City of Inglewood, California
TIGER FY 2013 Discretionary Grant Application
Century Boulevard Mobility Improvement Project

ATTACHMENT No. 4
BENEFIT-COST ANALYSIS

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CENTURY BOULEVARD MOBILITY IMPROVEMENT PROJECT

CITY OF INGLEWOOD, DEPARTMENT OF PUBLIC WORKS

Prepared by Wildan Financial, May 2013

SUMMARY MATRIX

Current Status/Baseline & Problem to Be Addressed	Change to Baseline/ Alternatives	Type of Impacts	Population Affected by Impacts	Summary of Results	Page Reference in BCA
Four of the 16 key intersections along the Century Boulevard project area operate at Level of Service (LOS) "D" or worse during both AM and PM peak periods. Under a no-build scenario, current traffic volumes are projected to increase to such levels that seven intersections are expected to be operating at LOS "D" or worse during both peak periods, and three intersections operating at LOS "D" or worse during the PM peak period.	The proposed project encompasses a series of smart street improvements which will rebalance the flow and promote travel alternatives that will mitigate the impacts of growth along this primary east-west arterial. Improvements include: Transit service improvements, roadway improvements, pedestrian linkage improvements, and bicycle facility improvements.	Increase the use of non-motorized transportation and reduce vehicle travel demand on Century Boulevard, as well as the street network that serves this vital east-west corridor; Improve access to transportation for adjacent disadvantaged communities, while reducing the adverse environmental impacts associated with traffic congestion. Freight travel (goods movement) Light-, medium-, and heavy-duty vehicles traveling on this east-west corridor to the LAX area will benefit from improved speeds as a result of the roadway capacity enhancements.	Page 5 provides additional information on affected population.	Monetized Value of travel time savings, fuel cost savings, and reduced fuel emissions. Additionally, a qualitative narrative is provided describing the benefits due to improvements to accessibility, land use changes impacts, vehicle maintenance savings, and savings from the reduction of accidents along the corridor.	Pages 6 - 17

PROJECT SUMMARY

1. Base Case (no-build). The Century Boulevard Mobility Improvement Project will enhance Century Boulevard, currently a major east-west arterial in the Cities of Inglewood and Los Angeles, into a balanced multimodal travel corridor. Century Boulevard provides direct access to the San Diego (I-405), and Harbor (I-110) freeways and indirect access, via major north-south cross streets, to the Century (I-105) freeway and Metro Green Line light rail station. The street terminates at Los Angeles International Airport (approximately 1.5 miles west of Inglewood), and provides direct automobile access to both passenger and freight terminals. LAX is currently the third busiest airport in the country in passenger service and fifth busiest in terms of cargo service.[1]

   Century Boulevard traffic volumes currently range from 67,274 average daily traffic (ADT) at LAX at the western edge of the project's influence to over 40,000 ADT towards the east.[2]

Cross Street	Average Daily Trips 2010	Average Daily Trips 2035
Avion Drive	67,274	84,900
Airport Boulevard	55,400	69,915
La Cienega Boulevard	48,960	61,788
Western Avenue	31,056	39,193

   According to City of Inglewood data, four of the 16 key intersections along the Century Boulevard project area operate at Level of Service (LOS) "D" or worse during both AM and PM peak periods. Under a no-build scenario, current traffic volumes are projected to increase by 26 percent by 2040.[3] Traffic volumes in this corridor could rise to nearly 85,000 ADT near LAX within 30 years. By 2030, seven intersections are expected to operating at LOS "D" or worse during both peak periods, and three intersections operating at LOS "D" or worse during the PM peak period.

   If the Century Boulevard Mobility Improvement Project were not built, projected traffic impacts from freight goods movement will continue to outpace infrastructure development. 78 percent of the region's air cargo moves through LAX, making it one of the busiest air cargo airports in the world. Air cargo is critical for manufacturing operations. For example, dollar value of high-value cargo shipped by air from Los Angeles outpaced the combined value from the Ports of Long Beach and Los Angeles

[1] Airports Council International. 2012 North American Airport Traffic Summary (Top 50 Airports – Passengers and Cargo). Preliminary Results.
[2] City of Los Angeles Department of Transportation 2009-2010 Traffic Volumes Book. 2010 traffic volume counts.
[3] Los Angeles County Metropolitan Transportation Authority. 2010 Long Range Transportation Plan, Technical Appendices.

($36.5 billion vs. $35.2 billion).[4] Currently, trucks use 45-60 percent of the capacity of Southern California freeways near the seaports and airports. In addition, air cargo tonnage at LAX is expected to reach 2,496,000 tons annually by 2035, the fastest-growing component of the regional goods movement picture.

While ambient growth will fuel much of this increase, projected development will also generate more travel demand. These projects include:

- 27 percent growth in passenger travel at LAX, from 62 to 78.9 million annually, to accommodate regional growth and national increases in freight volumes;[5]
- A proposed LAX satellite parking and check-in facility that will include commercial office and retail space;
- Shuttle service between the satellite parking facility and LAX;
- Proposed auto-oriented redevelopment projects along Century Boulevard that include airport-serving hotels, retail, and commercial office space; and
- The proposed redevelopment of the 238-acre Hollywood Park Racetrack property into a mixed-use infill community consisting of approximately 3,000 homes, 620,000 SF of retail, and 75,000 SF of commercial office space.

Congestion will be further worsened by Century Boulevard's obsolete facilities and deteriorated physical condition. The existing lane alignments are outdated, turning radii are inadequate, sidewalks are discontinuous and deteriorated, handicap ramps are lacking at many intersections, and the street lacks raised median islands. Roadway improvement projects planned by the City may only be marginally effective in reducing congestion and travel delay along Century Boulevard. Furthermore, the potential to increase the street's capacity is significantly limited by the cost of obtaining additional right-of-way.

2. Project Description. The proposed project encompasses a series of smart street improvements along a critical three-mile segment of Century Boulevard that serves LAX. Improvements will rebalance the flow and promote travel alternatives that will mitigate the impacts of growth along this primary east-west arterial and at LAX. The project area is bounded by Van Ness Avenue and the City of Los Angeles to the east and La Cienega Boulevard leading into Los Angeles International Airport to the west. Project benefits will also extend 0.25 miles to the north and south of Century Boulevard. Proposed improvements include:

    a. Transit service improvements. Facilities will be enhanced, including installation of bus pull out pockets at major intersections, bus stop enhancements, and signal

[4] Los Angeles County Metropolitan Transportation Authority. 2004 Short Range Transportation Plan.
[5] Southern California Association of Governments. 2008 Regional Transportation Plan.

synchronization. This will improve the efficiency of Metro Bus Line 117 that serves the corridor.

b. Roadway improvements. Turning pockets at major intersections will enhance capacity for east-west travel.
c. Pedestrian linkage improvements. Pedestrian travel will be enhanced through reconstruction of sub-standard or missing sidewalks, enhanced crosswalks at intersections and mid-blocks, and wayfinding signage. Streetscape improvements, such as landscaped median islands and new street trees along new sidewalks will also enhance pedestrian travel.
d. Bicycle facility improvements. Installation of bicycle storage facilities and Class II bicycle lanes.

3. Justification and Impact on Long-Term Outcomes. With traffic volumes and congestion along this critical east-west travel corridor to LAX already at unacceptable levels, the Century Boulevard Mobility Improvement Project is needed to address existing congestion and the projected 26 percent increase in passenger travel to LAX within thirty years. A concomitant increase of traffic volumes by 26 percent will result in gridlock for this vital travel and freight corridor, with resulting economic impacts on the import and export of goods throughout the nation and overseas.

   The Century Boulevard Mobility Improvement Project will rebalance this street segment into a complete multimodal urban thoroughfare. Multiple benefits include:

   - Passenger travel. Significant investments in pedestrian, bicycle, and transit facilities will increase the use of non-motorized transportation and reduce vehicle travel demand on Century Boulevard, as well as the street network that serves this vital east-west corridor.
   - Improved access and livability. The project will improve access to transportation for adjacent disadvantaged communities, while reducing the adverse environmental impacts associated with traffic congestion.
   - Freight travel. Light-, medium-, and heavy-duty vehicles traveling on this east-west corridor to the LAX area will benefit from improved speeds as a result of the roadway capacity enhancements.

   The project will contribute to several beneficial long-term outcomes. These benefits are discussed in more detail in the Benefit Cost Analysis section below.

4. Affected populations. The proposed project improvements will directly benefit local travelers and residents, while indirectly benefiting passengers and consumers of goods that travel to and from LAX:

A. Direct Beneficiaries

i. Freight-related shippers, distributors, and haulers. These stakeholders will enjoy more efficient transport of goods to and from LAX, thereby reducing travel time and operational costs. This "last-mile" of travel for goods to and from local distribution centers often adds disproportionately high cost and time in the goods movement process, as surface transport must share the road with passenger travel to and from LAX.

ii. Local employees. There are approximately 71,978 employees that work within ¼-mile of the project area on Century Boulevard in Inglewood.[6] With the projected average daily travel on Century Boulevard increasing to nearly 100,000 trips per day in 2040, the opportunity to use alternative modes of travel will provide some relief from the need to drive on Century Boulevard.

iii. Residents. There are approximately 70,480 residents that live within ¼-mile of the project area on Century Boulevard in Inglewood.[7] Residents from these disadvantaged communities will gain pedestrian, bicycle, and transit options that should increase access to jobs and other destinations. Improved speeds and reduced vehicle travel demand will help reduce ambient noise and air pollution impacts, thereby addressing environmental justice concerns for communities adjacent to Century Boulevard and under the flight path to LAX.

B. Indirect beneficiaries

i. Consumers of goods. With the cost of freight transport reduced from improvements in local capacity and reductions in travel demand, consumers nationwide that use products going through LAX may see incremental decreases in the cost of goods and services that emanate to and from LAX.

ii. LAX Passengers. To the extent future cargo operators are able to locate along the corridor and use it for transport, future passengers traveling to LAX will see travel times and congestion reduced from what it will have been in the absence of the corridor improvements as LAX grows in both cargo and passenger traffic.

iii. Future residents and employees. Local redevelopment efforts in Inglewood will increase the demand for travel. In particular, the redevelopment of the 238-acre Hollywood Park Racetrack property, which will add 3,000 homes, 620,000 SF of retail, and 75,000 SF of commercial office space.

[6] Southern California Association of Governments, 2008 Regional Transportation Plan. Projection based on U.S. 2000 Census Data.
[7] Ibid.

5. Alternatives. The proposed project is needed to ease the travel of east-and west-bound freight, workers, and general traffic, as well as provide mitigation for the impacts on the disadvantaged communities along Century Boulevard and the LAX flight path. The need for this project has grown in the absence of other alternatives that have not been realized or implemented, including:

    A. Interchange on the San Diego Freeway (I-405) at Arbor Vitae Street. This project was intended to relieve congestion along Century Boulevard by providing a secondary direct access route between the San Diego Freeway and LAX, thereby relieving congestion on Century Boulevard. However, this interchange project has been mired to two decades of legal and political battles and now proves too costly given current financial constraints.

    B. Decentralize future regional aviation demand in Southern California to reduce the impacts of continued growth of LAX on local communities and the transportation network. In spite of the Southern California Association of Governments' attempts to plan for decentralizing future aviation demand to other airports in the five-county region, LAX is expected to continue to accommodate more passenger demand and high-value cargo in the future. These trends will continue to pose growing demands on an overburdened local transportation network, with disproportionate impacts on the disadvantaged communities in the City of Inglewood.

    C. Light-rail service along Century Boulevard to provide east-west transit service that connects the Metro Blue Line and the proposed Crenshaw/LAX Transit corridor light-rail project. While providing east-west service near LAX can help reduce vehicle travel demand on Century Boulevard, there are insufficient funds to build such transit improvements.

BENEFIT COST ANALYSIS (BCA)

The Benefit/Cost Analysis (BCA) evaluates the extent to which residents of the United States as a whole are made better off as a result of the project. The analysis accounts for the net benefits and net costs based on the criteria described in the TIGER BCA Resource Guide. The following table presents the total project benefit and cost over the life-cycle of the project discounted at 3 and 7 percent. The 3 percent discount is a more appropriate rate for the analysis because the alternative use of funds to be dedicated to the project will be for other public expenditures, rather than private investment. The project benefits are presented below using the more conservative 7 percent discount rate to demonstrate that the project's long term benefits clearly outweigh the project's costs.

Table 1 – Benefit/Cost Summary

	3%	7%
Present Value of Benefits	$173,551,857	$93,503,797
Present Value of Direct Project Costs	$41,830,313	$38,661,301
Benefit/Cost Ratio	**4.1**	**2.4**

It is important to note that even if the estimates of benefits are off by nearly 60 percent, the Benefit/Cost Ratio will still be greater than one (1) in the more conservative 7 percent discount rate scenario. The estimates of benefits will have to be off by over 75 percent before the Benefit/Cost Ratio declines below one (1).

It is also important to note these ratios are not a comprehensive measure of a project's total benefits, as many benefits cannot be readily quantified or occur under conditions of uncertainty. The following table presents a summary of both quantifiable and difficult-to-quantify benefits included in our analysis. The benefits are segmented by the criteria described in the TIGER Grant Notice of Funding Availability (NOFA).

Table 2 – Benefit Summary by Selection Criteria

Selection Criteria	Discounted at 3%	Discounted at 7%
Livability		
Accessibility	Qualitative	Qualitative
Land Uses Changes	Qualitative	Qualitative
Transit and Bicycle/Pedestrian Improvements	Qualitative	Qualitative
Affordability	Qualitative	Qualitative
Economic Competitiveness		
Travel Time Savings	$160,261,589	$85,745,132
Fuel Costs Savings	$11,608,934	$6,211,155
Vehicle Maintenance Savings	Qualitative	Qualitative
Safety		
Savings from Reduction in Accidents	Qualitative	Qualitative
State of Good Repair		
Maintenance & Repair Savings	Qualitative	Qualitative
Sustainability		
Value of Reduced Emissions	$1,681,334	$1,547,510
Total Benefits	**$173,551,857**	**$93,503,797**

A narrative of the costs and benefits included in the BCA, including difficult-to-quantify costs and benefits is presented below. Details on the methodology used to quantify costs and benefits are included in the Supporting Tables A through H as well as in the "Century Boulevard BCA Spreadsheet 2013.xls" supplement.

1. Livability

A. Accessibility

i. The City of Inglewood meets the criteria identified in the Public Works and Economic Development Act of 1965 (42 U.S.C. § 3161) for "Economically Distressed Areas." Inglewood's per capita income of $20,187 is 72 percent of the national average of $27,915.[8] Approximately 21 percent of residents in the City of Inglewood live in poverty, with unemployment rates that are 23 percent above the national average. [9] Approximately 40 percent of households in Inglewood have incomes below $35,000 per year.

ii. Access to jobs, health care, and other essential needs is critical to addressing environmental justice objectives for this community. Approximately 70,480 residents live within ¼-mile of Century Boulevard along the project's service area. In addition, about 71,978 employees work in this same zone that could benefit from improved pedestrian, bicycle facilities, and transit enhancements.

iii. The project will improve local access for residents and employees to alternative modes of transportation. The 70,480 residents from adjacent neighborhoods will see improved transit service, bicycle and pedestrian amenities. Service enhancements to Metro Bus Line 117 that serves the corridor will increase patronage and ultimately access to:
- Jobs, including substantial job centers surrounding LAX.
- Local medical facilities, including Daniel Freeman Hospital and other health care providers.
- Other destinations, such as the proposed redevelopment of the 238-acre Hollywood Park Racetrack property into a mixed-use infill community consisting of approximately 3,000 homes, 620,000 SF of retail, and 75,000 SF of commercial office space. Initiatives to promote hiring of local residents will further increase the benefits to the local population.

[8] U.S. Census, American Fact Finder, American Community Survey, 2007-2011.
[9] Ibid.

B. Land use changes linked to transportation

i. The City of Inglewood General Plan projects growth from redevelopment projects on Century Boulevard and throughout the community that rely on transportation improvements over time. Given the vital role that Century Boulevard plays in the economic health of Inglewood, failure to improve capacity and reduce travel demand on Century Boulevard will inhibit the legal and logistical ability of new development to locate in the city. For example, the Los Angeles County Metropolitan Transportation Authority requires that new development be accompanied by transportation enhancements through its countywide Congestion Management Program.

ii. The proposed enhancements will help increase demand for a transit-oriented development project at a proposed light-rail station at Century Boulevard and Aviation, near LAX. Proposed pedestrian, bicycle, and transit improvements will help employees and visitors access such development at the future Century station.

C. Transit and bicycle/pedestrian improvements

The proposed project is designed to shift drivers along Century Boulevard and parallel routes to alternative modes of transportation. This includes shifts to bicycle facilities. The community will benefit from potential traffic calming associated with increased bicycle use. The development of pedestrian-scale amenities will reduce conflicts between pedestrians and vehicles, and increase walking trips in lieu of vehicle travel.

D. Affordability

The City of Inglewood is defined as an "Economically Distressed Area" under federal guidelines. Inglewood's per capita income of $20,187 is 72 percent of the national average of $27,915.[10] According to the Bureau of Labor Statistics, the unemployment rate for the Los Angeles/Long Beach/Santa Ana Metropolitan Statistical Area has been between 1.1 to 2.5 percent greater than the national rate since 2008. The local unemployment rate is 8.4 percent compared to the national rate of 7.1 percent as of April 2013.

Additionally, both short and long term changes in economic conditions resulting from the decline in the local real estate market, decline in retail, and other factors have resulted in increased unemployment and economic adjustment problems.

[10] U.S. Census, American Fact Finder, American Community Survey, 2007-2011.

E. Transportation Benefits

The project encompasses a set of multimodal improvements that will have benefits with independent utility:

i. Reduction in vehicle travel demand from shifting of travelers from autos to alternative modes (i.e., bus transit, pedestrian, bicycling) that result in reduction in vehicle travel demand.

ii. Improvements in average travel speed on Century Boulevard and associated roadways based on a 25 percent increase in capacity.

The transportation benefits are quantified and included in the Economic Competitiveness section below.

2. Economic Competitiveness

The Century Boulevard Mobility Improvement Project will promote national economic competitiveness by lowering operating costs of transport of goods to and from LAX for transport both abroad and to local distribution centers for transport throughout the United States. Hundreds of distribution centers for dry goods, perishables, and other products are located in the LAX/Inglewood area. The travel time savings will result in more predictable, reliable travel times that will benefit all stakeholders through the goods movement supply chain.

The proposed project means shorter wait times and a more direct route available, which reduces transportation costs, increases convenience, and improves reliability for drivers from the region. As a result, the project will improve access for Inglewood residents as well as residents of the greater region to more commercial markets, tourist activities, retail shopping, and jobs.

It is estimated that the project will reduce congestion by increasing capacity by up to 25 percent on Century Boulevard through the use of signal synchronization at 16 intersections along this major arterial. If unaddressed, ten of the 16 intersections are projected to operate at unacceptable levels of service (LOS “D” or worse) by 2030. With the proposed capacity enhancements at Van Ness Avenue, Crenshaw Boulevard, 11th Avenue/Village Street, Club Drive, Yukon Avenue, Doty Avenue, Prairie Avenue, Hawthorne Boulevard, and Inglewood Avenue, exclusive right-turn and left-turn movements will help increase capacity on the three through lanes in each direction along Century Boulevard. When combined with signal timing through the entire major arterial corridor, capacity is expected to increase by up to 25 percent, with concomitant increases in travel speed. This will also improve the travel speeds and on-time performance of Metro bus lines that operate on this six-lane arterial. The result is a

reduction in delay of 4,563 hours of travel time saved daily or approximately 1.14 million hours per year.[11]

The BCA quantifies the benefits of travel time savings, fuel savings, and vehicle maintenance savings (qualitative analysis only) due to a more efficient corridor. It is important to note that the estimates below assume that the benefits are based on the conservative assumption that 100 percent of the traffic is passenger vehicles as opposed to a mix of passenger vehicles (i.e., local and regional personal travel) and commercial vehicles (i.e., cargo trucks bound/going for/from the airport). A more detailed analysis will separate the impacts of passenger vehicles and commercial vehicles. By assuming only passenger vehicles, the estimates are relatively conservative since commercial vehicles typically have higher values of travel time, gas consumption, maintenance costs, and fuel emissions.

A. Value of Travel Time Savings

Net Estimated Benefits: $160 million and $86 million discounted at 3 percent and 7 percent, respectively.

As discussed above, the proposed project will rebalance the flow and promote travel alternatives that will mitigate the impacts of projected traffic growth along this primary east-west arterial serving LAX. As a result, the improvements will reduce travel time of both passengers and cargo. This reduction in delays generates economic benefits because the time saved could be used for productive purposes, recreation and other enjoyable or necessary activities for which individuals are willing to pay.[12]

The Value of Travel Time Savings (VTTS) is estimated by calculating the net reduction in delays (i.e., Hours of Travel Time Saved) resulting from increased inspection capacity in the Build scenario relative to the No-Build scenario.

As discussed above it is estimated that the project will result in a reduction in delays of 4,563 hours daily. Assuming that these delay reductions occur on weekdays only, and assuming 250 weekdays per year, the annual number of hours of travel time saved is approximately 1.14 million.

Over its life-cycle (20 years after its completion), the project will generate approximately 22.8 million hours of travel time saved. However this number is reduced to account for potential delay increases during the construction period. Data

[11] Assumes that the estimated time travel savings of 4,563 occur on weekdays. There are approximately 250 weekdays in a year.
[12] Belenky, P. Revised Departmental Guidance on Valuation of Travel Time in Economic Analysis. U.S. Department of Transportation.

on expected increase in delays during construction are not available. For purposes of the BCA, it is assumed that construction will produce delays of 4,563 hours daily. This is an inflated assumption given that construction will be scheduled to minimize impact on peak hour traffic. These time delays are assumed to accrue during the construction period of June 2014 and March 2017 (estimated close out date).

The total Hours of Travel Time Saved related the project, net of increases in delays during construction, is approximately 20 million hours over the life-cycle of the project.

The monetized VTTS is calculated by multiplying Hours of Travel Time Saved times the monetized value factors as published in the TIGER BCA Resource Guide.[13] The VTTS associated with the project is highlighted above. Detailed calculations and data sources are provided in the "Century Boulevard BCA Spreadsheet 2013.xls" submitted with this application.

See columns D and E in Table B of the BCA Spreadsheet for methodology on calculating VTTS, (refer to Attachment No. 5 of the online grant application).

B. Reduced Fuel Consumption

Net Estimated Benefits: $11.6 million and $6.2 million discounted at 3 percent and 7 percent, respectively.

In addition to the VTTS, a reduction in delays along the corridor provides a benefit to drivers through reduced fuel expenses. It is assumed that vehicles consume between 0.25 and 0.80 gallons of gasoline per hour spend idling.[14]

As discussed above, the project will save approximately 20 million hours of travel time. Using the above factors for average fuel consumption while idling, it is estimated that approximately 4.9 million gallons of gasoline will be saved over the life cycle of the project (net of increase consumption during construction period). For modeling purposes, average annual costs of $3.85 per gallon of gasoline are assumed. The estimated fuel savings benefits are highlighted above. See columns F and G in Table B of the BCA Spreadsheet for methodology on calculating benefits from reduced fuel consumption, (refer to Attachment No. 5 of the online grant application).

[13] The monetized value of time travel is adjusted to 2012 dollars using the methodology in the BCA Guide.

[14] See supporting tables for sources. Also, please note that cargo trucks can consume between 0.75 and 1.30 gallons of diesel per hour of idling and that the cost per gallon of diesel is higher than gasoline. However, the analysis makes the conservative assumption that 100 percent of the traffic are passenger vehicles.

C. Reduced Automobile Maintenance Costs

Net Estimated Benefits: Qualitative Analysis

In addition to increased fuel consumption, idling causes increased maintenance costs and engine wear.[15] According to the Illinois Environmental Protection Agency:

> "An idling engine operates below its optimum temperature, and due to this lower temperature, fuel is not fully burned during the combustion process. The unburned residues contaminate the oil and form deposits within the engine, which can decrease fuel economy up to five percent as well as reduce engine life. In addition, lower engine temperatures resulting from idling allow water to condense within the exhaust pipes and mufflers, leading to premature corrosion. The trucking industry has analyzed the impact of idling on diesel engines, both in terms of maintenance and engine wear costs. Long-duration idling creates the need for more oil and oil filter changes and accelerates the timeframe for scheduled maintenance. Similarly, the longer the idling time and the more frequent the idling, the sooner the engine will need to be rebuilt or replaced."[16]

According to a report dated April 2009 prepared for the U.S. Environmental Protection Agency, one hour of truck idling creates $0.50 and $0.95 in additional required maintenance.[17] These benefits of reducing maintenance costs of transportation fleets will increase economic competitiveness by reducing transportation costs for manufacturers and could ultimately lead to lower prices for consumers. Reliable estimates for maintenance costs for autos are not readily available, but it is very likely that a reduction in delays will also reduced maintenance expenditures for passenger vehicles.

Due to lack of data and time, the benefits associated with the reduction in maintenance costs are not included in the BCA even though those benefits are real and probably significant.

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[15] U.S. Environmental Protection Agency. http://www.epa.gov/smartway/technology/idling.htm

[16] Illinois Environmental Protection Agency Fact Sheet. "Ladies and Gentlemen: Turn Off Your Engines!" What You Should Know About Diesel Truck Idling. Undated. Available at: http://www.illinoisgreenfleets.org/idling/ladies-and-gentlemen-idling-fact-sheet.pdf.
Natural Resources Canada also examines the maintenance costs related to idling in the publication "Idling Gets You Nowhere." Available at http://fleetsmart.nrcan.gc.ca/documents/PDF/idling-booklet-e.pdf

[17] Truck Stop Electrification and Anti-Idling as a Diesel Emissions Reduction Strategy at U.S. –Mexico Ports of Entry. April 2009 Prepared by Ross & Associates Environmental Consulting Group for the U.S. Environmental Protection Agency
http://www.epa.gov/region9/climatechange/pdfs/TSE_Otay_report.pdf

3. Safety

Net Estimated Benefits: $29 to $43 million per year (not included in BCA)

Traffic incident data obtained from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS) shows that a total of 91 traffic accidents occurred along Century Boulevard within the City of Inglewood for the 21-month period spanning from January 1, 2007 to September 30, 2008. These accidents accounted for a total of 77 people suffering injuries and one fatality.

Most of the accidents involved vehicles traveling at unsafe speeds or making unsafe turning movements. All of the accidents involving pedestrians resulted from street crossings either at mid block locations or crossing streets at un-signalized intersections.

The California Office of Traffic Safety ranks cities with similar size populations in order to identify emerging traffic safety problem areas, facilitate funding decisions, and to assist cities in identifying disproportionate traffic safety areas. Inglewood fell within a grouping of 52 cities with similar-sized populations. Inglewood's composite ranking was 11 out of the 52 cities in terms of the greatest number of traffic accidents.

Table 3 – Traffic Accidents, Century Boulevard within the City of Inglewood

	2007		2008		Total	
Accident Type	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Broadside	16	33%	18	42%	34	37%
Rear End/High Speed	15	31%	12	28%	27	30%
Side Swipe	4	8%	4	9%	8	9%
Pedestrians Involved	2	4%	6	14%	8	9%
Other	11	23%	3	7%	14	15%
Total	**48**		**43**		**91**	
Accidents with Injuries	40	83%	37	86%	77	85%
Accidents with Fatalities	1	2%	0		1	1%
Total Injuries/Fatalities	46		56		102	
Average Injury/Accident	0.96		1.3		1.32	

Source: California Highway Patrol's Statewide Integrated Traffic Records System (SWITR)

The proposed improvements to the corridor's capacity on roadways and for alternative modes of transportation will have safety benefits. These benefits will be realized because of: a) reduction in vehicle travel demand on Century Boulevard for residents and employees along this vital arterial, b) improved roadway capacity with the

installation of dedicated right turn lanes that will remove such movements from through lanes, and c) reduced potential for recurring incidents because of lighter traffic volumes.

The benefits associated with the reduction in number of accidents are not included in the BCA. However, the City of Inglewood projects a 40 percent reduction in accidents along Century Boulevard resulting from the implementation of the multimodal improvements. Previous estimates by the City of Inglewood of the monetized value of such accident reduction range from $29 to $43 million per year. Refer to tables 4a, 4b, 5a, and 5b in Attachment Number 3 of the online grant application submittal.

4. State of Good Repair

The Century Boulevard Mobility Improvement Project earmarks over $44.5 million in capital improvements to this major arterial that will address longstanding deferred maintenance of the roadway and reduce long-term maintenance costs for the City. Potential federal TIGER funds will accelerate the construction of these mobility enhancements and position the City to address mobility impacts and job creation as the local and national economies begin to rebound.

A. Maintenance & Repair Savings

Net Estimated Benefits: Qualitative Analysis

Federal funding will remedy the deferred maintenance needs for the corridor. As of 2005, the Pavement Condition Index (PCI) threshold for Inglewood roads was 41, considered a “critical pavement condition” that reflects the $1 million backlog as of 2002.[11] Resurfacing of Century Boulevard at major intersections to install right turn pockets will improve this major arterial’s PCI and reduce future 3R (rehabilitation, reconstruction, and resurfacing) costs.

Due to data and time constraints, potential benefits of reduced maintenance and repair costs are not included in the BCA.

5. Environmental Sustainability

The Century Boulevard Multimodal Corridor Project’s capacity improvements combined with projected reductions in vehicle travel demand will produce four levels of environmental sustainability benefits:

- Fuel Consumption. The Century Boulevard Mobility Improvement Project is expected to reduce fossil fuel consumption by motor vehicles by approximately 285,000 gallons per year. The quantified benefits due to reduced fuel consumption are included under Economic Competitiveness benefits.

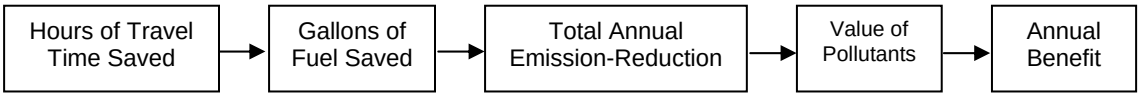
- Regional Air Quality. The project will produce both reductions in running exhaust emissions due to increases in travel speeds on Century Boulevard, as well as reductions in running, start, and hot soak emissions from the elimination of vehicle trips in favor of pedestrian, bicycle, and transit trips.
- Climate Change. The project will contribute to global sustainability by reducing 2,500 metric tons of CO2 emissions from vehicle travel annually plus additional reductions in volatile organic compounds (VOC) and other pollutants
- Energy Consumption. The Project will improve capacity at key intersections through the Century Boulevard corridor between Van Ness Avenue and La Cienega Boulevard through exclusive turn lane enhancements for both left and right turns. This, along with signal timing of the corridor and transit service enhancements, will improve travel speeds for Metro buses that run on compressed natural gas. By improving mode share for transit bus service on Metro Bus Line 117 that serves the corridor, an increasing share of travel on Century Boulevard from natural gas vehicles will reduce the share of vehicles operating on less efficient gasoline or diesel fuels.

The valuation of environmental benefits is described below.

A. Environmental Benefits from Reduced Emissions

Net Estimated Benefits: $1.7 million and $1.5 million discounted at 3 percent and 7 percent, respectively.

The reduced emissions are based on reduced vehicle-idling time attributed to the project as described above. A variety of sources were used to convert idling-time reductions over the life of the proposed project into reduced gasoline and diesel fuel consumption, and commensurate reductions in emissions. The emission savings have been calculated for a variety of "criteria pollutants", such as Volatile Organic Compounds (VOCs), Nitrogen Oxides (NO_x), and Particulate Matter ($PM_{2.5}$ and PM_{10}), as well as from the emission of greenhouse gases, such as carbon dioxide (CO2). The values per ton of each pollutant are based on the recommended monetized values published in the TIGER BCA Resource Guide. The diagram below illustrates the general methodology for estimating the annual benefits from reduced emissions.



Using this methodology, the total benefits from reduced emissions over the life-cycle of the project are shown above.

See columns I through M in Table B of the BCA Spreadsheet for methodology on how the environmental benefits from reduced emissions are calculated, (refer to Attachment No. 4 of the online grant application).

6. Costs

Net Estimated Costs: $41.8 million and $38.6 million discounted at 3 percent and 7 percent, respectively.

Project costs begin to accrue in 2010 and continue into 2017. The project is estimated to have construction work completed by December 2016, and project close out completed by March 2017. All project costs incurred prior to the first year of analysis have been included in 2013, for the purpose of capturing all costs in the BCA.

See Tables F through H of the “Century Boulevard BCA Spreadsheet 2013.xls” for more details on cost estimates.

Total project costs and schedule were compiled by AECOM, the City of Inglewood project design consultant, in August 2012 and updated as of May 2013.

Refer to City of Inglewood TIGER FY 2013 Discretionary Grant Application, and grant application attachments for additional information on construction costs and schedule.