Office of the City Manager

ACTION CALENDAR
July 14, 2015
(Continued from June 23, 2015)

To: Honorable Mayor and Members of the City Council

From: Christine Daniel, City Manager

Submitted by: Andrew Clough, Director, Public Works

Subject: 2-Way Southside Streets Conversion

INTRODUCTION

Public Works Transportation has worked with a consultant to study and prepare a report evaluating the potential for converting Southside streets, including Bancroft and Durant, into 2-way traffic operation as envisioned in the Southside Plan adopted by Council in September 2011. The study found that such a conversion was feasible, consistent with the range of alternatives environmentally cleared in the Southside Environmental Impact Report, would not adversely affect overall traffic operations or travel times, and could be achieved at an estimated cost of $5 million.

Transportation staff are currently engaged in a Complete Streets process to identify short and long-term projects for Measure BB funding, and the 2-way conversion project is anticipated to be included in projects to be submitted for Measure BB funds. Staff are working with consultant support to prepare the grant funding requests, which are due to the Alameda County Transportation Commission July 31, 2015. The list of projects and funding applications are scheduled to be brought to the Transportation Commission for review on June 18 and to the City Council for approval on July 14, 2015.

CURRENT SITUATION AND ITS EFFECTS

In order to address Council questions about the feasibility and process for converting Bancroft and Durant to 2-way traffic operation, Public Works Transportation tasked Fehr & Peers, one of the City's on-call transportation consultants, to conduct the traffic analysis, and consider traffic control methods and cost estimates. The consultant was also asked to identify smaller-scale incremental improvements that could support the project goals in the near term while providing the foundation to support the potential 2-way conversion in the future.

The November 2014 Fehr & Peers report (Attachment 1) presents the evaluation of:

- Conversion of Bancroft Way and Durant Avenue from 1-way operation to 2-way operation between Shattuck Avenue and Piedmont Avenue; and
- Conversion of Dana Street and Ellsworth Street from 1-way operation to 2-way operation between Dwight Way and Bancroft Way.

In brief, the study found that travel times would remain similar whether or not Bancroft Way and Durant Avenue were converted to provide 2-way operation. Vehicle queues approaching signalized intersections would increase with 2-way circulation but the increase is reasonable and expected, and would not have an adverse impact on overall traffic operations. In addition, the project is within the range of circulation alternatives that were environmentally cleared by the Southside Plan EIR.

However, it is estimated that complete implementation of the project would cost about $5 million. About $2.3 million of this is for traffic signal changes: there are 14 existing traffic signals that would need to be upgraded and modified with additional signal heads and mast arms to accommodate 2-way traffic operations, and 4 new traffic signals would be required (Bancroft at Ellsworth Street, Dana Street, Bowditch Street, and College Avenue). The City does not currently have a funding source to fully implement this project as described in the Fehr & Peers report.

Concurrent with and independent of this study, the City, UC Berkeley, and AC Transit are each moving forward with localized transportation projects that are consistent with the Southside Plan and the Fehr & Peers report. In addition, the report identifies other smaller-scale, shorter-term projects that could be implemented and provide significant benefit sooner at lower cost, and still be consistent with a future 2-way conversion. The attached report presents several of these projects, and recommends that the City pursue these while continuing to explore funding for the full 2-way conversion. The City has also recently begun a major update of the Bicycle Plan, which creates an opportunity to revisit and refine some of the proposed improvements in the area, both those recommended by the Southside Plan and those studied by Fehr & Peers.

The completed report was presented to the City of Berkeley Transportation Commission in February 2015, and the Commission approved (M/S: Bruzzone/Gerhardstein; Ayes: Bruzzone, Gerhardstein, Lathbury, McCaughrin, Roberts, Thomas, Zander; noes: none; abstain: none; absent: Humbert) that:

> 1) Transportation Commission has reviewed and finds acceptable the Fehr & Peers study. 2) The Commission recognizes and supports as valid the Southside Plan policy for 2-way streets. 3) The best approach to delivery is a deliberate and incremental approach with Complete Streets criteria. 4) An overall strategy should be developed in the Bike Plan (if Council funds a scope change in the Bike Plan) or using an on-call consultant, to identify the highest priority areas for conversion and develop specific project definitions with order of magnitude costs. 5) Council can decide on individual projects to move to conceptual engineering, design, and construction.

Prior to and following the presentation of the Fehr & Peers report to the Transportation Commission, the Commission received letters from the attorneys Miller Starr Regalia on behalf of their client Mr. Daryl Ross, a property owner along Bancroft Avenue in the vicinity of College Avenue. The letters stated their client's objection to the proposal to convert Bancroft to a 2-way street, and expressed support for the Bicycle Plan Update, but only insofar as it did not incorporate the "Conversion Project." (see Attachment 2)

Subsequently, Council heard public comment regarding the potential conversion projects at their Worksession on April 7, 2015. Public comment focused on the importance of the Bancroft 2-way conversion to bicycle access in the area, and encouraged Council to support moving the project forward. Council comments supported staff moving forward with seeking funding to design and implement the project.

BACKGROUND

The Berkeley City Council adopted the Southside Plan[1] in September 2011, 13 years after initiating development of the Plan. One of the Plan's major transportation goals is to "increase the quality, amenity and use of all non-automotive modes of transportation."

The Southside Plan includes numerous potential ways to improve transit and improve bicycle and pedestrian safety. The Plan's environmental document analyzed a broad range of circulation alternatives which were presented as concepts requiring further study and evaluation.

Council held a worksession in November 2012[2] to discuss the status of Telegraph Avenue, which included a presentation by representatives of the University of California, Berkeley Design Advocates (BDA), and the Telegraph Avenue Business Improvement District. One of the projects identified by BDA was converting Bancroft Way and Durant Avenue into 2-way streets. BDA presented their opinion that this would result in a safer environment for pedestrians and cyclists, reduce auto-traffic speed, and provide more convenient transit access to UC Berkeley as a result of relocating and concentrating bus traffic to Bancroft Way.

On April 30, 2013, Council approved the Mayor's recommendation[3] to have staff study the project concept, including conducting traffic analyses, considering various traffic control methods, developing cost estimates, and considering issues related to environmental (CEQA) analysis, construction, possible funding sources, partners, and schedule.

ENVIRONMENTAL SUSTAINABILITY

The Pedestrian and Bicycle Plan Projects and Southside conceptual project options that would be implemented as part of 2-way street conversions in the Southside are designed to improve pedestrian, bicycle, and traffic safety, and thus increase the number of Berkeley residents and visitors walking, biking, and taking transit. Increasing cycling and walking is the number 2 goal under the Transportation and Land Use section of the Climate Action Plan. The Plan sets the goal of reducing transportation emissions 33% below 2000 levels by 2020 and 80% by 2050, and states that

[1] Southside Plan: http://www.ci.berkeley.ca.us/southsideplan/

[2] November 27, 2012 Worksession: www.cityofberkeley.info/Clerk/City_Council/2012/11Nov/City_Council__11-27-2012_-_Special_Meeting_Annotated_Agenda.aspx

[3] Consider Conversion of Bancroft Way and Durant Avenue into Two-Way Streets: www.cityofberkeley.info/Clerk/City_Council/2013/04Apr/Documents/2013-04-30_Item_54_Consider_Conversion_of_Bancroft.aspx

transportation modes such as public transit, walking, and cycling must become the primary means of fulfilling our mobility needs in order to meet these goals.

POSSIBLE FUTURE ACTION

Staff generally concur with the recommendation in the Fehr & Peers report to pursue full funding of the 2-way conversion projects as a long-term priority, while continuing to seek funding to implement smaller-scale, shorter-term projects in the near term. Staff also generally agrees with the Transportation Commission recommendation to move forward incrementally on a Complete Streets basis, identifying and defining projects and seeking funding, with the support of on-call consultants. Staff plans to incorporate both short and long-term projects from the Fehr & Peers report into our Complete Streets transportation vision document and seek funding through Measure BB for implementation and will seek other grant funding when feasible and consistent with the City's funding priorities.

Based on the potential for local opposition to some elements of the proposed 2-way conversion on Bancroft, staff does not support the Transportation Commission option to expand the scope of the Bike Plan Update as the mechanism to develop an overall strategy for the two-way conversion projects. Developing a multimodal project of this magnitude is beyond the scope and purpose of the Bike Plan Update. Instead, staff will use the Fehr & Peers study to inform the Bicycle Plan, and pursue other means to carry forward the conversion of Bancroft Avenue from 1-way to 2-way. In particular it is proposed to include this project in the Complete Streets Implementation and funding process.

Currently the Transportation Division and on-call consultants are engaged in a Complete Streets process to identify short and long-term projects for Measure BB funding. The 2-way conversion projects described in the Fehr & Peers report are anticipated to be included in that list of projects to be submitted for funding through Measure BB. Once projects are identified, staff will work with consultant support to prepare Measure BB grant funding requests due to the Alameda County Transportation Commission by July 31, 2015. The list of projects and proposed funding applications are scheduled to be brought to the Transportation Commission for review on June 18 and to the Council for approval on July 14, 2015.

FISCAL IMPACTS OF POSSIBLE FUTURE ACTION

Total costs of possible future actions are not fully known at this time. The current Complete Streets project identification process is expected to cost $113,000 in consultant fees. Based on previous experience, subsequent Measure BB grant funding requests could cost $5,000 to $10,000 per application in consultant fees. Preparation of two short-term project applications could cost $10,000 to $20,000 and long-term applications could cost $10,000 to $20,000 or more per corridor in consultant fees. Staff, consultant, and capital costs for the actual projects are unknown at this time and will be identified as part of the project development required for the grant applications.

CONTACT PERSON

Farid Javandel, Transportation Division Manager, Public Works, 981-7061

Attachments:
1: Fehr & Peers November 2014 Project Evaluation Report
2: Correspondence from Miller Starr Regalia

FEHR PEERS

MEMORANDUM

Date: November 19, 2014

To: Matt Nichols

From: Rob Rees

Subject: Southside Plan – Two-Way Street Conversion Evaluation

OK14-0008

Fehr & Peers was retained to assess two-way circulation in the Southside consistent with the policies in the Southside Plan. This memorandum presents that assessment.

The Southside Plan was adopted by the Berkeley City Council September 27, 2011 and was the culmination of 13 years of community planning. The Plan's major transportation goal is to increase the quality, amenity, and use of all non-automotive modes (public transit, bicycles, and pedestrian), and reduce the number of trips made in single-occupant automobiles.

The Plan includes circulation options to be considered as potential ways to improve transit, and create safer travel conditions for bicyclists and pedestrians. These options can be found in many of the 44 policies within the 9 objectives of the Plan, and since these concepts were included as ideas to be evaluated they do not necessarily agree with each other. In response to the need for Plan flexibility the City expanded the environmental document to analyze and clear a broad range of circulation alternatives.

The two-way circulation alternative evaluated by Fehr & Peers in this memorandum is consistent with both the Southside Plan and the range of circulation alternatives that were environmentally cleared. The alternative would generally convert

- Bancroft Way and Durant Avenue from one-way operation to two-way operation between Shattuck Avenue and Piedmont Avenue.
- Dana Street and Ellsworth Street from one-way operation to two-way operation between Dwight Way and Bancroft Way.

Figures referenced in this memorandum are provided at the end of the document after **Attachment A** which contains the Southside Plan's transportation policies and **Attachment B** which contains the implementation cost for converting the streets to two-way operation.

CONCLUSIONS

The time to travel between Fulton Avenue and Piedmont Avenue on either Bancroft Way or Durant Avenue would remain similar (ranging from 3.6 to 3.9 minutes) whether or not Bancroft Way and Durant Avenue were converted to provide two-way operation.

Vehicle queues approaching signalized intersections would increase with two-way circulation. The increase is reasonable and expected because under a two-way circulation scheme the signal timings/phasing must accommodate two directions of traffic and as such is inherently less efficient in minimizing vehicle queues at signalized intersections than a corridor with one direction of traffic. Given similar travel time characteristics noted in the previous paragraph, the increase in vehicle queues within the corridor would not have an adverse impact on overall traffic operations.

The total cost was determined to be about $5 million with the following breakdown:

- $3.5 million for construction ($2.3 million of which is for traffic signal changes)
- $700,000 for contingency
- $840,000 for environmental / design studies and design

PHASING CONSIDERATIONS

The two-way circulation alternative evaluated in this memorandum is consistent with both the Southside Plan and the range of circulation alternatives that were environmentally cleared, but it has a high cost of about $5 million for complete implementation and as a result its completion will likely be delayed several years until funding can be obtained. In the meantime, the University and AC Transit are moving forward with localized transportation projects that are consistent with the Southside Plan and there are other projects that could be implemented at less cost, be consistent with a future two-way conversion, benefit users sooner.

Lower Sproul Redevelopment

The University is undertaking a major redevelopment of Lower Sproul that will also provide pedestrian and transit amenities along the University's frontage on Bancroft Way generally between Telegraph Avenue and Dana Street. The project is expected to be completed in Fall 2015 and upon completion Bancroft Way will provide a transit only lane along the University frontage, two lanes for vehicle traffic, and the on-street parking along the street's southern frontage will remain. The street cross-section was designed to facilitate a potential conversion of Bancroft Way from one-way to two-way operation. These improvements are consistent with Policy T-B1 in the Southside Plan.

Line 51 Corridor Delay Reduction Project

AC Transit is undertaking improvements to the Line 51 through Alameda, Oakland, and Berkeley to reduce delay and improve reliability. Key features of the project include bus bulbs, bus stop relocations and consolidations, transit queue jump signals and queue bypass lanes, bus stop extensions, and transit signal priority. Within the Southside the project would signalize the Bancroft Way intersection with Dana Street to facilitate the orderly flow of traffic through the intersection and minimize the transit delays now experienced at the intersection. The traffic signal design will incorporate design elements so that it can easily be retrofitted at a later date to accommodate two-way traffic flow on either Bancroft Way or Dana Street. These improvements are consistent with parts of several policies including: Policy T-D3 and Policy T-D4 in the Southside Plan.

Others Infrastructure Options to Consider

The Southside Plan identified several other infrastructure projects that could be implemented prior to a complete two-way circulation change in Southside. Two potential projects, listed below, would have an immediate benefit to users at a much lower cost.

Dana Street as a Two-Way Street – Dana Street currently operates as a one-way southbound street with a Class II Bike Lane from Bancroft Way to Dwight Way and it serves low volumes of vehicle traffic. North of Bancroft Way the Dana Street bikeway continues as a two-way facility through the University connecting Dana Street to Arch Street north of campus, and south of Dwight Way the Dana Street bikeway also continues as a two-way facility. This results in a northbound gap in the bikeway system along the Dana Street corridor.

> **Recommendation:** Convert Dana Street from a one-way street to a two-way street consistent with Southside Plan Policy T-C2, to improve its safety and functionality as a bike route. The street conversion could either a) incorporate a northbound bike lane while southbound riders would travel in a shared lane or b) incorporate bike lanes in both directions with the removal of on-street parking. Ellsworth Street, the one-way couplet pair to Dana Street, should also be converted to a two-way street which is consistent with Southside Plan Policy T-D1. (Cost: $1,000,000 including environmental/design studies, design, and construction).

Bancroft Way / College Avenue Traffic Signal – The Southside Plan Policy T-D3 calls for implementing streetscape improvements to calm traffic and facilitate pedestrian crossings at key locations. College Avenue and Bancroft Way intersect at a major pedestrian access to the University for pedestrians and bicycles, and the existing stop-sign controlled intersection introduces right-of-way uncertainty because of the high volumes of vehicle and pedestrian traffic using the intersection. Signalization would add some delay to pedestrian travel through the intersection but would clarify the rights-of-way for all users and improve its safety. Signalization would also be consistent with Southside Plan Policy T-D4 which calls for intersection changes at high collision locations to reduce high collision rates.

> **Recommendation:** Signalize the Bancroft Way / College Avenue intersection and consider narrowing the roadway to accommodate wider sidewalks and landscaping. (Cost: $350,000 including environmental/design studies, design, and construction).

BACKGROUND

The 28 city blocks that make up the Southside are a mix of uses offering housing, offices, retail shops, schools, churches, social institutions, parks and open space, recreational facilities, and parking. The area is located within walking distance of BART, and is served by several bus lines and shuttle services. The pedestrian scale of the neighborhood allows one to easily walk between uses and to/from the UC Berkeley campus or Downtown Berkeley, and Bicycle Boulevards provide important links to the area. **Figure 1** shows the 28 city blocks and highlights key transit, bicycle, and pedestrian transportation elements within the area.

The Transportation Element of the Southside Plan presents a coordinated approach to Southside transportation issues and transportation policy framework, and sets the foundation from which the City and the University can develop a coordinated response to the traffic and transportation issues in the Southside. The Objectives, Goals and Policies from the Transportation Element

attached to this memorandum (**Attachment A**) call for balancing transportation modes, in part, because operational and physical constraints limit additional vehicle capacity.

Intersection operation analysis, conducted as part of the transportation studies supporting the Southside Plan, established that major streets (such as Shattuck Avenue and Piedmont Avenue) connecting the area to the rest of the city and beyond are already near capacity, and some streets within the area, such as Telegraph Avenue in the vicinity of Bancroft Way, are highly congested. The Southside Plan established that existing streets will not be widened, nor will new streets be added. Regional traffic from the area must drive on surface streets for up to two miles before reaching the freeway. In addition, City policy for the last 30 years has limited the number of streets which can be used to reach the Southside in order to limit the number of residents exposed to large volumes of traffic. The policy, which has led to the installation of a system of traffic diverters, has been largely successful in protecting neighborhood streets, but places great demands on the major streets.

ANALYSIS

As noted previously, the two-way circulation alternative evaluated by Fehr & Peers in this memorandum would generally convert

- Bancroft Way and Durant Avenue from one-way operation to two-way operation between Shattuck Avenue and Piedmont Avenue.
- Dana Street and Ellsworth Street from one-way operation to two-way operation between Dwight Way and Bancroft Way.

This analysis focuses on the traffic operations and implementation costs. A complete multi-modal assessment was previously completed as part of the transportation studies supporting the Southside Plan.

TRAFFIC OPERATIONAL CONSIDERATIONS

A micro-simulation model was prepared using the Synchro/SimTraffic software to establish the geometric and intersection requirements along these corridors. The model incorporated vehicle and pedestrian traffic forecasts that were derived from the Southside Plan and updated to represent Year 2035 conditions during the weekday PM peak hour. The model was initially used to test three options including: Option 1, no build representing the existing geometrics and

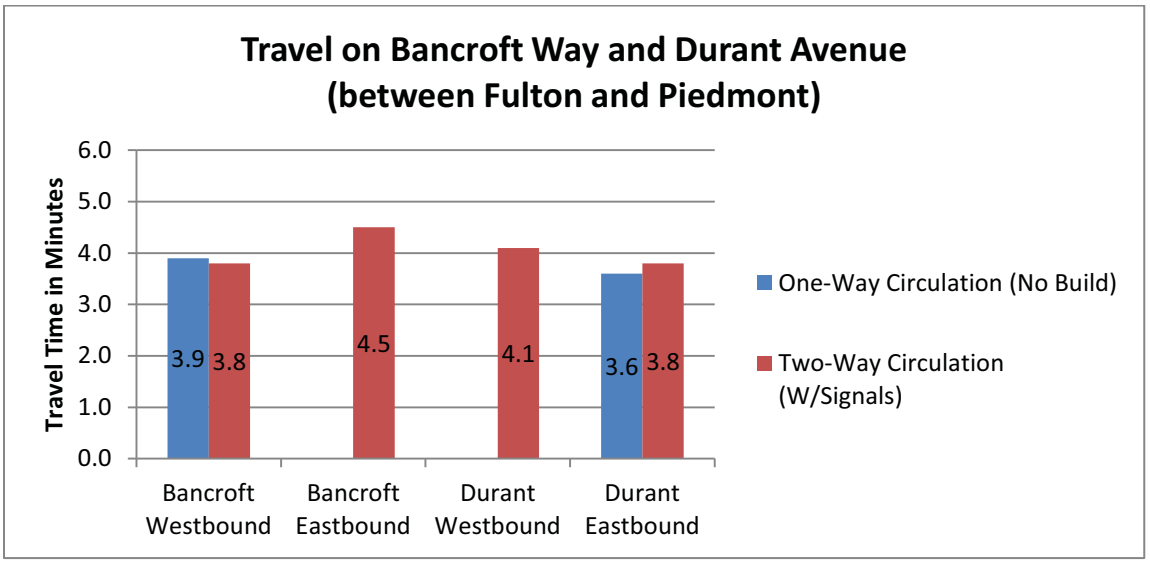
intersection controls; Option 2, two-way circulation with traffic signals; and Option 3, two-way circulation with stop signs.

Option 3, incorporating stop signs, failed because vehicle queues approaching the stop-sign controlled intersections extended back through adjacent intersections, causing gridlock within the Southside and ultimately the gridlock extended back to the Shattuck Avenue and Piedmont Avenue corridors. As a result, this option was discarded.

The remaining two options, Option 1 (no build) and Option 2 (two-way circulation with traffic signals), were executed using random seed values and 10 runs were averaged to establish two Measures of Effectiveness.

- ***Travel Time*** represents the average driving time in minutes to travel between the Piedmont Avenue and Oxford/Fulton Avenue intersections on Bancroft Way or Durant Avenue. Travel time includes the travel between intersections as well as the delay waiting at each intersection.
- ***Extent of Vehicle Queue*** represents the distance in feet at each intersection approach that vehicles are stopped during the PM peak hour.

Travel Time Results



The Southside street grid system and equidistant intersection spacing along the Bancroft Way and Durant Avenue corridors yields efficient, well-coordinated, intersection operations; thus, the travel time through the Southside remains consistent between the two alternatives. Efficient operations

are also achieved through the use of left-turn lanes at signalized intersections to more efficiently channelize vehicle flows through the intersections and to allow protected left-turn phasing which separates left turning traffic from pedestrian traffic crossing the street.

Vehicle Queues at Intersections

Figure 2 and **Figure 3** illustrate vehicle queue characteristics at intersection approaches assuming one-way circulation i.e., no build and assuming two-way circulation with traffic signals. The two-way circulation alternative yields greater vehicle queues than the one-way circulation because signal coordination under a one-way circulation system is more efficient. Bancroft Way and Durant Avenue are one-way streets so the traffic signal system only needs to coordinate a single direction of travel on each corridor. Whereas, under a two-way circulation scheme the signal timings/phasing must accommodate two directions of traffic and as such is inherently less efficient in minimizing vehicle queues at signalized intersections. Traffic forecasts historically have over-estimated the increase in traffic growth, and as a result the vehicle queue characteristics may not be realized. **Figure 4** was prepared to illustrate the expected vehicle queue characteristics if the two-way circulation scheme were implemented by 2020.

IMPLEMENTATION COST CONSIDERATIONS

The two-way alternative (Option 2) would generally convert Bancroft Way and Durant Avenue from one-way operation to two-way operation between Shattuck Avenue and Piedmont Avenue, and would convert Dana Street and Ellsworth Street from one-way operation to two-way operation between Dwight Way and Bancroft Way. More project specificity is needed to establish reasonable design and construction cost estimates for converting these streets to allow two-way operation.

Figure 5 highlights the infrastructure changes assumed for costing to implement two-way circulation. The streets would generally be restriped to accommodate two-way traffic, existing signs would need to be rotated or removed to accommodate two-way traffic flow, and parking meters would be replaced with pay-station parking.

There are 14 existing traffic signals that would need to be modified with additional signal heads and mast arms to accommodate two-way traffic operations, and based on preliminary field investigations most of the signal poles at these intersections would need to be replaced to accommodate the added equipment necessary to allow two-way operations and meet current City and State design standards. Given the age of the original equipment the cost estimate also

considers replacement of conduit, signal heads, and pedestrian heads; new pedestrian push buttons that provide audible feedback for visually impaired users; and new electrical service pedestals, controller cabinets, and controllers. With these changes the City will also be required to modify / install curb ramps that meet current Americans with Disabilities Act (ADA) standards.

In addition to the existing signalized intersections, 4 new traffic signals would be required on Bancroft Way at Ellsworth Street, Dana Street, Bowditch Street, and College Avenue. The new traffic signals are needed to clarify right-of-way between the high volume of pedestrians and vehicles because the two-way conversion would add additional conflict points at each intersection. Stop-controlled intersections would be maintained on Piedmont Avenue at Bancroft Way and Durant Avenue because of the historic median which limits changes to sign relocation, striping, and curb ramps.

Maintaining existing vehicle, bicycle, and pedestrian traffic would need to be a priority while constructing the two-way circulation system in Southside and this will add cost to the project implementation.

Cost Estimate

Based on the infrastructure changes outlined above, cost estimates were developed. The detailed cost estimates are attached (**Attachment B**). The total cost was determined to be about $5 million with the following breakdown:

- $3.5 million for construction ($2.3 million of which is for traffic signal changes)
- $700,000 for contingency
- $840,000 for environmental / design studies and design

ADDITIONAL BACKGROUND INFORMATION

The information provided in the following sections was assembled from a review of Southside planning documents and is intended to provide a broader summary of the existing transportation characteristics for those that are interested. Refer to the Southside Plan which provides much greater detail.

STREET PRIORITIZATION

The City of Berkeley General Plan designates streets based on mobility and connectivity including:

- Major Streets – for the movement of automobiles, trucks, buses, pedestrians and bicycles across the city, connecting to the regional transportation network.
    - Haste Street
    - Dwight Way
    - Fulton Street (north of Dwight)
    - Telegraph Avenue south of Haste Street
    - College Avenue south of Dwight Way
- Collector Streets – for the movement of automobiles, buses, pedestrians, and bicycles between neighborhoods and across the city.
    - Bancroft Way
    - Durant Avenue
    - Telegraph north of Haste Street
    - College Avenue north of Dwight Way
    - Derby/Belrose/Warring corridor
- Local Streets – for slow moving traffic, bicycles, and pedestrians traveling within a neighborhood.
    - Channing Way
    - Dana Street
    - Ellsworth Street
    - Bowditch Street

All five east/west streets (Bancroft, Durant, Channing, Haste, and Dwight) in the Southside, as well as Telegraph and College Avenues, have been designated as emergency access and evacuation routes. According to the General Plan, these streets must be maintained for emergency access and emergency evacuation in case of a major disaster, such as wild fires, reservoir rupture or hazardous materials release. These streets have been designated because they provide the only direct access to Berkeley's southern hill neighborhoods.

BICYCLES

Despite the high level of cycling, conditions in the Southside are not ideal for bike riders. Some of the streets are narrow, typically 36 feet in width, with barely enough room for traffic and parking, let alone bike lanes. As most bicyclists have the same origins and destinations as motorists, most bicyclists share the roadway with auto traffic. Cyclists often ride the wrong way on the Southside's one-way streets to avoid circuitous routes of travel through the neighborhood.

The City of Berkeley Bicycle Plan designates two corridors in the Southside as "Bicycle Boulevards" which are intended to serve as Berkeley's primary bikeways and allow for the free-flow travel of cyclists (while also allowing autos) including:

- Channing Way from Piedmont Avenue to Fourth Street (in West Berkeley)
- Bowditch Street from Bancroft Way to Dwight Way and onto Hillegass Avenue to the City of Oakland. There is a contra-flow bike lane on Dwight Way for southbound cyclists (Dwight is one-way northbound), before turning left onto Hillegass Avenue.

Dana Street and Fulton Street in the Southside are designated by the Bike Plan as "Class 2 Bike Lanes" which means these streets should, to the extent possible, include a striped lane for the exclusive use of bicyclists. Dana Street, currently a one-way street, has a Bike Lane. Telegraph Avenue, Bancroft Way and Piedmont Avenue are designated as "Class 2.5 Bikeways" (Class 3 or shared roadways according to Caltrans). Changes to these corridors such as signage, repaving, and signal timing are intended to make bicycle travel convenient and safe.

Bicycle travel through the University, connecting with City bikeways, has improved over the last 15 years with the University constructing two north-south bicycle routes; one from Dana Street on the south side of campus to Arch Street on the north, and one connecting College Avenue on the south with Euclid Avenue on the north.

BUS TRANSIT

The Southside is well-served by transit with six lines (1, 1R, 49, 51B, 52, F); all of which also serve downtown Berkeley where a total of 15 lines converge. Through these lines, riders have transit access to most parts of Berkeley, Albany, Kensington, El Cerrito, Richmond, Oakland, and San Francisco, as well as the Downtown Berkeley BART Station which is located less than one mile from Southside, and the Rockridge BART Station which is less than two miles away, on College Avenue in Oakland.

Amenities for bus riders are lacking in the Southside. Lack of bus shelters and transit information (maps and schedules at bus stops) discourages bus ridership. Similarly, traffic congestion reduces transit reliability and also discourages bus ridership. To address these issues AC Transit considered enhancements for Line 1/1R and for Line 51B. AC Transit's BRT proposal for Line 1/1R was considered, but the Locally Preferred Alternative (or LPA) presented to the City Council was not accepted. Instead, the Council provided a modified alternative for AC Transit's consideration at a future date. AC Transit is now preparing construction drawings to improve reliability for Line

51B which operates through Southside. Unlike the BRT proposal which would have had buses operating in dedicated lanes for transit, Line 51B would continue to operate in mixed-flow traffic lanes.

The University is undertaking substantial building and infrastructure changes for the Sproul Plaza area and these include wider sidewalks and transit amenities along Bancroft Way between Telegraph Avenue and Dana Street.

PEDESTRIANS

The pedestrian circulation system encompasses the sidewalks and walking paths within and surrounding the area, as well as the intersection crosswalks, pedestrian signals and curb ramps. Safe facilities are continuous and well signed with adequate warning measures at hazardous locations such as higher-volume motor vehicle driveways and intersections. An effective pedestrian circulation system also incorporates a primary walking corridor along each facility that is unencumbered by objects such as landscaping, street furniture, vehicles, and signs. Intersections are points of conflict as vehicle and bicycle traffic encroach into crosswalks, reducing the effective crosswalk width and potentially forcing pedestrians outside the crosswalk to walk around the encroaching vehicle or bicycle.

Currently, vehicle encroachment into the crosswalk zone is observed throughout the Southside. The City of Berkeley's Bicycle and Pedestrian Task Force's Evaluation and Recommendations Report found that six intersections on Bancroft Way and Telegraph Avenue in the Southside are among the highest pedestrian collision intersections in the City including:

- Bancroft Way at College Avenue
- Bancroft Way at Bowditch Street
- Bancroft Way at Dana Street
- Telegraph Avenue at Bancroft Way
- Telegraph Avenue at Durant Avenue
- Telegraph Avenue at Dwight Way

PARKING

There are about 5,500 on- and off-street parking spaces in the Southside excluding private parking for residential uses. The City's share of the area's parking includes the 430 space Telegraph/Channing Garage (just west of Telegraph Avenue between Durant Avenue and

Channing Way) and about 1,500 on-street spaces. The City has no current plans to expand or reduce its parking supply in the Southside. The University has about 2,400 spaces in Southside and their 2020 Long Range Development Plan (LRDP) allows up to 600 additional parking spaces in the Southside by 2020. The remaining supply, about 1,200 spaces, is either private parking spaces or spaces allocated to churches and non-profits.

Public parking in the Southside area is generally fully utilized during the day. As a result visitors, residents and employees often circulate through the area in search of an available space. Residents are provided parking permits, which allow them long term parking on the street. Short term parking for the commercial areas is important to area merchants. As a result the Telegraph-Channing garage responded several years ago by increasing short-term parking opportunities.

GOODS MOVEMENT

Delivery vehicles, because of their larger size, often need additional roadway width and larger intersections to safely maneuver. The streets within the Southside area are generally designed to accommodate single unit vehicles up to about 35 feet in length with some encroachment into the opposing lanes when completing intersection turning movements. Delivery vehicles are generally parked in the loading zones on Telegraph Avenue and Durant Avenue, although, occasionally a delivery vehicle blocks one of the three travel lanes on Durant Avenue. Where loading zones are otherwise occupied by private passenger cars, such as on portions of Bancroft Way, delivery vehicles are more likely to be parked in the adjacent vehicle travel lane.

ATTACHMENT A

IV. OBJECTIVES, POLICIES, AND ACTIONS[1]

The following objectives and policies have been developed based on an analysis of existing transportation, access and parking conditions in the Southside and the surrounding areas, and on the comments and thoughtful input of Berkeley citizens and University and City representatives. The overall goal of this element is to improve the Southside circulation system by increasing the usability of mass transit, enhancing pedestrian and bicycle safety, calming and guiding traffic in the neighborhood, and providing convenient access to the University and the Telegraph Avenue retail district.

Objective T-A: Jointly advocate for improved mass transit and non-auto travel to the Southside.

Policy T-A1: The City and University should jointly advocate to AC Transit and BART regarding the need for continued and ongoing improvement of transit service to the Southside.

Policy T-A2: Form a collaborative partnership between the City, the University, Oakland and other jurisdictions, and the regional transit agencies to study and improve transit options and simplify transit connections throughout the Bay Area.

Policy T-A3: Work with AC Transit to implement the proposed Bus Rapid Transit (BRT) project as embodied in the LPA measures passed by Council. Advocate to AC Transit and the regional transportation bodies for light rail as a longer term way to provide cleaner, more efficient transit service for the Southside. Ensure that College Avenue, Telegraph Avenue, Bancroft Way, and Durant Avenue are evaluated as future light rail corridors.

Policy T-A4: Both the City and the University and other Southside employers should work with AC Transit and BART to establish an "Eco Pass" program to provide free or subsidized transit passes to their employees to reduce the cost of using transit relative to the cost of driving.

Policy T-A5: Encourage Southside employers to participate in the Commuter Check program, or other pre-tax transit benefit, that allows employees to save money by providing commute vouchers to employees that employees or employers can pay for with pre-tax dollars.

Objective T-B: Increase the usability and enhance the amenity of public transit to, from, and within the Southside.

[1] The Southside Plan, adopted by the Berkeley City Council September 27, 2011 (page 91 through 99)

Policy T-B1: Improve bus stops throughout the area.

A. When feasible, add covered platforms, shelters, "bulb-outs," and appropriate street furniture at heavily used bus stops.

B. Add clear signage, route maps and schedules, and adequate lighting at all Southside bus stops.

C. Improve the Telegraph/Bancroft area, particularly Bancroft west of Telegraph, as a major "station" and destination point for transit, including appropriate loading, unloading, and waiting facilities for commuters using campus shuttles, conventional buses, and anticipated bus rapid transit or light rail.

Policy T-B2: Devise ways to decrease mass transit travel times through the Southside.

A. Establish a planning criterion that major bus routes and shuttles should run at least every ten minutes from 7 a.m. to 10 p.m.

B. On Telegraph Avenue, and on other Southside streets with transit service, vigorously enforce traffic laws prohibiting double parking and ensure that trucks and other vehicles making deliveries to local businesses use designated loading zones. Expand loading zones as needed to ensure that deliveries can be made efficiently without double-parking (see Policy T-F5).

C. Continue to consult with AC Transit about timing and type of traffic signals on transit routes through the Southside. Maintain changes in the timing and type of signals to facilitate movement of buses while also improving safety for pedestrians.

Policy T-B3: Ensure that adequate para-transit services are provided in the Southside.

Objective T-C: Improve travel and safety conditions for bicyclists and pedestrians.

Policy T-C1: Encourage UC to improve north-south and east-west bicycle routes through campus that connect to the bicycle routes on Bowditch and Dana streets.

Policy T-C2: Change Dana Street from one-way traffic to two-way traffic to improve its safety and functionality as a bike route in a manner consistent with the City's adopted Bicycle Plan.

Policy T-C3: The City, University, and private property owners should provide more short term and all-day and nighttime bike parking in the Southside and on campus.

A. Add bike parking in the Telegraph/Channing Garage and the UC parking structures.

Policy T-C4: Develop a program of sidewalk and intersection repair and improvements.

A. Repave or repair Telegraph Avenue sidewalks when feasible.

B. Repair damaged sidewalks and intersections throughout the neighborhood.

C. Develop and implement intersection improvements for major pedestrian intersections such as Bancroft Way at College Avenue, Bancroft and Dana Street, and Telegraph Avenue at Dwight Way.

D. Add zebra-striped crosswalks at major intersections.

E. Add disabled access ramps at major intersections. Add or refurbish curb ramps at major intersections to provide optimal safe access. Where existing infrastructure elements prevent building a ramp, evaluate either repositioning the problematic elements or using a "bulb-out" to create the surface necessary for a safe ramp.

F. Install pedestrian level lighting wherever and whenever feasible.

Policy T-C5: Ensure that improved pedestrian and bicycle safety is included as a significant objective in all further studies of, and changes to, the Southside circulation pattern.

Policy T-C6: Encourage preservation of existing north-south midblock pedestrian passageways, such as passageways between Bancroft and Channing, west of Telegraph. Encourage developers to consider creation of new safe and inviting midblock pedestrian passageways where appropriate and complementary with the goals of new development. Address street crossing safety concerns where pedestrian passageways are located or are under consideration.

Policy T-C7: Enforce traffic laws, including laws that apply to bicyclists and pedestrians, to improve safety for pedestrians and bicyclists.

Objective T-D: Calm and guide traffic throughout the Southside.

Policy T-D1: Convert Dana Street and Ellsworth Street to two-way traffic to calm traffic on these streets and allow for less circuitous travel through the area.

Policy T-D2: Consider conversion of Bancroft and Durant to two-way streets with a restriction on through automobile travel at Telegraph. Evaluate jointly with AC Transit the impacts of this change on the movement of transit vehicles in the area and on traffic circulation in the area.

Policy T-D3: Implement streetscape improvements to calm traffic and facilitate pedestrian crossing.

A. Consider adding "bulb-outs" at intersections.

B. Add a series of stop signs and traffic signals at key intersections throughout the neighborhood, including:

- A traffic signal at Dana Street and Bancroft Way to slow traffic and facilitate pedestrian crossing,
- A traffic signal at Bancroft Way and College Avenue, and
- A stop sign at Ellsworth Street and Bancroft Way.

C. Consider adding a traffic signal or other traffic calming device at Parker Street and Telegraph Avenue. Any traffic control device at Parker and Telegraph should be a type that makes it possible for pedestrians and bicycles to cross Telegraph without adding any additional traffic to Parker between Telegraph and Shattuck Avenue or Telegraph and College Avenue.

D. New traffic signals should be all-way-stop signals that allow pedestrians to cross-in any direction without contending with automobiles making turns.

E. New signals should be Accessible Pedestrian Signals.

Policy T-D4: Fix High Hazard Intersections in the Southside, by adding signals or stop signs as suggested above and by using other techniques identified in Bicycle and Pedestrian Task Force recommendations, the Pedestrian Plan, and the General Plan. Intersections with high pedestrian collision rates that need to be addressed include:

- Durant and Telegraph
- Bancroft and College
- Dwight and Telegraph
- Bancroft and Bowditch
- Bancroft and Dana
- Bancroft and Telegraph

Policy T-D5: Develop a directional signage program to assist access to major facilities and parking, and to better direct traffic through the area and to destinations beyond the Southside.

Policy T-D6: When considering changes to circulation (conversion from one-way to two-way circulation, limits on automobile circulation), the three most important criteria for evaluating changes should be impacts on transit, impacts on the safety of bicyclists and pedestrians, and impacts on the volume of traffic.

Objective T-E: Ensure the most efficient use of existing parking to reduce the need for new parking facilities to be built.

Policy T-E1: Develop shared parking agreements between the City, the University and private parking providers to efficiently share and better utilize existing Southside parking, particularly short-term customer parking. Encourage UC to allow visitors using disabled placards and plates to have access to existing parking at different locations on campus to allow equal access to campus amenities.

Policy T-E2: Apply the results and recommendations of the Transportation Demand Management Study regarding ways to better utilize existing parking facilities in both the Southside and the Downtown.

Policy T-E3: Rigorously enforce the Residential Preferential Parking Program. Make changes to the visitor/guest permits to eliminate abuses of 14-day and 1-day visitor/guest permits. Consider increasing the cost of these temporary permits; placing a limit on the number that can be purchased at one time and over the course of a year; replacing 14-day permits with 7-day permits; and/or making them more difficult to counterfeit.

Policy T-E4: Enforce laws that prohibit cars from blocking sidewalks and that prohibit use of yards for parking. Enforce laws against illegal use of blue-zone parking and blocking curb ramps, to ensure equal access for all persons with disabilities.

Policy T-E5: Strongly encourage sponsors and organizers of sports events at Memorial Stadium, Haas Pavilion, and Edwards Field, performances at Zellerbach, and special events on Telegraph and elsewhere in the Southside to promote and encourage use of transit by people attending events. All advertising for sports events and other events should include transit information. Advertising should also include information regarding traffic congestion and parking problems in the Southside and surrounding neighborhoods. Encourage advertising at BART stations and on AC Transit buses.

Objective T-F: Improve customer and visitor parking in, and access to, the Telegraph Avenue commercial district.

Policy T-F1: Improve the customer parking options available in the Southside retail district.

A. Continue efforts already underway or completed to make the Telegraph/Channing Garage more convenient and desirable for short-term, customer parking, such as:

1. Continue the parking validation system to encourage short-term parking by charging less for people who patronize area merchants and by charging other parkers more;

2. Continue the pay system so users pay on the way out for time spent in the garage rather than in advance for time they anticipate spending;

3. Designate the lower floors for short-term parking;

4. Rebuilding the existing elevator and add an additional elevator in the existing vacant elevator chamber;

5. Continue to enhance the physical appearance of the interior of the garage through improved lighting, bright and reflective new paint, and regular maintenance; and

6. Eliminate monthly parking permits in the Telegraph/Channing garage.

B. Recommend creating daytime short-term parking in UC lots near the retail district in exchange for University access to commuter parking in Telegraph/Channing Garage.

C. Install more effective and an increased amount of signage directing autos to available public parking.

D. Increase public usage of University parking lots at times when public parking is allowed.

1. Create better signage to direct the public to University parking lots, and to better explain public parking hours and costs.

2. Improve the payment systems at University parking lots to make them easier to use.

E. Encourage UC to provide short-term, weekday parking for patrons to the University's cultural facilities, such as designating short-term parking spots in key University garages for patrons to the Berkeley Art Museum, Hearst Museum, or Zellerbach Hall.

Policy T-F2: Improve the transit connection between the Telegraph commercial district and Downtown Berkeley.

A. Provide maps and schedules of AC Transit and campus shuttle routes at all transit and shuttle stops.

B. Better inform the public of the availability and low cost of campus shuttles to the public.

C. Finish upgrading bus stops in the area to include shelters, larger waiting areas, and improved signage (see Economic Development and Community Character Elements).

D. The City and University should consider funding a joint City/Campus transit connection between Downtown Berkeley and Telegraph Avenue daily, at nights, and on weekends.

Policy T-F3: Improve pedestrian access to the retail district and pedestrian travel within the district.

A. Improve the pedestrian connection between Downtown and the Southside.

1. Add streetscape enhancements to the Bancroft corridor such as sidewalk improvements, more street trees, and sidewalk lighting.

2. Add signage in the Downtown (at the BART Plaza and in Center Street directories) directing pedestrians to the Telegraph commercial district.

B. Reduce sidewalk bottlenecks in the commercial area.

1. Enforce the ban on sidewalk sandwich board signs.

2. Strategically locate news racks and trash receptacles to avoid impeding the flow of pedestrian traffic.

3. Improve pedestrian connections between University cultural facilities such as Zellerbach Hall and the Telegraph commercial area.

4. Add well-designed signage and marquees to the street frontage for Zellerbach Hall, the Berkeley Art Museum/PFA, the Hearst Museum of Anthropology and other cultural facilities.

5. Enhance sidewalk lighting at these street frontages.

6. Consider creating an entrance to the Telegraph/Channing Mall from Telegraph Avenue to improve pedestrian access to and from the mall, the parking structure, and its public restrooms.

7. Enforce laws against bicycle riding on the sidewalks.

Policy T-F4: Improve bicycle access to the area per the City of Berkeley Bicycle Plan.

A. Continue efforts underway to add bike racks in the retail district in areas where racks do not conflict with street artist locations or pedestrian movement. Provide bicycle parking in the Telegraph/Channing Garage.

B. Implement the City of Berkeley Bicycle Plan and the University's Campus Bicycle Plan policies.

C. Provide secure all-day bike parking in the area and encourage retailers to provide safe, off-street employee bike parking.

Policy T-F5: Improve loading and unloading for the commercial businesses.

A. Create and enforce workable rules to make loading and unloading of deliveries in the area easier and more efficient.

B. Improve signage at loading zones so rules are clear and easy to read.

C. Increase enforcement of time limits in loading zones to discourage auto parking in loading zones.

D. Increase enforcement of traffic rules prohibiting double parking.

E. Lengthen certain loading zones in the commercial area to better accommodate loading vehicles.

F. Add short term 5-10 minute green zones to facilitate short-term visits and drop-offs at area businesses.

G. Ensure that loading and unloading does not block or impede transit and para-transit vehicles.

Policy T-F6: Better accommodate and encourage tour buses in and to the commercial area.

Objective T-G: Develop a trip reduction strategy, including a methodology to monitor and measure performance, to achieve a quantified reduction in single-occupant vehicle trips to the Southside (including trips to Southside parking sites).

Policy T-G1: Publicize and take steps to ensure that all employers in the Southside are aware of existing transit subsidy programs like Commuter Check.

Policy T-G2: Publicize and encourage employers to participate in a Guaranteed Ride Home program.

Policy T-G3: Recognizing that increasing the supply of parking encourages driving, encourage UC to limit its supply of parking to year 2000 levels.

Policy T-G4: Encourage UC and other employers to charge market rate for long-term parking.

Policy T-G5: Develop a program of subsequent actions if initial actions do not result in sufficient trip reduction.

Policy T-G6: Encourage carpooling. All providers of long-term parking should be encouraged to provide special parking at discounted rates for carpools and vanpools.

Objective T-H: Locate and design parking facilities in a manner that maximizes opportunities for shared use, eases auto congestion on neighborhood streets, and protects the pedestrian orientation of the neighborhood. (See Southside Design Guidelines for more specific guidelines regarding parking design.)

Policy T-H1: Amend the zoning for the Southside Plan area to make surface parking lots a prohibited use.

Policy T-H2: When property owners develop surface parking lots with housing and/or mixed use development, replacement parking may be accommodated off site through new parking structure development. The Residential Mixed Use Sub Area (R-SMU) is the preferred location for replacement parking. Any such new parking structure should be located where it can serve commercial areas and should maximize shared parking.

Policy T-H3: Incorporate bicycle and motorcycle parking into all facilities.

Policy T-H4: Develop and implement strategies to minimize travel made in single-occupant vehicles to and from the Southside, in conjunction with any planning for new parking in the area.

Policy T-H5: Evaluate the adequacy of parking for people with disabilities in the Southside and recommend improvements as needed.

Policy T-H6: Ensure that parking garages have adequate vertical (height) clearance for modified vans and have smooth surfaces for vehicular and pedestrian access.

Objective T-I: Encourage more housing in the Southside in order to reduce auto trips to the area and facilitate travel on foot and by bike (See also Land Use and Housing Element).

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ATTACHMENT B

Construction Cost Estimate for Two-Way Street Conversion

Intersection Improvements - Overall Summary					
I.D	**Item**	**Unit of Measure**	**Unit Cost**	**Quantity**	**TOTAL**
Electrical					
000001	Pedestrian Countdown Head	EA	$750.00	138	$103,500.00
000002	Pedestrian Push Button	EA	$600.00	138	$82,800.00
000003	Signal Head	EA	$550.00	186	$102,300.00
000004	Mast Arm w/Signal Pole	EA	$8,500.00	15	$127,500.00
000005	Signal Pole (1-B)	EA	$1,200.00	48	$57,600.00
000006	Signal Pole with Luminaire	EA	$3,000.00	59	$177,000.00
000007	Remove Signal Pole	EA	$1,000.00	96	$96,000.00
000008	Signal Pole Light	EA	$800.00	69	$55,200.00
000009	Video Detection System	LS	$20,000.00	18	$360,000.00
000010	Controller	EA	$3,000.00	18	$54,000.00
000011	Controller Cabinet	EA	$3,000.00	18	$54,000.00
000012	Service Pedestal	EA	$6,000.00	16	$96,000.00
000013	Replace Wiring & Conduit	LS	$50,000.00	19	$950,000.00
000038	Remove RRFB System	LS	$800.00	1	$800.00
Signing and Striping					
000014	New Sign	EA	$500.00	76	$38,000.00
000016	Relocate Sign	EA	$250.00	4	$1,000.00
000017	New Sign and Post	EA	$700.00	1	$700.00
000019	Remove Sign and Post	EA	$150.00	51	$7,650.00
000020	New Monument Sign	EA	$1,500.00	1	$1,500.00
000022	Remove Stripe	LF	$1.00	1400	$1,400.00
000023	Remove Pavement Marking	SF	$5.00	415	$2,075.00
000024	12" Crosswalk Stripe	LF	$6.60	6920	$45,672.00
000026	8" Channelizing Stripe	LF	$4.80	500	$2,400.00
000028	Red Curb	LF	$2.50	100	$250.00
000029	Pavement Marking	SF	$8.50	153	$1,300.50
Civil					
000034	Curb Ramp	EA	$4,000.00	37	$148,000.00
000035	Curb Extension	SF	$35.00	1550	$54,250.00
000036	Curb & Gutter	LF	$45.00	15	$675.00
000037	Remove Median	SF	$10.00	60	$600.00
				Intersection Subtotal	$2,622,172.50

Midblock Improvements - Overall Summary					
I.D	**Item**	**Unit of Measure**	**Unit Cost**	**Quantity**	**TOTAL**
Signing and Striping					
000015	Rotate Sign	EA	$100.00	94	$9,400.00
000017	New Sign and Post	EA	$700.00	26	$18,200.00
000018	Relocate Sign and Post	EA	$400.00	1	$400.00
000019	Remove Sign and Post	EA	$150.00	8	$1,200.00
000020	New Monument Sign	EA	$1,500.00	6	$9,000.00
000021	Relocate Monument Sign	EA	$800.00	1	$800.00
000022	Remove Stripe	LF	$1.00	15905	$15,905.00
000023	Remove Pavement Marking	SF	$5.00	330	$1,650.00
000024	12" Crosswalk Stripe	LF	$6.60	800	$5,280.00
000025	Double Yellow Centerline Stripe	LF	$1.75	10795	$18,891.25
000026	8" Channelizing Stripe	LF	$4.80	1800	$8,640.00
000027	6" Bike Lane Striping	LF	$1.50	8220	$12,330.00
000028	Red Curb	LF	$2.50	250	$625.00
000029	Pavement Marking	SF	$8.50	430	$3,655.00
000030	Parking Tees	EA	$10.00	356	$3,560.00
000031	Pay Station	EA	$1,600.00	12	$19,200.00
000032	Remove Parking Meter	EA	$175.00	36	$6,300.00
000033	Remove Parking Meter Post	EA	$150.00	282	$42,300.00
				Midblock Subtotal	$177,336.25
				SUBTOTAL	$2,799,510.00
			Traffic Control	10%	$279,950.00
			Construction Management	5%	$139,980.00
			Mobilization	10%	$279,950.00
				TOTAL	$3,499,390.00
			Contingency	20%	$699,880.00
			TOTAL CONSTRUCTION		$4,199,270.00
			Environmental and Design	20%	$839,850.00
			TOTAL ESTIMATE		$5,039,120.00

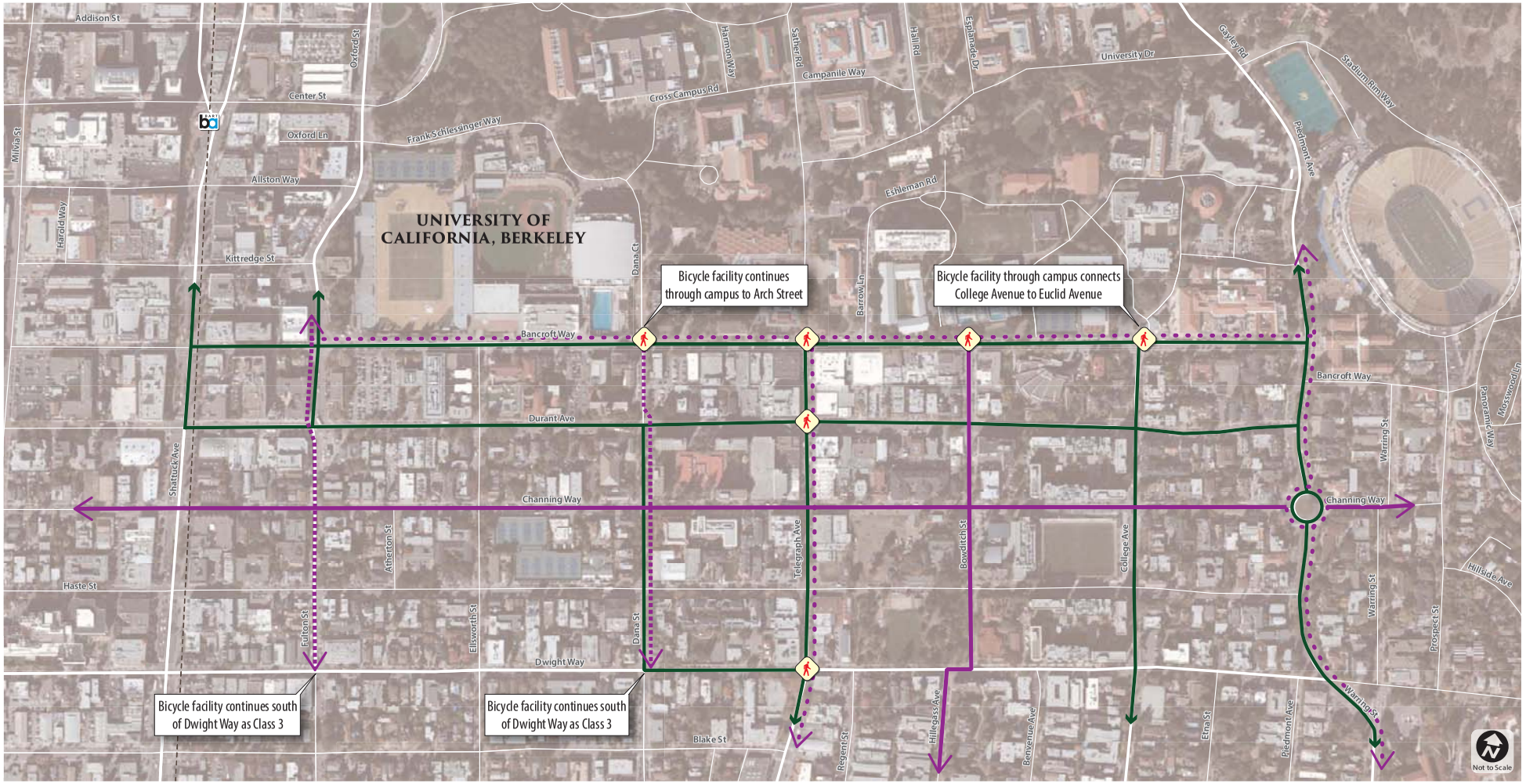

Figure 1.

Southside Transportation Characteristics

Memo:Figures\OK14-0008_Figure1_SouthsideChar

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Figure 2.

Southside Plan Implementation
2035 Traffic Operations Queueing
One-Way Streets (No Build)

Memo Figures\OK14-0008_Figure2_2035One-Way

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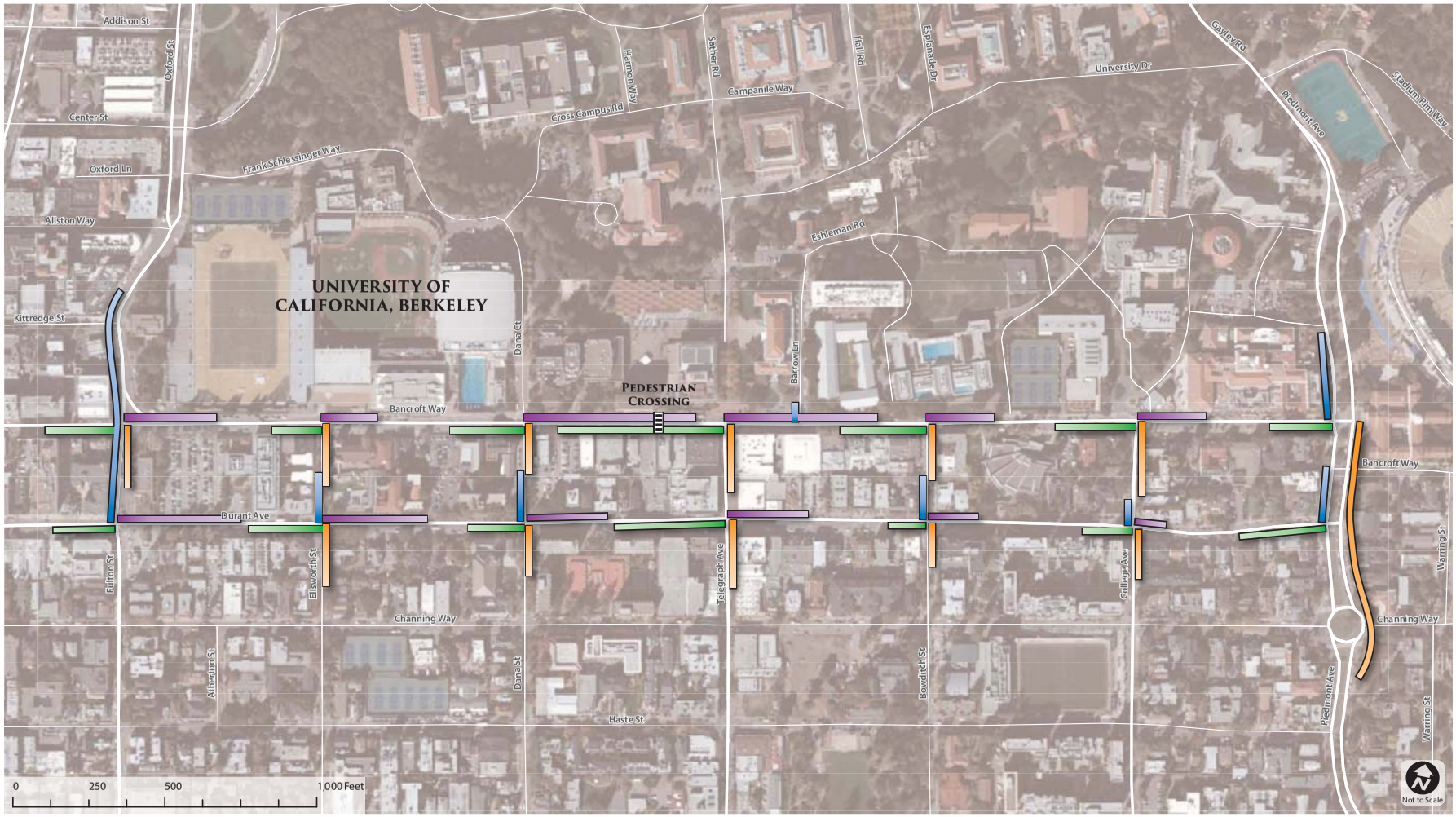

Figure 3.

Southside Plan Implementation
2035 Traffic Operations Queueing
Two-Way Streets (Signalized)

Memo Figures\OK14-0008_Figure3_2035Two-Way

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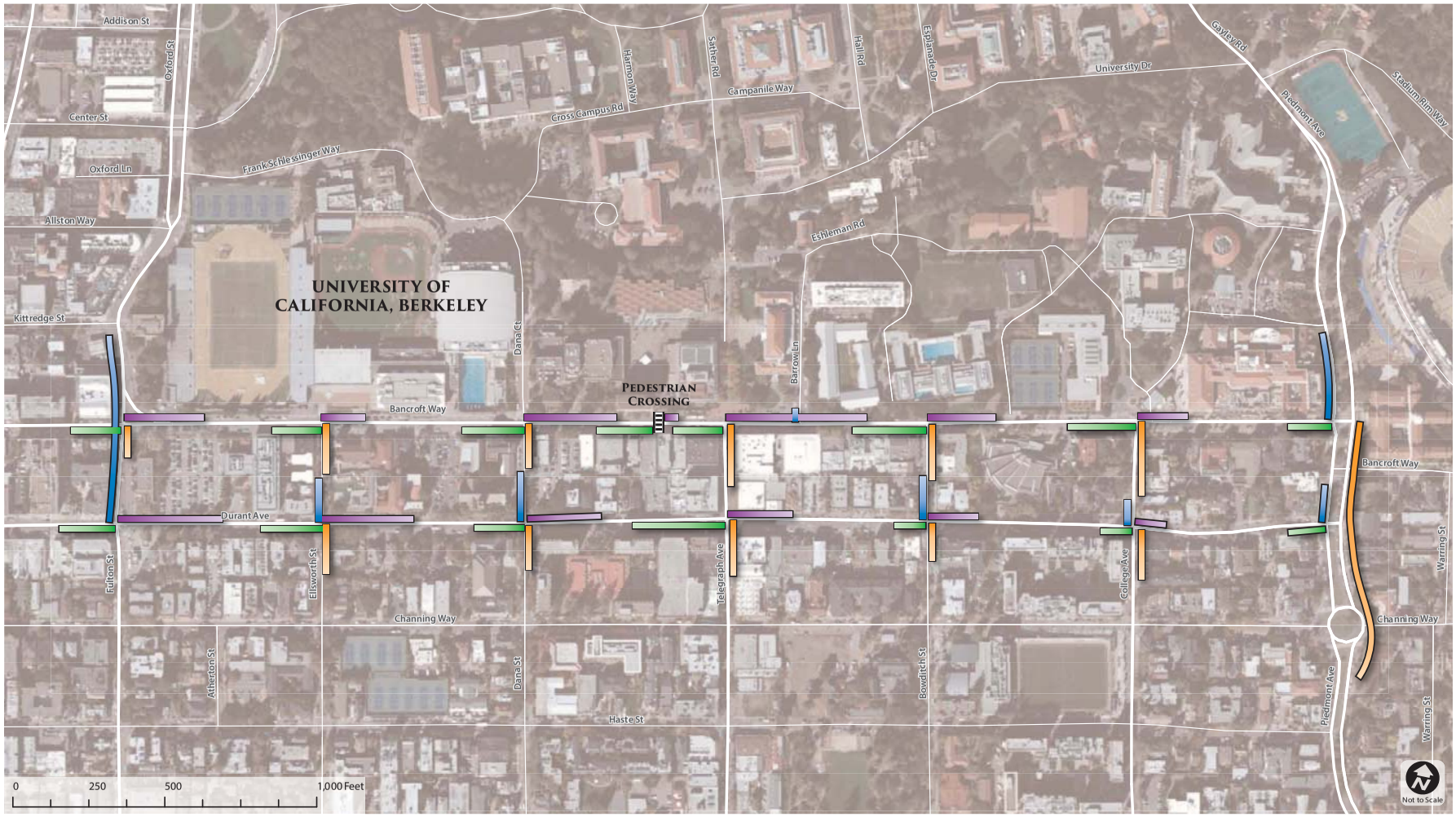

Figure 4.

Southside Plan Implementation
Opening Year "2020" Traffic Operations Queueing
Two-Way Streets (Signalized)

Memo Figures\OK14-0008_Figure4_OpeningDayTwoWay

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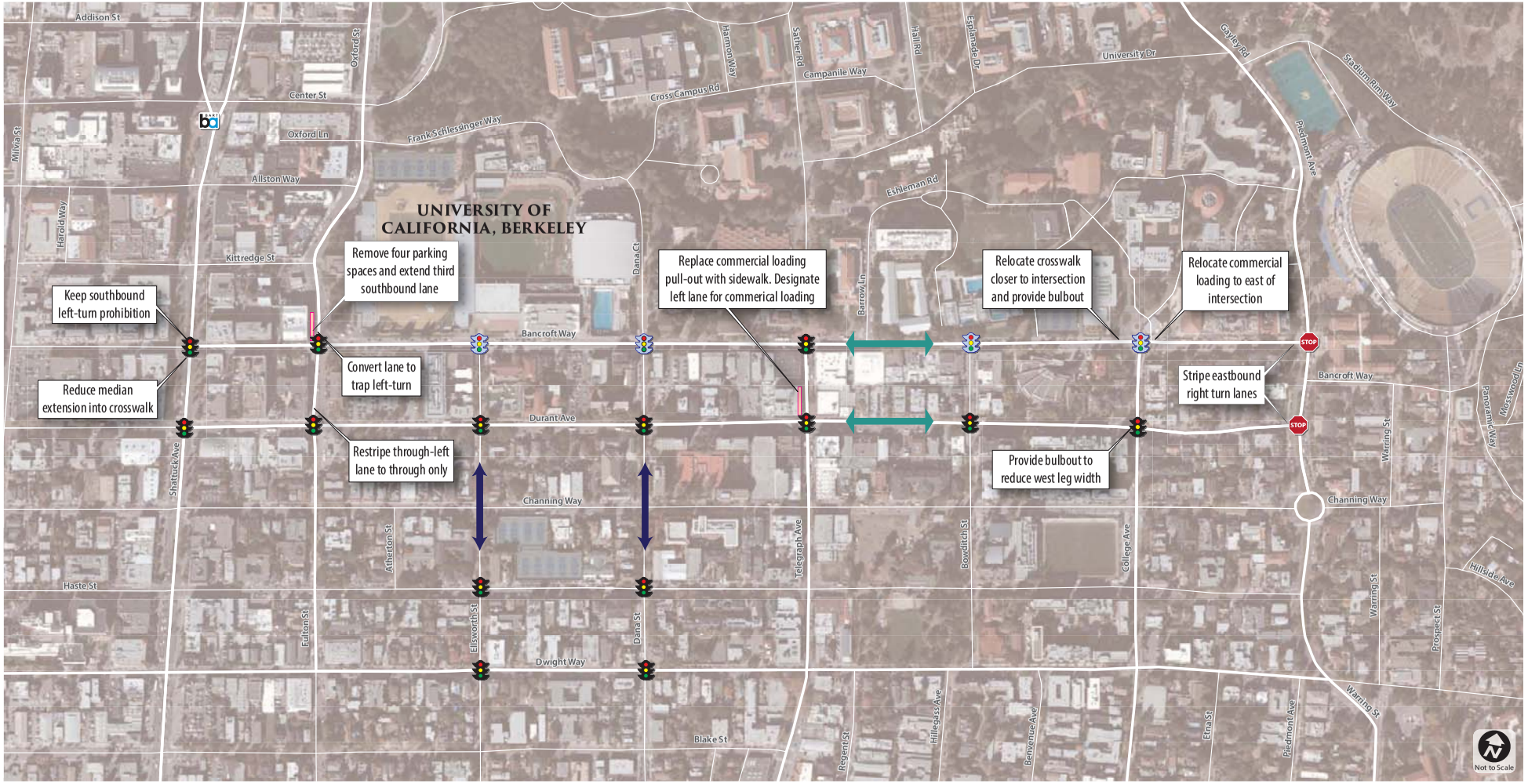

Figure 5.

Two-Way Street Conversion (Concept for Costing)

Memo:Figures\OK14-0008_Figure5_CostCon

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March 27, 2015

VIA EMAIL[FJaandel@CityofBerkeley.info;transportation@cityofberkeley.info; eanderson@ci.berkeley.ca.us]

City of Berkeley
Bicycle Subcommittee
Berkeley Transportation Commission
Farid Javandel, Secretary
Transportation Division
1947 Center Street 3rd Floor
Berkeley, CA 94704

Re: Public Comment Concerning The Consideration of Bancroft-Durant 2-Way Conversion Project; Item C-1 of the Bicycle Subcommittee's March 30, 2015 Agenda.

Dear Honorable Members of the Bicycle Subcommittee:

As you know, Miller Starr Regalia represents AMI, LLC, whose principal is Mr. Daryl Ross, the owner of various properties in the City of Berkeley ("City"), with businesses that include Caffe Strada, the Freehouse restaurant, and the Bancroft Hotel. In February 2015, we appeared before the Berkeley Transportation Commission in protest of a proposal to convert Bancroft Way and Durant Avenue from one-way to two-way streets. We understand that there currently is a proposal to package this conversion project ("Conversion Project") with the Berkeley Bike Plan Update, which the subcommittee will be considering as Agenda Item C-1 on March 30, 2015. We wish to resubmit our objections to and comments on the Conversion Project; for your convenience, we have attached correspondence that we originally submitted to the Berkeley Transportation Committee on February 18th, 2015 and hereby incorporate by reference. (*See* **Attachment 1.)**

Our client respects and supports the Berkeley Bike Plan Update, including the City's goal to make local streets safer for pedestrians and bicyclists. We do not object to the Berkeley Bike Plan Update in its entirety, but only insofar as it incorporates the Conversion Project. As indicated in **Attachment 1,** all available evidence in the administrative record indicates that the Conversion Project will jeopardize the safety of bicyclists and pedestrians, frustrating the City's articulated goal.

Accordingly, we respectfully request that the subcommittee recommend disapproval of the Conversion Project or, at the very least, disassociate the Conversion Project

from the Berkeley Bike Plan Update. Our client does not wish to delay the City's consideration of the thoughtful policies that previously comprised the Berkeley Bike Plan Update but, insofar as the City packages the Conversion Project with this larger initiative, challenge and delay may become inevitable.

Thank you for your attention to these important matters.

Sincerely,

MILLER STARR REGALIA

Ronny Clausner

RZC:rzc
Attachment: 2-18-2015 Wenter Letter to City of Berkeley
cc: Bryan W. Wenter, AICP
Daryl Ross, AMI, LLC

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February 18, 2015

VIA EMAIL [FJavandel@CityofBerkeley.info; transportation@cityofberkeley.info]

City of Berkeley
Transportation Commission
Farid Javandel, Secretary
Transportation Division
1947 Center Street – 3rd Floor
Berkeley, CA 94704

Re: Public Comment Concerning Item B-4, Berkeley Transportation Commission's Consideration of Bancroft-Durant 2-Way Conversion Project, Set for Discussion February 19, 2015.

Dear Mr. Javandel and Members of the Commission:

As you may know, Miller Starr Regalia represents AMI, LLC, whose principal is Mr. Daryl Ross, the owner of various properties in the City of Berkeley ("City"), with businesses that include Caffe Strada, the Freehouse restaurant, and the Bancroft Hotel. We wish to submit additional comment with respect to the Bancroft-Durant 2-Way Conversion Project ("Project"), which we understand the Berkeley Transportation Commission ("Commission") will discuss at its public meeting on February 19, 2015 under Agenda Item B-4.

Overall, we respectfully request that the Commission take a second look at whether the Project indeed would improve pedestrian and bicyclist safety in the Southside Area, and delay taking any action on this matter until the public has an opportunity to review critical traffic data, as identified further below.

Whereas the goal of the conversion Project is to reduce auto-pedestrian accidents, data suggests that the conversion would increase vehicular accidents by as much as 40 percent. We understand the goal of converting Bancroft Way and Durant Avenue from one-way to two-way streets is, in part, motivated by the City's desire to "improve bicycle and pedestrian safety." (*See* January 9, 2015 Staff Report, p. 1.) The goal is laudable and one shared by our client, especially when one considers that, each year, vehicles strike hundreds of pedestrians and bicyclists in the City's Southside Area. (*See* the March 2013 report prepared by UC Berkeley's Safe Transportation Research and Education Center, entitled *Pedestrian and*

Bicycle Safety Strategies for UC Berkeley Campus and Periphery: Recommendations for Implementation, p. 46, Figure 4.27; and p. 50, Figure 4.31.)[1]

We also can understand how one could assume that converting one-way streets to two-way thoroughfares would lead to less accidents. Conventional wisdom suggests that vehicles move slower along two-way streets, and so it is instinctive to conclude that having more two-way streets would reduce the risk of collisions between cars and people. However, studies show that converting one-way streets to two-way streets actually *increases*, significantly, the incidence of auto-pedestrian accidents, and we have not seen any evidence provided by the City that would show otherwise.

A 2009 report, entitled *Converting One-Way Streets to Two-Way Streets Creates Higher Accident Rates* (the "Conversion Report"), analyzes collision data in cities across the nation — including Portland, Denver, and New York City — and concludes that, while the conversion may in some instances slow the rate of vehicular speed, it increases auto-pedestrian accidents by 40 to 135 percent. (*See* **Attachment 1**, p. 2, ¶¶ 1, 3, 4, 8.) Highlights of this report are as follows:

- Cities that have converted from two-way to one-way flow have significantly reduced their vehicular and pedestrian accident rates, according to the Conversion Report. Per this analysis, New York City discovered that, after converting 5th and Madison Avenues to one-way, accident rates dropped 38 percent. (*See* **Attachment 1**, p. 2, ¶ 6.) Closer to home, the City of Portland, Oregon, after converting its downtown area to one-way streets, is reported to have seen a decrease in vehicular accident rates by 45 to 60 percent. (*See* **Attachment 1**, p. 2, ¶ 4.) Smaller cities in Oregon were reported to see decreases in accidents ranging from 24 to 38 percent. (*See* **Attachment 1**, p. 2, ¶ 5.)

- By contrast, cities that have converted one-way streets to two-way streets appear to have encountered greater risks of accidents. For instance, the City of Albuquerque is reported to have experienced an increase of traffic accidents by 38 percent after converting 62 blocks from one-way to two-way travel in the 1999-2003 timeframe. (*See* **Attachment 1**, p. 5, ¶ 3.) Breaking this data into component parts, the Conversion Report indicates that the pedestrian accident rate in Albuquerque increased by about 135 percent after the conversion, while the bicycle accident rate increased by almost 214 percent. (*See* **Attachment 1**, p. 5, ¶ 4.) Meanwhile, after the City of Denver converted seven streets to two-way travel, it reportedly found that accident rates increased 38 percent to 90 percent along these roadway segments. (*See* **Attachment 1**, p. 2, ¶ 8.) The City of Lubbock saw a similar increase along roadway segments it converted to a two-way configuration (about 42 percent). (*See* **Attachment 1**, p. 3, ¶ 1.) Finally, the City of Cincinnati, which undertook a conversion in 1999, showed that the total accident rate on the converted roadway segment increased by about 87 percent, and that pedestrian accidents increased by 103 percent. (*See*

[1] The SafeTREC report is available at http://safetrec.berkeley.edu/sites/default/files/Pedestrian-Bicycle-Safety-for-UC-Berkeley-Campus-and-Periphery.pdf. We ask that the City print this report and include it in the administrative record for the Project.

> **Attachment 1**, p. 3, Table 1.)[2] A report released by that City concluded that "all other things being equal, one-way traffic on a street will provide safer traffic operation than two-way traffic, both for motorists and pedestrians." (*See* **Attachment 1**, p. 4, ¶ 7.)

In many, if not all of the foregoing case studies, the Conversion Report indicates that a conversion to two-way flow led to a decrease in vehicle speed. (*See* **Attachment 1**, p. 6, ¶ 1.) Conventional wisdom is correct, then, on this point.[3] But of the analyses and case studies cited by the Conversion Report, all of them show, without exception, that the conversion to two-way flow leads to more accidents. (*See* **Attachment 1**, *in passim,* p. 5, ¶ 6.)

The author of the Conversion Report, identified as a traffic engineer who has worked for the Port Authority of New York and New Jersey, suggests that one-way flow yields less accidents for five separate reasons (*See* **Attachment 1**, p. 6, ¶ 3), but these reasons all appear to be based on a simple premise: one-way flow makes for simpler intersections.

The Project that the City is considering now would entail the expenditure of at least $5 million dollars. (January 9, 2015 Staff Report, p. 2; Fehr & Peers November 19, 2014 Memorandum, p. 2.)[4] Given the foregoing studies, we ask that the City take a measured, second look at whether the conversion of Bancroft Way and Durant Avenue would in fact make Berkeley streets safer. While Berkeley is a unique community, there is no evidence that its vehicular and pedestrian movements distinguish it in a way that makes the Conversion Report, and the studies that this report cites, inapplicable. Thus, there exists a fair argument that implementation of the Project will lead to more injuries, exacerbating the very concern that animates this proposal.

If the City has conducted a study showing the Project would lead to less vehicular and pedestrian accidents, we respectfully request that it provide the public with a copy of that study.

Installation of a traffic light at the corner of Bancroft Way and College Avenue increases the risk of accidents. As discussed in our previous correspondence to the Commission — which included a December 6, 2013 letter submitted to AC Transit and a traffic report prepared by expert consultant Kittelson & Associates, Inc. — installation of a traffic signal at the

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[2] The City of Cincinnati has acknowledged a decrease in safety. (*See* August 27, 2004 Memorandum to the City Council, available at http://city-egov.cincinnati-oh.gov/Webtop/ws/council/public/child/Blob/10689.pdf;jsessionid=05BD4ECCEB38454315F5D7F2CD9F6BD6?m=10190.)

[3] Notwithstanding the above, the author of the Conversion Report notes that, while two-way flow may reduce "average speed," or the time it takes a car to get from one point to another, it may not significantly reduce "moving speed," or the speed at which vehicles travel when they actually are moving. (*See* **Attachment 1**, p. 7, ¶ 3.) On two-way streets, motorists may try to compensate for increased stoppages by driving more quickly while they are moving. (*See* **Attachment 1**, p. 7, ¶¶ 3, 4.)

[4] This $5 million figure apparently derives from Attachment B to the Fehr & Peers memorandum, but this attachment was not included in the agenda packet for the Commission's January 9, 2015 meeting. We respectfully request that the City provide us and the public a copy of this Attachment B.

intersection of Bancroft Way and College Avenue may result in a significant impact to pedestrian safety. This heighted risk exists for a number of reasons, including that (1) the Bancroft Way approach to the intersection has a steep grade (ranging from 9 to 13 percent), which significantly affects a motorist's ability to brake (i.e., the braking distance required is 35 percent longer); (2) vehicles often exceed the speed limit on Bancroft Way, and vehicle speeds tend to increase during a green signal phase; and (3) a signal has the potential to add further congestion to sidewalks that already accommodate thousands of pedestrians per hour, creating the potential for more conflict between vehicles and pedestrians. We note here that the Project also appears to include the relocation of delivery zones to the east of the Bancroft Way/College Avenue intersection (Fehr & Peers November 19, 2014 Memorandum, Figure 5), which could operate to obstruct travel lanes on the steep downgrade approach to the intersection, potentially further obscuring visibility.

Our client's view on the necessity of a traffic signal is not singular. It appears that the Safe Transportation Research and Education Center ("SafeTREC"), affiliated with UC Berkeley's School of Public Health and the Institute of Transportation Studies, disagrees that a traffic signal should be installed at the Bancroft Way/College Avenue Intersection. In its March 2013 report entitled *Pedestrian and Bicycle Safety Strategies for UC Berkeley Campus and Periphery: Recommendations for Implementation*, the group specifically advised that the City "not change [the] intersection from stop control to signal control," but rather install high-visibility ladder markings at an intersection crosswalk for the cost of $1,800. (*See* p. 88 [report recommendations regarding Location 2.6].)

We respectfully submit that installing a traffic signal at the Bancroft Way/College Avenue intersection would have significant impacts to pedestrian safety, and that the City more effectively could protect pedestrians at a fraction of the Project's $5 million cost by installing high-visibility ladder markings at the intersection.

It appears the Project must undergo further environmental review. The foregoing reports constitute substantial evidence, supporting a fair argument, that the Project may have significant environmental effects. As discussed in Miller Starr Regalia's letter of January 15, 2015, it does not appear that the City may rely on the Southside Plan Environmental Impact Report ("Southside Plan EIR") as a means of satisfying the California Environmental Quality Act ("CEQA") for the proposed Project. As discussed more extensively in that letter, the Southside Plan EIR is a programmatic document intended to evaluate policy amendments to the City's general plan, and did not cover or even purport to cover implementation of traffic improvements.

To this end, the Southside Plan EIR does not appear to have evaluated safety risks to pedestrians and bicyclists, and does not appear to have evaluated, to any extent, traffic impacts at the Bancroft Way/College Avenue intersection. (*See, e.g.,* Southside Plan EIR, Tables IV.C-5, IV.C-6, and IV.C-7 [tables evaluating level of service changes do not include Bancroft Way/College Avenue intersection].) This omission, of course, makes sense, when one considers that the City intended to conduct more specific review at the time that circulation improvements were proposed. (*See, e.g.,* Project Findings, as attached to the City's November 27, 2011 Staff Report for the Southside Plan, p. 2 ["Four impacts identified in the EIR (TRANS 2, TRANS11, TRANS12, and TRANS13) relate to the possible future conversion of Bancroft Way and Durant Avenue to two-way traffic. Because circulation changes will not be implemented as part of this Project, but only as part of a future decision-making process,

adoption of the Southside Plan would not result in these particular impacts. Therefore, this document does not include findings for Council adoption with respect to these actions."].)

Since the specific details concerning their implementation never crystallized during preparation of the Southside Plan EIR, the City must now evaluate, on an individual basis, the impacts of implementing the proposed Project, and do so in a subsequent EIR.

Critical information does not appear to have been presented to the public. We respectfully ask that the Commission delay its consideration of the Project until the public has had an opportunity to fully vet the data supporting its proposal. For instance, the January 9, 2014 agenda packet included a traffic report that did not address pedestrian safety, and the Project's impact in this regard deserves more measured review. The public also deserves an opportunity to review design level drawings (showing, for instance, lane configurations), modeling data to support the conclusion of the traffic consultant's November 19, 2014 memorandum, and detailed cost information (e.g., the attachment that purported to contain this information was not included; *see* footnote 3.)

All of this information is necessary for our client and other members of the public to have an informed understanding of the Project, and we respectfully ask that consideration of the Project be continued until the City has provided us with the pertinent documents and afforded us a reasonable opportunity to review them. Finally, we separately have requested information by letter dated February 3, 2015 (*see* **Attachment 2**) regarding recent development in the Southside area that could affect traffic circulation, and request that the Commission not take action on the Project until we have an opportunity to review this data as well.

Conclusion. Our client respects and supports the City's efforts to make local streets safer for pedestrians and bicyclists. We only ask that, before the City move ahead with implementation of the Project, it take a second look and consider whether the Project indeed will reduce the risk of accident and, if so, consider whether there exist more effective, and less expensive, ways to accomplish its goal.

Thank you for your attention to these important matters.

Sincerely,

MILLER STARR REGALIA

Bryan W. Wenter, AICP

BZW:kli

Attachments: Exhibit 1
2-3-15 Clausner Letter to City of Berkeley

cc: JoAnne Dunec, Esq.
Daryl Ross, AMI, LLC

« Dallas Dart Light Rail: Major Failure for Transit and Taxpayers. Austin's results will be more devastating. Austin's Transportation Planning is Unsound, Unaffordable, Ineffective and Unsustainable »

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Austin's "Great Streets" Plan Will Endanger Citizens

COST Commentary: The report below ends with the following paragraph about a study in the mid-1930's. This 2009 report verifies that today's busy, two-way streets have the same accident-prone, dangerous characteristics as those in the 1930's.

"Sidis (or Mulligan) was right. The failure to understand the value of one-way streets is leading to unnecessary human injuries, destruction of property, excessive fuel consumption, and wastage of space in American cities. If the present movement to eradicate one-way flow is not stopped, the price paid will be enormous. Rather than convert remaining one-way streets to two-way, it would be beneficial if more two-way streets, in suburbs and small towns as well as large cities, were made one-way, as is being advocated now in Los Angeles, New York, and elsewhere and as has been done in much of Europe."

As Mr Cunneen, the author of the paper below, states: **"Those who want to convert one-way streets to two-way streets ignore a lifetime of accident studies showing one-way streets to be much safer."**

Austin's *Comprehensive Plan*, with its *"Great Streets"* program, has already resulted in conversion of downtown one-way streets to two-way streets and numerous additional conversions are planned for the near future. For the reasons stated below, COST recommends this ill-advised street conversion trend cease immediately to better protect our citizen's safety and provide enhanced mobility with reduced pollution.

CONVERTING ONE-WAY STREETS TO TWO-WAY STREETS CREATES HIGHER ACCIDENT RATES

Michael J. Cunneen, April 2009

The Traffic Calming Movement's Crusade Against One-Way Streets

One of the oddest movements making headway in North America over the past quarter-century has been one led by urban planners and neighborhood activists in many cities to eliminate one-way streets, converting them back to two-way flow. This movement began with those who had opposed the creation of one-way streets but now has spread to a new generation unacquainted with why one-way streets were created and what impact a reversion to two-way flow has.

Not knowing the impacts has not hindered advocates in propagating their ideas about why one-way streets are bad and should be eliminated or why they think two-way flow would be beneficial. Whole web sites have been dedicated to this issue, advocating the elimination of one-way streets, and local politicians and activists have championed this cause, causing many one-way streets to be eliminated and many more to be placed under study to be eliminated. Many books on urban planning, beginning with Jane Jacobs' "The Death and Life of Great American Cities", attack one-way streets as favoring traffic flow over neighborhood "livability".

The advocates for two-way flow claim that one-way streets were only created to better move a higher volume of traffic and operate simply as urban roadways that deliver high volumes of traffic at high speeds through cities, dividing neighborhoods and intimidating pedestrians, and generally existing only to enhance an automobile-oriented culture. In contrast, they claim that two-way streets would be more "pedestrian-friendly" and safer as traffic operates at lower speeds on these while less two-way traffic can be carried. Therefore, they say that converting one-way streets back to two-way flow is a "traffic calming" measure, improving safety and promoting pedestrian and bicycle movement as opposed to auto travel. The "pedestrian-friendly" claim has generally been used the most, frequently coupled with other beliefs that a reversion to two-way flow would help promote or popularize a downtown area such conversion is planned for. Emphasized most of all is that reversion to two-way flow would slow down traffic, thereby enhancing safety and making things generally nicer.

A recent report by the Rand Corporation on transportation improvements for Los Angeles noted that *"the primary motivation for one-way to two-way street conversion plans was to help … bike- and pedestrian-friendly … districts" and that "Two-way streets are generally considered to have lower vehicle speeds than one-way streets and are thus more accommodating to pedestrians and bikers" with "a higher-quality environment for pedestrians and cyclists".* They believe that two-way streets are *"more accommodating to*

ATTACHMENT 1

pedestrians and bikers" and yield *"a higher-quality environment for pedestrians and cyclists"* (see page 274, Rand Corporation, Moving Los Angeles: Short Term Policy Options for Improving Transportation, October 2008, MG-748-JAT/METRO/MCLA).

Advocates have been so successful that many cities have or have had programs just to convert one-way streets to two-way flow and publicly label this as a "traffic calming" or a "safety" measure, or both. Even in major cities where city transportation departments tend to favor one-way streets, such as New York City and Los Angeles, many community groups advocate a reversal of policy and actively prevent more streets being converted to one-way flow.

The Evidence from the Past on One-Way Streets

The main reason why the city departments of transportation in New York, Los Angeles, and elsewhere have favored one-way flow is the lessons they draw from city impact studies done mostly in the 1940's and '50s to asses what happened when they first converted two-way streets to one-way flow. These studies generally found that under one-way flow, accident rates were considerably lowered, especially for pedestrian accidents, while traffic was able to flow with less delay and greater speed.

Almost universally these older studies found that one-way streets had 10-40% lower accident rates than when previously two-way. Most significantly, pedestrian accidents declined far more, by 30-60% (see pages A-126; A-162, *National Highway Safety Needs Study, Appendix A*, Research Triangle Institute, March 1976 (DOT-HS-5-01069); Pages 7-2 to 7-8, *"One-Way Streets and Reversible Lanes", Synthesis of Safety Research Related to Traffic Control and Roadway Elements, Volume I,* Research Triangle Institute, March 1976 (FHWA-TS-82-232), December 1982; Page 28, Dr. Charles Zegeer, University of North Carolina, "Pedestrians and Traffic-Control Measures", *National Cooperative Highway Research Program, Synthesis of Practice, #139,* November 1988; and Chapter 10, Peter A. Mayer, *"One-Way Streets", Traffic Control and Roadway Elements, Their Relationship to Highway Safety,* Highway Users Federation for Safety and Mobility, 1971).

Typical of the positive safety experience achieved by converting to one-way streets was that of Portland, Oregon. The City of Portland converted most of its Downtown area to one-way on March 1, 1950. Their before-and-after data (1949 versus 1951) on the streets that were converted found that vehicular accidents decreased from 6,127 to 3,361 (-45.1%). Adjusting for the increase in volume, the vehicular accident rate per vehicle volume (the standard measure) actually decreased 58.1%. The number of pedestrian accidents on the downtown streets that were converted decreased from 237 to 126 (-46.8%). Adjusting for the increase in volume, the pedestrian accident rate per vehicle volume actually decreased 59.7% (see Fred Fowler, "One-Way Grid System for Portland, Oregon", Traffic Engineering, April 1953). This vast increase in safety was achieved even though volumes increased from 12,734 to 16,708 vehicles (+31.2%) and average speeds increased from 7.9 mph to 14.2 mph (+79.7%). The conversion to one-way was also credited with aiding bus transit, reducing delays, and increasing access to the downtown area.

In 1959, the Oregon State Highway Department published a report which summarized the overall impact of converting two-way state highway sections to one-way couplets through town and city centers in twelve smaller Oregon cities. The weighted average traffic accident rate declined 24% while the weighted average pedestrian accident rate declined 38% (see Oregon State Highway Department, A Study of One-Way Routings on Urban Highways in Oregon, Technical Report #59-4, April 1959). This report remains as one of the most comprehensive scientific investigations of the safety impacts of one-way flow on record.

Impact studies done by New York City for 5th and Madison Avenues found that after being converted to one-way in1966 accident rates dropped by 38% overall with accident injuries declining by 28% while both traffic volume and speed increased. Similar studies in London, England found that conversion to one-way there resulted in accidents declining up to 40% while speeds increased (see page 808, Institute of Transportation Engineers, Transportation and Traffic Engineering Handbook, 2nd Edition, 1987. Studies for Hamilton, Ontario for 1956-1960 found that conversion to one-way flow there resulted in a 17% reduction in accidents (see Chapter 10, Peter A. Mayer, Chapter 10, *"One-Way Streets", Traffic Control and Roadway Elements, Their Relationship to Highway Safety*, Highway Users Federation for Safety and Mobility, 1971). Similar results also were observed in small cities. A 1957 conversion to one-way in Modesto, California resulted in a 57% decrease in pedestrians injured and a 10% decrease in overall accidents even though average speed was doubled (see Douglas Carmody, *"First Year Report on Modesto's One Way Streets," Street Engineering,* December 1958)

The Evidence from Recent Studies on One-Way Streets

Few cities that have converted one-way streets to two-way will release accident impact data on this change. Typically, studies favoring two-way avoid any real before-and-after data on vehicle or pedestrian safety or avoid the safety issue altogether. Three cities that have produced before and after data on conversions to two-way flow are Denver, Colorado, Lubbock, Texas, and Cincinnati,Ohio. All three of these cities found that major increases in accident rates were the result of reverting to two-way traffic.

In 1986 Denver converted seven streets on three one-way couplets. They found that average intersection accident rates increased 37.6% while average mid-block accident rates increased 80.5%. The City report noted that accident rates were up on all three couplets "as is expected with two-way operation" (see Pages 15, 23, and 29, City of Denver, *One-Way Street Monitoring Study, Phase 1 Conversion Report*, January 1990). In spite of this the City of Denver rated the conversion as a "success".

Lubbock, Texas in 1995 converted two downtown streets back to two-way. Overall accident rates increased there 41.6% (see City of Lubbock, *Main and 10th Street Accident Analysis, Before/After Study*, 1998). The before and after accident data for Lubbock have appeared in few places outside the City government. However, advocates for two-way conversion have long used the Lubbock experiment as proof of success, largely by ignoring this data and relying instead on an article published in the ITE magazine which claims the conversion produced no accident problem in Lubbock (with no supporting data).

The study done for the City of Cincinnati,Ohio is the latest and most comprehensive of these. This Cincinnati report is the most useful done recently for a city transportation department in that it monitored impacts on a major street both when converted from two-way to one-way in 1975 and also when the same street was converted back from one-way to two-way in 1999 (see Edwards and Kelcey Associates, *Over-the-Rhine/Vine Street Circulation Study*, February 2003).

While many in favor of reconverting one-way streets to two-way often claim that city studies are so old as to be not worthy of examination this study is both recent and based on a 1999 street conversion. Table 1 summarizes the before and after conditions found for the November 1999 conversion from one-way to two-way flow on Vine Street while Table 2 summarizes the before and after conditions found for the August 1975 conversion from two-way to one-way flow on Vine Street.

The Cincinnati report found that a 15% increase in daily traffic volumes occurring on Vine Street when converted from one-way to two-way. There was also a 31% decrease in average vehicular speed that occurred when the street was converted from one-way to two-way. This slowing down of speed was *"expected".*

Table 1
Summary of Impacts, One-Way to Two-Way Flow
Direction Conversion, Vine Street, 12th Street to
Findlay/McMicken, Cincinnati, Ohio, November 1999

Component of Change	Before: One-Way		After Two-Way	
	Before	After	Number	Percent
Volume	30,900	35,600	+3,200	+15.2%
Average Speed *	18.0	12.4	-5.6	-31.1%
85th % Speed*	31.9	28.4	-3.5	-10.9%
Total Accidents	75.9	164	+88	+116%
Total Accident Rate	2.456	4.607	+2.151	+87.6%
Pedestrian Accidents **	5.9	12.0	6.1	+103%
Ped Accident Rate	.191	.337	+.146	+76.4%
Intersection Accidents	43.5	79	35.5	+82%
Int Accident Rate	1.408	2.219	.811	+57.6%
Midblock Accidents	32.5	85	52.5	+161.5%
Midblock Accident Rate	1.052	2.388	+1.336	+127.0%

•Volume refers to total weekday traffic volumes counted on Vine Street between 12th Street and Findlay Street/McMicken Avenue for 1995 and 2002 (Table 1)
•Average speed is given in miles per hour. This refers to total time from one end of the street section to another, including time spent idling in 1995 and 2002(Table 7).
•Total accidents refers to the average annual number of accidents on Vine Street between 12th Street and Findlay/McMicken Streets in 1991-97 versus 2000 (Table 4).
•Pedestrian accidents are all those on same section of Vine Street (Table 4).
•Intersection accidents are all those at intersections in the same section of Vine Street (Table 4).
•Midblock accidents are all those in between intersections on same section of Vine Street (Table 4).

Table 2
Summary of Impacts, Two-Way to One-Way
Flow Direction Conversion,
Vine Street, 12th Street to Findley/McMicken Streets,
Cincinnati, Ohio, August 1975

Component of Change	Before: Two-Way		After One-Way	
	Before	After	Number	Percent
Volume	24,520	28,025	+3,505	+14.3%
Average Speed *	NA	NA	NA	NA
Total Accidents	212	128	-84	-39.6%
Total Accident Rate	8.658	4.567	-4.091	-47.3%
Pedestrian Accidents **	16.6	13	-3.6	-21.7%
Ped Accident Rate	.6770	.4639	.2131	-31.5%
Intersection Accidents	126	79	-47	-37.3%
Int Accident Rate	5.139	2.819	-2.320	-45.1%
Midblock Accidents	86.3	49	37.3	-43.2%
Midblock Accident Rate	3.5196	1.7484	-1.7712	-50.3%

•Volume refers to total weekday traffic volumes counted on Vine Street between 12th Street and Findlay Street/McMicken Avenue for 1974 and 1976 (Table 1)
•Total Accidents refers to the average annual number of all accidents on Vine Street between 12th Street and Findlay/McMicken Streets for the 1972-74 average versus 1976 (Table 4).
•Pedestrian accidents are all those on same section of Vine Street (Table 4).
•Intersection accidents are all those at intersections in the same section of Vine Street (Table 4t.
•Midblock accidents are all those in between intersections on same section of Vine Street (Table 4).

The report notes that: *"With only one travel lane, more congestion occurs and travel times are higher and speeds lower"* (under two-way flow). Average speeds were, however, fairly low both before and after this conversion. The average speed when one-way was 18 miles per hour. Under two-way flow, this decreased to 12.4 miles per hour. The report further notes that with two-way flow *"congestion and delays were prevalent"* along Vine Street and that *"traffic moves less efficiently under two-way operation … with resultant congestion and delays"* (page 59). The change from one-way to two-way flow more than doubled the time it took to drive down this 3,133-foot section of Vine Street, from two minutes to over four and a half minutes and interfered with local bus operations.

As the slower two-way street is *"not user friendly"* (page 59), another phenomenon is taking place: *"motorists are driving around this area, probably avoiding the congestion along Vine Street"* (page 58). This would mean some traffic is being exported to parallel streets as *"motorists are using alternate routes"* (page 58).

Converting this one-way street to two-way flow resulted in a massive increase in accidents with the overall traffic accident rate going up by 116%. In contrast, when the street had been two-way but then converted to one-way flow the accident rate had decreased nearly 40%.As the report notes:

"The total of all reported accidents and pedestrian related accidents had fewer incidents when Vine Street was one-way. The assumption that one-way streets provide safer traffic operations for both motorists and pedestrians is true for Vine Street …. Two-way traffic introduces multi-directional flow with more conflict points, turning movements, and resultant congestion, hence more exposure to potential accidents" (Pages 3, 59).

The report further notes:

"It is generally assumed that, all other things being equal, one-way traffic on a street will provide safer traffic operation than two-way traffic, both for motorists and pedestrians." (Page 22) .

The safety benefits for pedestrians in this study, as found in several other studies, indicate that pedestrian safety in particular is enhanced by one-way flow. When the street was originally made one-way in 1975, the pedestrian accident rate declined by over 21%. In contrast, when it was changed in 1999 back to two-way, the pedestrian accident rate increased by 103%. Pedestrian accidents increased both at intersections and much more so at mid-block locations (Table 4, page 26) when the street reverted to two-way flow. The Business Courier of Cincinnati article on this study ("Study: Keep Vine Street 1-Way in OTR", June 21, 1996) noted that "it was a pedestrian fatality in 1975 that led to making Vine one-way through Over-the-Rhine". As the report notes (page 3) *"there were no reported fatal pedestrian accidents"* in the one-way period analyzed.

The study asked the local bus operator, Metro (Southwest Ohio Transit Authority) for an assessment of two-way operation on the six bus routes (with 243 weekday bus trips) that operate on Vine Street. It was not good: *"Metro has had to lengthen their bus schedule times along Vine Street due to the increased congestion"* (page 60). Metro's letter on the change to two-way reports that *"the changes to Vine Street have had a negative affect on Metro bus operations …. (with) more delays".* With only one lane in each

direction *"a left turn can block all northbound traffic".*

Recent Evidence from Downtown Albuquerque, New Mexico

Because of the widespread claims for one-way to two-way conversion being "pedestrian-friendly" and "bicycle-friendly" and appropriate for downtown areas, the author sought a major city downtown area that had been extensively converted from one-way to two-way street flow. The prime example was found in the downtown area of Albuquerque, New Mexico. There, city planners had implemented a host of pedestrian-oriented features and had, between 1999 and 2003, converted 62 blocks from one-way to two-way street flow on what had been four different one-way couplets. The four street couplets involved were Copper and Gold Avenues (converted in June and July of 1999), 2nd and 3rd Streets (converted in November of 2001), 5th and 6th Streets (converted in June of 2003), and Coal and Lead Avenues (converted in July of 2003). Signal devices showing a digital readout of the number of seconds left for pedestrians to cross the street and other pedestrian-oriented measures had also been implemented as part of this "pedestrianization" of downtown.

These special pedestrian measures, coupled with the great size of the area covered by this conversion and the availability of up to four years worth of before and after data per street made downtown Albuquerque the most comprehensive test of converting to two-way flow. The entire study was made by the author from NMDOT accident data and MRCOG traffic volume data and City of Albuquerque reports on the conversion.

This independent study found that conversion from one-way to two-way flow in this major downtown area had resulted in a 33.9% increase in the overall accident rate with the pedestrian accident rate going up by 134.9% (more than doubling) and the bicycle accident rate going up by 213.7% (more than tripling). Table 3 shows composite results for the downtown area. The reasons for these changes are discussed later in this report.

Prior to the conversion from one-way to two-way flow downtown, the City had converted a section of two avenues just outside the downtown area to two-way flow in June of 1996. These were Coal and Lead Avenues between 8th and 14th Streets. By applying the same data to this conversion the author was able to find that this had resulted in a similar 37.9% increase in overall accident rate with the pedestrian accident rate going up by 16.6% and the bicycle accident rate going up by 249.9%.

Table 3
Summary of Impacts, One-Way to Two Way Flow Conversion, Four Street Couplets, Albuquerque, New Mexico, 1999-2003

Component of Change	Before & After		Impact of Two-Way	
	Before	After	Number	Percent
Volume	359,430	284,180	-75,240	-20.9%
Total Accidents	778	824	+46	+5.9%
Total Accident Rate	21.65	28.99	+7.34	+33.9%
Pedestrian Accidents **	14	26	+12	+85.7%
Ped Accident Rate	0.39	0.91	+0.52	+134.9%
Bicycle Accidents	5	12	+7	+148.0%
Bike Accident Rate	0.14	0.44	0.30	+213.7%

•The four street couplets involved were Copper and Gold Avenues (converted June and July 1999), 2nd and 3rd Streets (converted November 2001), 5th and 6th Streets (converted June 2003), and Coal and Lead Avenues (converted July 2003).
•Volume refers to total weekday traffic volumes counted from a sample of counts on all four street couplets involved, averaging four years before and four years after conversion.
•Total accidents refers to the number of reported traffic accidents four years before and four years after conversion from NMDOT data.
•Pedestrian accidents are the number of reported pedestrian accidents four years before and four years after conversion from NMDOT data.
•Bicycle accidents are the number of reported bicycle accidents four years before and four years after conversion from NMDOT data.

Misconceptions Regarding One-Way Street Conversions

General Safety: The author has yet to find any comprehensive before and after study on accident rates for any American city showing that accident rates declined after converting one-way flow to two-way. On the contrary, all data found showed the opposite to be the case. In every recent case found wherever one-way streets were converted to two-way flow, accident rates increased substantially. The City of Albuquerque data on this seems especially conclusive as it covers a large potion of a major downtown area with four years of data both before and after the directional conversion. The comparatively recent data from Albuquerque, Cincinnati, Denver, and Lubbock seems to confirm what the studies of the 1940's and '50's showed: one-way streets are considerably safer.

Speed and Safety: The author has yet to find any comprehensive before and after study on accident rates for any American city showing that accident rates declined after converting one-way flow to two-way. On the

contrary, all data found showed the opposite to be the case. In every recent case found wherever one-way streets were converted to two-way flow, accident rates increased substantially. Speeds also were reduced. The City of Albuquerque data on this seems especially conclusive as it covers a large potion of a major downtown area with four years of data both before and after the directional conversion. The City of Cincinnati data shows conversion to two-way reduced speed by over 31% but also increased accidents by over 87% (with pedestrian accidents up by over 76%).

The “traffic calming” advocates generally stay far away from actual accident data, preferring to concentrate exclusively on the misleading issue of traffic speed. Nearly all their claims for safety are predicated on the mistaken belief that lower speeds must mean greater safety. The Cincinnati study in particular disproves this: going two-way did greatly slow down traffic but also increased the traffic accident rate. Some of the older studies from decades ago showed a similar pattern in reverse: going one-way did speed up traffic but also decreased the traffic accident rate. There is no correlation between speed and safety; as one-way streets are inherently simpler and involve far fewer turning movements, they tend to be safer regardless of speed. It should be noted that with roadways in general, the fastest class of roadways (freeways, expressways, motorways) has the lowest accident rate while the slowest roads (local streets) typically have the highest accident rates.

Why One-Way is Safer for Vehicles: There are several dynamics at work here. First, far fewer turns can be made at intersections on one-way streets so there are far fewer turning conflicts. (Many articles favoring conversion to two-way claim the opposite, confusing the turning dynamics of one-way with two-way and usually inserting the language from old reports favoring one-way flow into their arguments for two-way flow without realizing they do not apply.) Second, traffic moving all in the same direction either prevents or greatly reduces the likelihood of some types of vehicle-to-vehicle collisions. Third, one-way flow lends itself best to traffic signal coordination such that traffic can continue moving at the same speed yet meet one green signal after another by sticking to that speed; this consistency in flow enhances safety and allows greater attention to be focused by the driver on matters beyond his own vehicle. Fourth, left turns can be made without waiting so that vehicles waiting to make a left turn are not rear-ended or side-swiped as they are on two-way streets. Fifth, with the greater traffic signal coordination and lesser delay, traffic moves smoothly at fairly uniform speed, the speed governed by signals. This leads to traffic grouping into “platoons” with wide gaps left on the street between these platoons. These wide gaps make it easier and safer for side street traffic to either cross or turn onto the major one-way street. This impact was visible in the older studies in which accidents relating to side street traffic declined greatly

Among the *“benefits of one-way streets”* cited in the 2008 Rand study for Los Angeles was that they *“allowing existing lanes to be widened …”* Widening lanes is a well-proven safety benefit that lowers accident rates. Two FHWA studies with data from several states found that widening lanes from 10 to 12 feet on two-lane rural highways would reduce accidents by 10-23% (see Page 2, “Safety Effectiveness of Highway Design Features, Volume III, Cross
Sections”, November 1992 (FHWA-RD-91-046); and Table 7, “Prediction of the Expected Safety Performance of Rural Two-Lane Highways”, Midwest Research Institute (FHWA-RD-99-207), 1999). The same two studies showed that widening from 9-foot to 12-foot lanes produces even larger gains of 15-32%. The Rand study also notes that one-way streets are *“safer to make left turns on”.*

Why One-Way is Safer for Pedestrians and Bicyclists: With traffic grouping into “platoons” with wide gaps not only side street vehicular traffic benefits but anything seeking to cross the one-way street has an easier time. Hence, the wide gaps make it easier and safer for pedestrians and for bicyclists to cross the street. This impact was visible in the older studies and in the most recent ones; one-way helps pedestrian and bicycle movement to be safer to a far greater extent than it does vehicular movement. In fact, almost no other measure improves pedestrian safety as does one-way flow. Regarding pedestrians crossing one-way streets, one leading safety expert noted: *”Conversion from two-way to one-way street systems has consistently been found to reduce pedestrian accidents”* (Dr. Charles Zegeer, University of North Carolina, “Engineering and Physical Measures to Improve Pedestrian Safety”, from 1988 *WALK ALERT Program Guide*, National Pedestrian Safety Program).

Two-way streets typically have twice the pedestrian accident rate of one-way streets so they are definitely not “pedestrian-friendly”, as is widely being claimed. The value of one-way streets for pedestrian safety is well appreciated in the pedestrian capital of North America. The New York City DOT continues to convert more two-way streets to one-way flow and publicly claims it as a pedestrian safety measure, a claim well substantiated by their before-and-after data going back for decades.

Another report done for the USDOT on safety contained this assessment of pedestrian safety and one-way streets:

“Perhaps the most effective urban counter-measure has been the one-way street … one-way streets not only increase the capacity and efficiency of busy roads but also greatly reduce vehicle-pedestrian conflicts. Jones, Repa, and Potgiesser (1974) indicated the following reductions in pedestrian accident totals as a result of conversion to one-way street systems: Sacramento, California 62%, Hollywood, Florida 51%, Raleigh, North Carolina 50%, Portland, Oregon 50%.” (see Page A-128, Research Triangle Institute, National Highway Safety Needs Study, Appendix A, 26U-1090-13 (DOT-HS-5-01069), Raleigh, NC March 1976).

Speed and Severity of Accidents: Some opponents of one-way flow are not impressed by the before and after accident data showing it to be safer because they believe that data does not tell the full story. They

believe that with the greater speed under one-way flow the accidents that do happen must be more severe and result in more injury and damage.

There are three major problems with this theory. First, as usual, the opponents cannot point to any real data substantiating this theory. A final version of this report will deal with this more as the Albuquerque accident data is classified by severity of accident and other data exists detailing injury accidents before and after directional conversions.

Second, it is far better not to be involved in any accident whatsoever and the data shows this is what one-way flow achieves.

Third, the people who fear that speed is so linked to severity misunderstand what data there is on traffic speed in these studies. Nearly all these studies generally give results in terms of “average speed”. What that means is the average speed from one point to another, the “average” including time in which vehicles are idling at a stop and not moving. This is not the same as “moving speed”, the speed at which vehicles move when they are actually moving, with no idling time included. A typical study would show that under two-way flow, vehicles were delayed (not moving but stopping for red lights) for 100 seconds and had an average speed of 20 miles per hour. The same study would then go on to show that under one-way flow, vehicles were delayed (not moving but stopping for red lights) for only 40 seconds and had an average speed of 25 miles per hour. Sounds like the one-way vehicles are moving 5 miles per hour or 25% more faster, doesn’t it ? That is universally the way that two-way advocates take this information.

The trouble is that the one-way vehicles may actually be moving at pretty much the same “moving speed” as under two-way flow. The higher “average speed” is the result of them spending less time stopped before red lights. The speed when they are moving may be the same as before but the “average speed” (total time from one point to another, including time spent idling) is higher. The failure to understand the difference between “moving speed” (as in how fast it’s moving when it’s actually moving) and “average speed” (based on total point-to-point travel time) has led to misinterpretation of data and the misconception that one-way greatly increases speed. Examining the data from DOT speed studies actually shows that the real change in “moving speed” (eliminating delay time) is considerably less than the change registered under “average speed”. This data is usually ignored because it shows the speed differences to be much smaller than “average speed” differences. Also ignored is that speeds under one-way flow are closer to the posted speed.

The Quack “Public Health” Case Against One-Way: One tactic that traffic calming advocates have turned to is to use people with medical degrees to write articles claiming some “public health” benefit for measures they support. This is especially so when real accident data does not support their claims, as with one-way flow, and where people unfamiliar with traffic safety are prone to draw erroneous conclusions.

A few years ago an article appeared in the *Journal of the Canadian Medical Association* making such a case against one-way flow (see Wazana, Rynard, Raina, Krueger, Chambers, *“Are Child Pedestrians at Increased Risk of Injury on One-Way as Compared to Two-Way Streets ?”*, *Journal of the Canadian Medical Association*, May 2000). The authors claimed that they had found a higher pedestrian accident rate on one-way streets in Hamilton, Ontario. This article has been widely used to support the case against one-way. What is wrong with it is that the doctors who did this study were not using the normal accident rate per traffic volume as used in traffic engineering studies (though it has been misrepresented as such). Instead they were using the rate of pedestrian accidents per linear mile. They found many more pedestrian accidents per mile on one-way streets than on two-way streets. Of course they found this and would find the same in nearly all North American metropolitan areas. This is because one-way streets were put in downtown and other areas where there are very high pedestrian crossing volumes whereas the bulk of two-way streets are small, residential streets with negligible pedestrian crossing volumes. What the authors did not realize was that all they had discovered was that there were many more pedestrians crossing one-way streets not that they were less safe to cross. Had they bothered to count those crossings they might well have discovered that while 2.5 more pedestrians were injured crossing one-way streets, the number crossing may have been over 5.0 times that of two-way streets. The rate per volume of pedestrian crossings (odds of being hit) was likely about half that of two-way streets.

To apply the “logic” used in the JCMA article further, one would find that there are several hundred times as many pedestrian accidents per mile in Manhattan as there are in South Dakota. Therefore, South Dakota is fantastically safer for pedestrians than Manhattan and Manhattan should be entirely redesigned to look like South Dakota. This kind of illogical “incidence” cause-and-effect thinking, by the way, has become rife in traffic calming reports dealing not only with one-way but speed humps and other measures.

*Why One-Way Does Not Lead to Longer Trips:*Some people argue that the benefits of one-way flow are counter-balanced by forcing drivers to drive further and make longer trips as they cannot always go directly the way they wish on a one-way network. The Rand report makes the statement that *“one-way operation will increase the required travel distance for many trips … leading to increased trip distances and … increased travel times”.* (see page 278, Rand Corporation, *Moving Los Angeles: Short Term Policy Options for Improving Transportation,* October 2008, MG-748-JAT/METRO/MCLA).

This is speculation, not the presentation of scientific evidence. The typical urban arterial vehicular trip is 3-5 miles (maybe roughly 20,000 feet); the typical extra distance added by one-way systems is perhaps about 2 blocks (500 feet). This adds only 2-3% to the distance and this only for motorists with origins or destinations on the one-way segments, not for through trips. The far steadier speed profile, accompanied by fewer stops

and less stop-and-go speed changes with one-way flow, would likely result in less delay, less overall travel time, less fuel consumption, and less pollution generated even with this slight addition in distance. With less delay the one-way trip time will be shorter than under two-way flow even if the physical distance is slightly longer.

Why One-Way is Better for the Environment: One-way operation permits much better traffic signal progression for smoother traffic flow. This results in traffic moving at regulated speeds with less stop-and-go driving. Less fuel is consumed and there is less air pollution. Another benefit is in conservation of space. Because one-way streets move more traffic per lane than two-way streets cities with one-way systems need to devote less space to roadways. Four lanes of a one-way couplet carry as much traffic as a seven-lane two-way street. The main reason for this is that special left-turn signal phases and lanes are not required. At intersections a one-way approach requires only one signal phase and no extra lanes.

The Transpo Group did a study for Bellingham WA, in which conditions were simulated by computer model for existing one-way versus change to two-way, quantified an enormous increase in air pollution and delay. Many similar area reports have been done showing the same thing. The higher level of idling and delays experienced under two-way flow leads to greater air pollution and fuel consumption. One-way leads to less pollution and less fuel wastage.

Why Traffic Calmers Don't "Get It" About One-Way Streets: The "traffic calming" movement shows little knowledge regarding real traffic safety and typically ignores or denies actual accident data. Traffic calmers believe that whatever impedes automobile movement must be good and that reducing automobile speed is inherently good. They simply favor whatever hinders and slows vehicles and are oblivious to the impact on safety, including pedestrian and bicycle safety. Most studies they like only measure changes in speeds and neglect any accident analysis.

The author was told by one such advocate that accident data does not matter because *"We ought to be concerned with the accidents that might happen in the future and not the ones that have happened".* This is a common view among traffic calmers. It is also an anti-scientific and anti-rational attitude: the only real data we can measure safety by is to be neglected whereas subjective impressions about theoretical accidents that don't happen are given great weight. Traffic calmers need to think scientifically, stop being in denial, look at real data, realize their theories are wrong, and accept the proven fact that one-way streets represent a "win/win" situation, good for vehicles, good for pedestrians, good for bicyclists, and good for transit. The one-way street is, in fact, a rather good traffic calming device.

What Can Be Done to Promote One-Way Streets: The author will be transforming this short report into a longer, more comprehensive one, incorporating data from other studies and providing references to other studies on this subject. In final form, this can act as a resource for use in court cases, public hearings, other studies, and so forth to influence state and local government policy on this issue. Many cities and regions have laws or planning guidelines that preclude them from implementing something that would make streets less safe. The challenge is to show them, or show a court, that a conversion to two-way flow does make streets less safe and endangers the public.

The knowledge has been out there for a lifetime that one-way streets are safer, especially for pedestrians. Enough data on this had been gathered in the 1920's and '30's that in 1936, America's "boy genius", William James Sidis, wrote an entire book (under a pseudonym) about traffic safety, in which his top recommendation was to:

*"…. extend the use of one-way streets to cover all streets … to have safe and convenient conditions for pedestrians" as " one-way streets help the pedestrian to an extraordinary extent" such that "The one-way operation of roads will insure a large measure of safety for pedestrians crossing at any point".*He further wrote:
"The advocacy of the universal use of one-way streets is the most fundamental suggestion embodied in this book … there does not appear to be any important reason why streets in cities should be operated upon the two-way principle".
"The best solution would extend the use of one-way streets to cover all streets … from a safety standpoint then, this is the most logical reason for adoption of one-way method".

and,
"Safety considerations … Are wholly in favor of the one-way idea.
(Source: pages 100, 106, 134, 212, 251, and 256, Barry Mulligan, Collisions in Street and Highway Transportation, Dorrance & Co. Philadelphia, 1936.)

Sidis (or Mulligan) was right. The failure to understand the value of one-way streets is leading to unnecessary human injuries, destruction of property, excessive fuel consumption, and wastage of space in American cities. If the present movement to eradicate one-way flow is not stopped, the price paid will be enormous. Rather than convert remaining one-way streets to two-way, it would be beneficial if more two-way streets, in suburbs and small towns as well as large cities, were made one-way, as is being advocated now in Los Angeles, New York, and elsewhere and as has been done in much of Europe.

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