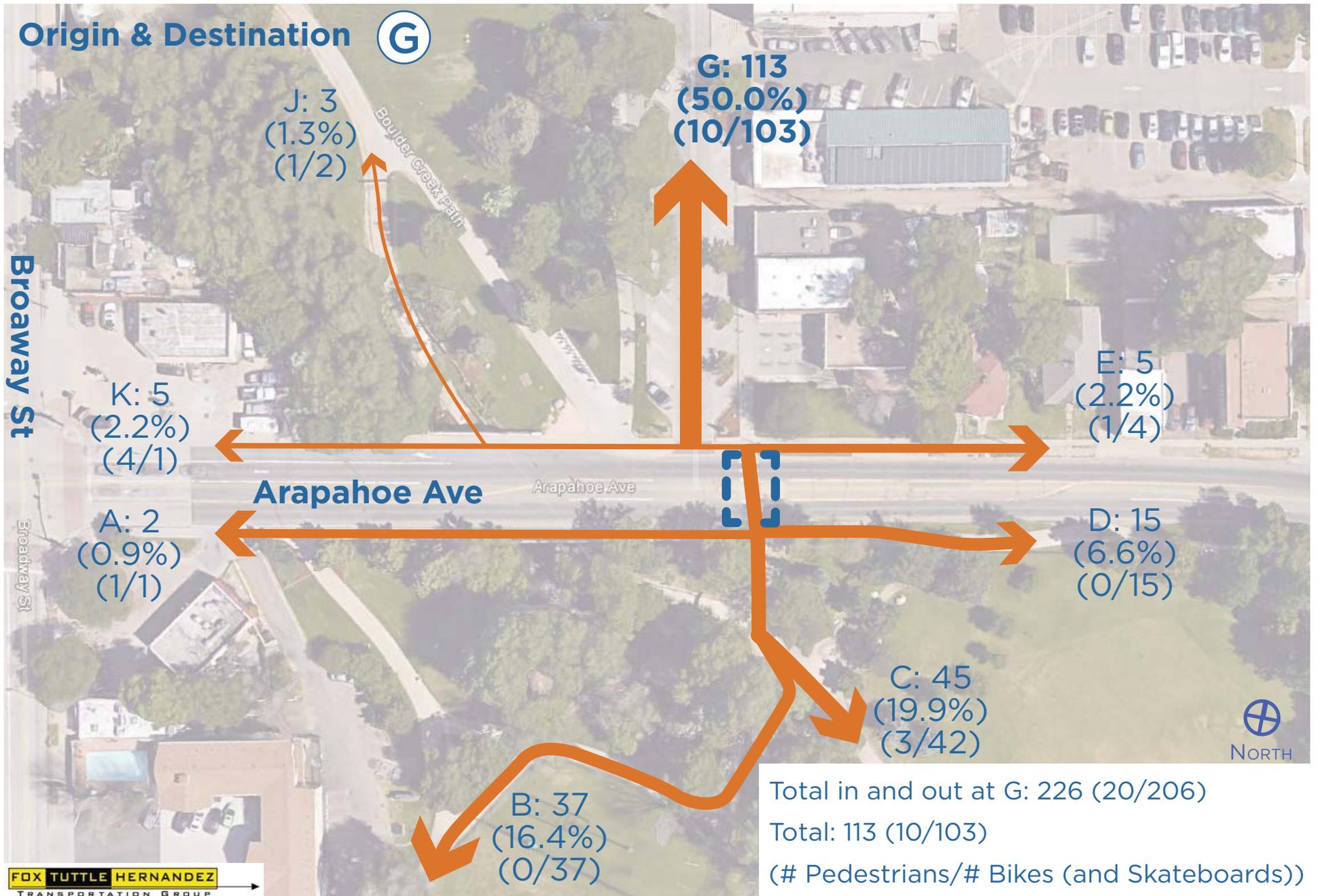


Arapahoe & 13th Underpass: Origins and Destinations  
 Trips in and out of "E"

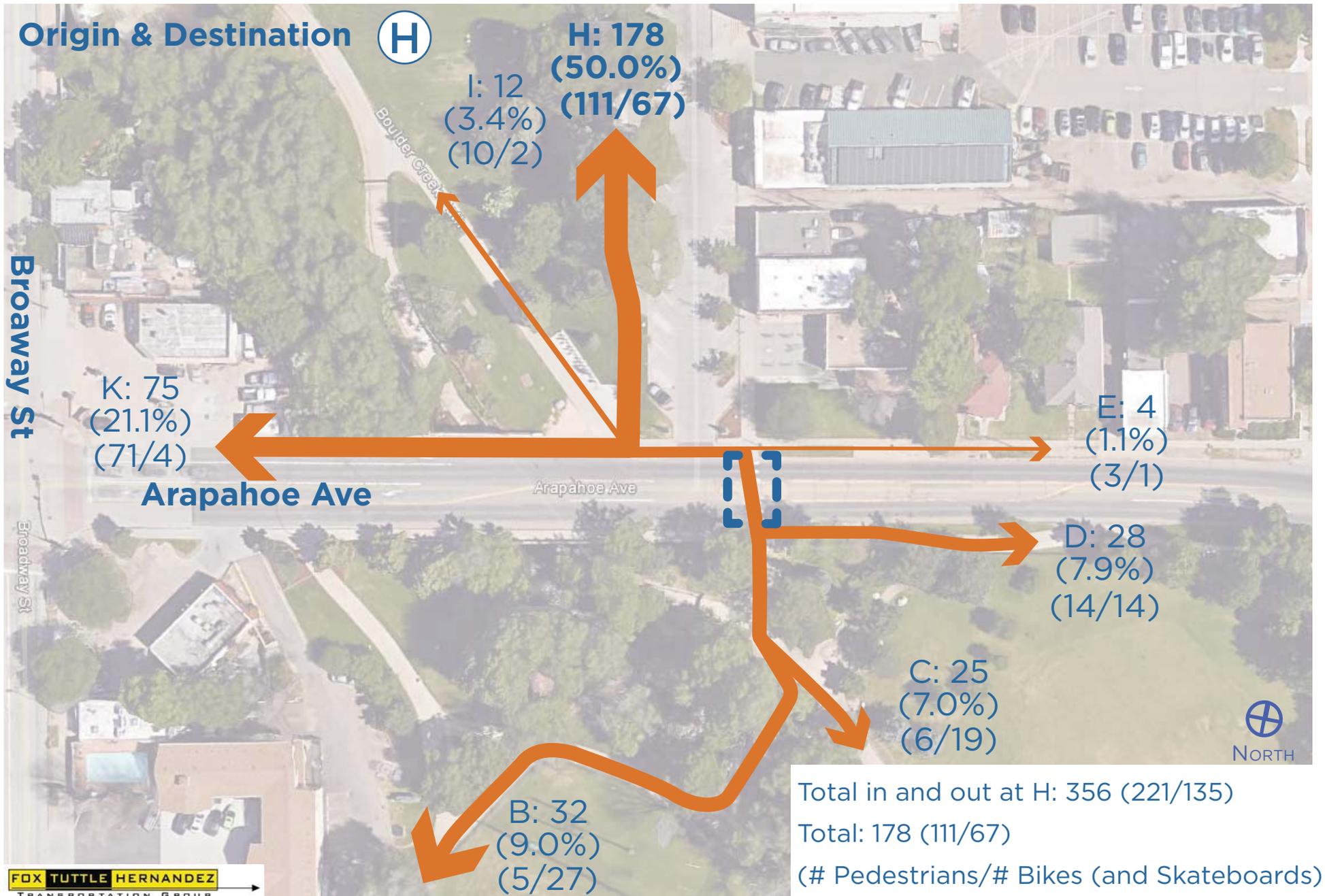


Arapahoe & 13th Underpass: Origins and Destinations  
 Trips in and out of "F"

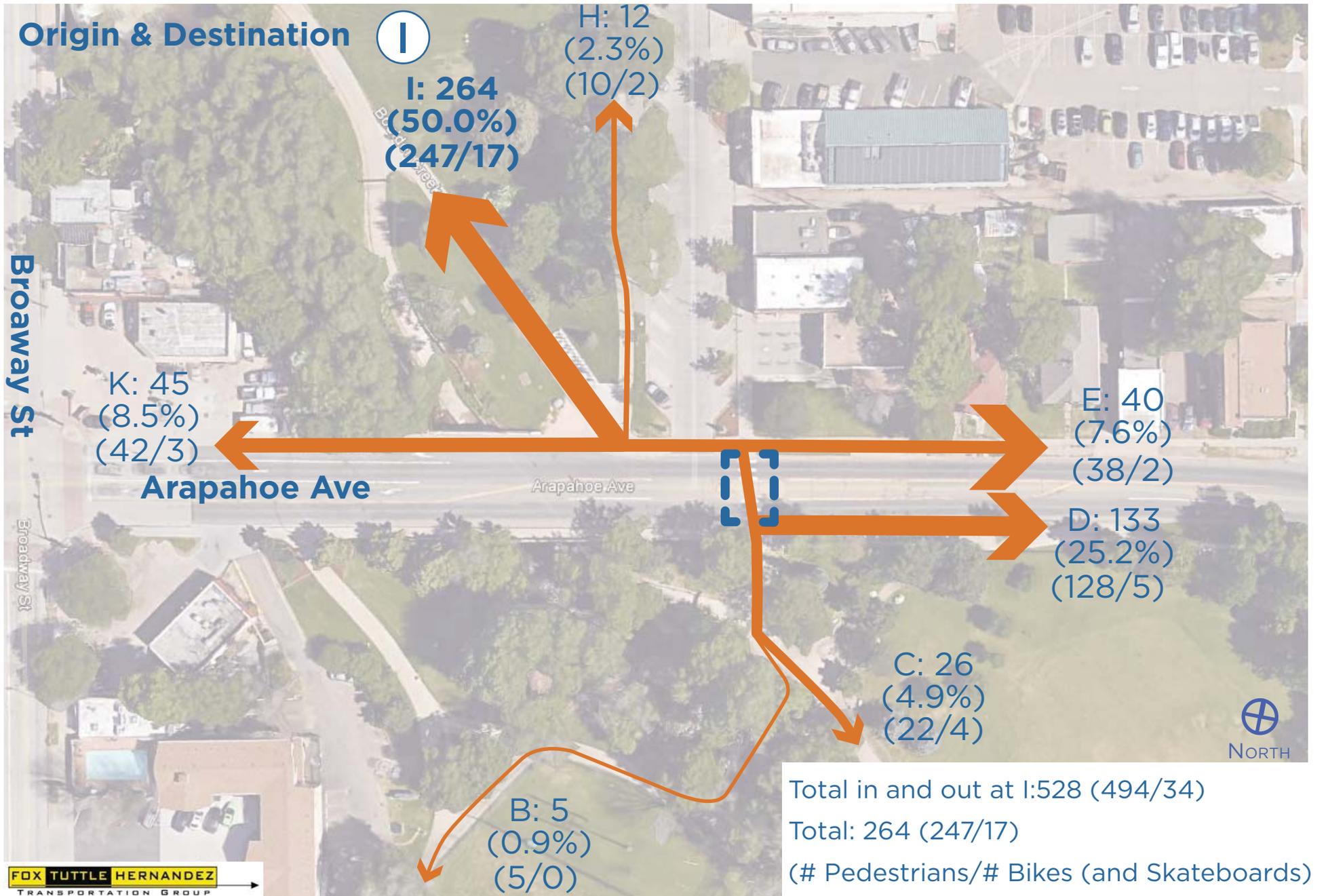




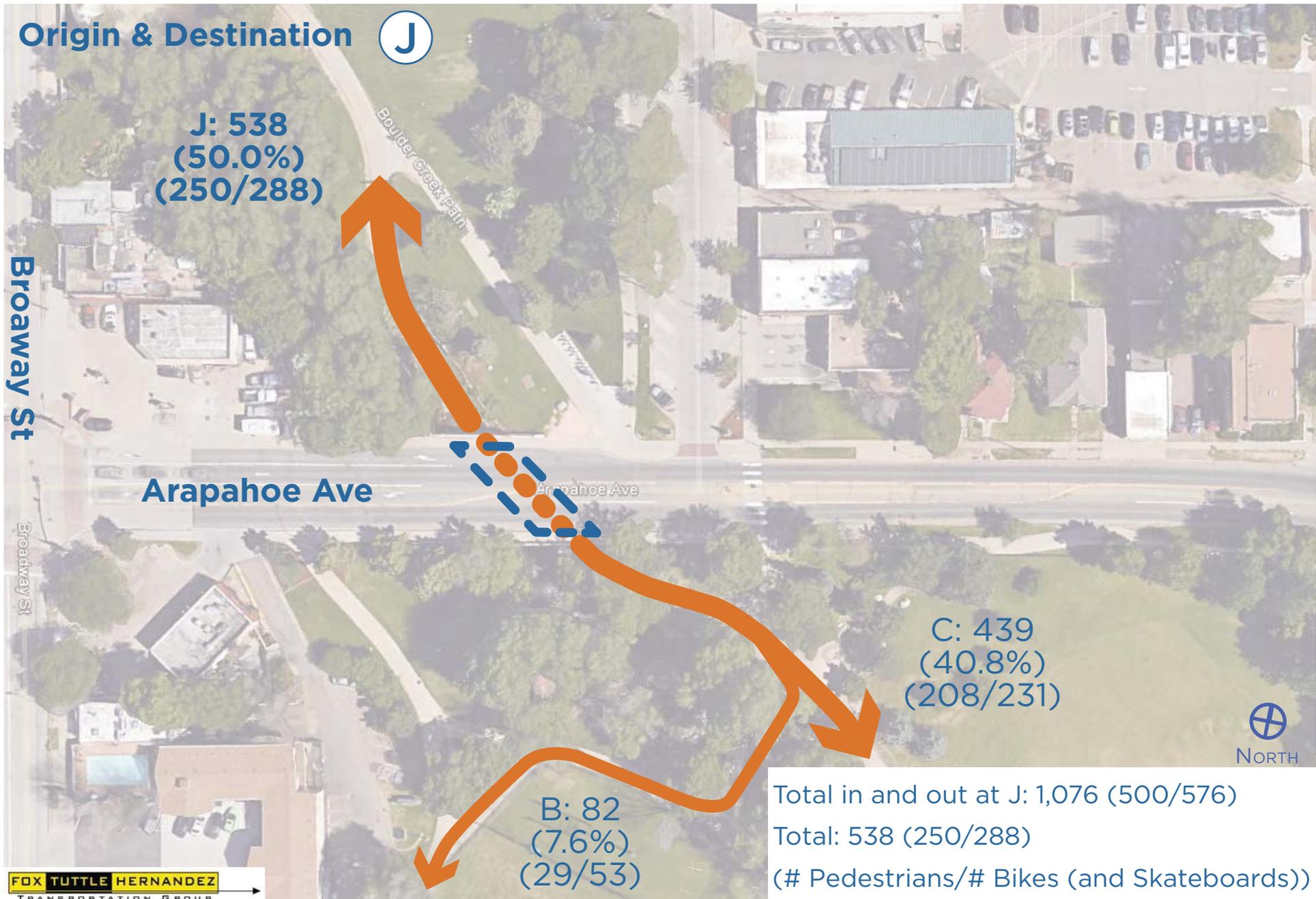
Arapahoe & 13th Underpass: Origins and Destinations  
Trips in and out of "G"



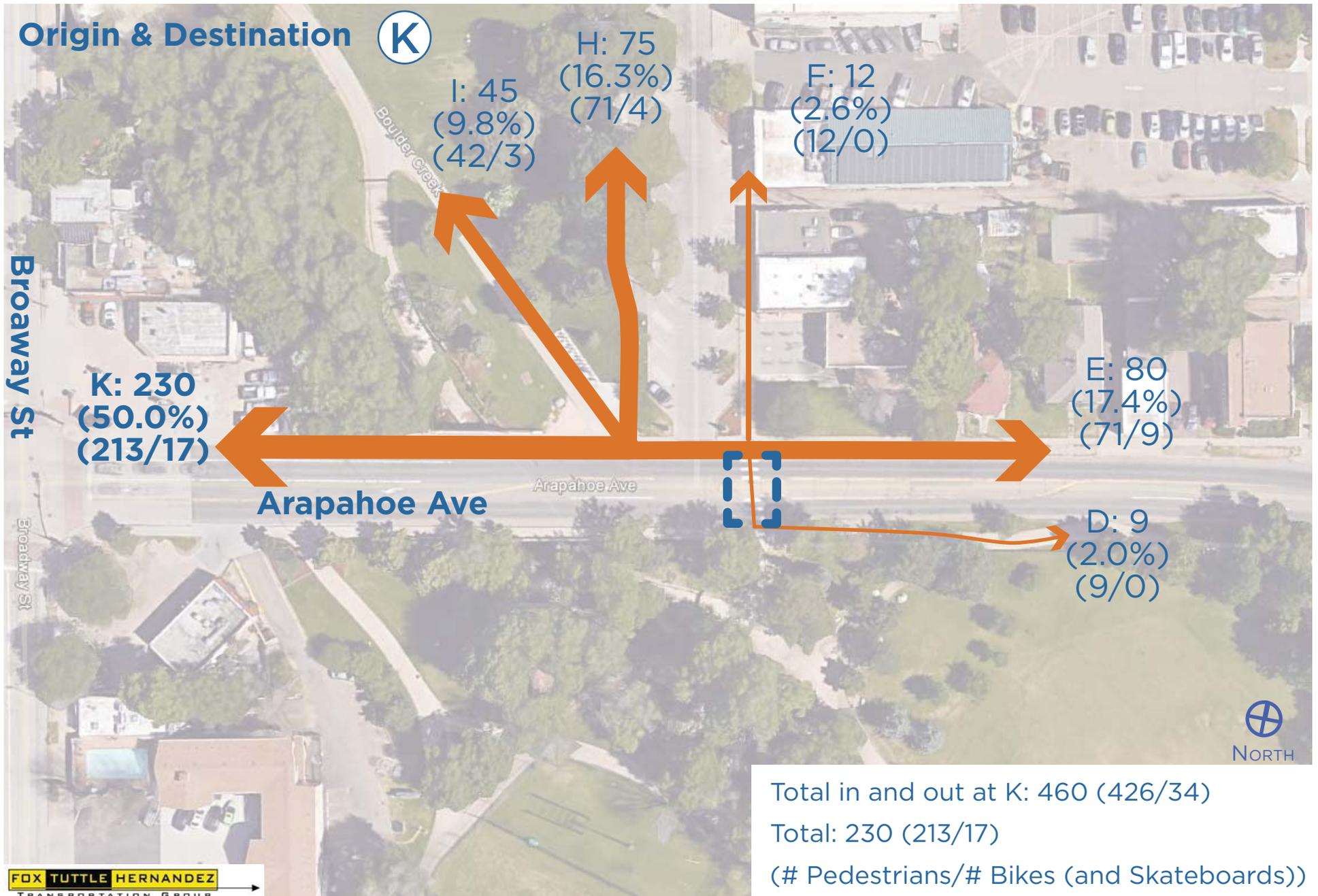
Arapahoe & 13th Underpass: Origins and Destinations  
 Trips in and out of "H"



Arapahoe & 13th Underpass: Origins and Destinations  
Trips in and out of "I"



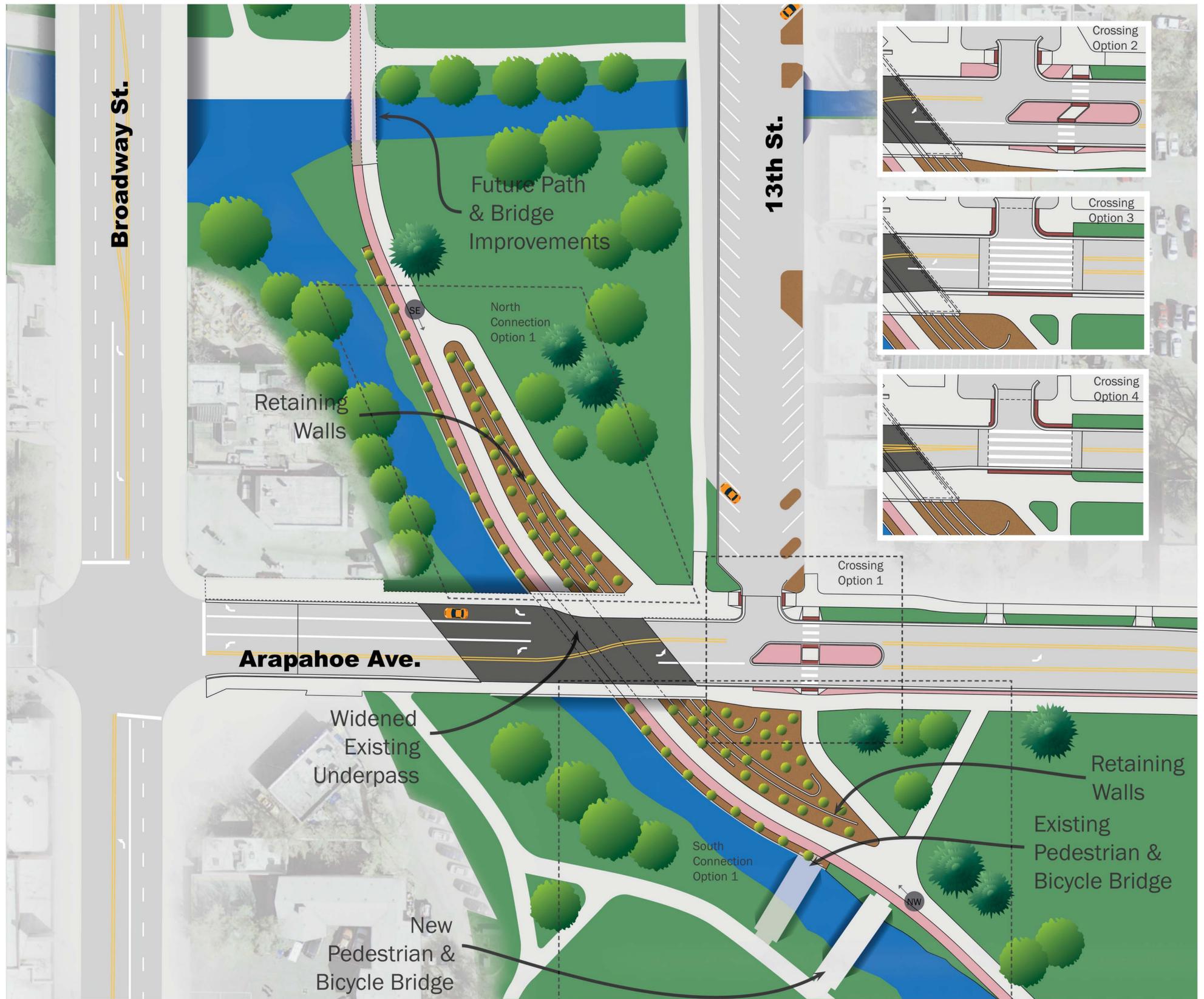
Arapahoe & 13th Underpass: Origins and Destinations  
Trips in and out of "J"



Arapahoe & 13th Underpass: Origins and Destinations  
Trips in and out of "K"

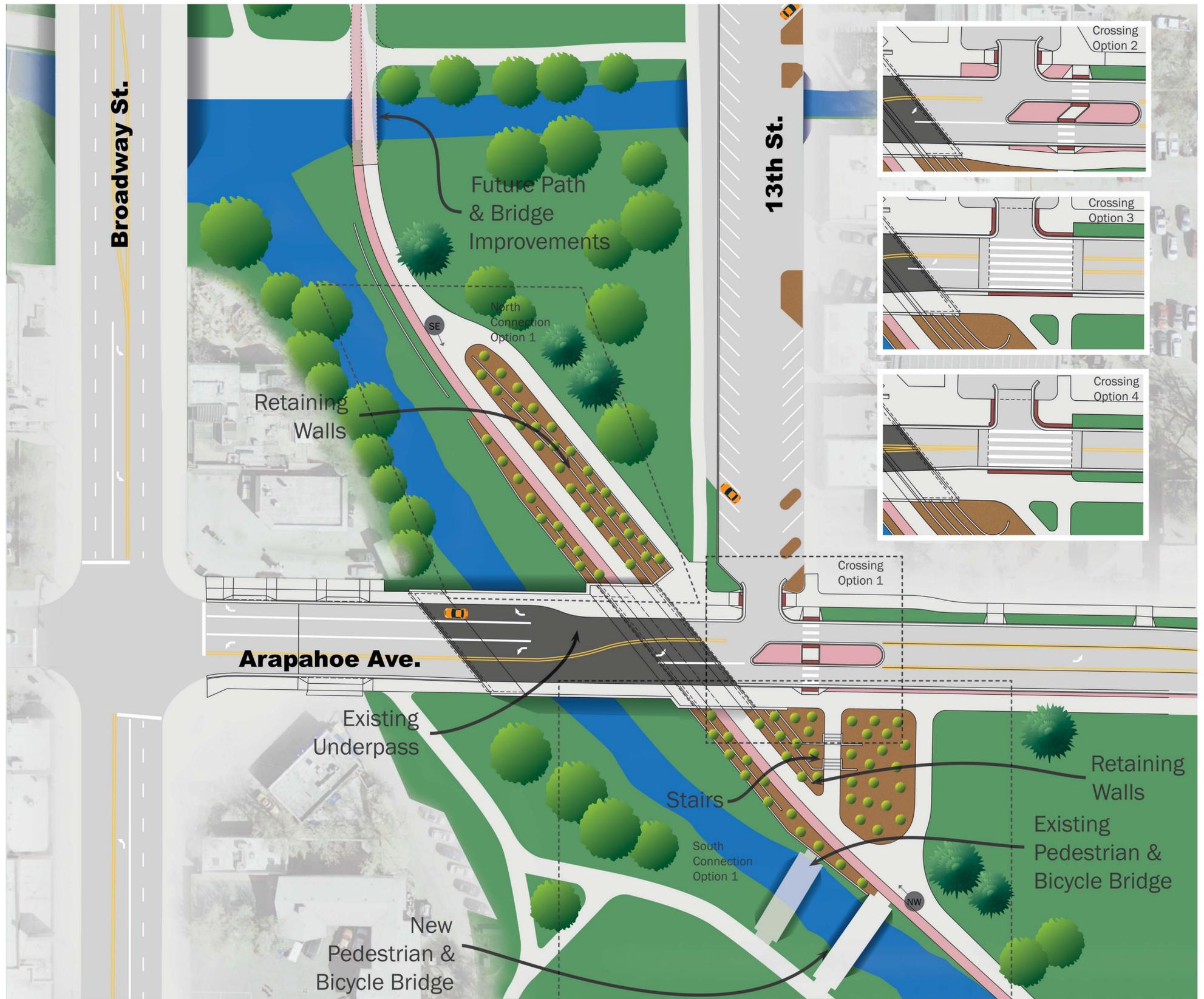
# Underpass Option 1

## North Connection Option 1 & South Connection Option 1



# Underpass Option 2

## North Connection Option 1 & South Connection Option 1



**Broadway St.**

**13th St.**

Future Path  
& Bridge  
Improvements

North  
Connection  
Option 1

Retaining  
Walls

**Arapahoe Ave.**



**Broadway St.**

**13th St.**

Future Path  
& Bridge  
Improvements

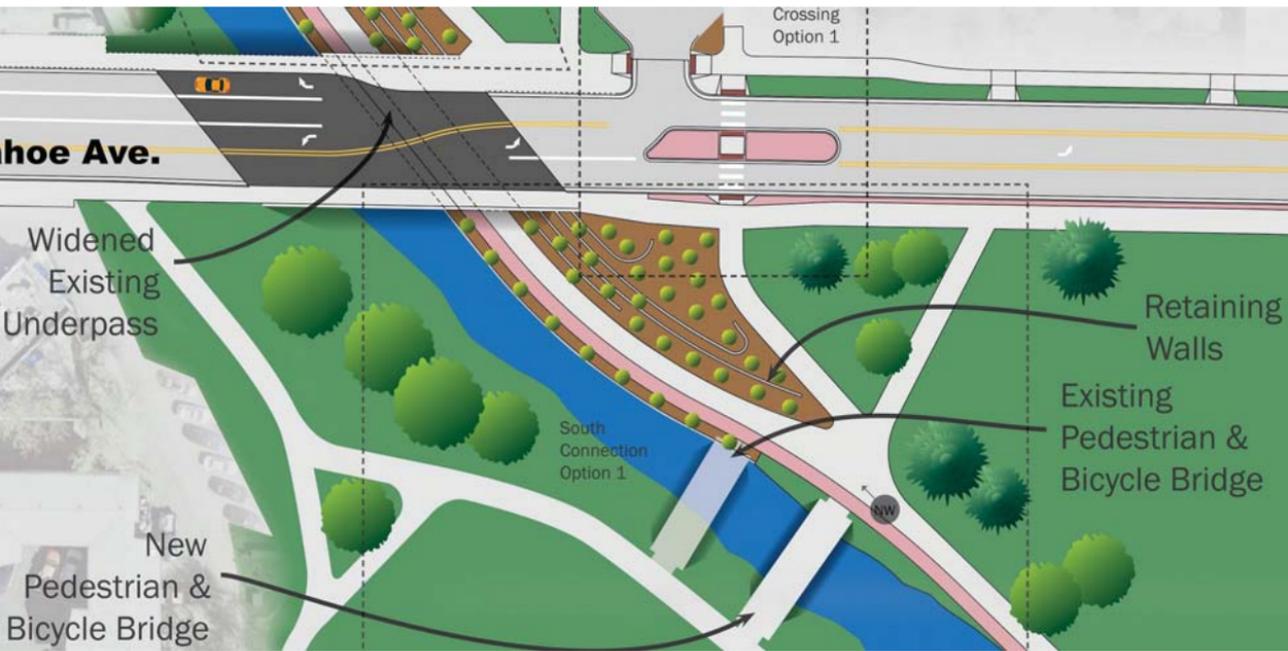
North  
Connection  
Option 2

Retaining  
Walls

**Arapahoe Ave.**

Widened







**hoe Ave.**

Crossing  
Option 1

Widened  
Existing  
Underpass

Retaining  
Walls

South  
Connection  
Option 2

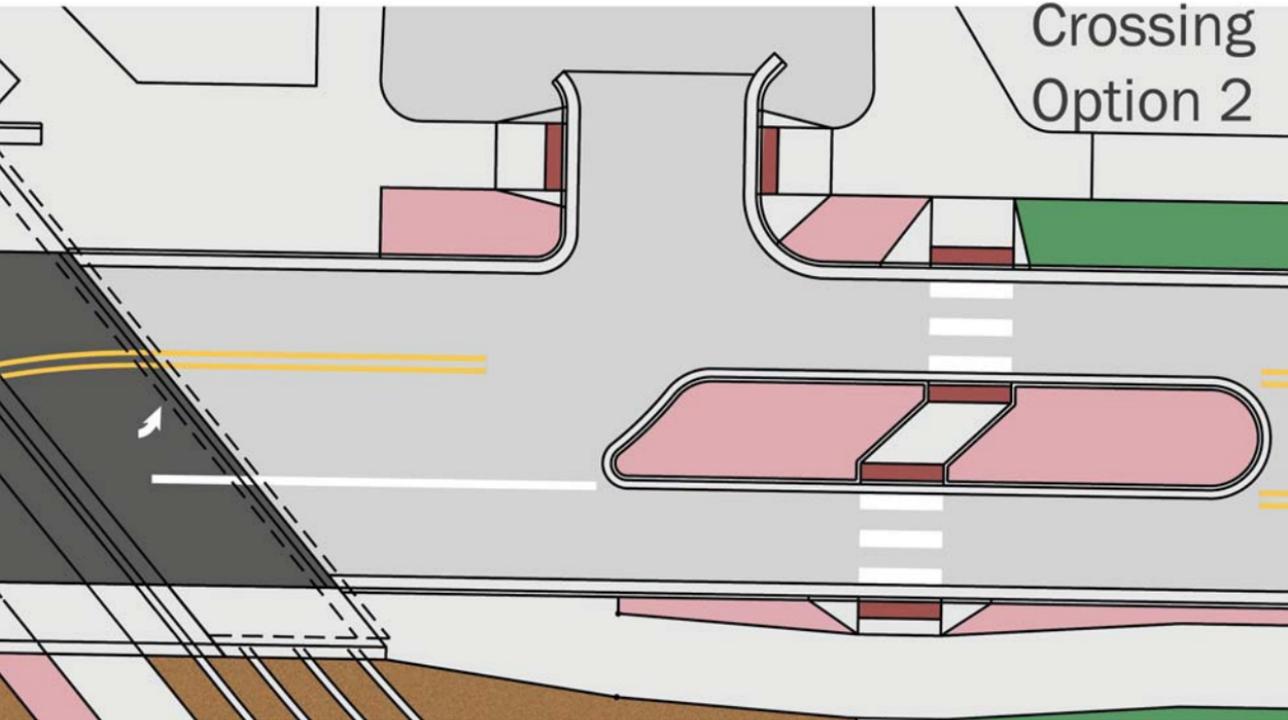
Existing  
Pedestrian &  
Bicycle Bridge

New  
Pedestrian &  
Bicycle Bridge

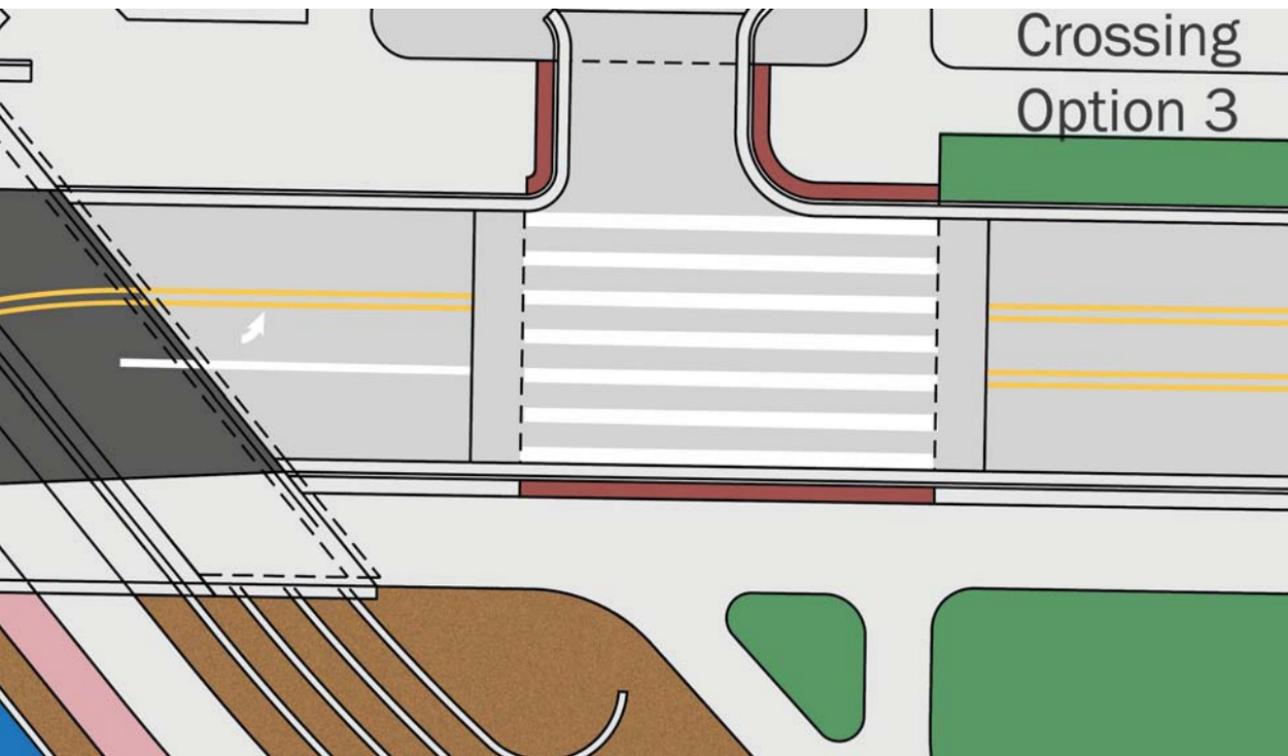
Crossing  
Option 1



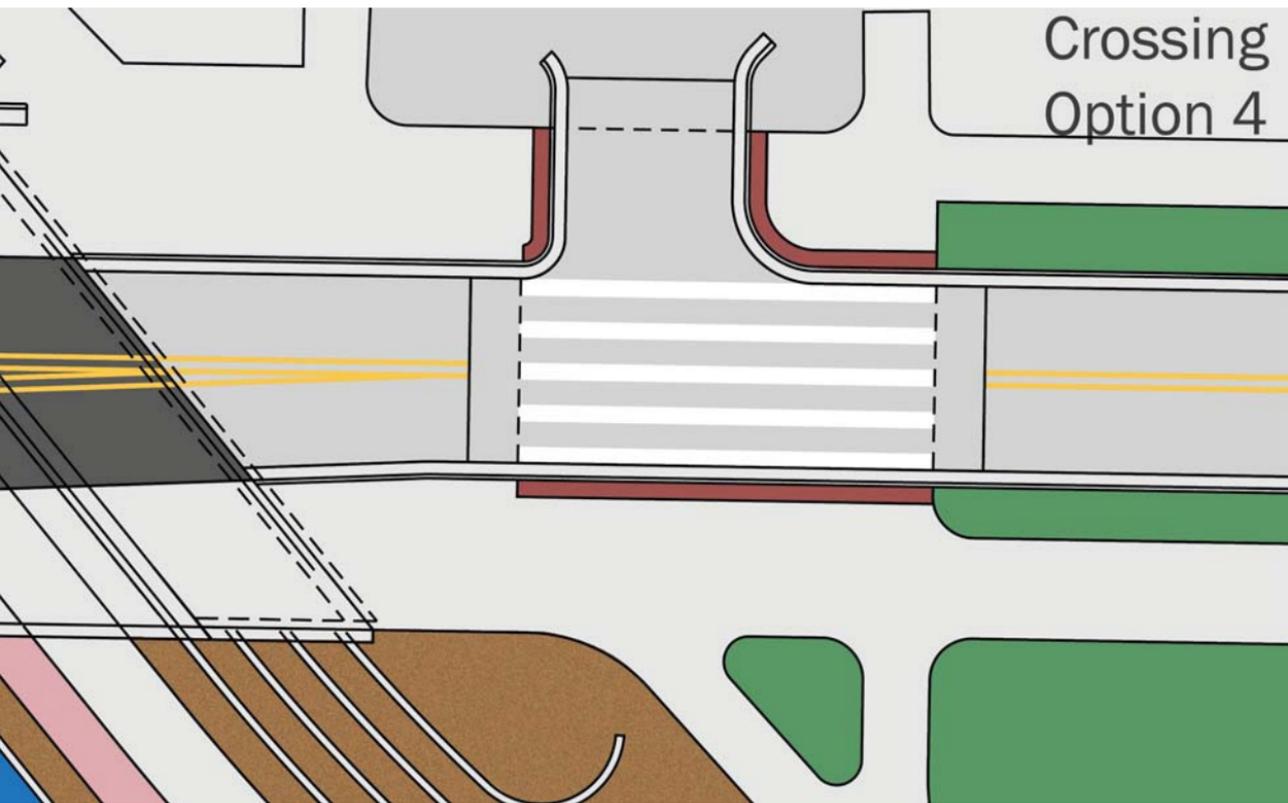
Crossing  
Option 2



Crossing  
Option 3



Crossing  
Option 4



# Project Evaluation Criteria

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## Safety

Reduces curves of path approaches to the underpass

Encourages use of the underpass over the on-street crossing

Encourages a bicycle entry speed of no more than 8mph at the on-street crossing of Arapahoe & 13<sup>th</sup>

Improves visibility of travelers entering the crosswalk

## Accessibility & Mobility

Simplifies path connections

Simplifies crossing movement for pedestrians & bicycles

Impacts on persons with disabilities, senior populations, youth

Supports existing patterns (pedestrian, bicycle, vehicle [including emergency vehicles]):

- Boulder Creek Path to Boulder Creek Path
- Boulder Creek Path to on-street crossing at Arapahoe Avenue
- Boulder Creek Path to Broadway multi-use path
- Broadway multi-use path to on-street crossing at Arapahoe Avenue
- Arapahoe Avenue eastbound travel
- Arapahoe Avenue westbound travel
- Emergency vehicles

## Environmental Impacts & User Experience

Minimizes encroachment on Boulder Creek

Isolates users from Boulder Creek

Habitat removal

Restores portions of streambank habitat from removal of existing underpass

Removes mature trees by Boulder Creek

Removes native vegetation

Impacts wildlife

Substantial changes in topography

Clearing, excavation, grading or other construction activities

Change in hardscape

Effects on the aesthetics of a site open to public view

Preserves contiguous green space in Central Park

Minimizes opportunities for unwanted activities in Central Park Builds retaining walls within Central Park

Opportunity to incorporate art into infrastructure improvements

Impacts users during construction

## Infrastructure

Impacts to existing water utility and ditch infrastructure

Creates a new structure with a different service life than the vehicular bridge

Supports future replacement or reconditioning of existing vehicular bridge

Modifies existing vehicular bridge

Increased maintenance

Requires relocation of underground utilities

## City Plans & Program

Supports Civic Area Vision Plan goals:

- Addressing conflict & connectivity along the Boulder Creek Multi-Use Path
- Reducing barrier-effect of Arapahoe Avenue
- Supports activation of Civic Area Central Park & 13<sup>th</sup> Street
- Maintains ability to host events and programs within Civic Area Central Park & 13<sup>th</sup> Street
- Supports Civic Area Vision Plan goal of pedestrian scale 13th Street
- Supports the conceptual plans for expansion of the Boulder County Farmers' Market
- Supports outcomes of the Market Hall Feasibility Study

Supports Boulder Valley Comprehensive Plan (BVCP) goal:

- Creating an accessible multimodal transportation system with safe travel options and connections

Transportation Master Plan (TMP) goals:

- Creating an accessible multimodal transportation system with safe travel options and connections
- Improving facilities for all modes
- Towards Vision Zero safety goal of reducing serious injury or fatal crashes

Decrease single-occupant vehicle use thus reducing and minimizing the use of non-renewable energy resources and greenhouse gas emissions.

## Other Considerations

Estimated project cost

Estimated project duration