

MEMORANDUM

February 5, 2021

To: Mason Giem, Public Works Programs Coordinator

Organization: City of SeaTac

From: Eric Widstrand, PE, PTOE, Rachel Finfer, Michael Hintze, Brian Almdale, Katie Knapp

Project: City of SeaTac LRSP and IB Pedestrian Crossing Safety Improvements

Re: Phase I Task 4 Pedestrian Countermeasure Prioritization Overview

This memo is intended to detail how potential countermeasures and projects have been identified and prioritized to improve pedestrian safety along International Blvd in the most cost-effective and impactful manner. The result of this prioritization process is a list of projects, scores for each prioritization variable, and an overall prioritization score. The separate prioritization sub-scores for each variable allows for scenario-building possibilities, offers increased process transparency, and helps communicate project benefits during project development and implementation phases.

Process for Countermeasure Selection

The overall process for identifying potential countermeasures first involved the development of a countermeasure toolbox. This toolbox draws from multiple sources, including National Cooperative Highway Research *Program Report 926 - Guidance to Improve Pedestrian and Bicyclist Safety at Intersections*, *Target Zero - Washington State's Strategic Highway Safety Plan*, and California's *Local Roadway Safety Manual* (which specifies countermeasures that have been thoroughly researched and verified as to their quantifiable safety benefits). In addition, Toole Design identified countermeasures and programs not included in these sources that are applicable to International Blvd corridor. See Table 7 for the countermeasure toolbox in its entirety, which contains information for each countermeasure considered in this analysis, details on crash modification factors (CMF), countermeasure cost estimates, implementation applicability along International Blvd, and each crash type addressed.

Countermeasures from this toolbox have been identified that address the top twelve high-priority locations along the corridor identified from the crash analysis, in alignment with Washington State Department of Transportation (WSDOT) process for project identification in Local Roadway Safety Plans. In addition to the top twelve high-priority locations, the entire corridor was reviewed to ensure that systemic safety opportunities were maximized.

Factors and Variables

Prioritization consisted of two elements: the first being *location priority* and the second being a *Benefit-Cost comparison* (see Table 1). Each of these elements include one or more factors. Further, some of these factors have several variables based on how the factor is best measured.

The location priority variables aim to prioritize locations that have a history of pedestrian crashes in terms of frequency and severity, and proximity to nearby common pedestrian activity generators. These activity generating variables serve as proxies for pedestrian exposure as pedestrian volume data is not available at the time of this analysis.

The Benefit-Cost comparison aims to assess individual countermeasures as well as selected countermeasure(s) at intersections along the corridors on how effective the countermeasures are expected to reduce pedestrian crashes (and

the associated societal costs of these crashes) compared to estimated countermeasure costs. Additional background information is provided below for the Benefit-Cost comparison metrics.

Table 1. Proposed Prioritization Factors

| Factor | Details | Weighting |
|--|---|--|
| Location Priority | | |
| Locations with high crash injury weighting | Aggregate weighted crash scores within 150 feet of intersections | 5 points if in top third 3 points if in middle third 0 points if in bottom third |
| High Pedestrian Activity Location: Transit | Light rail or Rapid Ride | 2 points for light rail stations (note – 176 th St and 200 th St have both a light rail station and a Rapid Ride stop, these locations would score 3 points). 1 point for Rapid Ride stop |
| High Pedestrian Activity Location: Destinations | Location is adjacent to restaurant, bar, grocery store, retail, school, park, or other similar pedestrian destination. | 1 point if pedestrian destination is present within 500' of the roadway per intersection leg (4 points possible) |
| Benefit-Cost Comparison | | |
| Benefit-Cost Ratio | When CMFs are available: apply expected crash modification factor to the value of observed crash history, calculated using EPDO criteria. Divide by the estimated cost to obtain the Benefit-Cost Ratio. | 10 points if BCR is in top third 5 points if BCR is in middle third 0 points if BCR is in bottom third |
| <i>[or]</i> | | |
| Generalized benefit vs. cost | When CMFs are not available, either because the recommendation is programmatic or because a CMF has not yet been evaluated, develop a generalized high-medium-low benefit/cost ratio based on estimated costs as well as expected safety benefit informed by research and engineering judgment. | 10 points if generalized benefit vs. cost is high 5 points if generalized benefit vs. cost is medium 0 points if generalized benefit vs. cost is low |
| Total Points Possible: 22 | | |

Benefit-Cost Ratio Development

Development of a Benefit-Cost Ratio (BCR) is based on the estimated cost of each countermeasure compared to the expected safety benefit. The BCR is developed by multiplying the countermeasures' CMF by the cost valuation of the location's applicable crash history. The cost valuation is assigned using the Equivalent Property Damage Only (EPDO) method. This method weighs crashes according to the highest severity injury sustained in the crash by converting each crash to an equivalent number of Property Damage Only (PDO) crashes. For example, a crash that results in a possible injury is equivalent to approximately 10 PDO crashes, whereas a fatal crash is equivalent to approximately 231 PDO crashes. These EPDO factors are informed by the comprehensive societal costs of crashes and are scaled relative to PDO comprehensive crash cost estimates. The EPDO technique is utilized because normalizing crashes to a base unit in this way allows crashes to be easily compared, which is helpful during prioritization efforts. Additionally, subcategories of crashes can be compared based on the average EPDO score per crash type to identify which types resulted in higher severity injuries. Total EPDO scores are a measure of overall crash intensity and the average EPDO score per crash is a measurement of average crash intensity/severity. See Table 2 for the comprehensive crash costs for each crash severity provided by WSDOT.

For this prioritization analysis, the expected benefit for each project was developed by multiplying the crash reduction factor by the EPDO score of the applicable crash history. This value was then divided by the countermeasure’s estimated cost, resulting in the BCR. A higher BCR reflects higher cost effectiveness for safety impacts. Planning level cost estimates were developed for the purposes of calculating the BCR, and the cost estimated details can be found in the Appendix.

$$\text{Benefit-Cost Ratio} = \frac{EPDO * (100 * (1 - CMF))}{\text{Estimated Countermeasure Cost}}$$

Table 2. WSDOT Crash Costs Estimates (2020 Values)¹

| Crash Severity | EPDO Score | Comprehensive Crash Cost |
|--|------------|--------------------------|
| Fatal (K)², Suspected Serious Injury (A) | 231.31 | \$3,423,400 |
| Suspected Minor Injury (B) | 16.04 | \$237,400 |
| Possible Injury (C) | 9.61 | \$142,300 |
| Property Damage Only (PDO) | 1.0 | \$14,800 |

Generalized Benefit vs. Cost Comparison

Not all pedestrian safety countermeasures have been rigorously studied and many have yet to be assigned a CMF. In addition, CMFs are not assigned to programmatic countermeasures, such as education and outreach programs. As a result of several known safety countermeasures lacking estimated CMFs, an additional method is needed to review and prioritize benefits and costs qualitatively. To do this, the countermeasures’ cost will be compared with the overall safety expectation of the countermeasure based on research and engineering judgement. This will enable a relative comparison of costs and benefits.

Prioritization Results

The following tables summarize the results of the prioritization analysis. Not every variable used in the prioritization are included in these tables (Table 3 through Table 5), those details can be viewed in the appendix of this memo.

Table 3 summarizes the results of the intersection prioritization analysis (Table 6 includes additional details for each prioritization element). Note, the weighted pedestrian injury total column in this table is an input variable used in the prioritization analysis, the raw value displayed here is to provide additional insight into how many crashes (and severity) occurred at each location relative to the overall prioritization score. The top five *high priority intersections* are indicated with bold text.³ These locations have a relatively high pedestrian crash intensity, are located near pedestrian activity generators, and have feasible countermeasures that are expected to reduce pedestrian crashes while having relatively low associated costs.

¹ Values provided by WSDOT staff

² Letters within the parenthesis refer to injury severity levels used by WSDOT (KABCO scale)

³ The top five intersection roadway configurations can be viewed in the International Boulevard Crash Analysis memo, which include crash diagrams for the top intersections based on aggregate EPDO scores.

Table 3. Intersection Prioritization Results (bold = high priority)

| Rank | Location | Countermeasures | Weighted Pedestrian Injury Total | Location Priority Score | Potential per Project Score | Overall Score |
|------|-----------------------------------|---|----------------------------------|-------------------------|-----------------------------|---------------|
| 1 | International Blvd and S 188th St | <ul style="list-style-type: none"> > Fill in Bus Pull Out > Move bus stop closer to intersection > Pedestrian signal recall* (assumed absent) > Add signage R9-3bP Use Crosswalk > Install median fencing at southern leg | 28 | 11 | 8.75 | 19.75 |
| 2 | International Blvd and S 176th St | <ul style="list-style-type: none"> > Upgrade curb ramp > Pedestrian Signal Recall* (assumed absent) > Improve signal hardware: retroreflective backplate > Install pedestrian scramble | 21 | 11 | 8.3 | 19.3 |
| 3 | International Blvd and S 154th St | <ul style="list-style-type: none"> > Curb radius reduction on SE/NW corner | 9 | 9 | 10 | 19 |
| 4 | International Blvd and S 208th St | <ul style="list-style-type: none"> > Install median fencing at southern leg | 10 | 8 | 10 | 18 |
| 5 | International Blvd and S 200th St | <ul style="list-style-type: none"> > Fill in Bus Pull Out > Move bus stop closer to intersection > Pedestrian signal recall* (assumed absent) > Add signage R9-3bP Use Crosswalk > Median fencing at northern leg | 11 | 10 | 7.5 | 17.5 |
| 6 | International Blvd and S 216th St | <ul style="list-style-type: none"> > Install median fencing at northern leg | 3 | 11 | 5 | 16 |
| 7 | International Blvd and S 182nd St | <ul style="list-style-type: none"> > Curb radius reduction on SW corner > Remove left turn lane > Install median refuge island > Install median fencing at southern leg | 5 | 10 | 3.3 | 13.3 |
| 8 | International Blvd and S 160th St | <ul style="list-style-type: none"> > Curb radius reduction at NE corner > Remove left turn lane > Install median refuge island > Install median fencing at southern leg | 3 | 8 | 1.7 | 9.7 |
| 9 | International Blvd and 518 | <ul style="list-style-type: none"> > Install marked pedestrian crossing at slip lane > Add signage "yield here to pedestrians" | 0 | 3 | 5 | 8 |

| Rank | Location | Countermeasures | Weighted Pedestrian Injury Total | Location Priority Score | Potential per Project Score | Overall Score |
|------|--|--|----------------------------------|-------------------------|-----------------------------|---------------|
| | off-ramp (northernmost) | | | | | |
| 10 | International Blvd and S 195th St | > Install marked pedestrian crossing at northern leg | 0 | 7 | 0 | 7 |
| 11 | International Blvd and S 180th St | > Install marked pedestrian crossing at southern leg | 2 | 6 | 0 | 6 |
| 12 | International Blvd and 518 onramp (southernmost) | > Install marked pedestrian crossing at slip lane > Add signage "yield here to pedestrians" | 0 | 3 | 0 | 3 |

Table 4 summarizes the prioritization results of several corridor wide countermeasures, based on a generalized Benefit-Cost analysis. In total, 10 corridor wide countermeasures were included in this analysis. Of those countermeasures, only five were included due to the availability of CMF estimates. Please note that projects ranked 6-10 should still be considered as viable projects. They have not been ruled out as infeasible—rather, because CMFs are not available for these treatments, a Benefit-Cost Ratio was not developed to support prioritization. Projects such as re-evaluating signal timing to support a reduced posted speed limit and evaluating the corridor for lane removal potential would support safety benefits along the corridor systemically by supporting slower motor vehicle speeds and minimizing pedestrian crossing distances—two key factors related to pedestrian crash risk. This table includes a cost estimate, number of location where the countermeasure might be installed, CMF, and an assessment of how effective the corridor wide project might be at reducing pedestrian crashes relative to cost.

Table 4: Corridor Wide Countermeasures Prioritization Results

| Rank | Countermeasure | Cost | Multiplier (# of Locations) | Total Cost | CMF | Safety Potential compared to Costs |
|------|--|--------------|-----------------------------|----------------|-------|------------------------------------|
| 1 | Install Leading Pedestrian Interval at each signalized intersection | \$1,521.63 | 18 | \$27,389.34 | 0.4 | Very High |
| 2 | Reduce posted speed limit to 30 MPH along corridor | \$18,259.56 | 1 | \$18,259.56 | 0.96 | Medium |
| 3 | Install pedestrian countdown signals at locations where not already present | \$273,893.40 | 1 | \$273,893.40 | 0.75 | Medium-Low |
| 4 | Stripe lane lines along International Blvd | \$827,523.26 | 1 | \$827,523.26 | 0.82 | Low |
| 5 | Install new pedestrian crossings at locations where crossings are more than ¼ mile apart | \$250,000.00 | 5 | \$1,250,000.00 | 0.453 | Low |

| | | |
|----|--|---|
| 6 | <i>Re-evaluate signal timing (in conjunction with reduced posted speed limit)</i> | <i>Not Assessed (CMF not available)</i> |
| 7 | <i>Install “No turn on red” signs at each signalized intersection</i> | <i>Not Assessed (CMF not available)</i> |
| 8 | <i>Evaluate corridor for lane removal potential based on traffic analysis to reduce pedestrian crossing distances.</i> | <i>Not Assessed (CMF not available)</i> |
| 9 | <i>Convert HOV lane to bus only lane along corridor</i> | <i>Not Assessed (CMF not available)</i> |
| 10 | <i>Install pedestrian signal recall at all intersections with bus or light rail stop, if not already present</i> | <i>Not Assessed (CMF not available)</i> |

Table 5 includes three programmatic recommendations that are applicable to the City of SeaTac and along International Blvd. These programmatic recommendations were selected from the countermeasure toolbox as being feasible to implement with reasonable expected crash reduction qualities. CMFs or cost estimates are not available for these programmatic countermeasures, so only the top 3 that were determined appropriate for SeaTac have been selected and included as priority countermeasures.

Table 5: Priority Programmatic Countermeasures

| Countermeasure | |
|-----------------------|--|
| 1 | Further engineering analysis to evaluate the effectiveness of street lighting along the corridor |
| 2 | Active speed feedback signs |
| 3 | Pedestrian decoy enforcement operations ⁴ |

Alignment with other SeaTac Planning Efforts

The projects identified through this planning effort represent significant investments within SeaTac and are largely in alignment with several of the City’s adopted planning documents and guidelines. Two key transportation planning documents, the City’s Transportation Master Plan (2015) and the ADA Self-Assessment and Transition Plan (2018), recognize the significant role that International Blvd plays within SeaTac’s transportation network and the need for safety improvements for people traveling along and across the corridor. Furthermore, the Transportation Master Plan identified significant growth opportunities along International Blvd as part of the City’s Urban Center District. These growth opportunities were identified in parallel with existing safety and accessibility concerns in the form of high crash intersections and roadway sections, and the need for ADA-compliant sidewalk and crossing investments. Addressing these safety and accessibility concerns will ensure that future growth is best supported by the corridor.

Although the countermeasures recommended in this memo are in alignment with broader planning efforts, one of the projects identified though in the Transportation Master Plan to accommodate growth within the Urban Center District is not in alignment with this project’s focus on pedestrian safety. The Transportation Master Plan recommends the widening of International Blvd between S 170th St and S 188th St, which is in conflict with the eighth corridor-wide countermeasure in

⁴ Enforcement efforts should actively consider equity-related issues and concerns. Public engagement should be conducted to help inform the program design and application prior to implementation to prevent equity-related issue from arising.

Table 4. This countermeasure recommends that the corridor be evaluated for lane removal feasibility in order to reduce pedestrian crossing distances and support speed management. This conflict highlights the need for the City to balance competing modal priorities along International Blvd, and to identify solutions that support safety and mobility for all users along and across the corridor. The prioritized projects from this planning process present an opportunity for the City to work towards both of its safety and mobility goals, and to address previously identified investment needs that will continue to support growth within the Urban Center District and along the City's transportation network.

In addition to City-led planning efforts, several of the City's partner agencies have also identified planning goals and project needs along and in connection to International Blvd. These goals and project needs have been considered in the identification and prioritization process as the projects' approval, design, and implementation will require close coordination between the City and its partner agencies. Because this roadway is state-owned, WSDOT will be a key partner. Other partner agencies include, but are not limited to the Port of Seattle, King County Metro, Sound Transit, and adjacent property owners along International Blvd. For example, the Port's desires to promote pedestrian and bicycle access to and from the airport via the light rail stations and to continue to support more intuitive connections between the Sound Transit Airport Light Rail Station highlights the need for continued coordination between the Port, the City, and Sound Transit for planning for and creating multi-modal connections along and across International Blvd. In particular, a countermeasure to relocate bus stops is included in the recommended countermeasure for the intersections at International Blvd and 188th St as well as International Blvd and 200th St (see Table 3). This change would need to be implemented in partnership with King County Metro. King County Metro and WSDOT are working on a project to improve speed and reliability for the Metro Rapid Ride line A along International Blvd. so any geometric changes related to bus stops should be coordinated with this project.

Appendix

The following map and tables are included as appendix items to improve document legibility. The primary attributes for each table are included in the body of this document, but additional details are included in the following tables.

Map 1: Intersection Prioritization Results

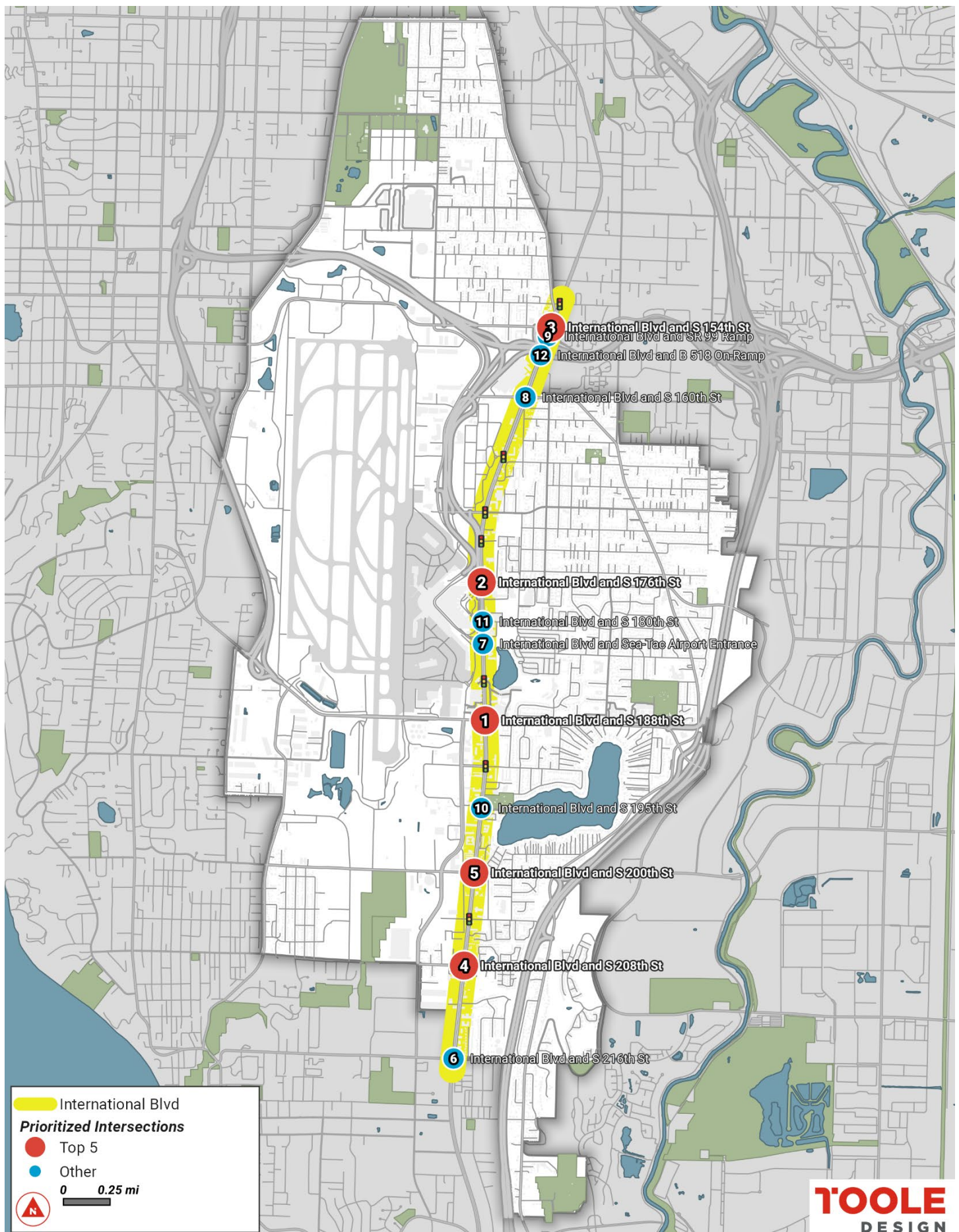


Table 6: Intersection Prioritization Analysis Details

| Rank | Location | CM | Treatment Cost | CMF | K | A | B | C | O | Crash score | Transit Score | Destination Score | Total Location Priority | Safety Potential per CM | Qualitative Safety Potential Justification | Safety Potential per Project | Overall Score |
|------|--|---|----------------|------|---|---|---|---|---|-------------|---------------|--------------------------------------|-------------------------|--------------------------------|---|------------------------------|---------------|
| 1 | International Blvd and S 188th St | Fill in Bus Pull Out | \$ 163,941.54 | None | 0 | 6 | 5 | 5 | 0 | 5 | 2 | 4 (hotels or fast food on all legs) | 11 | High cost high benefit (5) | Very expensive, but would likely have a significant impact at high crash location | 8.75 | 19.75 |
| | | Move bus stop closer to intersection | \$ 14,314.59 | None | | | | | | | | | | Low cost medium benefit (10) | | | |
| | | Pedestrian signal recall | \$ 1,268.03 | None | | | | | | | | | | Low cost medium benefit (10) | | | |
| | | Add signage R9-3bP Use Crosswalk | \$ 760.82 | None | | | | | | | | | | 10 | | | |
| | | Median fencing at southern leg (near term solution) | \$ 22,190.44 | 0.65 | | | | | | | | | | N/A (see Q7) | | | |
| 2 | International Blvd and S 176th St | Upgrade curb ramp | \$ 65,895.03 | None | 1 | 3 | 2 | 5 | 2 | 5 | 3 | 3 (SeaTac, Hilton, Park n Fly) | 11 | High cost low benefit (5) | Fairly expensive, primarily related to accessibility but would also have safety impacts | 8.3 | 19.3 |
| | | Pedestrian Signal Recall | \$ 1,268.03 | None | | | | | | | | | | Low cost high benefit (10) | | | |
| | | Improve signal hardware: retroreflective backplate | \$ 16,484.33 | 0.85 | | | | | | | | | | 10 | | | |
| | | Install pedestrian scramble | \$ 14,455.49 | 0.6 | | | | | | | | | | N/A (SEE q11) | | | |
| 5 | International Blvd and S 200th St | Fill in Bus Pull Out | \$ 173,339.02 | None | 0 | 2 | 2 | 3 | 0 | 5 | 3 | 2 (grocery, pizza) | 10 | High cost medium benefit (0) | Very expensive, less benefit compared to 188 th due to historical crash data. Valuable from a systemic standpoint (the risk is still there, even if crash history is not as high). | 7.5 | 17.5 |
| | | Move bus stop closer to intersection | \$ 14,314.59 | None | | | | | | | | | | Low cost medium benefit (10) | | | |
| | | Pedestrian signal recall | \$ 1,268.03 | None | | | | | | | | | | Low cost medium benefit (10) | | | |
| | | Add signage R9-3bP Use Crosswalk | \$ 760.82 | None | | | | | | | | | | 10 | | | |
| | | Median fencing at northern leg (near term solution) | \$ 28,530.56 | 0.65 | | | | | | | | | | N/A | | | |
| 4 | International Blvd and S 208th St | Install median fencing at southern leg (near term solution) | \$ 19,020.38 | 0.65 | 1 | 1 | 2 | 2 | 0 | 5 | 2 | 1 (hotel) | 8 | 10 | N/A | 10 | 18 |
| 3 | International Blvd and S 154th St | Curb radius reduction on SE/NW corner | \$ 5,817.06 | None | 0 | 1 | 4 | 2 | 0 | 5 | 2 | 2 (retail and restaurant) | 9 | Low cost high benefit (10) | Will slow turning speeds | 10 | 19 |
| 7 | International Blvd and S 182nd St/Sea-Tac Airport Entrance | Curb radius reduction on SW corner | \$ 59,371.75 | None | 0 | 0 | 3 | 2 | 0 | 5 | 2 | 3 (restaurant, hotel, and SeaTac) | 10 | High cost low benefit (0) | Less benefit than at 154th - speeds are probably somewhat low coming out of SeaTac | 3.3 | 13.3 |
| | | Remove left turn lane | \$ 17,131.02 | None | | | | | | | | | | Medium cost medium benefit (5) | | | |
| | | Install median refuge island | \$ 19,350.06 | 0.44 | | | | | | | | | | 5 | | | |
| | | Install median fencing at southern leg | \$ 25,360.50 | 0.65 | | | | | | | | | | N/A | | | |
| 6 | International Blvd and S 216th St | Install median fencing at northern leg | \$ 19,020.38 | 0.65 | 0 | 1 | 0 | 0 | 0 | 5 | 2 | 4 (restaurant, hotel, hotel, retail) | 11 | 5 | N/A | 5 | 16 |
| 8 | International Blvd and S 160th St | Curb radius reduction at NE corner | \$ 52,242.63 | None | 0 | 0 | 1 | 2 | 0 | 3 | 2 | 3 (restaurant, subway, barber shop) | 8 | High cost low benefit (0) | Not a significant crash history to justify | 1.7 | 9.7 |
| | | Remove left turn lane | \$ 19,793.87 | None | | | | | | | | | | Medium cost medium benefit (5) | | | |
| | | Install median refuge island | \$ 30,622.80 | 0.44 | | | | | | | | | | 0 | | | |
| | | Install median fencing at southern leg | \$ 19,020.38 | 0.65 | | | | | | | | | | N/A | | | |
| 9 | International Blvd and 518 (northern off-ramp) | Install marked pedestrian crossing at slip lane | \$ 1,902.04 | 0.75 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 3 | 5 | N/A | 5 | 8 |
| | | Add signage "Yield here to pedestrians" | \$ 10,905.02 | None | | | | | | | | | | Low cost low benefit (5) | | | |
| 12 | International Blvd and 518 (southern onramp) | Install marked pedestrian crossing at slip lane | \$ 1,902.04 | 0.75 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | N/A | 0 | 3 |
| | | Add signage "Yield here to pedestrians" | \$ 10,905.02 | None | | | | | | | | | | Medium cost low benefit (0) | | | |
| 11 | International Blvd and S 180th St | Install marked pedestrian crossing at southern leg | \$ 12,933.86 | 0.6 | 0 | 0 | 2 | 0 | 0 | 3 | 2 | 1 (SeaTac) | 6 | 0 | N/A | 0 | 6 |
| 10 | International Blvd and S 195th St | Install marked pedestrian crossing at northern leg | \$ 12,426.65 | 0.6 | 0 | 0 | 1 | 1 | 0 | 3 | 2 | 2 (hotel, park) | 7 | 0 | N/A | 0 | 7 |

Table 7: Countermeasure Toolbox

| Countermeasure Name | Relevance to corridor | Relevance Details | Crash Types Addressed | Applicable context and tradeoffs | Source | CMF | CMF crash types or other safety details |
|--|-----------------------|--|---|--|---|------|--|
| Grade separated crossing (e.g. sky bridge) | Low | Only appropriate if other fixes are not feasible | Motorist Failed to Yield to Pedestrian, Pedestrian Failed to Yield, Motorist Left Turn into Pedestrian—Parallel Paths, Motorist Right Turn into Pedestrian—Parallel Paths | Measure of last resort. Locations where at-grade crossing treatments are not possible or potentially unsafe, such as crossings of free-flow, high-speed highway ramps or railroads; locations with high vehicle volumes, high-speed highways, railroad tracks or natural barriers where it is preferable to prioritize bicycle and pedestrian travel through the intersection to reduce overall delay. May reduce delay for motorists compared to at grade crossing; will increase travel time for pedestrians (climbing stairs or elevator) | NCHRP 926 (Tier 3 CM) | 0.87 | |
| Curb extensions | Low | No locations with on-street parking at intersections | Motorist Right Turn into Pedestrian—Parallel Paths | Applicable in areas with permanent on-street parking | 2019 Target Zero, NCHRP 926 (Tier 3 CM) | N/A | |
| Pedestrian Hybrid Beacons | Low | No unsignalized marked crossings across International Blvd | Motorist Failed to Yield to Pedestrian, Pedestrian Failed to Yield | | 2019 Target Zero, NCHRP 926 (Tier 3 CM) | 0.7 | All |
| Road Reconfiguration/diet | Medium | Long-term solution | Motorist Failed to Yield to Pedestrian, Pedestrian Failed to Yield, Motorist Left Turn into Pedestrian—Parallel Paths, Motorist Right Turn into Pedestrian—Parallel Paths | Priority bicycle and pedestrian routes; May reduce motor vehicle capacity | 2019 Target Zero, NCHRP 926 (Tier 3 CM) | 0.71 | All |
| RRFB | Low | No unsignalized marked crossings across International Blvd; International Blvd speed limit above recommended context | Motorist Failed to Yield to Pedestrian, Pedestrian Failed to Yield | | 2019 Target Zero, NCHRP 926 (Tier 3 CM) | 0.53 | Vehicle-pedestrian crashes |
| Curb Radius Reduction | High | Appropriate with truck aprons | Motorist Right Turn into Pedestrian—Parallel Paths | Areas with low truck volumes; May make turning more difficult for large trucks; may result in shorter cycle lengths due to reduced crossing distances | 2019 Target Zero, NCHRP 926 (Tier 3 CM) | N/A | Thomas et al 2016 suggests that the treatment may effectively slow motorist turning speeds, which can increase opportunities for motorists to yield to pedestrians and reduce the severity of crashes. |
| In-street pedestrian crossing signs | Low | No uncontrolled marked crossings | | Uncontrolled crossings | 2019 Target Zero | N/A | |
| Pedestrian-scale lighting | Low | Much of the corridor already has pedestrian-scale lighting; would need further study to confirm need | | | 2019 Target Zero | 0.73 | Injury crashes |
| Accessible pedestrian signals | Medium | | | | 2019 Target Zero | N/A | |
| Curb ramps | Medium | | | | 2019 Target Zero | N/A | |
| Leading Pedestrian Interval | High | | Motorist Right Turn into Pedestrian—Parallel Paths | Signalized intersections; medium to high turning-vehicle volumes and pedestrian volumes. May increase delay for motorists | 2019 Target Zero, NCHRP 926 (Tier 3 CM) | 0.41 | Vehicle-pedestrian crashes |
| Exclusive pedestrian phasing/ Protected phases | High | | Motorist Left Turn into Pedestrian—Parallel Paths, Motorist Right Turn into Pedestrian—Parallel Paths | Intersections with high volumes of pedestrians and low to medium vehicle volumes. May increase delay for all users | 2019 Target Zero, NCHRP 926 (Tier 3 CM) | 0.64 | Vehicle-pedestrian crashes |
| Updated signal timing | Medium | | Motorist Failed to Yield to Pedestrian, Pedestrian Failed to Yield | Signalized intersections where pedestrian and/or bicyclist traffic is expected, particularly medium or high volumes. May impact delay for all users | 2019 Target Zero, NCHRP 926 (Tier 3 CM) | 0.5 | Vehicle-pedestrian crashes; varies based on specific signal phasing |
| Improve signal hardware: lenses, back-plates, mounting, size, and number | Medium | | | Applicable with high frequency of right-angle or read-end crashes that can be attributed to signal visibility. | CA LRSM | 0.85 | All |

| Countermeasure Name | Relevance to corridor | Relevance Details | Crash Types Addressed | Applicable context and tradeoffs | Source | CMF | CMF crash types or other safety details |
|---|-----------------------|---|---|--|---|-------------|---|
| Install left-turn lane and add turn phase (signal has no left-turn phase before) | Low | | Look for rear-end crashes and/or crashes involving non-motorized users (driver may be looking for gaps and not paying attention to pedestrian). | | CA LRSM | 0.45 | All |
| Provide protected left turn phase (left turn lane already exists) | Medium | | Applicable to crashes involving left-turning vehicles -- may be angle, head-on, sideswipe or rear end. Also may include pedestrian crashes. | | CA LRSM | 0.7 | All |
| Improve pavement friction (High Friction Surface Treatments) | Low | | Wet-pavement condition crashes or "failure to stop" crashes | Applicable to crashes involving left-turning vehicles -- may be angle, head-on, sideswipe or rear end. Also may include pedestrian crashes. | CA LRSM | 0.45 | All |
| Install raised median on approaches (at signalized intersections) | Medium | | Intersections noted as having turning movement crashes near the intersection as a result of insufficient access control. | High volume intersections, driveways located too close to the functional area of the intersection | CA LRSM | 0.55 | All |
| Install pedestrian median fencing (roadway or signalized intersection) | Medium | | Pedestrian/Bicycle crashes occurring on the approaches/influence area of the new pedestrian median fencing | Signalized intersections with high pedestrian generators nearby may experience high volumes of pedestrians J-walking across the travel lanes at midblock locations instead of walking to the intersection and waiting to cross during the walk phase. When the safety issue cannot be mitigated with signal timing and shoulder/sidewalk treatments, then installing a continuous pedestrian barrier in the median may be a viable solution. Will increase out of direction travel for pedestrians, likely increasing delay and decreasing convenience | CA LRSM, NCHRP 926 (Tier 3 CM) | 0.65 | Ped/Bike |
| Pedestrian Countdown Signals | High | Appropriate if not already installed | Pedestrian Failed to Yield | Signalized intersections spanning wide streets; crossings with medium to high volumes of pedestrians | CA LRSM, NCHRP 926 (Tier 3 CM) | -0.3, 0.75 | Vehicle-pedestrian crashes have shown non-negative |
| All-Walk Phase | Low | | Motorist Left Turn into Pedestrian—Parallel Paths, Motorist Right Turn into Pedestrian—Parallel Paths | Signalized intersections with high instances of turning-vehicle--pedestrian conflicts. Will increase delay for all motorists and bicyclists. | CA LRSM, NCHRP 926 (Tier 3 CM) | 0.66 | Vehicle-pedestrian crashes |
| Install pedestrian crossing (signalized intersections) | Medium | | signalized intersections with no marked crossing and pedestrian signal heads, where pedestrians are known to be crossing intersections that involve significant turning movements. They are especially important at intersections with multiphase traffic signals such as left turn arrows and split phases, school crossings, double right or double left turns. | | CA LRSM | 0.75 | Ped/Bike |
| Lighting | Medium | | Motorist Failed to Yield, Pedestrian Failed to Yield, Motorist Left Turn into Pedestrians - Parallel Paths, Motorist Right Turn into Pedestrian—Parallel Paths | Controlled and uncontrolled intersections; at and near intersections in commercial or retail areas; near schools, parks, and recreation centers | Scope, NCHRP 926 (Tier 3 CM), CA LRSM | 0.73 | Injury crashes |
| Install dynamic/variable speed warning signs | Medium | | | | CA LRSM | 0.7 | All |
| Install sidewalk/pathway (to avoid walking along roadway) | High | | | Areas noted as not having adequate or no sidewalks and a history of walking along roadway pedestrian crashes. | CA LRSM | 0.2 | Ped/Bike |
| Install/upgrade pedestrian crossing at uncontrolled locations (with enhanced safety features) | High | | | Non-signalized intersections where pedestrians are known to be crossing intersections that involve significant vehicular traffic. They are especially important at intersections with turn pockets. Detectable Warning Surfaces at curb ramps should be considered as an enhanced safety feature. | CA LRSM, 2019 Target Zero | 0.65 | Ped/Bike |
| Install raised pedestrian crossing | Low | Speeds should be below 35 mph | Motorist Left Turn into Pedestrian—Parallel Paths, Motorist Right Turn into Pedestrian—Parallel Paths | Locations where motorists are failing to yield at pedestrian crossings, slip lanes. May slightly increase motorist delay, may be difficult for large trucks to cross | Target Zero, CA LRSM, NCHRP 926 (Tier 3 CM) | 0.54 - 0.49 | .54 - fatal/injury; .49 - fatal/injury on entrances or exits to streets and driveways |
| Advance stop/yield lines | Low | No uncontrolled marked crossings | Motorist Failed to Yield to Pedestrian | Uncontrolled multilane crossings (at least two lanes in one direction) | NCHRP 926 (Tier 3 CM) | 0.75 | |
| Active Warning Beacons | Low | No unsignalized marked crossings across | Pedestrian Failed to Yield | Unsignalized crossings, high pedestrian volumes, crossings where driver yielding is low. Occasional slight delay for motorists | NCHRP 926 (Tier 3 CM) | N/A | |

| Countermeasure Name | Relevance to corridor | Relevance Details | Crash Types Addressed | Applicable context and tradeoffs | Source | CMF | CMF crash types or other safety details |
|---|-----------------------|------------------------------------|---|---|--|-------------|--|
| Parking Restrictions/Daylighting | Low | No existing parking | Motorist Failed to Yield to Pedestrian, Pedestrian Failed to Yield, Motorist Right Turn into Pedestrian--Parallel Paths | | NCHRP 926 (Tier 3 CM) | 0.7 | Vehicle-pedestrian crashes |
| Hardened Centerline or Continuous Raised Median | Medium | | Motorist Left Turn into Pedestrian—Parallel Paths | intersection/midblock crossing locations or locations where it is desired to restrict left-turning movements, such as those where left turning motorists don't sufficiently yield, turn too fast, or cut across centerlines. Access restrictions may divert traffic to inappropriate routes or increase U-turns. Required turning radius of large trucks may impact ability of island to protect crossings. | NCHRP 926 (Tier 3 CM) | 0.54 - 0.69 | .54 all crashes; .69 Vehicle-pedestrian crashes |
| No turn on red signs | High | | Motorist Right Turn into Pedestrian—Parallel Paths | Signalized intersections; high volumes of right-turning vehicles and high volumes of pedestrians. May increase delay for motorists | NCHRP 926 (Tier 3 CM) | 0.97 | All crashes, but not well studied, possibly would result in safety improvements for pedestrians and bicyclists |
| Protected Intersections | Low | No bike facilities on corridor | Motorist Right Turn into Pedestrian—Parallel Paths | | NCHRP 926 (Tier 3 CM) | N/A | |
| Crossing Islands/pedestrian refuge island | High | | Motorist Failed to Yield to Pedestrian, Pedestrian Failed to Yield | Preferable on all roads with two or more lanes of through traffic in each direction and operating speeds over 30 mph; midblock or intersection crossings; should be considered on all roadways where space is available to provide refuge and particularly on roads with medium-to-high speeds and medium-to-high vehicle volumes. Motorists: access restrictions may divert traffic to inappropriate routes or increase U-turns; Required turning radius of large trucks may impact ability of island to protect crossings | NCHRP 926 (Tier 3 CM), Caltrans, Target Zero. Recognized as FHWA Proven Safety Countermeasure. | 0.54 -0.69 | 0.54 - all crashes; 0.69 -Vehicle-pedestrian crashes. |
| Pedestrian Decoy Operations | High | | Motorist Failed to Yield to Pedestrian | Equity concerns with enforcement | | N/A | |
| Pedestrian Conspicuity Enhancements & Education | Low | Most appropriate at citywide scale | Nighttime | | | N/A | |
| Pedestrian Gap Acceptance Training | Low | Most appropriate at citywide scale | Pedestrian Failed to Yield | | | N/A | |
| Install left turn lane (where no left-turn lane exists) | Low | | | | CA LRSM | 0.65 | All |
| Lower speed limit by 10 mph | High | | | | CMF Clearinghouse | 0.96 | All |
| Install automated speed camera at signalized intersection | High | | | | CMF Clearinghouse | 0.76 | Injury |
| HOV to bus lane conversion | Medium or High | | | | | N/A | |
| Lighting study | Medium or High | | | | Non-engineering strategy | N/A | |
| Detached sidewalk (as redevelopment occurs) | Low | | | | | N/A | |
| Install new traffic signal in non-signalized location | Medium or High | | Right-angle, left-turn | Consideration should only be given after less restrictive forms of traffic control have been utilized | CA LRSM | 0.7 | All |

Cost Estimates

Assumptions

- The contingencies in cost estimates were taken from a similar project in Seattle due to the comparable level of improvements between the two projects.
- Seattle Department of Transportation bid item unit costs from 2017-2019 were used to assume the cost of the items for this project, as City of SeaTac bid cost items were not readily available.
- An assumption was made on the capability of the existing signal equipment to be able to reprogram for signal recall. The lump sum for implementing the signal recall only includes labor cost.
- Data was not available to clarify which intersections currently have pedestrian countdown signals. Our assumption is that every intersection requires new signals.
- The LPI cost lump sum was taken from the \$200 to \$1200 cost range estimated in FHWA's *Safe Transportation for Every Pedestrian Countermeasures Tech Sheets* from October 2019.
- For the median fencing countermeasures, chain linked fence is to be installed 20' from the end of the median at the intersection and 20' past the bus stop.
- The signal improvement at 176th St only includes the retro-reflective signal backplate.

S 118th St

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--|-------|------------|----------|----------------------|
| Fill in Bus Pull Out | SIDEWALK, CEM CONC W/ 25% POZZOLANS | SY | 100 | 244 | \$ 24,444 |
| | REMOVE CURB & GUTTER | LF | 20 | 230 | \$ 4,600 |
| | CURB AND GUTTER, CEM CONC W/ 25% POZZOLANS | LF | 80 | 250 | \$ 20,000 |
| | REMOVE INLET | EA | 500 | 3 | \$ 1,500 |
| | INLET, TYPE 250A | EA | 2500 | 3 | \$ 7,500 |
| | ADJUST EXISTING MH, CB, OR VC | EA | 600 | 3 | \$ 1,800 |
| | CURB RAMP 422A W/ 25% POZZOLANS | EA | 2400 | 2 | \$ 4,800 |
| Project EE Subtotal | | | | | \$ 64,644.44 |
| Escalation | | | 6% | | \$ 3,878.67 |
| EE Subtotal (after escalation) | | | | | \$ 68,523.11 |
| EE Contingency | | | 25% | | \$ 17,130.78 |
| PM Contingency | | | 20% | | \$ 13,704.62 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 99,358.51 |
| Mobilization | | | 10% | | \$ 9,935.85 |
| Traffic Control | | | 15% | | \$ 14,903.78 |
| Design & Environmental | | | 30% | | \$ 29,807.55 |
| Construction & Closeout | | | | | \$ 99,358.51 |
| Project Subtotal | | | | | \$ 154,005.69 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 9,935.85 |
| Project Total | | | | | \$ 163,941.54 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--------------------------------------|-------|------------|----------|----------------------|
| Move Bus Stop | REMOVE BUS SHELTER FOOTING | EA | 900 | 1 | \$ 900 |
| | BUS SHELTER FOOTING W/ 25% POZZOLANS | SY | 800 | 6 | \$ 4,444 |
| | RELOCATE SIGN, BUS ZONE | EA | 300 | 1 | \$ 300 |
| Project EE Subtotal | | | | | \$ 5,644.44 |
| Escalation | | | 6% | | \$ 338.67 |
| EE Subtotal (after escalation) | | | | | \$ 5,983.11 |
| EE Contingency | | | 25% | | \$ 1,495.78 |
| PM Contingency | | | 20% | | \$ 1,196.62 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 8,675.51 |
| Mobilization | | | 10% | | \$ 867.55 |
| Traffic Control | | | 15% | | \$ 1,301.33 |
| Design & Environmental | | | 30% | | \$ 2,602.65 |
| Construction & Closeout | | | | | \$ 8,675.51 |
| Project Subtotal | | | | | \$ 13,447.04 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 867.55 |
| Project Total | | | | | \$ 14,314.59 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--------------------------|-------|------------|----------|----------------------|
| Pedestrian Signal Recall | PEDESTRIAN SIGNAL RECALL | LS | 500 | 1 | \$ 500 |
| Project EE Subtotal | | | | | \$ 500.00 |
| Escalation | | | 6% | | \$ 30.00 |
| EE Subtotal (after escalation) | | | | | \$ 530.00 |
| EE Contingency | | | 25% | | \$ 132.50 |
| PM Contingency | | | 20% | | \$ 106.00 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 768.50 |
| Mobilization | | | 10% | | \$ 76.85 |
| Traffic Control | | | 15% | | \$ 115.28 |
| Design & Environmental | | | 30% | | \$ 230.55 |
| Construction & Closeout | | | | | \$ 768.50 |
| Project Subtotal | | | | | \$ 1,191.18 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 76.85 |
| Project Total | | | | | \$ 1,268.03 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|---------------|-------|------------|----------|----------------------|
| Signage | SIGN, TRAFFIC | SF | 200 | 1.5 | \$ 300 |
| Project EE Subtotal | | | | | \$ 300.00 |
| Escalation | | | 6% | | \$ 18.00 |
| EE Subtotal (after escalation) | | | | | \$ 318.00 |
| EE Contingency | | | 25% | | \$ 79.50 |
| PM Contingency | | | 20% | | \$ 63.60 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 461.10 |
| Mobilization | | | 10% | | \$ 46.11 |

| | | | |
|---------------------------------------|-----|-----------|---------------|
| Traffic Control | 15% | \$ | 69.17 |
| Design & Environmental | 30% | \$ | 138.33 |
| Construction & Closeout | | \$ | 461.10 |
| Project Subtotal | | \$ | 714.71 |
| Management Const Contingency (10% CC) | 10% | \$ | 46.11 |
| Project Total | | \$ | 760.82 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--------------------------|-------|------------|----------|----------------------|
| Median Fencing | CHAIN LINK FENCE, TYPE 6 | LF | 50 | 175 | \$ 8,750 |
| Project EE Subtotal | | | | | \$ 8,750.00 |
| Escalation | | | 6% | | \$ 525.00 |
| EE Subtotal (after escalation) | | | | | \$ 9,275.00 |
| EE Contingency | | | 25% | | \$ 2,318.75 |
| PM Contingency | | | 20% | | \$ 1,855.00 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 13,448.75 |
| Mobilization | | | 10% | | \$ 1,344.88 |
| Traffic Control | | | 15% | | \$ 2,017.31 |
| Design & Environmental | | | 30% | | \$ 4,034.63 |
| Construction & Closeout | | | | | \$ 13,448.75 |
| Project Subtotal | | | | | \$ 20,845.56 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 1,344.88 |
| Project Total | | | | | \$ 22,190.44 |

S 176th St

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|---|-------|------------|----------|----------------------|
| Upgrade Curb Ramps | REMOVE CEM CONC SIDEWALK | SY | 50 | 56 | \$ 2,778 |
| | SIDEWALK, CEM CONC W/ 25% POZZOLANS | SY | 100 | 56 | \$ 5,556 |
| | REMOVE CURB & GUTTER | LF | 20 | 100 | \$ 2,000 |
| | CURB AND GUTTER, CEM CONC W/ 25% POZZOLANS | LF | 80 | 100 | \$ 8,000 |
| | CURB RAMP 422A W/ 25% POZZOLANS | EA | 2400 | 3 | \$ 7,200 |
| | SAWCUT CEMENT CONCRETE SIDEWALK, FULL DEPTH | LF | 5 | 90 | \$ 450 |
| Project EE Subtotal | | | | | \$ 25,983.33 |
| Escalation | | | 6% | | \$ 1,559.00 |
| EE Subtotal (after escalation) | | | | | \$ 27,542.33 |
| EE Contingency | | | 25% | | \$ 6,885.58 |
| PM Contingency | | | 20% | | \$ 5,508.47 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 39,936.38 |
| Mobilization | | | 10% | | \$ 3,993.64 |
| Traffic Control | | | 15% | | \$ 5,990.46 |
| Design & Environmental | | | 30% | | \$ 11,980.92 |
| Construction & Closeout | | | | | \$ 39,936.38 |
| Project Subtotal | | | | | \$ 61,901.39 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 3,993.64 |
| Project Total | | | | | \$ 65,895.03 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--------------------------|-------|------------|----------|----------------------|
| Pedestrian Signal Recall | PEDESTRIAN SIGNAL RECALL | LS | 500 | 1 | \$ 500 |
| Project EE Subtotal | | | | | \$ 500.00 |
| Escalation | | | 6% | | \$ 30.00 |
| EE Subtotal (after escalation) | | | | | \$ 530.00 |
| EE Contingency | | | 25% | | \$ 132.50 |
| PM Contingency | | | 20% | | \$ 106.00 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 768.50 |
| Mobilization | | | 10% | | \$ 76.85 |
| Traffic Control | | | 15% | | \$ 115.28 |
| Design & Environmental | | | 30% | | \$ 230.55 |
| Construction & Closeout | | | | | \$ 768.50 |
| Project Subtotal | | | | | \$ 1,191.18 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 76.85 |
| Project Total | | | | | \$ 1,268.03 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|---------------------------|-------|------------|----------|----------------------|
| Improve Signal Hardware | RETROREFLECTIVE BACKPLATE | EA | 500 | 13 | \$ 6,500 |
| Project EE Subtotal | | | | | \$ 6,500.00 |
| Escalation | | | 6% | | \$ 390.00 |
| EE Subtotal (after escalation) | | | | | \$ 6,890.00 |
| EE Contingency | | | 25% | | \$ 1,722.50 |
| PM Contingency | | | 20% | | \$ 1,378.00 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 9,990.50 |
| Mobilization | | | 10% | | \$ 999.05 |
| Traffic Control | | | 15% | | \$ 1,498.58 |
| Design & Environmental | | | 30% | | \$ 2,997.15 |
| Construction & Closeout | | | | | \$ 9,990.50 |
| Project Subtotal | | | | | \$ 15,485.28 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 999.05 |
| Project Total | | | | | \$ 16,484.33 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---------------------------|--|-------|------------|----------|----------------------|
| Pedestrian Scramble Phase | SIGNAL HEAD, PEDESTRIAN COUNTDOWN, LED | EA | 1500 | 2 | \$ 3,000 |
| | INSTALL SIGN, TRAFFIC, OWNER FURNISHED | EA | 300 | 4 | \$ 1,200 |
| | PAVEMENT MARKING, THERMOPLASTIC, 8 IN STRIPE | LF | 5 | 60 | \$ 300 |
| | REMOVE PAINT STRIPING | LF | 5 | 60 | \$ 300 |

| | REMOVE CURB | LF | 30 | 30 | \$ | 900 |
|---|-------------|----|-----|----|----|------------------|
| Project EE Subtotal | | | | | \$ | 5,700.00 |
| Escalation | | | 6% | | \$ | 342.00 |
| EE Subtotal (after escalation) | | | | | \$ | 6,042.00 |
| EE Contingency | | | 25% | | \$ | 1,510.50 |
| PM Contingency | | | 20% | | \$ | 1,208.40 |
| EE Grand Total (Construction & Closeout) | | | | | \$ | 8,760.90 |
| Mobilization | | | 10% | | \$ | 876.09 |
| Traffic Control | | | 15% | | \$ | 1,314.14 |
| Design & Environmental | | | 30% | | \$ | 2,628.27 |
| Construction & Closeout | | | | | \$ | 8,760.90 |
| Project Subtotal | | | | | \$ | 13,579.40 |
| Management Const Contingency (10% CC) | | | 10% | | \$ | 876.09 |
| Project Total | | | | | \$ | 14,455.49 |

S 200th St

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|----------------------|--|-------|------------|----------|----------------------|
| Fill in Bus Pull Out | SIDEWALK, CEM CONC W/ 25% POZZOLANS | SY | 100 | 200 | \$ 20,000 |
| | REMOVE CURB & GUTTER | LF | 20 | 275 | \$ 5,500 |
| | CURB AND GUTTER, CEM CONC W/ 25% POZZOLANS | LF | 80 | 275 | \$ 22,000 |
| | REMOVE INLET | EA | 500 | 2 | \$ 1,000 |
| | INLET, TYPE 250A | EA | 2500 | 2 | \$ 5,000 |
| | ADJUST EXISTING MH, CB, OR VC | EA | 600 | 2 | \$ 1,200 |
| | CURB RAMP 422A W/ 25% POZZOLANS | EA | 2400 | 1 | \$ 2,400 |
| | DRIVEWAY, CEM CONC, HES (24 HRS), 8 IN | SY | 200 | 100 | \$ 20,000 |

| | | | | | |
|---|--|--|-----|--|----------------------|
| Project EE Subtotal | | | | | \$ 68,350.00 |
| Escalation | | | 6% | | \$ 4,101.00 |
| EE Subtotal (after escalation) | | | | | \$ 72,451.00 |
| EE Contingency | | | 25% | | \$ 18,112.75 |
| PM Contingency | | | 20% | | \$ 14,490.20 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 105,053.95 |
| Mobilization | | | 10% | | \$ 10,505.40 |
| Traffic Control | | | 15% | | \$ 15,758.09 |
| Design & Environmental | | | 30% | | \$ 31,516.19 |
| Construction & Closeout | | | | | \$ 105,053.95 |
| Project Subtotal | | | | | \$ 162,833.62 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 10,505.40 |
| Project Total | | | | | \$ 173,339.02 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|-----------------|--------------------------------------|-------|------------|----------|----------------------|
| Move Bus Stop | REMOVE BUS SHELTER FOOTING | EA | 900 | 1 | \$ 900 |
| | BUS SHELTER FOOTING W/ 25% POZZOLANS | SY | 800 | 6 | \$ 4,444 |
| | RELOCATE SIGN, BUS ZONE | EA | 300 | 1 | \$ 300 |

| | | | | | |
|---|--|--|-----|--|---------------------|
| Project EE Subtotal | | | | | \$ 5,644.44 |
| Escalation | | | 6% | | \$ 338.67 |
| EE Subtotal (after escalation) | | | | | \$ 5,983.11 |
| EE Contingency | | | 25% | | \$ 1,495.78 |
| PM Contingency | | | 20% | | \$ 1,196.62 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 8,675.51 |
| Mobilization | | | 10% | | \$ 867.55 |
| Traffic Control | | | 15% | | \$ 1,301.33 |
| Design & Environmental | | | 30% | | \$ 2,602.65 |
| Construction & Closeout | | | | | \$ 8,675.51 |
| Project Subtotal | | | | | \$ 13,447.04 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 867.55 |
| Project Total | | | | | \$ 14,314.59 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|--------------------------|-------------------------|-------|------------|----------|----------------------|
| Pedestrian Signal Recall | PEDETRIAN SIGNAL RECALL | LS | 500 | 1 | \$ 500 |

| | | | | | |
|---|--|--|-----|--|--------------------|
| Project EE Subtotal | | | | | \$ 500.00 |
| Escalation | | | 6% | | \$ 30.00 |
| EE Subtotal (after escalation) | | | | | \$ 530.00 |
| EE Contingency | | | 25% | | \$ 132.50 |
| PM Contingency | | | 20% | | \$ 106.00 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 768.50 |
| Mobilization | | | 10% | | \$ 76.85 |
| Traffic Control | | | 15% | | \$ 115.28 |
| Design & Environmental | | | 30% | | \$ 230.55 |
| Construction & Closeout | | | | | \$ 768.50 |
| Project Subtotal | | | | | \$ 1,191.18 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 76.85 |
| Project Total | | | | | \$ 1,268.03 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|---------------|-------|------------|----------|----------------------|
| Signage | SIGN, TRAFFIC | SF | 200 | 1.5 | \$ 300 |
| Project EE Subtotal | | | | | \$ 300.00 |
| Escalation | | | 6% | | \$ 18.00 |
| EE Subtotal (after escalation) | | | | | \$ 318.00 |
| EE Contingency | | | 25% | | \$ 79.50 |
| PM Contingency | | | 20% | | \$ 63.60 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 461.10 |
| Mobilization | | | 10% | | \$ 46.11 |
| Traffic Control | | | 15% | | \$ 69.17 |
| Design & Environmental | | | 30% | | \$ 138.33 |
| Construction & Closeout | | | | | \$ 461.10 |
| Project Subtotal | | | | | \$ 714.71 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 46.11 |
| Project Total | | | | | \$ 760.82 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--------------------------|-------|------------|----------|----------------------|
| Median Fencing | CHAIN LINK FENCE, TYPE 6 | LF | 50 | 225 | \$ 11,250 |
| Project EE Subtotal | | | | | \$ 11,250.00 |
| Escalation | | | 6% | | \$ 675.00 |
| EE Subtotal (after escalation) | | | | | \$ 11,925.00 |
| EE Contingency | | | 25% | | \$ 2,981.25 |
| PM Contingency | | | 20% | | \$ 2,385.00 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 17,291.25 |
| Mobilization | | | 10% | | \$ 1,729.13 |
| Traffic Control | | | 15% | | \$ 2,593.69 |
| Design & Environmental | | | 30% | | \$ 5,187.38 |
| Construction & Closeout | | | | | \$ 17,291.25 |
| Project Subtotal | | | | | \$ 26,801.44 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 1,729.13 |
| Project Total | | | | | \$ 28,530.56 |

S 208th St

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--------------------------|-------|------------|----------|----------------------|
| Median Fencing | CHAIN LINK FENCE, TYPE 6 | LF | 50 | 150 | \$ 7,500 |
| Project EE Subtotal | | | | | \$ 7,500.00 |
| Escalation | | | 6% | | \$ 450.00 |
| EE Subtotal (after escalation) | | | | | \$ 7,950.00 |
| EE Contingency | | | 25% | | \$ 1,987.50 |
| PM Contingency | | | 20% | | \$ 1,590.00 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 11,527.50 |
| Mobilization | | | 10% | | \$ 1,152.75 |
| Traffic Control | | | 15% | | \$ 1,729.13 |
| Design & Environmental | | | 30% | | \$ 3,458.25 |
| Construction & Closeout | | | | | \$ 11,527.50 |
| Project Subtotal | | | | | \$ 17,867.63 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 1,152.75 |
| Project Total | | | | | \$ 19,020.38 |

S 154th St

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--------------------------------------|-------|------------|----------|----------------------|
| Curb Radius Reduction | REMOVE PAINT STRIPING | LF | 5 | 20 | \$ 100 |
| | PAVEMENT MARKING, PAINT, 4 IN STRIPE | LF | 5 | 50 | \$ 250 |
| | PAVEMENT MARKING, PAINT, 8 IN STRIPE | LF | 5 | 50 | \$ 250 |
| | FLEXIBLE DELINEATOR POST | EA | 200 | 3 | \$ 600 |
| Pillow Apron | SAWCUT ASPHALT CONCRETE, FULL DEPTH | LF | 5 | 50 | \$ 250 |
| | REMOVE ASPHALT PAVEMENT | SY | 50 | 8 | \$ 417 |
| | PAVEMENT, HMA (CL 1/2 IN) | TN | 300 | 1 | \$ 427 |
| Project EE Subtotal | | | | | \$ 2,293.75 |
| Escalation | | | 6% | | \$ 137.63 |
| EE Subtotal (after escalation) | | | | | \$ 2,431.38 |
| EE Contingency | | | 25% | | \$ 607.84 |
| PM Contingency | | | 20% | | \$ 486.28 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 3,525.49 |
| Mobilization | | | 10% | | \$ 352.55 |
| Traffic Control | | | 15% | | \$ 528.82 |
| Design & Environmental | | | 30% | | \$ 1,057.65 |
| Construction & Closeout | | | | | \$ 3,525.49 |
| Project Subtotal | | | | | \$ 5,464.52 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 352.55 |
| Project Total | | | | | \$ 5,817.06 |

S 182nd St

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--|-------|------------|----------|----------------------|
| Reduce Curb Radius | SIDEWALK, CEM CONC W/ 25% POZZOLANS | SY | 100 | 61 | \$ 6,111 |
| | REMOVE CURB & GUTTER | LF | 20 | 75 | \$ 1,500 |
| | CURB AND GUTTER, CEM CONC W/ 25% POZZOLANS | LF | 80 | 100 | \$ 8,000 |
| | REMOVE INLET | EA | 500 | 1 | \$ 500 |
| | INLET, TYPE 250A | EA | 2500 | 1 | \$ 2,500 |
| | CURB RAMP 422A W/ 25% POZZOLANS | EA | 2400 | 2 | \$ 4,800 |
| Project EE Subtotal | | | | | \$ 23,411.11 |
| Escalation | | | 6% | | \$ 1,404.67 |
| EE Subtotal (after escalation) | | | | | \$ 24,815.78 |
| EE Contingency | | | 25% | | \$ 6,203.94 |
| PM Contingency | | | 20% | | \$ 4,963.16 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 35,982.88 |
| Mobilization | | | 10% | | \$ 3,598.29 |
| Traffic Control | | | 15% | | \$ 5,397.43 |
| Design & Environmental | | | 30% | | \$ 10,794.86 |
| Construction & Closeout | | | | | \$ 35,982.88 |
| Project Subtotal | | | | | \$ 55,773.46 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 3,598.29 |
| Project Total | | | | | \$ 59,371.75 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--------------------------------------|-------|------------|----------|----------------------|
| Remove Left Turn Lane | PAVEMENT MARKING, PAINT, 4 IN STRIPE | LF | 5 | 500 | \$ 2,500 |
| | PAVEMENT MARKING, PAINT, 8 IN STRIPE | LF | 5 | 800 | \$ 4,000 |
| | REMOVE THERMO LEGEND/SYMBOL | EA | 200 | 1 | \$ 200 |
| | REMOVE THERMO STRIPING | LF | 5 | 11 | \$ 55 |
| Project EE Subtotal | | | | | \$ 6,755.00 |
| Escalation | | | 6% | | \$ 405.30 |
| EE Subtotal (after escalation) | | | | | \$ 7,160.30 |
| EE Contingency | | | 25% | | \$ 1,790.08 |
| PM Contingency | | | 20% | | \$ 1,432.06 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 10,382.44 |
| Mobilization | | | 10% | | \$ 1,038.24 |
| Traffic Control | | | 15% | | \$ 1,557.37 |
| Design & Environmental | | | 30% | | \$ 3,114.73 |
| Construction & Closeout | | | | | \$ 10,382.44 |
| Project Subtotal | | | | | \$ 16,092.77 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 1,038.24 |
| Project Total | | | | | \$ 17,131.02 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|-------------------------------------|-------|------------|----------|----------------------|
| Median Refuge Island | REMOVE CURB | LF | 30 | 6 | \$ 180 |
| | SAWCUT ASPHALT CONCRETE, FULL DEPTH | LF | 5 | 50 | \$ 250 |
| | REMOVE PAVEMENT | SY | 70 | 11 | \$ 778 |
| | CURB, CEM CONC W/ 25% POZZOLANS | LF | 60 | 50 | \$ 3,000 |
| | SIDEWALK, CEM CONC W/ 25% POZZOLANS | SY | 200 | 11 | \$ 2,222 |
| | DETECTABLE WARNING PLATE | SF | 50 | 24 | \$ 1,200 |
| Project EE Subtotal | | | | | \$ 7,630.00 |
| Escalation | | | 6% | | \$ 457.80 |
| EE Subtotal (after escalation) | | | | | \$ 8,087.80 |
| EE Contingency | | | 25% | | \$ 2,021.95 |
| PM Contingency | | | 20% | | \$ 1,617.56 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 11,727.31 |
| Mobilization | | | 10% | | \$ 1,172.73 |
| Traffic Control | | | 15% | | \$ 1,759.10 |
| Design & Environmental | | | 30% | | \$ 3,518.19 |
| Construction & Closeout | | | | | \$ 11,727.31 |
| Project Subtotal | | | | | \$ 18,177.33 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 1,172.73 |
| Project Total | | | | | \$ 19,350.06 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---------------------------------------|--------------------------|-------|------------|----------|----------------------|
| Median Fencing | CHAIN LINK FENCE, TYPE 6 | LF | 50 | 200 | \$ 10,000 |
| Project EE Subtotal | | | | | \$ 10,000.00 |
| Escalation | | | 6% | | \$ 600.00 |
| EE Subtotal (after escalation) | | | | | \$ 10,600.00 |

| | | | |
|---|-----|-----------|------------------|
| EE Contingency | 25% | \$ | 2,650.00 |
| PM Contingency | 20% | \$ | 2,120.00 |
| EE Grand Total (Construction & Closeout) | | \$ | 15,370.00 |
| Mobilization | 10% | \$ | 1,537.00 |
| Traffic Control | 15% | \$ | 2,305.50 |
| Design & Environmental | 30% | \$ | 4,611.00 |
| Construction & Closeout | | \$ | 15,370.00 |
| Project Subtotal | | \$ | 23,823.50 |
| Management Const Contingency (10% CC) | 10% | \$ | 1,537.00 |
| Project Total | | \$ | 25,360.50 |

S 216th St

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--------------------------|-------|------------|----------|----------------------|
| Median Fencing | CHAIN LINK FENCE, TYPE 6 | LF | 50 | 150 | \$ 7,500 |
| Project EE Subtotal | | | | | \$ 7,500.00 |
| Escalation | | | 6% | | \$ 450.00 |
| EE Subtotal (after escalation) | | | | | \$ 7,950.00 |
| EE Contingency | | | 25% | | \$ 1,987.50 |
| PM Contingency | | | 20% | | \$ 1,590.00 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 11,527.50 |
| Mobilization | | | 10% | | \$ 1,152.75 |
| Traffic Control | | | 15% | | \$ 1,729.13 |
| Design & Environmental | | | 30% | | \$ 3,458.25 |
| Construction & Closeout | | | | | \$ 11,527.50 |
| Project Subtotal | | | | | \$ 17,867.63 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 1,152.75 |
| Project Total | | | | | \$ 19,020.38 |

S 160th St

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--|-------|------------|----------|----------------------|
| Reduce Curb Radius | SIDEWALK, CEM CONC W/ 25% POZZOLANS | SY | 100 | 50 | \$ 5,000 |
| | REMOVE CURB & GUTTER | LF | 20 | 70 | \$ 1,400 |
| | CURB AND GUTTER, CEM CONC W/ 25% POZZOLANS | LF | 80 | 80 | \$ 6,400 |
| | REMOVE INLET | EA | 500 | 1 | \$ 500 |
| | INLET, TYPE 250A | EA | 2500 | 1 | \$ 2,500 |
| | CURB RAMP 422A W/ 25% POZZOLANS | EA | 2400 | 2 | \$ 4,800 |
| Project EE Subtotal | | | | | \$ 20,600.00 |
| Escalation | | | 6% | | \$ 1,236.00 |
| EE Subtotal (after escalation) | | | | | \$ 21,836.00 |
| EE Contingency | | | 25% | | \$ 5,459.00 |
| PM Contingency | | | 20% | | \$ 4,367.20 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 31,662.20 |
| Mobilization | | | 10% | | \$ 3,166.22 |
| Traffic Control | | | 15% | | \$ 4,749.33 |
| Design & Environmental | | | 30% | | \$ 9,498.66 |
| Construction & Closeout | | | | | \$ 31,662.20 |
| Project Subtotal | | | | | \$ 49,076.41 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 3,166.22 |
| Project Total | | | | | \$ 52,242.63 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--------------------------------------|-------|------------|----------|----------------------|
| Remove Left Turn Lane | PAVEMENT MARKING, PAINT, 4 IN STRIPE | LF | 5 | 550 | \$ 2,750 |
| | PAVEMENT MARKING, PAINT, 8 IN STRIPE | LF | 5 | 935 | \$ 4,675 |
| | REMOVE THERMO LEGEND/SYMBOL | EA | 200 | 1 | \$ 200 |
| | REMOVE THERMO STRIPING | LF | 5 | 36 | \$ 180 |
| Project EE Subtotal | | | | | \$ 7,805.00 |
| Escalation | | | 6% | | \$ 468.30 |
| EE Subtotal (after escalation) | | | | | \$ 8,273.30 |
| EE Contingency | | | 25% | | \$ 2,068.33 |
| PM Contingency | | | 20% | | \$ 1,654.66 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 11,996.29 |
| Mobilization | | | 10% | | \$ 1,199.63 |
| Traffic Control | | | 15% | | \$ 1,799.44 |
| Design & Environmental | | | 30% | | \$ 3,598.89 |
| Construction & Closeout | | | | | \$ 11,996.29 |
| Project Subtotal | | | | | \$ 18,594.24 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 1,199.63 |
| Project Total | | | | | \$ 19,793.87 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|-------------------------------------|-------|------------|----------|----------------------|
| Median Refuge Island | SAWCUT ASPHALT CONCRETE, FULL DEPTH | LF | 5 | 75 | \$ 375 |
| | REMOVE PAVEMENT | SY | 70 | 22 | \$ 1,556 |
| | CURB, CEM CONC W/ 25% POZZOLANS | LF | 60 | 75 | \$ 4,500 |
| | SIDEWALK, CEM CONC W/ 25% POZZOLANS | SY | 200 | 22 | \$ 4,444 |
| | DETECTABLE WARNING PLATE | SF | 50 | 24 | \$ 1,200 |
| Project EE Subtotal | | | | | \$ 12,075.00 |
| Escalation | | | 6% | | \$ 724.50 |
| EE Subtotal (after escalation) | | | | | \$ 12,799.50 |
| EE Contingency | | | 25% | | \$ 3,199.88 |
| PM Contingency | | | 20% | | \$ 2,559.90 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 18,559.28 |
| Mobilization | | | 10% | | \$ 1,855.93 |
| Traffic Control | | | 15% | | \$ 2,783.89 |
| Design & Environmental | | | 30% | | \$ 5,567.78 |
| Construction & Closeout | | | | | \$ 18,559.28 |
| Project Subtotal | | | | | \$ 28,766.88 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 1,855.93 |
| Project Total | | | | | \$ 30,622.80 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---------------------------------------|--------------------------|-------|------------|----------|----------------------|
| Median Fencing | CHAIN LINK FENCE, TYPE 6 | LF | 50 | 150 | \$ 7,500 |
| Project EE Subtotal | | | | | \$ 7,500.00 |
| Escalation | | | 6% | | \$ 450.00 |
| EE Subtotal (after escalation) | | | | | \$ 7,950.00 |
| EE Contingency | | | 25% | | \$ 1,987.50 |

| | | | |
|---|-----|-----------|------------------|
| PM Contingency | 20% | \$ | 1,590.00 |
| EE Grand Total (Construction & Closeout) | | \$ | 11,527.50 |
| Mobilization | 10% | \$ | 1,152.75 |
| Traffic Control | 15% | \$ | 1,729.13 |
| Design & Environmental | 30% | \$ | 3,458.25 |
| Construction & Closeout | | \$ | 11,527.50 |
| Project Subtotal | | \$ | 17,867.63 |
| Management Const Contingency (10% CC) | 10% | \$ | 1,152.75 |
| Project Total | | \$ | 19,020.38 |

SR99 On Ramp N

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--|-------|------------|----------|----------------------|
| Yield Here to Ped Sign | SIGN, TRAFFIC | SF | 200 | 9 | \$ 1,800 |
| | PAVEMENT MARKING, THERMOPLASTIC, LEGEND/SYMBOL | EA | 300 | 7 | \$ 2,100 |
| | POST, TRAFFIC SIGN, TS-10 | EA | 400 | 1 | \$ 400 |
| Project EE Subtotal | | | | | \$ 4,300.00 |
| Escalation | | | 6% | | \$ 258.00 |
| EE Subtotal (after escalation) | | | | | \$ 4,558.00 |
| EE Contingency | | | 25% | | \$ 1,139.50 |
| PM Contingency | | | 20% | | \$ 911.60 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 6,609.10 |
| Mobilization | | | 10% | | \$ 660.91 |
| Traffic Control | | | 15% | | \$ 991.37 |
| Design & Environmental | | | 30% | | \$ 1,982.73 |
| Construction & Closeout | | | | | \$ 6,609.10 |
| Project Subtotal | | | | | \$ 10,244.11 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 660.91 |
| Project Total | | | | | \$ 10,905.02 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--------------------------------------|-------|------------|----------|----------------------|
| Marked Crosswalk | PAVEMENT MARKING, PAINT, 8 IN STRIPE | LF | 5 | 150 | \$ 750 |
| Project EE Subtotal | | | | | \$ 750.00 |
| Escalation | | | 6% | | \$ 45.00 |
| EE Subtotal (after escalation) | | | | | \$ 795.00 |
| EE Contingency | | | 25% | | \$ 198.75 |
| PM Contingency | | | 20% | | \$ 159.00 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 1,152.75 |
| Mobilization | | | 10% | | \$ 115.28 |
| Traffic Control | | | 15% | | \$ 172.91 |
| Design & Environmental | | | 30% | | \$ 345.83 |
| Construction & Closeout | | | | | \$ 1,152.75 |
| Project Subtotal | | | | | \$ 1,786.76 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 115.28 |
| Project Total | | | | | \$ 1,902.04 |

SR99 On Ramp S

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--|-------|------------|----------|----------------------|
| Yield Here to Ped Sign | SIGN, TRAFFIC | SF | 200 | 9 | \$ 1,800 |
| | PAVEMENT MARKING, THERMOPLASTIC, LEGEND/SYMBOL | EA | 300 | 7 | \$ 2,100 |
| | POST, TRAFFIC SIGN, TS-10 | EA | 400 | 1 | \$ 400 |
| Project EE Subtotal | | | | | \$ 4,300.00 |
| Escalation | | | 6% | | \$ 258.00 |
| EE Subtotal (after escalation) | | | | | \$ 4,558.00 |
| EE Contingency | | | 25% | | \$ 1,139.50 |
| PM Contingency | | | 20% | | \$ 911.60 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 6,609.10 |
| Mobilization | | | 10% | | \$ 660.91 |
| Traffic Control | | | 15% | | \$ 991.37 |
| Design & Environmental | | | 30% | | \$ 1,982.73 |
| Construction & Closeout | | | | | \$ 6,609.10 |
| Project Subtotal | | | | | \$ 10,244.11 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 660.91 |
| Project Total | | | | | \$ 10,905.02 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--------------------------------------|-------|------------|----------|----------------------|
| Marked Crosswalk | PAVEMENT MARKING, PAINT, 8 IN STRIPE | LF | 5 | 150 | \$ 750 |
| Project EE Subtotal | | | | | \$ 750.00 |
| Escalation | | | 6% | | \$ 45.00 |
| EE Subtotal (after escalation) | | | | | \$ 795.00 |
| EE Contingency | | | 25% | | \$ 198.75 |
| PM Contingency | | | 20% | | \$ 159.00 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 1,152.75 |
| Mobilization | | | 10% | | \$ 115.28 |
| Traffic Control | | | 15% | | \$ 172.91 |
| Design & Environmental | | | 30% | | \$ 345.83 |
| Construction & Closeout | | | | | \$ 1,152.75 |
| Project Subtotal | | | | | \$ 1,786.76 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 115.28 |
| Project Total | | | | | \$ 1,902.04 |

S 180th St

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--|-------|------------|----------|----------------------|
| Marked Crosswalk | REMOVE CURB & GUTTER | LF | 20 | 10 | \$ 200 |
| | CURB AND GUTTER, CEM CONC W/ 25% POZZOLANS | LF | 80 | 10 | \$ 800 |
| | PAVEMENT MARKING, PAINT, 8 IN STRIPE | LF | 5 | 340 | \$ 1,700 |
| | CURB RAMP 422A W/ 25% POZZOLANS | EA | 2400 | 1 | \$ 2,400 |
| Project EE Subtotal | | | | | \$ 5,100.00 |
| Escalation | | | 6% | | \$ 306.00 |
| EE Subtotal (after escalation) | | | | | \$ 5,406.00 |
| EE Contingency | | | 25% | | \$ 1,351.50 |
| PM Contingency | | | 20% | | \$ 1,081.20 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 7,838.70 |
| Mobilization | | | 10% | | \$ 783.87 |
| Traffic Control | | | 15% | | \$ 1,175.81 |
| Design & Environmental | | | 30% | | \$ 2,351.61 |
| Construction & Closeout | | | | | \$ 7,838.70 |
| Project Subtotal | | | | | \$ 12,149.99 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 783.87 |
| Project Total | | | | | \$ 12,933.86 |

S 195th St

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--------------------------------------|-------|------------|----------|----------------------|
| Marked Crosswalk | REMOVE CURB | LF | 30 | 50 | \$ 1,500 |
| | REMOVE THERMO STRIPING | LF | 5 | 180 | \$ 900 |
| | RELOCATE SIGN, TRAFFIC | EA | 300 | 1 | \$ 300 |
| | CURB, CEM CONC W/ 25% POZZOLANS | LF | 50 | 10 | \$ 500 |
| | PAVEMENT MARKING, PAINT, 8 IN STRIPE | LF | 5 | 340 | \$ 1,700 |
| Project EE Subtotal | | | | | \$ 4,900.00 |
| Escalation | | | 6% | | \$ 294.00 |
| EE Subtotal (after escalation) | | | | | \$ 5,194.00 |
| EE Contingency | | | 25% | | \$ 1,298.50 |
| PM Contingency | | | 20% | | \$ 1,038.80 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 7,531.30 |
| Mobilization | | | 10% | | \$ 753.13 |
| Traffic Control | | | 15% | | \$ 1,129.70 |
| Design & Environmental | | | 30% | | \$ 2,259.39 |
| Construction & Closeout | | | | | \$ 7,531.30 |
| Project Subtotal | | | | | \$ 11,673.52 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 753.13 |
| Project Total | | | | | \$ 12,426.65 |

Corridor Wide

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--|-------|------------|----------|----------------------|
| Reduce Posted Speed Limit | REMOVE SIGN, TRAFFIC | EA | 300 | 12 | \$ 3,600 |
| | INSTALL SIGN, TRAFFIC, OWNER FURNISHED | EA | 300 | 12 | \$ 3,600 |
| Project EE Subtotal | | | | | \$ 7,200.00 |
| Escalation | | | 6% | | \$ 432.00 |
| EE Subtotal (after escalation) | | | | | \$ 7,632.00 |
| EE Contingency | | | 25% | | \$ 1,908.00 |
| PM Contingency | | | 20% | | \$ 1,526.40 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 11,066.40 |
| Mobilization | | | 10% | | \$ 1,106.64 |
| Traffic Control | | | 15% | | \$ 1,659.96 |
| Design & Environmental | | | 30% | | \$ 3,319.92 |
| Construction & Closeout | | | | | \$ 11,066.40 |
| Project Subtotal | | | | | \$ 17,152.92 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 1,106.64 |
| Project Total | | | | | \$ 18,259.56 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|------------------------------|-------|------------|----------|----------------------|
| Leading Pedestrian Interval | REPROGRAMMING TRAFFIC SIGNAL | LS | 600 | 1 | \$ 600 |
| Project EE Subtotal | | | | | \$ 600.00 |
| Escalation | | | 6% | | \$ 36.00 |
| EE Subtotal (after escalation) | | | | | \$ 636.00 |
| EE Contingency | | | 25% | | \$ 159.00 |
| PM Contingency | | | 20% | | \$ 127.20 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 922.20 |
| Mobilization | | | 10% | | \$ 92.22 |
| Traffic Control | | | 15% | | \$ 138.33 |
| Design & Environmental | | | 30% | | \$ 276.66 |
| Construction & Closeout | | | | | \$ 922.20 |
| Project Subtotal | | | | | \$ 1,429.41 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 92.22 |
| Project Total | | | | | \$ 1,521.63 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---|--|-------|------------|----------|----------------------|
| Pedestrian Countdown Signal | SIGNAL HEAD, PEDESTRIAN COUNTDOWN, LED | EA | 1500 | 72 | \$ 108,000 |
| Project EE Subtotal | | | | | \$ 108,000.00 |
| Escalation | | | 6% | | \$ 6,480.00 |
| EE Subtotal (after escalation) | | | | | \$ 114,480.00 |
| EE Contingency | | | 25% | | \$ 28,620.00 |
| PM Contingency | | | 20% | | \$ 22,896.00 |
| EE Grand Total (Construction & Closeout) | | | | | \$ 165,996.00 |
| Mobilization | | | 10% | | \$ 16,599.60 |
| Traffic Control | | | 15% | | \$ 24,899.40 |
| Design & Environmental | | | 30% | | \$ 49,798.80 |
| Construction & Closeout | | | | | \$ 165,996.00 |
| Project Subtotal | | | | | \$ 257,293.80 |
| Management Const Contingency (10% CC) | | | 10% | | \$ 16,599.60 |
| Project Total | | | | | \$ 273,893.40 |

| COUNTERMEASURES | DESCRIPTION | UNITS | UNIT PRICE | QUANTITY | UNIT PRICE EXTENSION |
|---------------------------------------|--------------------------------------|-------|------------|----------|----------------------|
| Striped Lane Lines | PAVEMENT MARKING, PAINT, 4 IN STRIPE | LF | 5 | 65261 | \$ 326,304 |
| Project EE Subtotal | | | | | \$ 326,304.00 |
| Escalation | | | 6% | | \$ 19,578.24 |
| EE Subtotal (after escalation) | | | | | \$ 345,882.24 |
| EE Contingency | | | 25% | | \$ 86,470.56 |

| | | | |
|---|-----|-----------|-------------------|
| PM Contingency | 20% | \$ | 69,176.45 |
| EE Grand Total (Construction & Closeout) | | \$ | 501,529.25 |
| Mobilization | 10% | \$ | 50,152.92 |
| Traffic Control | 15% | \$ | 75,229.39 |
| Design & Environmental | 30% | \$ | 150,458.77 |
| Construction & Closeout | | \$ | 501,529.25 |
| Project Subtotal | | \$ | 777,370.33 |
| Management Const Contingency (10% CC) | 10% | \$ | 50,152.92 |
| Project Total | | \$ | 827,523.26 |