Appendix A

College Street Corridor Plan

College Street Improvements
Final Report

WHPacific

CITY OF LACEY

Final Report

College Street Improvements
Lacey, WA

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May 8, 2009

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Purpose

The purpose of this technical memorandum is to present an overview of findings and recommendations for the College Street corridor study work. The study started in February 2008 and concluded in November. The study consisted of the following elements:

- *Alternatives Analysis* – a technical memorandum to define the recommended dimensions of the cross-sectional elements;
- *Horizontal Alignment and Right-of-Way Limits* – a technical memorandum to define the recommended alignment;
- *Neighborhood Circulation and Access* – a technical memorandum to define the recommended changes to street access and/or driveway access;
- *Improvements Phasing Plan* – a technical memorandum to estimate project costs and define the recommended phasing of the improvements;
- *Public Process* – progress reports to the City of Lacey Transportation Committee and two public open houses; and
- *Width Provided for Bicycles* – a technical memorandum to expand the evaluation of the roadway width provided for bicycles in response to comments from the open houses.

The limits of the corridor study are shown in the vicinity below (Figure 1).

The Summary section of the report provides an overview of each element. Detailed technical memorandums for each element are included as appendices.

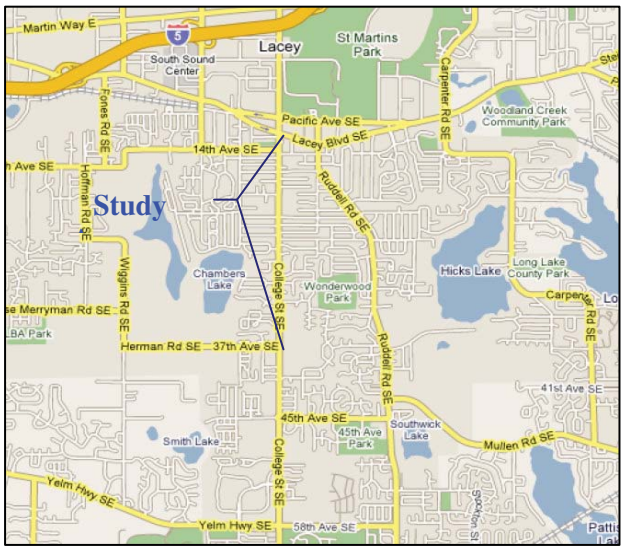

Figure 1 - Vicinity Map

Background

Existing Conditions

College Street from Lacey Boulevard to 37th Avenue SE is a four-lane National Highway System (NHS) principal arterial with a general right-of-way width of 60 feet. The existing street width is approximately 45 feet from curb to curb. There are narrow sidewalks located along the corridor on each side of the street. The corridor is a built environment fronted by homes, small businesses, apartments, and schools.

College Street provides a primary north-south link for traffic, transit, pedestrians, and bicyclists within the City from south Thurston County to Interstate 5. The corridor currently carries 21,000 (2005 traffic count) and is projected to carry 32,000 vehicles per day by 2020 according to the Lacey Transportation Plan (College Street is identified as a Strategy Corridor in the Lacey Transportation Plan[1]). The corridor also provides local access to many homes fronting the street and provides access to several local streets and collectors.

[1] City of Lacey, *2004 Lacey Transportation Plan*, page 55.

Traffic is heavy along the corridor and congested during peak hours. Vehicles turning left from College Street to homes or local streets increase congestion by occupying the inside through-lane while waiting for breaks in traffic. There are approximately 130 driveways 24 T-intersections, and four 4-way intersection collectively generating significant turn volumes. There are high-frequency collision locations along the corridor due to conflicts between turning vehicles and high volumes of through traffic. Narrow sidewalks, high volumes, and a lack of bike lanes discourage use by pedestrians and bicyclists. A lack of street amenities (i.e., planter strips/vegetation, decorative street lighting, street furniture) conflicts with community values articulated by City staff and City Council.

Previous Work

Previous study work resulted in a report titled, "College Street, Evaluation of Options", August 2005. This report documented a comprehensive alternatives analysis that scored and ranked ten options (nine build and one no-build) for improvements to College Street that addressed the corridor needs. The corridor needs were grouped into three main categories:

- Preserve/enhance community values;
- Optimize traffic operations and safety; and
- Optimize cost.

After considering options that ranged from no-build to adding a frontage road that widened the overall right-of-way footprint to 121 feet, the report recommended Option 9 as the preferred option. This option best provides a blend of corridor capacity, neighborhood connectivity, non-motorized uses, and corridor aesthetics. The cross-section included a planted center median to control access and provide space for left-turn lanes at key intersections; wide sidewalks with tree wells to promote walk-ability; space for commuting bicycles; and roundabouts at major intersections to provide intersection control. The overall right-of-way width of 72 feet widens to 76 feet at left-turn lane locations.

Option 9 scored best by performing very well for "optimizing traffic operations and safety" by providing two through-lanes, controlling access, and providing left turns at key intersections; performing well in "preserving/enhancing community values" by providing space for commuting bicycles, wide sidewalks with tree wells, and planted medians; and performing average in "optimizing cost".

The report concluded with a recommendation to further refine Option 9 by considering the following:

- Appropriate locations for median breaks, u-turns, and roundabouts.
- Potential driveway consolidation and/or elimination to reduce the number of conflict points.
- Fine tuning of the cross-sectional elements to minimize impacts to adjacent properties.
- Locations and amounts of corridor aesthetics and pedestrian amenities.
- Appropriate (if any) locations for mid-block crossings that link pedestrian oriented land uses.

The elements included in this corridor study answered these questions. It provides the City with a basis for long range planning in the area and presents a vision for improvements to the corridor. In the near term, the study provides the City a tool to steer decision making in the area – land use, development site plans, right of way acquisition, etc. While the study presents specific recommendations, there is room for flexibility to make refinements as individual projects progress toward realization. As refinements are considered, the study will provide the basic framework and the foundational vision for the corridor.

Summary

The following summarizes the work from each of the study elements – Alternative Analysis, Horizontal Alignment and Right of Way Limits, Neighborhood Circulation and Access, Improvement Phasing Plan, Public Process, and Width Provided for Bicycles.

Alternative Analysis

The purpose of the Alternative Analysis was to evaluate and recommend a specific dimension for each cross-sectional identified in Option 9 from the previous study work. We evaluated four alternatives combinations of cross-sectional widths (see Table 1) against the following criteria; operations and safety, adherence to federal standards for NHS routes, right-of-way width and cost, eligibility for grant funding, and community values. Based on these criteria, the "Recommended" alternative performs best (see Figure 2).

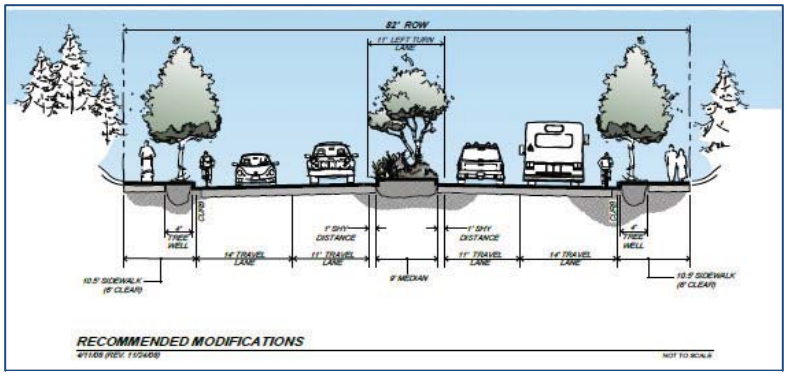

Figure 2 – Recommended Alternative

The Recommended Alternative uses 11-foot lanes as a practical minimum lane width (since 10-foot lanes provide no buffer for trucks and/or buses considering width from outside of mirror to outside of mirror). It provides a widened outside lane (14 feet) to provide space for commuting bicycles. This approach to accommodating bicycles decreases the right of way impacts. The planted median is a consistent 11 feet along the corridor to accommodate the possibility of future left lanes.

The biggest benefit of this alternative is the minimal right-of-way width. One drawback is it provides less space for bicycles than the other three alternatives.

Table 1
Alternative Combinations Considered

Alternative	Median	Lanes	Space for Bikes	Planter	Tree Well	Sidewalk	Total R/W
Option 9	6'-10'[1]	10'	3'	N/A	Yes	10'	72'-76'
NHS/TIB Stds.	12'	12'	5'	N/A	Yes	10.5'	91'
Lacey Stds.	12'	11'	5'	6.5	No	8'	95'
Recommended	11'	11'	3'	N/A	Yes	10.5'	82'

1. The median tapers to 10 feet at left turn locations.

We qualitatively scored each of the alternatives against the following criteria; operations and safety, adherence to standards, right-of-way width and cost, eligibility for grant funding, and community values. The scoring is shown below in Table 2.

Table 2
Scoring of Alternatives Considered[1]

Alternative	Operations/ Safety	Standards	R/W Width and Cost	Grant Funding	Community Values	Total Score
Option 9	2	2	4	3	3	14
NHS/TIB Stds.	4	4	2	4	2	16
Lacey Stds.	3	4	1	4	2	14
Recommended	3	4	3	3	3	16

1. Alternatives are scored from 1 (lowest) to 4 (highest) in each criterion.

Although the "NHS/TIB Standards" alternative scores equally well with the "Recommended" alternative, the "Recommended" alternative is preferred because of the lesser right-of-way width. The "Recommended" alternative is shown above in Figure 2.

Horizontal Alignment and Right of Way Limits

We evaluated alternative horizontal alignments to determine the least cost alignment considering construction costs and right of way impacts (measured by estimated acquisition costs). The cost differences between alternative alignments are significantly higher for right-of-way acquisition than pavement reconstruction. Therefore, the recommended horizontal alignment is based solely on minimizing right-of-way acquisition costs. We compared costs for three horizontal alignments - centered on existing right-of-way; aligned against the westerly right-of-way; and aligned against the easterly right-of-way. To further refine our comparison, we broke the corridor into four segments. The segment limits correspond to the location of the proposed roundabout locations at 29th Avenue SE, 22nd Avenue SE, and 16th Avenue SE (see Figure 3). Breaking the segments at the roundabout locations allows for transitions between alternative alignments. Therefore, we are not limited to one alignment for the entire corridor.

Figure 3 – Segment Map

The estimated costs for right-of-way acquisition for the three horizontal alignments are shown in Table 3. The numbers of full parcel acquisitions are shown in Table 4. Note these numbers exclude impacts from the three roundabouts, since the impacts from roundabouts are mostly independent of the alternative alignments.

We recommend the following horizontal alignments by segment to minimize right-of-way acquisition costs. These alignments are shown in **bold** in Tables 3 and 4. Figure 4 graphically depicts the horizontal alignment by segment.

- Segment 1 - Aligned against the easterly right-of-way line;
- Segment 2 - Aligned against the westerly right-of-way line;
- Segment 3 - Aligned against the easterly right-of-way line; and
- Segment 4 - Aligned against the westerly right-of-way line.

The total cost and the total number of full parcel acquisitions for the recommended alignment are shown in Tables 5 and 6, respectively. These numbers do include impacts for the three roundabouts. Therefore, the totals in Tables 5 and 6 differ from the totals from Tables 3 and 4.

Figure 4 – Horizontal Alignment by Segment

Table 3
Estimated Right-of-Way Acquisition Costs (Excl. Roundabouts)

Segment	Aligned on the Centerline	Aligned Against the Westerly Right-of-Way	Aligned Against the Easterly Right-of-Way
1	$1,157,827	$3,046,962	**$864,618**
2	$4,942,902	**$1,934,930**	$7,324,351
3	$2,417,583	$1,665,844	**$1,292,543**
4	$3,687,493	**$2,568,042**[1]	$3,570,840

1. Assumes a full parcel acquisition is not required for the apartment buildings at 1510 College Street SE.

Table 4
Full Parcel Acquisitions for Structures and/or Driveways Impacted (Excl. Roundabouts)

Segment	Aligned on the Centerline	Aligned Against the Westerly Right-of-Way	Aligned Against the Easterly Right-of-Way
1	2	8	**1**
2	14	**5**	22
3	7	5	**3**
4	11	**6**[1]	11

1. Assumes a full parcel acquisition is not required for the apartment buildings at 1510 College Street SE.

Table 5
Estimated Right-of-Way Acquisition Costs – Recommended Alignment (Incl. Roundabouts)

Segment	Estimated R/W Costs
1	$1.50 M
2	$3.04 M
3	$1.91 M
4	$3.14 M[1]
TOTAL	**$9.59 M**[1]

1. Assumes a full parcel acquisition is not required for the apartment buildings at 1510 College Street SE.

Table 6
Full Parcel Acquisitions – Recommended Alignment (Incl. Roundabouts)

Segment	Number of Full Parcel Acquisitions
1	3
2	8
3	5
4	7[1]

1. Assumes a full parcel acquisition is not required for the apartment buildings at 1510 College Street SE.

The total right-of-way costs shown in Table 5 are preliminary and they are represented in 2008 dollars. We recommend $13.0M as a reasonable planning level estimate at this stage of project development.

Neighborhood Circulation and Access

Strategic Corridor

The City of Lacey recognizes College Street as a Strategy Corridor. Strategy Corridors are major arterials in dense urban areas where traditional approaches to address congestion such as roadway widening are not practical or conflict with community values. Traditional performance measures, such as Level of Service, do not apply to Strategy Corridors because they would not allow increased densities in the urban core.

Neighborhood Circulation and Access Management Plan (NCAMP)

The NCAMP recommends a raised median to manage access. Access management is a tool to reduce traffic congestion and reduce traffic collisions. The intent of access management is to provide access for abutting properties while preserving the flow of traffic. The NCAMP also identifies measures recommended for College Street as a Strategy Corridor. The recommendations include identifying roundabout locations, median break locations (allowing for left turns), street grid connections to increase access to alternate routes, and driveways consolidations. Figure 5 shows the recommended roundabouts, median breaks, and street grid connections.

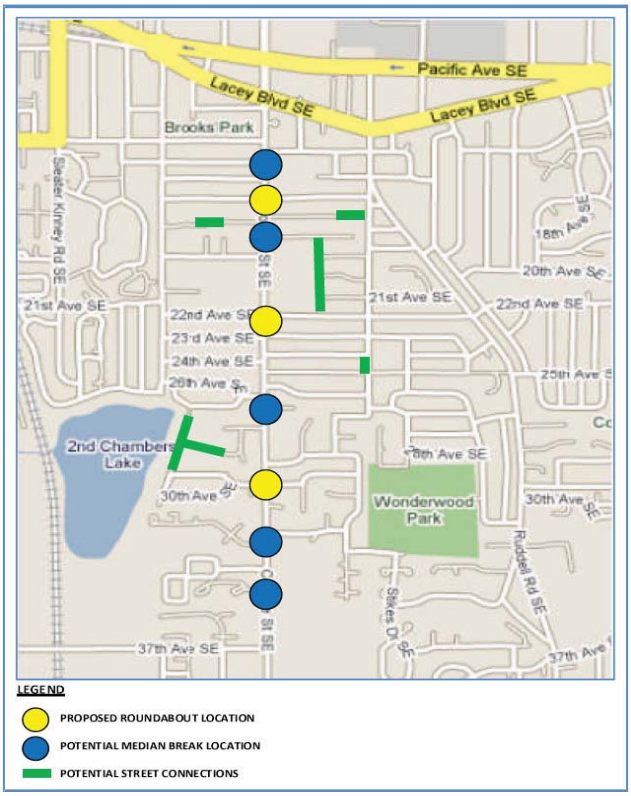

Figure 5 – Neighborhood Circulation Access & Management Plan

Traffic Analyses

Traffic analysis was conducted to evaluate how the recommended improvements will impact traffic operations in 2030. The results show the recommended access control measures will not adversely affect neighborhoods, although left turn movements at some neighborhoods will be difficult in the PM peak hour. The roundabouts will operate well under expected future volumes on College Street.

Findings

The proposed improvements for the College Street Corridor from 37th Avenue SE to Lacey Boulevard comply with Strategic Corridor requirements. The proposed access management shown on the

Neighborhood Circulation and Access Management Plan strikes a reasonable balance between throughput operations and neighborhood access. Driveway revisions can maintain access while improving safety by reducing the number of conflict points. Potential grid connections can further enhance neighborhood access and circulation by providing access to other north-south arterials, such as Golf Club Road SE, Judd Street SE, and Ruddell Road SE. Some stop control intersections will experience delays making left turns in the PM peak hour due to heavy volumes on College Street. Alternatively, vehicles can turn right and make a u-turn at the nearest roundabout or median break. Left-turns from side streets are more likely that during off peak periods. The roundabouts operate well in the build out year.

Improvement Phasing Plan

We evaluated alternative construction phasing options for improvements to College Street from 37th Avenue SE to Lacey Boulevard. We based the phasing options based on operational benefit and practical project size. First, we gave priority to projects providing more operational benefit. Second, we defined project limits to keep the costs for individual projects roughly between $1M and $5M (in 2008 dollars), specifically to match a range of project sizes typically funded by grant opportunities. We developed two viable options described below. Note that any of the identified projects could be increased or decreased in scope to match funding opportunities.

Both approaches construct the roundabouts first, and the three roundabouts are ordered by highest entering volumes (22nd Avenue SE first, 29th Avenue SE second, and 16th Avenue SE third). The roundabouts are constructed first to provide u-turn opportunities for properties before center medians are constructed and access points are modified. The segments between roundabouts are ordered from north to south, since the traffic volumes are higher for the northerly segments.

Option 1 has seven phases ranging in cost from $2.1M to $5.7M. Option 2 has five phases ranging in cost from $3.1M to $7.5M.

Table 7
Phasing Options with Phase Costs

Option 1			Option 2		
Phase	**Cost[1]**	**Description**	**Phase**	**Cost[1]**	**Description**
Phase 1	$2,050,000	22nd Ave RAB	Phase 1	$4,990,000	22nd & 29th RABs
Phase 2	$2,940,000	29th Ave RAB	Phase 2	$7,463,000	16th RAB/Lacey to 16th
Phase 3	$3,100,000	16th Ave RAB	Phase 3	$3,060,000	16th to 22nd
Phase 4	$4,363,000	Lacey to 16th	Phase 4	$5,736,000	22nd to 29th
Phase 5	$3,060,000	16th to 22nd	Phase 5	$4,754,000	29th to 37th
Phase 6	$5,736,000	22nd to 29th	----	----	
Phase 7	$4,754,000	29th to 37th	----	----	
TOTALS	**$26,003,000**			**$26,003,000**	

1. Costs are in 2008 dollars.

The total phase costs (right of way and construction) shown in Table 7 are preliminary and they are represented in 2008 dollars. We recommend $30M as a reasonable planning level estimate at this stage of project development.

Public Process

The public process included progress reports to the City Transportation Committee and two open houses. The progress reports to the Transportation Committee occurred after each step of the study – Alternative Analysis, Horizontal Alignment and Right of Way, Neighborhood Circulation and Access, and Improvement Phasing Plan. These reports occurred on April 11, 2008, June 13, 2008, and September 12, 2008 (Access and Phasing), respectively.

At the conclusion of work to prepare the four technical memorandums listed above, the City held an open house at Mountain View Elementary School on Thursday, October 9, 2008 from 4:30 p.m. to 7:30 p.m. The open house was hosted by City staff and WHPacific staff. There were roll plot exhibits placed on table spread throughout the cafeteria area. The exhibits depicted results from each of the four technical memorandums prepared for the study. Citizens were able to review the material and ask questions. Citizens were also asked to complete a feedback form (see Appendix E).

The October 9 open house was very well attended – 81 persons completed feedback form. Based on these attendance numbers, the City Council requested a second open house scheduled on a different day of the week. The second open house was held on Wednesday, November 5, 2008 from 4:30 p.m. to 7:30 p.m. During the November 5 open house, 45 persons completed the feedback form.

The following are key points from the public feedback:

- Most persons learned of the meeting through direct mailing.
- Over 70% of respondents live/work in the vicinity of College Street. Nearly 95% of respondents live/work near College Street or commute along College Street.
- The majority of respondents rated congestion below average or poor for vehicles, bicycles, and pedestrians.
- Over 80% of respondents generally agreed with the plan.
- Respondents generally agreed with the order of projects in the phasing plan.

Detailed results from the feedback forms are included in Appendix E.

Responses to Public Process

As a result of the input received during the public process, we made the following refinements to the planned improvements:

- **Circulation Routes:** We added the following connections to enhance the neighborhood connections:
    - Connect 18th Ave SE to 22nd Ave SE along a new route immediately east of Mountain View Elementary.
    - Connect Judd Street between 24th Ave SE and 25th Ave SE.
- **Design Flexibility:** We committed to flexibility during the final design to minimize specific project impacts at spot locations.
- **Space for Bicycles:** We prepared a technical memorandum to document a cost/benefit evaluation of providing additional space for bicycles. The memorandum concludes the added costs of $1.7M are greater than the benefits provided by additional space for bicycles, since it is anticipated bicyclists will be primarily Type A users (i.e., commuters) and the nearby Chehalis-Western Trail provides an alternative route for bicyclists.

Appendices

Appendix A – Alternatives Analysis Technical Memorandum

Appendix B – Horizontal Alignment and Right of Way Limits

Appendix C – Neighborhood Circulation and Access

Appendix D – Improvements Phasing Plan

Appendix E – Public Process

Open House Public Feedback Form

Open House Public Feedback Summary – Combined from Oct. 9 and Nov. 5

Appendix F – Bike Lane Technical Memorandum

Appendix A

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TECHNICAL MEMORANDUM

Date: April 11 , 2008. Rev 4/17/09

RE: **Alternative Analysis Technical Memorandum**

To:	Martin Hoppe, P.E., PTOE	**From:**	Scott Sawyer, P.E.
Company:	City of Lacey	**Title:**	Senior Project Manager
Phone:	360.438.2681	**Phone:**	360.918.5305
Fax:	360.456.7799	**Fax:**	360.754.1195
Address:	420 College Street SE		
	Lacey, WA 98509-3400	**Project #:**	34709
		Project Name:	College Street Improvement Report

Purpose

The purpose of this technical memorandum is to present ranges of dimensions for roadway cross-sectional elements for College Street from 37th Avenue SE to Lacey Boulevard; median width, left-turn lane width, through-lane width, space for bicyclists, planter/tree well width, and sidewalk width (clear width); and recommend a proposed cross-section for College Street for use in subsequent preliminary and final design.

Summary

We scored four alternatives against the following criteria; operations and safety, adherence to standards, right-of-way width and cost, eligibility for grant funding, and community values. Based on these criteria, the "Recommended" alternative performs best (see Figure 1).

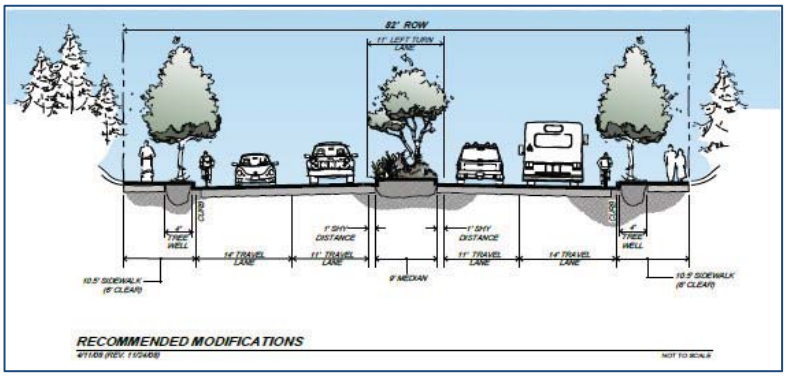


Figure 1 – Recommended Alternative

This alternative uses 11-foot lanes as a practical minimum width (since the 10-foot lanes provide no buffer for trucks and/or buses considering width from outside of mirror to outside of mirror). It uses 14-foot outside lanes with space for bicyclists to decrease the impact to right-of-way width. The planted median is a consistent 11 feet to accommodate the possibility of future lane turn lanes. A reduced median width could still be considered at spot locations along the corridor.

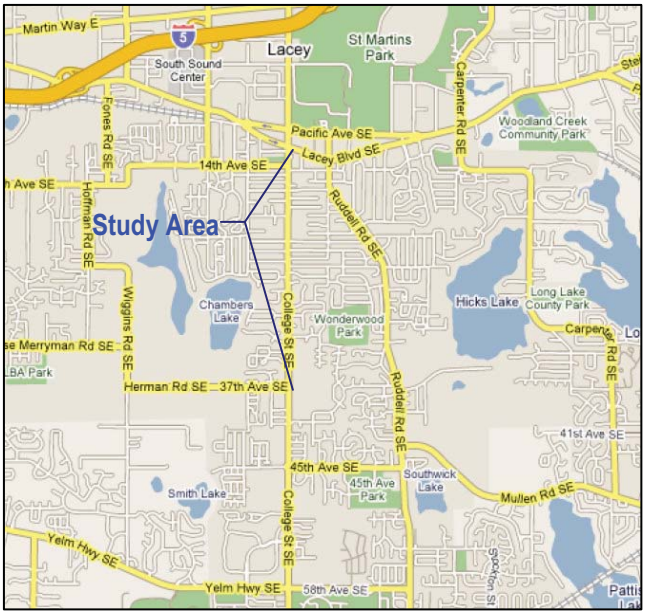
The biggest benefit of this alternative is the minimal right-of-way width. One drawback is lesser space provided for bicyclists. Since the width provided is less than 5 feet wide, the project will not score bike route points (2 points maximum) on a Transportation Improvement Board (TIB) grant application under the Urban Arterial Program (UAP). The bike points fall under the Sustainability criteria (15 points maximum). There are 100 points available on the UAP grant application, so bike points are only two percent of the available points.

Background

Existing Conditions

College Street from Lacey Boulevard to 37th Avenue SE is a four-lane National Highway System (NHS) principal arterial with a general right-of-way width of 60 feet. The existing street width is approximately 45 feet from curb to curb. There are narrow sidewalks located along the corridor on each side of the street. The corridor is a built environment fronted by homes, small businesses, apartments, and schools.

College Street provides a primary north-south link for traffic, transit, pedestrians, and bicyclists within the City from south Thurston County to Interstate 5. The corridor currently carries 21,000 (2005 traffic count) and is projected to carry 32,000 vehicles per day by 2020 according to the Lacey Transportation Plan (College Street is identified as a Strategy Corridor in the Lacey Transportation Plan[1]). The corridor also provides local access to many homes fronting the street and provides access to several local streets and collectors.



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Previous study work resulted in a report, "College Street, Evaluation of Options", August 2005. This report documented a comprehensive alternatives analysis that scored and ranked ten options (nine build and one no-build) for improvements to College Street that addressed the corridor needs. The corridor needs were grouped into three main categories:

[1] City of Lacey, *2004 Lacey Transportation Plan*, page 55.

- Preserve/enhance community values;
- Optimize traffic operations and safety; and
- Optimize cost.

After considering options that ranged from no-build to adding a frontage road that widened the overall right-of-way footprint to 121 feet, the report recommended Option 9 as the preferred option. This option best provides a blend of corridor capacity, neighborhood connectivity, non-motorized uses, and corridor aesthetics. The cross-section included a planted center median to control access and provide space for left-turn lanes at key intersections; wide sidewalks with tree wells to promote walk-ability; space for bicyclists; and roundabouts at major intersections to provide intersection control. The overall right-of-way width of 72 feet widens to 76 feet at left-turn lane locations.

Option 9 scored best by performing very well for "optimizing traffic operations and safety" by providing two through-lanes, controlling access, and providing left turns at key intersections; performing well in "preserving/enhancing community values" by providing space for bicyclists, wide sidewalks with tree wells, and planted medians; and performing average in "optimizing cost". The Option 9 cross-section is shown graphically in Figure 3.

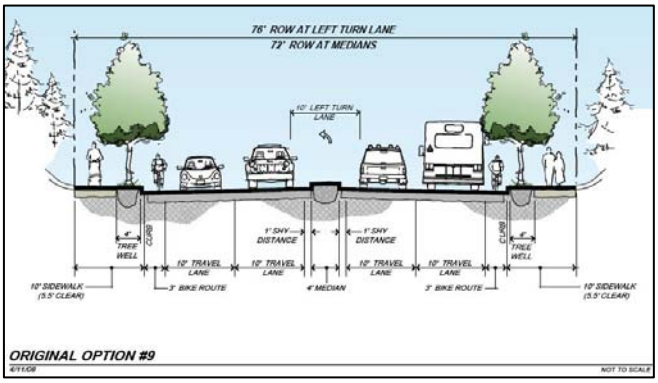

Figure 3 – Option 9 Alternative

The report concluded with a recommendation to further refine Option 9 considering the following:

- Appropriate locations for median breaks, U-turns, and roundabouts.
- Potential driveway consolidation and/or elimination to reduce the number of conflict points.
- Fine tuning of the cross-sectional elements to minimize impacts to adjacent properties.
- Locations and amounts of corridor aesthetics and pedestrian amenities.
- Appropriate (if any) locations for mid-block crossings that link pedestrian oriented land uses.

This technical memorandum addresses the third bullet above. Subsequent technical memorandums will address other bullets.

Alternatives Analysis

Range of Dimensions

The work from the report, "College Street, Evaluation of Options", August 2005 set the cross-sectional elements that comprise the preferred option, Option 9. These elements are raised median, left-turn lane, through-lanes, space for bicyclists, tree wells/planter strips, and sidewalks. During presentation of the report to the Lacey City Council, the Council agreed with Option 9 as the recommended option, but asked for further consideration of the specific widths shown for the cross-sectional elements. Below are descriptions for each element, the range of dimensions considered, and evaluations for each element considering the following:

- Operations/Safety

- Design Standards (City of Lacey standards[2] and/or AASHTO Greenbook guidance[3])
- Cost/Right-of-Way Width
- Grant Funding Requirements
- Community Values

Median

Description: The raised median is intended to provide access control through the corridor to manage the number of left turn movements and the associated number of conflict points between vehicles. More access control will benefit traffic operations (increasing the throughput of vehicles), and reduce collisions (by reducing conflicting movements). The width of the median is driven by two factors; (1) minimum area practical to provide for planting, and (2) compatibility with the width of left-turn lanes.

Range of Dimensions: The minimum width considered is six feet (edge of lane to edge of lane, which yields one foot of planting area after subtracting one foot of shy distance, six inches of curb, and one foot of maintenance strip on each side). The maximum width considered is 12 feet (similarly yields 7 feet of planting area). The minimum width of six feet is based on providing four feet of raised median width for pedestrian refuge (the minimum refuge width for wheelchairs[4]). The maximum width is based on the City of Lacey standard for median width.[5]

Benefits/Drawbacks: Each of the median widths control access, thereby improving operations and safety. There are no grant funding requirements tied specifically to median width. A narrow median reduces costs (less material) and right-of-way width. The wider median increases costs and right-of-way width, but eliminates the need for tapers at left-turn locations. The wider median also provides greater flexibility in the future for changes (i.e., more median breaks and/or left turn pockets) without additional widening to the outside. The narrow median does not provide sufficient width for planting. A minimum of three feet is needed for planting, which requires a median width of eight feet considering shy distance, curbs, and maintenance curbs. The wider median does provide space for planting, which promotes community values through improved aesthetics.

Left-Turn Lane and Through-Lanes

Description: The left-turn lanes are provided at median breaks at key intersections for left-turn and u-turn access. These key intersections are stop-controlled for the side street. They are located between roundabouts.

The through-lanes provide throughput for the corridor and provide access to local destination within the study area.

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[2] City of Lacey, *Development Guidelines and Public Works Standards*, July 2005.

[3] American Association of State Highway Transportation Officials (AASHTO), *Policy on Geometric Design of Highways and Streets*, 5th Edition, 2004.

[4] AASHTO, *Policy on Geometric Design of Highways and Streets*, 5th Edition, 2004, Page 366.

[5] City of Lacey, *Development Guidelines and Public Works Standards*, July 2005, Street Design Arterial – DWG NO. 4-2.2.

Range of Dimensions: The minimum left-turn width considered is 10 feet based on AASHTO Greenbook guidance for an urban arterial.[6] The maximum left-turn width considered is 12 feet based on City of Lacey standards.[7]

The minimum through-lane width considered is 10 feet based on AASHTO Greenbook guidance for an urban arterial.[8] However, the guidance states 10 feet "may be used in highly restricted areas having little or no truck traffic." The maximum width considered is 12 feet based on AASHTO Greenbook guidance for maximum through-lane width for an urban arterial.[9]

The lanes widths presume the use of a bike lane. Without a bike lane, the outside lane width should be increased to better accommodate turning vehicles. If the outside lane isn't widened, it will require a larger curb return radius, which is counter to encouraging pedestrian users.

Benefits/Drawbacks: The narrow lane widths will slightly increase side-swipe collisions. Based on AASHTO Greenbook guidance, ten feet is appropriate for arterials with little to no truck traffic. There is sufficient truck volumes to exclude the use of 10-foot lanes since they provide no buffer between adjacent lanes for trucks (or buses) when considering their width from outside of mirror to outside of mirror. The narrow width does not meet minimum width for left-turn lanes and through-lanes per AASHTO Greenbook guidance (considering trucks)[10], and it does not meet City of Lacey standards.[11] The narrow lane widths reduce cost and right-of-way width. All of the lane widths meet requirements for grant funding, since they meet AASHTO Greenbook guidance. The narrow lane widths may have a slight positive affect on community values since it will tend to reduce speeds and reduce street width at pedestrian crossings, making the corridor friendlier to non-motorized users.

Space for Bicyclists

Description: Delineated space for bicyclists promotes non-motorized uses. It is expected that most bicyclists will be Type A users (advanced or experienced riders), as defined by the AASHTO, *Guide for the Development of Bicycle Facilities*.[12]

Range of Dimensions: The widths considered for bicylcists match the classes of bike lanes used by the City of Lacey.[13] A Class III is a non-striped lane created by widening the outside travel lane approximately three feet (i.e., lane width of 14 feet). A Class 2.5 is a three-foot striped bike route, an enhanced Class III bike route used by the City. A Class II is a five-foot striped bike lane. The Lacey Transportation Plan calls for a Class II bike lane on College Street.[14] Therefore, the minimum width

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[6] AASHTO, *Policy on Geometric Design of Highways and Streets*, 5th Edition, 2004, Page 473.

[7] City of Lacey, *Development Guidelines and Public Works Standards*, Street Design Arterial – DWG NO. 4-2.2.

[8] AASHTO, *Policy on Geometric Design of Highways and Streets*, 5th Edition, 2004, Page 472-473.

[9] Ibid.

[10] Ibid.

[11] City of Lacey, *Development Guidelines and Public Works Standards*, Street Design Arterial – DWG NO. 4-2.2.

[12] AASHTO, *Guide for the Development of Bicycle Facilities*, 1999, page 6.

[13] Ibid, at Bikeway Classes – DWG NO. 4-16.

[14] City of Lacey, *1998 Lacey Transportation Plan*, Figure 5.

considered is three feet and the maximum width considered is five feet. This range of widths also generally complies with AASHTO guidelines.[15]

Benefits/Drawbacks: Because bicycles will be closer to cars, the narrow width may slightly reduce throughput by decreasing speeds in the outside lane, and may slightly increase side-swipe collisions (between cars, and between cars and bicycles). However, data suggests the difference in operations and safety may not be distinguishable.[16] Most vehicle/bicycle collisions are related to maneuvers at intersections.[17] The narrow width meets City of Lacey standards and AASHTO Greenbook guidance. The narrow width will reduce costs and right-of-way width. The narrow width does not meet the 5-foot minimum requirement for bike route points (2 points maximum) for UAP grant funding from TIB.[18] The bike route points fall under the Sustainability criteria (15 points maximum). There are 100 points maximum on the UAP grant application, so bike route points are only two percent of the available points. The narrow width still meets requirements for federal funding and other state grants since it meets AASHTO Greenbook and AASHTO guidance. The wider lane may be slightly better at promoting community values associated with non-motorized uses.

Tree Wells/Planter Strips and Sidewalks

Description: The tree wells (or planter strips) provide plantings to improve the corridor aesthetic and provide a buffer between the travel lanes and pedestrians, which dramatically increases comfort for pedestrians.

The sidewalks promote non-motorized uses in the corridor.

Range of Dimensions: The width of a tree well for the City of Lacey is four feet with an offset from back of curb for constructability.[19] We did not consider other tree well widths since the City uses a standard grate size so parts are interchangeable, improving maintenance efficiency. Coupled with the tree well, we used a total sidewalk width of 10 feet, providing five feet of clearance at the tree wells.

We did consider a planter strip instead of the tree well. We considered a planter strip width of 6.5 feet per City of Lacey standards.[20] Coupled with the planter strip, we considered a sidewalk width of eight feet per City of Lacey standards.[21] This yields a total width of 14.5 feet compared to a sidewalk width of 10.5 feet.

Benefits/Drawbacks: Neither of the combinations (tree well/sidewalk and planter strip/sidewalk) has a distinguishable affect on operations or safety. Both the tree well width and the planter strip width meet AASHTO Greenbook guidance. The tree well is based on a City of Lacey standard width; however, the

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[15] AASHTO, *Guide for the Development of Bicycle Facilities*, 1999, pages 16-17.

[16] Federal Highway Administration (FHWA), *Bicycle Lanes Versus Wide Curb Lanes: Operational and Safety Finding and Countermeasure Recommendations*, October 1999, page 23.

[17] Michael Amsden and Thomas Huber, *Bicycle Crash Analysis Using Crash Typing Tools and Geographic Information* Systems, (Wisconsin DOT Final Report No. 0092-05-18, June 2006), page 19.

[18] Transportation Improvement Board, http://www.tib.wa.gov/Sustainability/NewCriteria.htm.

[19] City of Lacey, *Development Guidelines and Public Works Standards*, Tree Well and Grate – DWG NO. 4-30.

[20] Ibid, at Street Design Arterial – DWG NO. 4-2.2.

[21] Ibid.

standard for an arterial calls for a planter strip and sidewalk. The tree well/sidewalk width is narrower, so it reduces costs and right-of-way width. Both combinations meet grant funding requirements. The planter strip/sidewalk combination better promotes community values by providing more space for non-motorized uses and increasing the amount of planting.

Alternative Combinations Considered

Based on the range of dimensions for the cross-sectional elements described above, we developed the following alternatives (see Table 1 for specific dimensions).

Option 9

Description: This alternative matches exactly Option 9 from the previous study report[22] (see Figure 3 above).

Benefits/Drawbacks: The biggest benefit of this alternative is the minimal right-of-way width (72 feet to 76 feet). The biggest drawback is the use of 10-foot lanes, since they provide no buffer for trucks and/or buses considering width from outside of mirror to outside of mirror. This excludes this alternative as operationally impractical.

This alternative has operational deficiencies and may adversely impact safety and capacity in the corridor. The narrow lanes will increase side-swipe collisions. The 10-foot lane widths are less than City of Lacey standards, and the 3-foot bike routes preclude bike route points (2 points maximum) under UAP grant funding from TIB. The alternative provides the minimum right-of-way width and cost of the four alternatives considered. Narrower lanes at pedestrian crossings will help promote non-motorized uses.

NHS/TIB Standards

Description: This alternative takes the standard width for each cross-sectional element as dictated by the AASHTO Greenbook (a 12-foot lane width is used as the "desirable" lane width[23]) and TIB policy (5-foot bike lanes).

Benefits/Drawbacks: This alternative does not have a clear biggest benefit. The biggest drawback is the extra right-of-way width due to the 12-foot lanes.

This alternative will tend to increase speeds, which will slightly increase throughput and may increase overall collision and/or increase collision severity. The consistent median width eliminates changes in direction caused by the narrow median from Option 9. Each of the elements meets AASHTO Greenbook guidance and TIB standards, making it eligible for all grants. It creates the maximum right-of-way width and cost of the four alternatives considered. The medians, tree wells, and wide sidewalks promote community values, but the wider lanes create a less inviting environment for non-motorized users.

City of Lacey Standards

Description: This alternative takes the standard width for each cross-sectional element as dictated by City of Lacey standards, including use of a planter strip.[24]

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[22] CH2M Hill for the City of Lacey, "College Street, Evaluation of Options", August 2005

[23] AASHTO, Policy *on Geometric Design of Highways and Streets*, 5th Edition, 2004, Page 472.

[24] City of Lacey, *Development Guidelines and Public Works Standards*, Street Design Arterial – DWG NO. 4-2.2.

Benefits/Drawbacks: The biggest benefit of this alternative is the added non-motorized amenities created by the planter strip. Conversely, the biggest drawback is the extra right-of-way width due to the planter strip.

This alternative provides a reasonable balance between operational/safety goals and community value goals. It exactly matches City of Lacey standards. It also meets AASHTO Greenbook guidance and TIB standards, making it eligible for all grants. It is the most expensive of the four alternatives with the widest right-of-way (95 feet). The median, planter strip, and wide sidewalk promote community values.

Recommended

Description: This alternative uses 11-foot lanes as a practical minimum width (since the 10-foot lanes provide no buffer for trucks and/or buses considering width from outside of mirror to outside of mirror). It provides 14-foot outside lanes to provide space for bicyclists. The lesser width decreases the impact to right-of-way width. The planted median is a consistent 11 feet, but a reduced median width could still be considered at spot locations along the corridor.

Benefits/Drawbacks: The biggest benefit of this alternative is the minimal right-of-way width (the least right-of-way, excluding Option 9 since 10-foot lanes are operationally impractical). The drawback is the lesser space for bicyclists.

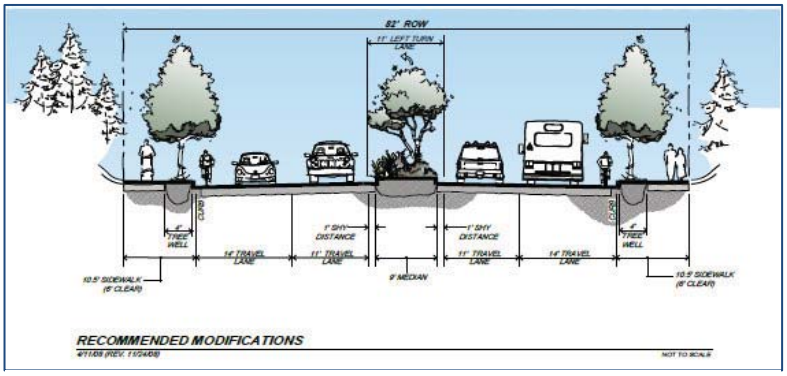


Figure 4 – Recommended Alternative

Similar to the "Lacey Standards" alternative, this alternative provides a reasonable balance between operational/safety goals and community value goals. The alternative meets AASHTO Greenbook guidance and City of Lacey standards (except for median width). It does not include a planter strip, but tree wells and wide sidewalks promote community values. It is eligible for all grants, except TIB grant funding as stated above.

Table 1
Alternative Combinations Considered

Alternative	Median	Lanes	Space for Bikes	Planter	Tree Well	Sidewalk	Total R/W
Option 9	6'-10'[1]	10'	3'	N/A	Yes	10'	72'-76'
NHS/TIB Stds.	12'	12'	5'	N/A	Yes	10.5'	91'
Lacey Stds.	12'	11'	5'	6.5	No	8'	95'
Recommended	11'	11'	3'	N/A	Yes	10.5'	82'

1. The median tapers to 10 feet at left turn locations.

Recommendation

We qualitatively scored each of the alternatives against the following criteria; operations and safety, adherence to standards, right-of-way width and cost, eligibility for grant funding, and community values. The scoring is shown below in Table 2.

Table 2
Scoring of Alternatives Considered[1]

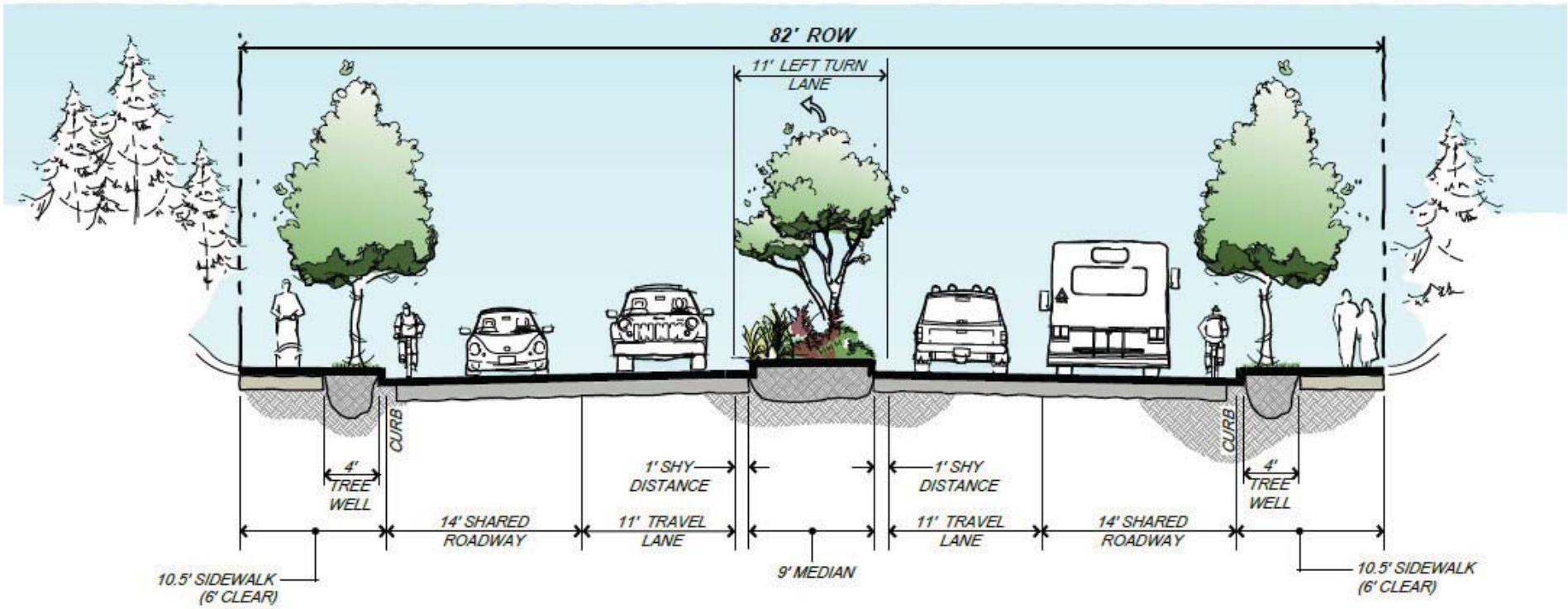
Alternative	Operations/ Safety	Standards	R/W Width and Cost	Grant Funding	Community Values	Total Score
Option 9	2	2	4	3	3	14
NHS/TIB Stds.	4	4	2	4	2	16
Lacey Stds.	3	4	1	4	2	14
Recommended	3	4	3	3	3	16

1. Alternatives are scored from 1 (lowest) to 4 (highest) in each criterion.

Although the "NHS/TIB Standards" alternative scores equally well with the "Recommended" alternative, the "Recommended" alternative is preferred because of the lesser right-of-way width. The "Recommended" alternative is shown above in Figure 4.

Attachments

1. Recommended Alternative
2. Option 9 Alternative

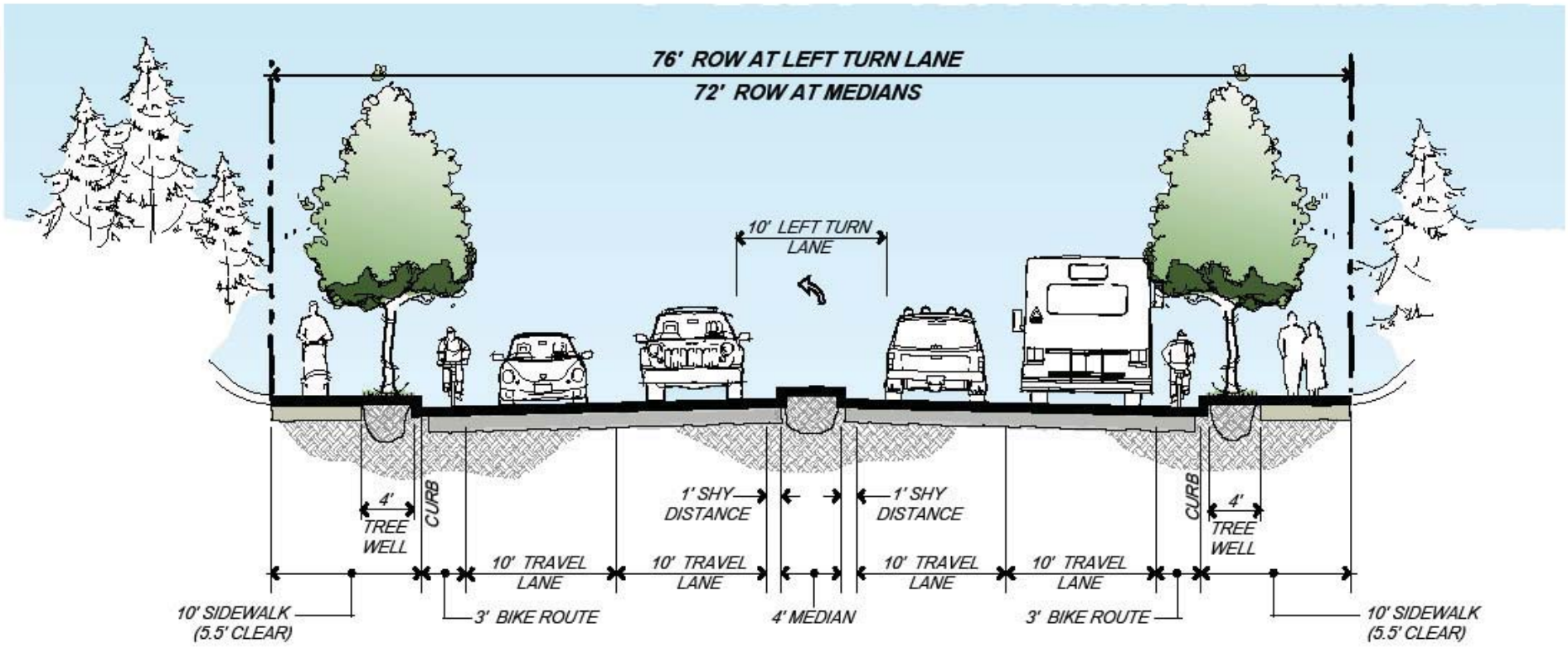


RECOMMENDED MODIFICATIONS

4/11/08 (REV. 11/17/08)

NOT TO SCALE

WHPacific



ORIGINAL OPTION #9

4/11/08

NOT TO SCALE

WHPacific

Appendix B

WHPacific

724 Columbia Street NW, Suite 140
Olympia, Washington 98501
360.754.3375 ◆ fax 360.754.1195

TECHNICAL MEMORANDUM

Date: July 29, 2008 Rev. 4/17/09

RE: Horizontal Alignment and Right of Way Limits

To:	Martin Hoppe, P.E., PTOE	**From:**	Scott Sawyer, P.E. and Mike Johnson
Company:	City of Lacey	**Title:**	Sr. Project Manager
Phone:	360.438.2681	**Phone:**	360.918.5305
Fax:	360.456.7799	**Fax:**	360.754.1195
Address:	420 College Street SE		
	Lacey, WA 98509-3400	**Project #:**	34709
		Project Name:	College Street Improvement Report

Purpose

The purpose of this technical memorandum is to present a recommended horizontal alignment for College Street from 37th Avenue SE to Lacey Boulevard. The recommendation is based on a cost evaluation of pavement construction (Crown/Cross-Slope Analysis) and right-of-way impacts (Right-of-Way Analysis).

Summary

We evaluated alternative horizontal alignments by determining cost estimates for pavement reconstruction and right-of-way acquisition. The cost differences between alternative alignments are significantly higher for right-of-way acquisition than pavement reconstruction. Therefore, the recommended horizontal alignment is based solely on minimizing right-of-way acquisition costs. We compared costs for three horizontal alignments - centered on existing right-of-way; aligned against the westerly right-of-way; and aligned against the easterly right-of-way. To further refine our comparison, we broke the corridor into four segments. The segment limits

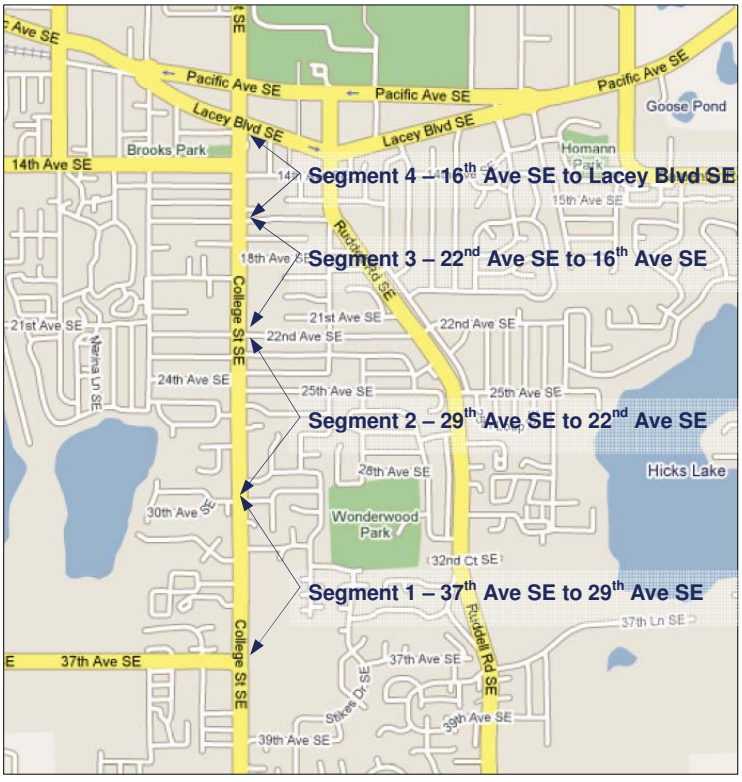


Figure 1 – Segment Map

correspond to the location of the proposed roundabout locations at 29th Avenue SE, 22nd Avenue SE, and 16th Avenue SE (see Figure 1). Breaking the segments at the roundabout locations allows for transitions between alternative alignments. Therefore, we are not limited to one alignment for the entire corridor.

The estimated costs for right-of-way acquisition for the three horizontal alignments are shown in Table 1. The numbers of full parcel acquisitions are shown in Table 2. Note, these numbers exclude impacts from the three roundabouts, since the impacts from roundabouts are mostly independent of the alternative alignments.

Table 1
Estimated Right-of-Way Acquisition Costs (Excluding Roundabout Impacts)

Segment	Aligned on the Centerline	Aligned Against the Westerly Right-of-Way	Aligned Against the Easterly Right-of-Way
1	$1,157,827	$3,046,962	**$864,618**
2	$4,942,902	**$1,934,930**	$7,324,351
3	$2,417,583	$1,665,844	**$1,292,543**
4	$3,687,493	**$2,568,042**[1]	$3,570,840

1. Assumes a full parcel acquisition is not required for the apartment buildings at 1510 College Street SE.

Table 2
Full Parcel Acquisitions for Structures and/or Driveways Impacted (Excluding Roundabout Impacts)

Segment	Aligned on the Centerline	Aligned Against the Westerly Right-of-Way	Aligned Against the Easterly Right-of-Way
1	2	8	**1**
2	14	**5**	22
3	7	5	**3**
4	11	**6**[1]	11

1. Assumes a full parcel acquisition is not required for the apartment buildings at 1510 College Street SE.

We recommend the following horizontal alignments by segment to minimize right-of-way acquisition costs. These alignments are shown in **bold** in Tables 1 and 2.

- Segment 1 - Aligned against the easterly right-of-way line;
- Segment 2 - Aligned against the westerly right-of-way line;
- Segment 3 - Aligned against the easterly right-of-way line; and
- Segment 4 - Aligned against the westerly right-of-way line.

The total cost and the total number of full parcel acquisitions for the recommended alignment are shown in Tables 3 and 4, respectively. These numbers do include impacts for the three roundabouts. Therefore, the totals in Tables 3 and 4 differ from the totals from Tables 1 and 2.

Table 3
Estimated Right-of-Way Acquisition Costs – Recommended Alignment (Including Roundabouts)

Segment	Estimated R/W Costs
1	$1.50 M
2	$3.04 M
3	$1.91 M
4	$3.14 M[1]
TOTAL	**$9.59 M**[1]

1. Assumes a full parcel acquisition is not required for the apartment buildings at 1510 College Street SE.

Table 4
Full Parcel Acquisitions for Structures and/or Driveways Impacted – Recommended Alignment (Including Roundabouts)

Segment	Number of Full Parcel Acquisitions
1	3
2	8
3	5
4	7[1]

1. Assumes a full parcel acquisition is not required for the apartment buildings at 1510 College Street SE.

The total right-of-way costs shown in Table 3 are preliminary and they are represented in 2008 dollars. We recommend $13.0 M as a reasonable planning level estimate at this stage of project development.

Background

Existing Conditions

College Street from Lacey Boulevard to 37th Avenue SE is a four-lane National Highway System (NHS) principal arterial with a general right-of-way width of 60 feet. The existing street width is approximately 45 feet from curb to curb. There are narrow sidewalks located along the corridor on each side of the street. The corridor is a built environment fronted by homes, small businesses, apartments, and schools.

College Street provides a primary north-south link for traffic, transit, pedestrians, and bicyclists within the City from south Thurston County to Interstate 5. The corridor currently carries 21,000 (2005 traffic count) and is projected to carry 32,000 vehicles per day by 2020 according to the Lacey Transportation Plan (College Street is identified as a Strategy Corridor in the Lacey Transportation Plan[1]). The corridor also provides local access to many homes fronting the street and provides access to several local streets and collectors.

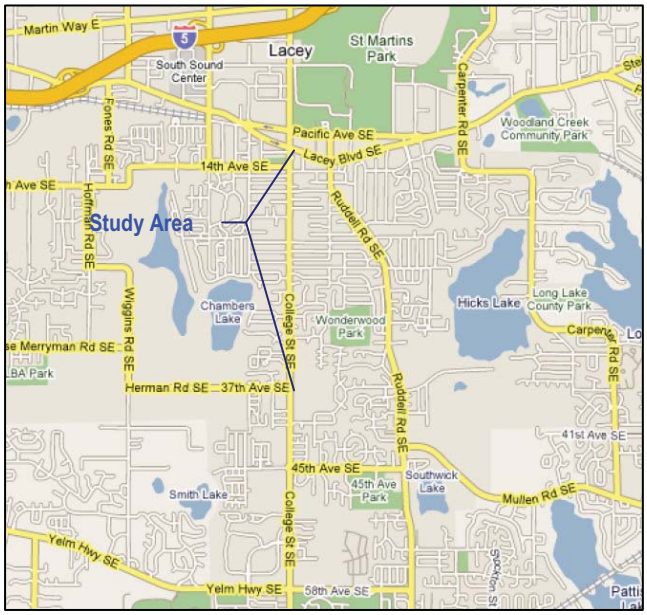


Figure 2 - Vicinity Map

Traffic is heavy along the corridor and congested during peak hours. Vehicles turning left from College Street to homes or local streets increase congestion by occupying the inside through-lane while waiting for breaks in traffic. There are approximately 130 driveways 24 T-intersections, and four 4-way intersection collectively generating significant turn volumes. There are high-frequency collision locations along the corridor due to conflicts between turning vehicles and high volumes of through traffic. Narrow sidewalks, high volumes, and a lack of bike lanes discourage use by pedestrians and bicyclists. A lack of street amenities (i.e., planter strips/vegetation, decorative street lighting, street furniture) conflicts with community values articulated by City staff and City Council.

[1] City of Lacey, *2004 Lacey Transportation Plan*, page 55.

Previous Work

Previous study work resulted in a report, "College Street, Evaluation of Options", August 2005. This report documented a comprehensive alternatives analysis that scored and ranked ten options (nine build and one no-build) for improvements to College Street that addressed the corridor needs. The report recommended Option 9 as the preferred option, because it best provides a blend of corridor capacity, neighborhood connectivity, non-motorized uses, and corridor aesthetics. The cross-section included a planted center median to control access and provide space for left-turn lanes at key intersections; wide sidewalks with tree wells to promote walk-ability; space for commuting bicycles; and roundabouts at major intersections to provide intersection control. The overall right-of-way width of 72 feet widens to 76 feet at left-turn lane locations.

The current study work began in February 2008 and consists of the following tasks:

- *Alternatives Analysis* to define the recommended dimensions of the cross-sectional elements;
- *Horizontal Alignment and Right-of-Way* to define the recommended alignment;
- *Neighborhood Circulation and Access* to define recommended changes to street access and/or driveway access; and
- *Improvements Phasing Plan* to estimate project costs and define recommended phasing for the improvements.

WHPacific prepared an Alternatives Analysis technical memorandum, dated April 11, 2008. The memorandum presented ranges of dimensions for roadway cross-sectional elements (median width, left-turn lane width, through-lane width, space for bicyclists, planter/tree well width, and sidewalk width), and recommended a proposed cross-section for College Street for use in subsequent study work, including the *Horizontal Alignment and Right-of-Way* work presented herein. The recommended cross-section is shown in Figure 3.

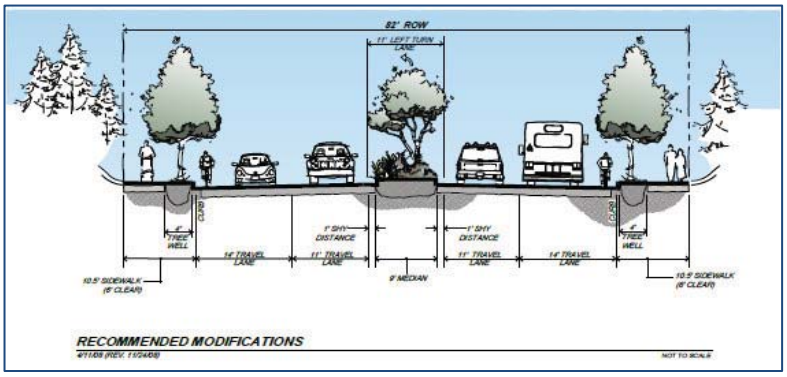


Figure 3 – Recommended Alternative

Crown/Cross Slope Analysis

Approach

Available Data

The City of Lacey provided survey data from February 2004 used for an overlay project in 2006. The data contains curbs, crowns, utilities, storm drainage, topography behind curb at intersections, right-of-way centerlines, right-of-way lines, parcel limits, and elevation information to create a TIN file. After discussions with the City of Lacey regarding changes to elevation data due to the 2006 overlay work, we determined a uniform upward adjustment to pavement elevations (2 inches) is adequate to create elevation data for this study work. The survey data limits generally extend from curb to curb, begin approximately 900 feet south of 29th Avenue SE, and end approximately at 13th Avenue Ct. SE. We used the survey data to create cross-sections every 50 feet. The cross-sections show the existing roadway has three distinct cross-section conditions, (1) one-side of the road is steeper than the other (asymmetrical crown); (2) normal crown with cross-slopes approximating 2-percent (normal symmetrical crown); and (3) normal crown with steep cross-slopes (steep symmetrical crown). These conditions change through the corridor as shown in Figure 4.

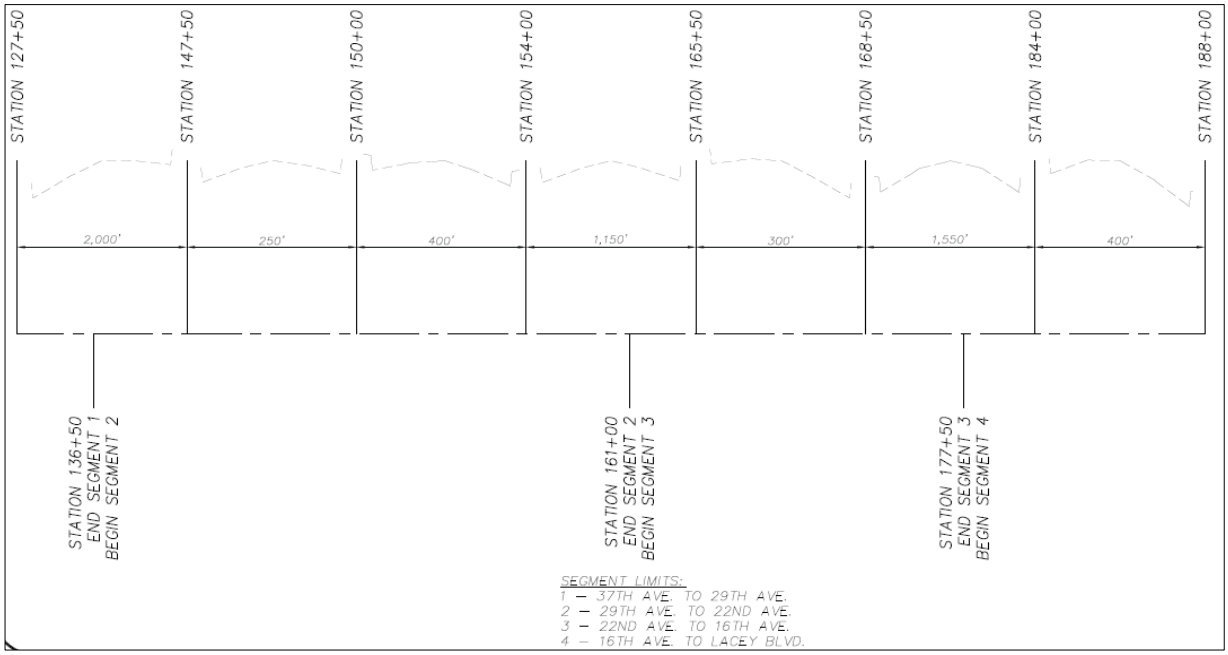


Figure 4 – Existing Cross-Slope Variation

Assumptions

After reviewing the cross-sections, we used two conditions (asymmetrical crown and normal symmetrical crown) to evaluate pavement costs. We limited the evaluation of costs from proposed curb to curb (61 feet). Therefore, we did not consider grading behind the curbs. Other key assumptions include:

- Grinding is not required;
- Existing pavement will be overlaid with a 2-inch HMA wearing course;
- The new roadway is crowned with 2-percent cross-slopes;
- HMA will be used for all fill to flatten steep cross-slopes; and
- The new pavement section for widening is 4-inch of HMA over 12-inches of crushed rock.

Findings

Alternatives

The purpose of the Crown/Cross-Slope Analysis is to evaluate differences in pavement construction costs based on alternative crown locations. We considered three horizontal alignments;

- Aligned on the right-of-way centerline;
- Aligned against the westerly right-of-way line; and
- Aligned against the easterly right-of-way line.

Using the two representative cross-slope conditions, we generated quantities and cost estimates for the three alignment alternatives. We broke the corridor into four segments (see Figure 5). The segment limits correspond to the location of the proposed roundabout locations at 29th Avenue SE, 22nd Avenue SE and 16th Avenue SE. Breaking the segments at the roundabout locations allows for transitions between alternative alignments. Therefore, we are not limited to one alignment for the entire corridor.

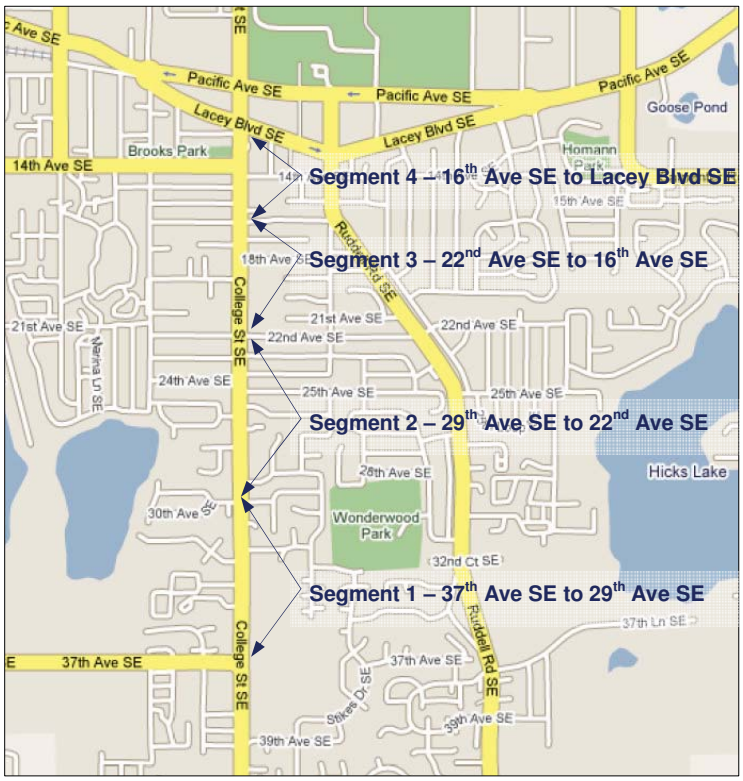


Figure 5 – Segment Map

The differences in pavement costs are shown below in Table 5. The least cost alignment is shown as $0 for each segment since we are interested only in the cost differences. The costs shown do not represent full pavement cost estimates. The costs shown in Table 5 indicate there are no significant differences in costs between the alignment alternatives.

Table 5
Alternative Analysis Comparison

Segment	Aligned on the Centerline	Aligned Against the Westerly Right-of-Way	Aligned Against the Easterly Right-of-Way
1[1]	$25,020	$0	$27,090
2	$18,070	$0	$26,075
3	$0	$17,160	$5,295
4[1]	$0	$8,850	$2,445

1. The cost differences for these segments are based on the limits of available survey data, not the actual segment length.

Right-of-Way Analysis

Approach

Available Data

The City of Lacey provided Geographical Information System (GIS) information, planimetrics for the corridor, survey data, and aerial photography. The GIS data provided comes from the Thurston County Assessor's Office (February 2008) and contains land values, building values, total values, lot size, property owner, site address, and property owner's address. The planimetric files (1998) contain buildings, driveways, roadway, fences, and other features above ground. The survey data (February 2004) contains curbs, crowns, utilities, storm drainage, topography behind curb at intersections, right-of-way centerlines, right-of-way lines, parcel limits, and elevation information. The aerial photography was flown in 2006.

Assumptions

For estimating the cost of right-of-way acquisitions we used assessed values from the GIS data. We increased the assessed values by a factor of 1.4 to estimate market values. We used land values for strip acquisitions, and we used total values for full parcel acquisitions. We also included administrative costs based on averages provided by the City of Lacey[2] and WSDOT Real Estate Services[3] as shown in Table 6. All right-of-way costs (acquisition and administrative) are estimated in 2008 dollars.

We assumed a full parcel acquisition if either of the following conditions is met:

- The proposed right-of-way reduces the driveway length to less than 20 feet, the minimum driveway length per City of Lacey guidelines[4]. We used aerial photography, planimetric data, and project photos to locate and verify driveways.
- The proposed right-of-way line encroaches within two feet of a structure. We used aerial photography, planimetric data, and project photos to locate structures.

For full parcel acquisitions, we did not offset the acquisitions cost by potential re-sale value of a remnant parcel.

[2] Miller, Angelea, *e-mail* (College Street Right-of-Way Costs), March 2008.
[3] Lovgren, Paul, *phone conversation*, March 2008.
[4] City of Lacey, *Development Guidelines and Public Works Standards*, July 2005, page 4-45.

Table 6
Right-of-Way Administrative Costs

Description	Cost
Negotiation costs (right-of-way costs ≤ $25k)	$4,500 per parcel
Negotiation costs (right-of-way costs > $25k)	$6,750 per parcel
Title and escrow costs (right-of-way costs ≤ $25k)	$1,100 per parcel
Title and escrow costs (right-of-way costs > $25k)	$1,650 per parcel
Appraisal costs (only for right-of-way costs > $25k)	$5,500 per parcel
Appraisal review costs (only for right-of-way costs > $25k)	$1,000 per parcel
Statutory evaluation allowance (all right-of-way purchases)	$750 per parcel
Relocation services (full take from a rental home or commercial)[1]	$80,000 per parcel
Relocation services (full take from a single family home owner)	$30,000 per parcel

1. We assumed a property is a rental property if the owner's address is different than site address.

Findings

Alternatives

The purpose of the Right-of-Way Analysis is to evaluate differences in acquisitions costs based on alternative horizontal alignments. We considered three horizontal alignments:

- Aligned on the right-of-way centerline;
- Aligned against the westerly right-of-way line; and
- Aligned against the easterly right-of-way line.

We laid the proposed cross-section (82 feet) against the existing right-of-way and the GIS parcel data to generate right-of-way acquisition costs for the three alternative alignments. We broke the results into the same four segments used in the Crown/Cross-Slope Analysis. We found significant differences in costs for the alternative alignments as shown in Table 7 below. Full parcel acquisitions are shown in Table 8. The right-of-way acquisition costs for Segment 4, Aligned Against the Westerly Right-of-Way are based on the assumption full acquisition is not required at the apartment buildings at 1510 College Street SE. The proposed right-of-way line does encroach on the existing buildings, but it is assumed the buildings may be remodeled to remove end units to avoid full acquisition. The estimated cost shown includes $800K as costs to cure for impacts to the existing buildings.

Table 7
Estimated Right-of-Way Acquisition Costs

Segment	Aligned on the Centerline	Aligned Against the Westerly Right-of-Way	Aligned Against the Easterly Right-of-Way
1	$1,157,827	$3,046,962	**$864,618**
2	$4,942,902	**$1,934,930**	$7,324,351
3	$2,417,583	$1,665,844	**$1,292,543**
4	$3,687,493	**$2,868,042**[1]	$3,570,840

1. Assumes a full parcel acquisition is not required for the apartment buildings at 1510 College Street SE.

Table 8
Full Parcel Acquisitions for Structures and/or Driveways Impacted

Segment	Aligned on the Centerline	Aligned Against the Westerly Right-of-Way	Aligned Against the Easterly Right-of-Way
1	2	8	**1**
2	14	**5**	22
3	7	5	**3**
4	11	**6**[1]	11

1. Assumes a full parcel acquisition is not required for the apartment buildings at 1510 College Street SE.

Recommendation

Based on the significant cost differences for right-of-way acquisition costs, we recommend the following horizontal alignments by segment. Figure 6 graphically depicts the horizontal alignment by segment:

- Segment 1 - Aligned against the easterly right-of-way line;
- Segment 2 - Aligned against the westerly right-of-way line;
- Segment 3 - Aligned against the easterly right-of-way line; and
- Segment 4 - Aligned against the westerly right-of-way line.

The total cost and the total number of full parcel acquisitions for the recommended alignment are shown in Tables 9 and 10, respectively. These numbers do include impacts for the three roundabouts. Therefore, the totals in Tables 3 and 4 differ from the totals from Tables 1 and 2.

Figure 6 – Horizontal Alignment by Segment

Table 9
Estimated Right-of-Way Acquisition Costs – Recommended Alignment (Including Roundabouts)

Segment	Estimated R/W Costs
1	$1.50 M
2	$3.04 M
3	$1.91 M
4	$3.14 M[1]
TOTAL	**$9.59 M**[1]

1. Assumes a full parcel acquisition is not required for the apartment buildings at 1510 College Street SE.

Table 10
Full Parcel Acquisitions for Structures and/or Driveways Impacted – Recommended Alignment (Including Roundabouts)

Segment	Number of Full Parcel Acquisitions
1	3
2	8
3	5
4	7[1]

1. Assumes a full parcel acquisition is not required for the apartment buildings at 1510 College Street SE.

Table 11 shows strip acquisitions and full parcel acquisitions by segment. Table 11 also shows potential ways to avoid some of the full parcel acquisitions (i.e., reduce the median width, reduce the sidewalk width and remove tree wells, and/or shift the horizontal alignment. For a shift in the horizontal alignment there will be an increase in the parcels impacted and a corresponding increase in administrative costs. The full parcel acquisitions due to the three roundabouts are shown in Table 11, but the square footages for strip acquisitions shown in Table 11 do not include acquisition for roundabouts as shown on the Right-of-Way Analysis Maps, Attachment A, since the roundabout layouts are very conceptual.

Attachments

Attachment A – Right-of-Way Analysis Maps – Acquisition Summary
Attachment B – Right-of-Way Analysis Maps – Aerial Photography

Table 11
Strip and Full Parcel Acquisitions by Segment

Segment 1 – 37th to 29th (Aligned Against the Easterly Right-of-Way Line) - Strip Acquisitions

Parcel Number	Site Address	Existing Parcel (SQFT)	Right-of-Way Required (SQFT)	Remaining Parcel (SQFT)
11829130502	3023 College Street SE	8,979	1,904	7,075
62810004400	3029 College Street SE	16,734	2,503	14,231
62810004300	3035 College Street SE	12,960	2,066	10,894
62810004200	3041 College Street SE	15,166	2,114	13,052
11829410400	3201 College Street SE	41,563	2,863	38,700
11829410103	3301 College Street SE	387,746	4,462	383,284
11829410900	3307 College Street SE	261,512	3,042	258,470
11829410702	3407 College Street SE	20,787	1,429	19,358
11829410701	3409 College Street SE	20,758	1,430	19,328
11829410300	3413- 3507 College St SE	28,751	5,127	23,624
11829410301	3511 College St	18,002	3,207	14,795
11829410101		17,995	3,203	14,792
58090006700	4513 SE 29th Ct	10,693	2,797	7,896
58090006800	4515 SE 29th Ct	8,174	1,746	6,428
58090006900	4517 SE 29th Ct	9,883	1,748	8,135
11829130800	4520 32ND Lane SE	10,282	312	9,970
62810000100	4529 Montclair Drive SE[1]	11,634	2,598	9,036
62810004100	4530 Montclair Drive SE	11,951	2,662	9,289

1. A shed is impacted.

Segment 1 - 37th to 29th (Aligned Against the Easterly Right-of-Way Line) – Full Parcel Acquisitions

Parcel Number	Site Address	Existing Parcel (SQFT)	Structure/ Roundabout Impact	Driveway Impact	Remaining Driveway Depth (FT)	Potential Mitigation*
58090006900	4517 29th Court SE	9,883	R			N/A
33750001000	4605 Bel Air Drive SE	8,986	R			N/A
11829410102	3515 College Street SE	17,974		D	10’	1

*Potential Mitigation Options:
1. Construct College St aligned on the centerline to the north side of parcel then transition to the west. This will align with existing conditions at the intersection of 37th Ave. SE.

Table 11
Strip and Full Parcel Acquisitions by Segment

Segment 2 - 29th to 22nd (Aligned Against the Westerly Right-of-Way Line) - Strip Acquisitions

Parcel Number	Site Address	Existing Parcel (SQFT)	Right-of-Way Required (SQFT)	Remaining Parcel (SQFT)
11821330100	2406 College Street SE	37,992	4,438	33,554
84850000100	2602 College Street SE	21,162	3,439	17,723
84850000101	2606 College Street SE	15,512	2,523	12,989
11828220400	2626 College Street SE	39,886	2,433	37,453
11828220500	2702 College Street SE	49,877	3,649	46,228
11828220600	2706 College Street SE	51,346	3,749	47,597
11828230202	2818 College Street SE	9,392	1,484	7,908
11828220703	4600 28th Ave SE	6,970	468	6,502
11828220704	4604 28th Ave SE	8,793	285	8,508
33750000100	4604 Bel Air Drive SE	9,511	2,208	7,303
58700002100	4705 SE 22nd Avenue	83,375	5,358	78,017
11828220205	4805 27th Lane SE	5,283	303	4,980

Segment 2 - 29th to 22nd (Aligned Against the Westerly Right-of-Way Line) – Full Parcel Acquisitions

Parcel Number	Site Address	Existing Parcel (SQFT)	Structure/ Roundabout Impact	Driveway Impact	Remaining Driveway Depth (FT)	Potential Mitigation*
84800002100	2502 College Street SE	13,047	S			1
84800002101	2506 College Street SE	9,496	S			1
11828230201	2822 College Street SE	9,407		D	8'	2
58090000100	4520 29th Avenue SE	11,214	R			N/A
62000000100	4525 22nd Avenue SE	11,965	R			N/A
43550000100	4602 SE 24th Avenue	10,201	S			3
58700002000	4603 SE 23rd Avenue	10,638	S			N/A
33750000100	4604 Bel Air Drive SE	9,511	R			N/A

*Potential Mitigation Options:
1. Reduce both sidewalk and median width.
2. Move Roundabout entrance to the west and transition out to the east.
3. Reduce both sidewalk and median width. Curb return could possibly impact driveway even with this mitigation.

Table 11
Strip and Full Parcel Acquisitions by Segment

Segment 3 – 22nd to 16th (Aligned Against the Easterly Right-of-Way Line) - Strip Acquisitions

Parcel Number	Site Address	Existing Parcel (SQFT)	Right-of-Way Required (SQFT)	Remaining Parcel (SQFT)
59100001600	1605 College Street SE	10,670	1,486	9,184
59100001500	1613 College Street SE	10,656	1,485	9,171
11820413202	1915 College Street SE	11,462	1,981	9,481
11820440100	2109 College Street SE	133,096	990	132,106
11820440200	2121 College Street SE	14,864	2,959	11,905
59100000101	4533 17th Avenue SE	5,710	1,561	4,149
11820410700	4550 19th Avenue SE	39,956	6,569	33,387
11820413201	4553 19th Avenue SE	10,831	1,848	8,983

Segment 3 – 22nd to 16th (Aligned Against the Easterly Right-of-Way Line) – Full Parcel Acquisitions

Parcel Number	Site Address	Existing Parcel (SQFT)	Structure/ Roundabout Impact	Driveway Impact	Remaining Driveway Depth (FT)	Potential Mitigation*
71400000100	1601 College Street SE	10,639	S & R			N/A
59100000100	1705 College Street SE	4,968	S & D			N/A
11820413200	1921 College Street SE	16,022	S			1
11820440200	2121 College Street SE	14,864	R			N/A
64720001200	4603 16th Avenue SE	7,998	R			N/A

*Potential Mitigation Measures:
1. Reduce both sidewalk and median width

Segment 4 – 16th to Lacey (Aligned Against the Westerly Right-of-Way Line) - Strip Acquisitions

Parcel Number	Site Address	Existing Parcel (SQFT)	Right-of-Way Required (SQFT)	Remaining Parcel (SQFT)
79800000400	1324-1326 College St SE	11,712	1,650	10,062
74700001500	1418 College Street SE	12,095	1,811	10,284
11821231900	1510 College Street SE[1]	226,466	10,119	216,347

1. Assumes a full parcel acquisition is not required for the apartment buildings at 1510 College Street SE, assuming three building can be remodeled to remove six end units.

Table 11
Strip and Full Parcel Acquisitions by Segment

Segment 4 – 16th to Lacey (Aligned Against the Westerly Right-of-Way Line) – Full Parcel Acquisitions

Parcel Number	Site Address	Existing Parcel (SQFT)	Structure/ Roundabout Impact	Driveway Impact	Remaining Driveway Depth (FT)	Potential Mitigation*
79800000100	1302 College Street SE	7,527		D	13'	N/A
79800000200	1308 College Street SE	7,431	S			N/A
79800000300	1320 College Street SE	7,527	S			N/A
11821231800	1328 College Street SE	9,359	S & D			N/A
71400001601	4524 SE 16th Avenue	5,516	R			N/A
74700000100	4602 SE 14th Avenue	12,237	S			1
74700001300	4603 SE 14th Avenue	10,662	S			N/A

*Potential Mitigation Measures:

1. Reduce both sidewalk and median width. Curb return could possibly impact driveway even with this mitigation.

Appendix C

WHPacific

724 Columbia Street NW, Suite 140
Olympia, Washington 98501
360.754.3375 • fax 360.754.1195

TECHNICAL MEMORANDUM

Date:	October 22, 2008 Rev 4/17/09	**RE:**	**Neighborhood Circulation and Access**
To:	Martin Hoppe , P.E., PTOE	**From:**	Scott Sawyer, P.E.
Company:	City of Lacey	**Title:**	Senior Project Manager
Phone:	360.438.2681	**Phone:**	360.918.5305
Fax:	360.456.7799	**Fax:**	360.754.1195
Address:	420 College Street SE		
	Lacey, WA 98509-3400	**Project #:**	034709
		Project Name:	College Street Improvement Report

Purpose

The three purposes of this memorandum are to present the recommended improvements to College Street as a Strategy Corridor; present the recommendations for the College Street Neighborhood Circulation and Access Management Plan (NCAMP); and present results of traffic analyses to evaluate the performance of College Street with the recommended improvements.

Summary

Strategic Corridor

The City of Lacey recognizes College Street as a Strategy Corridor. Strategy Corridors are major arterials in dense urban areas where traditional approaches to address congestion such as roadway widening are not practical or conflict with community values. Traditional performance measures, such as Level of Service, do not apply to Strategy Corridors because they would not allow increased densities in the urban core.

Neighborhood Circulation and Access Management Plan (NCAMP)

The NCAMP recommends a raised median to manage access. Access management is a tool to reduce traffic congestion and reduce traffic collisions. The intent of access management is to provide access for abutting properties while preserving the flow of traffic. The NCAMP also

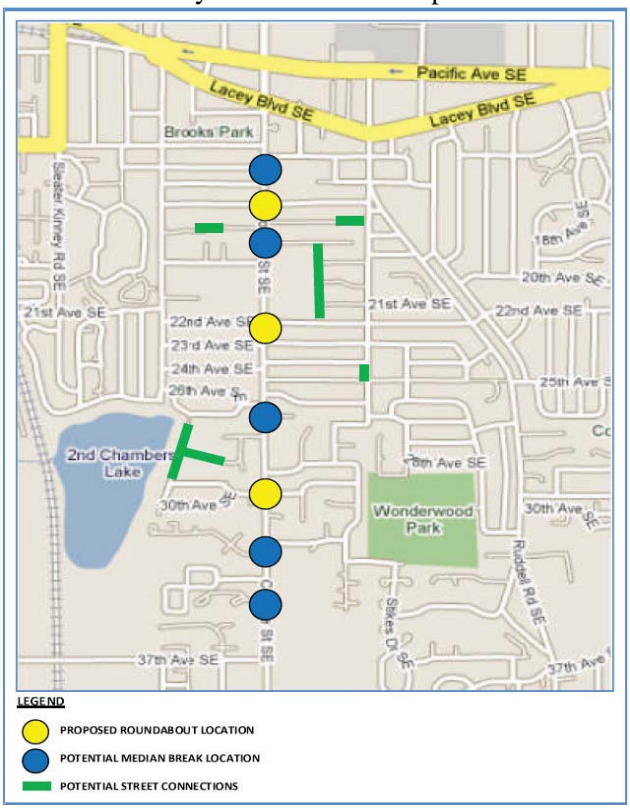


Figure 1 – Neighborhood Circulation Access and Management Plan

identifies measures recommended for College Street as a Strategy Corridor. The recommendations include identifying roundabout locations, median break locations (allowing for left turns), street grid connections to increase access to alternate routes, and driveways consolidations. Figure 1 shows the recommended roundabouts, median breaks, and street grid connections.

Traffic Analyses

Traffic analysis was conducted to evaluate how the recommended improvements will impact traffic operations in 2030. The results show the recommended access control measures will not adversely affect neighborhoods, although left turn movements at some neighborhoods will be difficult in the PM peak hour. The roundabouts will operate well under expected future volumes on College Street.

Background

Existing Conditions

College Street is a four-lane National Highway System (NHS) principal arterial from Lacey Boulevard to 37th Avenue SE with a general right-of-way width of 60 feet. The existing street width is approximately 45 feet from curb to curb. There are narrow sidewalks located along the corridor on each side of the street. The corridor is a built-environment fronted by homes, small businesses, apartments, and schools.

College Street provides a primary north-south link for traffic, transit, pedestrians, and bicyclists within the City from south Thurston County to Interstate 5. The corridor currently carries 21,000 vehicles per day (2005 traffic count) and is projected to carry 32,000 by 2020 according to the Lacey Transportation Plan. The corridor also provides local access to several homes fronting the street and to several local streets and collectors.

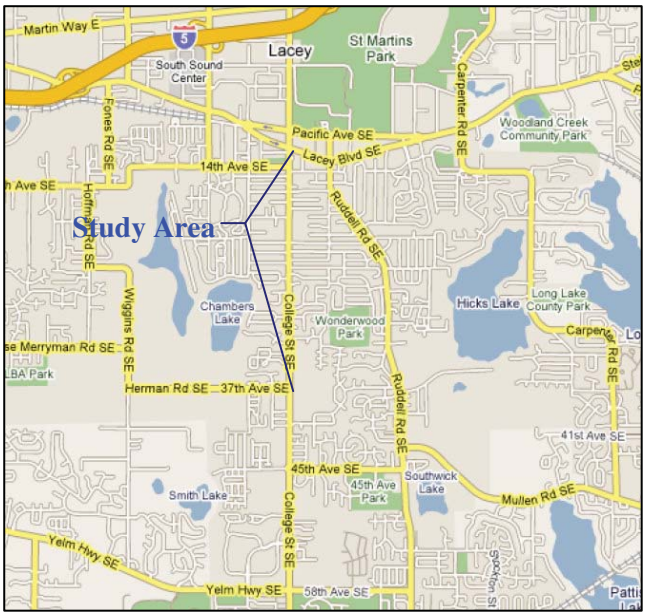


Figure 2 - Vicinity Map

Traffic is heavy along the corridor and congested during peak hours. Vehicles turning left from College Street to homes or local streets increase congestion by occupying the inside through-lane while waiting for breaks in traffic. There are approximately 130 driveways 24 T-intersections, and four 4-way intersection collectively generating significant turn volumes. There are high-frequency collision locations along the corridor due to conflicts between turning vehicles and high volumes of through traffic. Narrow sidewalks, high volumes, and a lack of bike lanes discourage use by pedestrians and bicyclists. A lack of street amenities (i.e., planter strips/vegetation, decorative street lighting, street furniture) conflicts with community values articulated by City staff and City Council.

Previous Work

Previous study work resulted in a report, "College Street, Evaluation of Options", August 2005. This report documented a comprehensive alternatives analysis that scored and ranked ten options (nine build and one no-build) for improvements to College Street that addressed the corridor needs. The report recommended Option 9 as the preferred option, because it best provides a blend of corridor capacity, neighborhood connectivity, non-motorized uses, and corridor aesthetics. The cross-section included a planted center median to control access and provide space for left-turn lanes at key intersections; wide sidewalks with tree wells to promote walk-ability; space for commuting bicycles; and roundabouts at

major intersections to provide intersection control. The overall right-of-way width of 72 feet widens to 76 feet at left-turn lane locations.

The current study work began in February 2008 and consists of the following tasks:

- *Alternatives Analysis* to define the recommended dimensions of the cross-sectional elements;
- *Horizontal Alignment and Right-of-Way* to define the recommended alignment;
- *Neighborhood Circulation and Access* to define recommended changes to street access and/or driveway access; and
- *Improvements Phasing Plan* to estimate project costs and define recommended phasing for the improvements.

WHPacific prepared an *Alternatives Analysis* technical memorandum, dated April 11, 2008. The memorandum presented ranges of dimensions for roadway cross-sectional elements (median width, left-turn lane width, through-lane width, space for bicyclists, planter/tree well width, and sidewalk width), and recommended a proposed cross-section for College Street for use in subsequent study work. The recommended cross-section is shown in Figure 3.

WHPacific also prepared a *Horizontal Alignment and Right-of-Way Limits* technical memorandum dated June 6, 2008. The memo recommended aligning the cross-section shown in Figure 3 as follows:

- Segment 1 (37th Ave SE to 29th Ave SE) - Aligned against the easterly right-of-way line;
- Segment 2 (29th Ave SE to 22nd Ave SE) - Aligned against the westerly right-of-way line;
- Segment 3 (22nd Ave SE to 16th Ave SE) - Aligned against the easterly right-of-way line; and
- Segment 4 (16th Ave SE to Lacey Boulevard SE) - Aligned against the westerly right-of-way line.

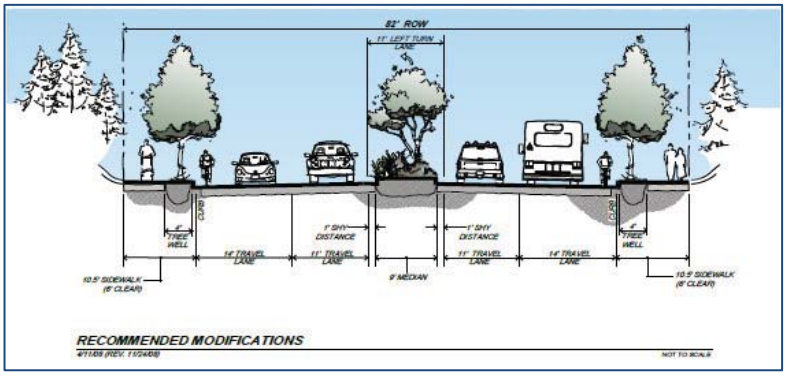


Figure 3 – Recommended Alternative

Strategic Corridor

College Street is classified as a four-lane Principal Arterial under the National Highway System classification system; however, the NHS classification allows the City to have jurisdictional control of College Street. Under the City of Lacey functional classification, College Street is classified as a Major Arterial.

Thurston Regional Planning Council 2025 Transportation Plan has designated College Street from Martin Way to Yelm Highway as a Strategy Corridor. Strategy Corridors are roadways where traditional performance measures based on capacity do not apply because community values or physical environmental constraints will not allow capacity improvements beyond a 5-lane section. Strategy Corridors occur in areas where increased density and infill are encouraged. Without the designation of a Strategy Corridor, growth may move to less dense areas where it is more practical to increase capacity. This could lead to urban sprawl which contradicts the Growth Management Act goals of limiting sprawl by increasing infill and density.

The City of Lacey recognizes College Street as a Strategy Corridor. The City considers the following factors in evaluating proposed improvements to Strategy Corridors:

- Provide high quality and fully intergraded bike, pedestrian, carpool, and transit services.
- Complete and connected grids
- Utilize Access Management Strategies
- Manage Parking
- Use aggressive Travel Demand Management Strategies
- Intensity Land Use in the urban core.

The recommended improvements for the College Street Corridor are consistent with the City's guidelines for Strategy Corridors as summarized below:

High Quality and Fully Intergraded Bike, Pedestrian, Carpool, and Transit Services

College Street is constrained by right of way limits with businesses and homes fronting College Street. The sidewalks are narrow and there are no bicycle lanes. Currently, Intercity Transit Route 64 provides hourly service to College Street with transfer stations near Lacey City Hall and Yelm Highway.

The Recommended Alternative provides Type III bicycle lanes (3-foot) and 10.5-foot sidewalks to improve non-motorized facilities, and access to transit routing.

Complete and Connected Grids

Connected grid streets provide multiple route options and encourage local traffic to use these routes over arterials. Potential grid connections are discussed under Neighborhood Circulation and Access Management Plan below.

Access Management

Access management for College Street is discussed under Neighborhood Circulation and Access Management Plan below.

Parking Management

There is currently no parking on College Street and the Recommended Alternative does not provide on-street parking due to limited rights-of-way.

Aggressive Travel Demand Management Strategies

The City of Lacey is implementing travel demand management strategies on a regional level:

- Encouragement of land use policies that provide public-private partnerships to develop parking prices consistent with demand in urban and employment areas
- Encouragement of travel during non-peak periods to take advantage of wasted capacity Encouragement of schools and large employers to implement travel demand management strategies

Land Use Intensification

Traditional capacity based concurrency requires added capacity to mitigate increased trips from development. College Street is mostly built-out and fronted by residences and business. Therefore, adding capacity would require significant right-of-way acquisition with displacement of homes and businesses. Designating College Street as a Strategy Corridor allows for land use intensification and infill. It centers growth in the urban core and discourages sprawl.

Neighborhood Circulation and Access Management Plan

The Neighborhood Circulation and Access Management Plan (NCAMP) recommends access management along College Street to balance throughput operations with left-turn access to abutting neighborhoods. The NCAMP calls for (1) raised-median access control along College Street, (2) median breaks to provide left-turn access to neighborhoods lacking access to other north-south arterials, (3)

driveway revisions to reduce the number of access points, and (4) street grid connections to give neighborhood access to other north-south arterials. Key recommendations of the NCAMP are shown in Figure 4. Detailed recommendations are shown on the attached roll map.

Raised-Median Access Control and Median Breaks

The NCAMP recommends a raised median to manage access. Access Management is a tool to address to reduce traffic congestion and reduce traffic collisions. The intent of Access Management is to provide access for abutting properties while preserving the flow of traffic in terms of safety, capacity and speed of travel. Studies show the uncontrolled proliferation of driveways and intersections along a corridor reduces the capacity, increases the number and severity of collisions, and inhibits bicycle and pedestrian usage. The benefits of access management include:

- Improved Safety - by reducing the number and severity of collisions;
- Improved Operations - by reducing delays while maximizing the potential roadway capacity;
- Reduced Environmental Impacts - by lowering the amount of air pollution caused by stop-and-go operation thereby increasing fuel economy; and
- Improved Economics - by preserving public investment in the roadway infrastructure, avoiding the need for roadway widening or other roadway improvements.

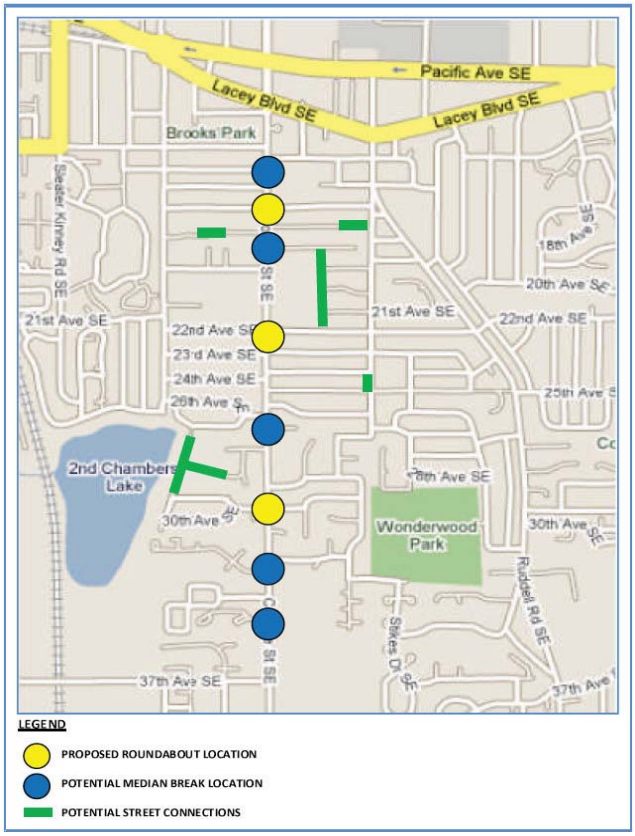


Figure 4 – Neighborhood Circulation Access and Management Plan

The NCAMP also recommends roundabouts at major intersections and median breaks at other key intersections to provide left-turn access. We considered the following approaches to identifying median break locations:

- Space median breaks to match the 660-foot standard spacing for College Street as a Major Arterial.
- Locate median breaks at the intersections with the highest left-turn volumes to/from side-streets.
- Locate median breaks at locked neighborhoods (i.e., abutting neighborhoods that lack access to other north-south arterials - Golf Club Road SE, Judd Street SE, or Ruddell Road SE).
    - Locate medians at the locked neighborhoods with the highest number of units (aka residences) in the neighborhood.
    - Located median breaks to book-end locked neighborhoods to minimize the longest distance traveled to a median break or roundabout for any neighborhood.

For the purpose of this memorandum, we are recommending one possible approach to locating medians. We are recommending median breaks to book-end locked neighborhoods so left-turn and/or u-turn access is less than ¼-mile from any locked neighborhood. As projects progress for implementing the recommended improvements, the median break locations should be revisited and other approaches considered. The median break locations could change in the future.

There are 14 locked neighborhoods/apartment complexes:

- College Park Apartments
- Chambers Crest Apartments
- Driveway across from 32nd Lane SE Private
- 32nd Lane SE Private
- Montclair Avenue SE
- College Lane SE
- 29th Avenue SE
- Driveway (west side of College) between 27th Court SE and 29th Avenue SE
- 27th Court SE
- 27th Land SE Private
- 18th Avenue SE East
- 17th Avenue SE West Leg
- 17th Avenue SE East Leg
- Diamond Head Apartments
- 13th Court SE

Median breaks are recommended at the following intersections:

- College Park Apartments
- Montclair Avenue SE
- 27th Lane SE Private
- 18th Ave SE
- Diamond Head Apartments/14th Way SE (west leg)

Driveway Revisions

There are approximately 130 driveways on College Street between 37th Avenue SE and Lacey Boulevard. There is a potential conflict point at each driveway for vehicle traffic, pedestrians, and/or bicyclists. Reducing the number of conflict points will improve safety by decreasing the potential for collisions. The majority of driveways are the single access points for residences and businesses fronting College Street.

The NCAMP reviewed the driveways along College Street and indentified potential consolidation, relocation, and removal of driveways. There are locations where adjacent properties could share one driveway (Shared). Single properties with multiple driveways are candidates for consolidation (Consolidation) or removal of one driveway (Removal). Properties with additional side street access are candidates for relocation (Relocation). Driveways to properties that are identified as potential full parcel takes (per the Horizontal Alignment and Right of Way Limits technical memorandum) were not evaluated (Right of Way Take). Lastly, there are two driveways marked for removal that front a vacant lot at 1326/1324 College Street (Vacant). The following is a summary of revisions:

- Shared – 1
- Consolidation – 7
- Relocation – 5
- Right of Way Take – 24
- Vacant – 2

A detailed listing of driveways and revisions is included as Attachment A.

Identifying Additional Neighborhood Connections

There is a grid system currently in place on the west side of College Street, Golf Club Road SE, 26th Avenue SE, and Lacey Boulevard. There is also a grid system on the east side between College Street,

Judd Street SE/Ruddell Road SE, 31st Avenue SE, and Lacey Boulevard. A review of the street network identified potential connection points to enhance the network and provide locked neighborhoods with access to other north-south arterials (i.e., Golf Club Road SE, Judd Street SE, or Ruddell Road SE). The potential connection points are as follows:

- Connect Lakeside Drive and Lakeview Drive and connect Muriel Dr to Lakeview Drive
- Connect 17th Ave SE (west leg) to Golf Club Road SE
- Connect 18th Ave SE (east leg) to Judd Street SE
- Connect 18th Ave SE to 22nd Ave SE immediately east of Mountain View Elementary
- Connect Judd Street between 24th Ave SE and 25th Ave SE

Traffic Analysis

The designation of College Street as a Strategy Corridor allows for implementation of policy points that encourage multi-modal travel while limiting the increase of single occupancy vehicles. While traditional capacity based concurrency does not apply to College Street, it is valuable to forecast how the corridor will operate.

The traffic data used for analysis is from counts during the PM peak hour. Turning movements to and from the side streets were collected. Previously, turning movement counts were collected on College Street at the intersections of Lacey Boulevard, 22nd Avenue SE, and 37th Avenue SE. A concept-level traffic analysis was conducted based on the information collected and future conditions from the regional planning model. The data and forecast volumes used for the analysis were collected from one peak hour.

Approaches to analyze College Street for existing conditions and for a build out year are described below.

Existing Condition

- Turning movement counts collected for Lacey Boulevard, 22nd Avenue SE and 37th Avenue were used to approximate the through volumes for College Street at the other intersections in the study limits.
- Side Street and driveway turning movement counts were added to the College Street through movements.
- The Level of Service (LOS) for stop controlled intersections was calculated for each intersection using Highway Capacity Software. LOS for stop controlled intersection is based on the worst movement with the most delay and does not report on the overall performance of the intersection.

Build Out

- The build out forecast volume is 32,000 vehicles per day on College Street per the Thurston County Regional Planning Council travel demand model.
- The Design Hourly Volume was assumed to be 10 percent to determine an hourly rate of 800 vehicles per lane per hour.
- Side street traffic was re-routed to account for medians, median breaks, and roundabouts.
- The LOS for stop controlled intersections was calculated for each side street using Highway Capacity Software.
- The LOS for roundabout intersections was calculated using SDIRA software and is based on the average delay of the entire intersection. The following steps were used to calculate the LOS:
    - Assume a two-lane approach on College
    - Assume a one-lane approach on Side Street
    - Use a degree of saturation equal to .85 which is recommended for design applications. (Ratio of volume versus theoretical capacity)
    - Increase the side street volume until the degree of saturation reaches 0.85
    - Compare the side street volume at saturation with current traffic counts.

Results for Existing Stop Controlled Intersections

A review of the traffic data shows some patterns indicating the side street access is constrained in the PM peak by the heavy volume on College Street. The highest right-turn volume counted from a side street was 142 vehicles at 14th Avenue SE. In contrast, the highest left turn volume counted from a side street was 11 vehicles at 29th Avenue SE and Chamber Crest Apartments. The LOS at 14th Avenue SE, including the 142 right turning vehicles, is C. However, the LOS at 29th Avenue SE and at Chamber Crest Apartments is E, even though the volume is much less than at 14th Avenue SE. The LOS for 2008 PM peak hour stop controlled intersections is shown in the table below.

Table 1
2008 PM Peak Hour Stop Controlled Intersection LOS

Intersection	Worst Movement	LOS	Delay(sec)	Overall I/S LOS
13th Ave	EB	C	15.4	C
13th CT	WB	B	14.6	B
14th Ave West Leg	EB	D	30.2	C
14th Ave East Leg	WB	C	15.8	B
14th Way	WB	C	15.8	C
Diamond Head Apartments N Dr	WB	B	11	B
15th Ave SE	EB	B	14.9	B
Diamond Head Apartments S Dr	EB	B	11	A
16th Ave SE	EB	B	14.9	B
17th Ave SE West Leg	EB	C	22.9	C
17th Ave SE East Leg	WB	B	14.5	B
18th Ave SE	WB	B	14.2	B
19th Ave/Mountain View	EB	C	19.1	C
22nd Ave SE	WB	C	16.6	C
23rd Ave SE	EB	D	27.2	D
24th Ave SE West Leg	EB	C	15.1	B
24th Ave SE East Leg	WB	D	30.7	B
25th Ave SE	WB	B	12.4	B
26th Ave SE West Leg	EB	C	21.5	B
26th Ave SE East Leg	WB	C	15.1	C
27th Ave SE	EB	D	32.3	D
27th CT SE	EB	E	50	D
28th Ave SE	WB	C	19.3	B
29th/Belair	EB	E	40.5	C
College Ln SE	WB	B	10.4	A
31st Ave SE	WB	C	18.5	B
Montclair Dr	EB	C	17.7	C
32nd Lane	EB	E	48.9	E
Chambers Crest Apartments N Dr	EB	E	43.2	D
College Park Apartments	EB	E	39.2	D
Komachin Middle School N DR	WB	B	10.4	A

Results for Build-Out PM Peak Hour

The raised median changes many intersections by eliminating left turns. Since the left turn movements add the most delay, the LOS does not degrade on College Street even with growth in volume. In the areas where left turns are allowed the LOS is F for stop controlled intersections due to heavy volumes on College Street. In these areas it will be very difficult to make left turns during peak hours, but the ability

to make left turns will increase in the off peak areas. The results of the Build-Out PM Peak Hour LOS are shown in the table below.

Table 2
Build Out PM Peak Stop Controlled Intersection LOS

	Southbound		Northbound		
Intersection	**LOS[1]**	**Delay**	**LOS[1]**	**Delay**	**Intersection**
13th Ave SE	C	17.4			
			C	16.0	13th CT
14th Ave West Leg	D	30.2			
			C	15.5	14th Ave East Leg
14th Way SE	(F/D)	(69.8/34.1)			***Diamond Head Apts (Median Break)***
15th Ave SE	B	14.5			
16th Ave SE		**ROUNDABOUT**			**16th Ave SE**
17th Ave SE West Leg	C	15.8			
			B	14.5	17th Ave SE East Leg
			(E/D)	(41.7/30)	***18th Ave SE (Median Break)***
19th Ave / Mountain View	C	15.7	C	15.0	19th Ave/Mountain View
22nd Ave SE		**ROUNDABOUT**			**22nd Ave SE**
23rd Ave SE	C	15.9	B	14.8	23rd Ave SE
24th Ave SE West Leg	B	14.7			
			B	14.6	24th Ave SE East Leg
			A	8.4	25th Ave SE
26th Ave SE West Leg	C	15.5			
			B	14.9	26th Ave SE East Leg
					27th Ave SE
27th CT SE (Median Break)	(F/F)	(147.1/69.1)			
			C	15.2	28th Ave SE
29th/Belair		**ROUNDABOUT**			**29th/Belair**
			B	14.3	College Ln SE
			C	15.2	31st Ave SE
Montclair Dr (Median Break)	(F/C)	(61.2/30)			
32nd Lane	B	14.3			
Chambers Crest Apartments	B	14.9			
College Park (Median Break)	(D/D)	(31.4/26.8)			
			B	14.4	Komachin Middle School N DR

1. LOS is reported as (worst movement/overall intersection) for stop-controlled side streets.

Results for Build-Out PM Peak Hour Roundabout Controlled Intersections

The analysis shows roundabouts will handle 325 vehicles per hour from side streets when College Street volumes are 800 vehicles per lane and 271 vehicles per hour from side streets when College Street volumes are 900 vehicles per lane. The highest volume counted on a side street at a proposed roundabout location is 64 vehicles in the peak hour. At the volume rates used for College Street, the side street would have to increase by over 400 percent before the roundabout operation would begin to degrade. Even at these volumes the level of service for the side street approaches is C with a maximum delay of 32.1 seconds.

Table 3
Test Case 800 Vehicles Per Lane

Approach	Demand Flow Rate (veh/h)	Degree of Saturation	LOS	Ave Delay (sec)
Northbound	1957	0.75	A	8.7
Southbound	1957	0.75	A	8.7
Eastbound	325	0.839	C	27.9
Westbound	325	0.839	C	27.9

Table 4
Test Case 900 Vehicles Per Lane

Approach	Demand Flow Rate (veh/h)	Degree of Saturation	LOS	Ave Delay (sec)
Northbound	2174	0.8	A	8.8
Southbound	2174	0.8	A	8.8
Eastbound	271	0.81	C	32.1
Westbound	271	0.81	C	32.1

Findings

The proposed improvements for the College Street Corridor from 37th Avenue SE to Lacey Boulevard comply with Strategic Corridor requirements per Lacey Municipal Code 14.21. The proposed access management shown on the Neighborhood Circulation and Access Management Plan strikes a reasonable balance between throughput operations and neighborhood access. Driveway revisions can maintain access while improving safety by reducing the number of conflict points. Potential grid connections can further enhance neighborhood access and circulation by providing access to other north-south arterials, such as Golf Club Road SE, Judd Street SE, and Ruddell Road SE. Some stop control intersections will experience significant delays making left turns in the PM peak hour due to heavy volumes on College Street. Alternatively, vehicles can turn right and make a u-turn at the nearest roundabout or median break. Left-turns from side streets are more likely that during off peak periods. The roundabouts operate well in the build out year.

Figure 5 – Neighborhood Circulation Access and Management Plan

Recommendations

WHPacific recommends the access management strategies as shown on the Neighborhood Circulation and Access Management Plan (roll plan) for medians, median breaks, roundabouts, driveway revisions, and grid connections. Key recommendations from the plan are shown in Figure 5.

Attachments

Attachment A – Detailed Driveway Inventory and Revisions

Attachment A – Detailed Driveway Inventory and Revisions

NUMBER	STATION	OFFSET	EXISTING WIDTH	SITE ADDRESS	SITE USE	DRIVEWAY REVISION	COMMENT
1	116+75.39	LT	22'	3515 COLLEGE ST. SE	RENTAL/POSSIBLY BUSINESS	RW FULL TAKE	FULL TAKE DW - HAS ACCESS TO REAR OF PROPERTY FROM 3511
2	117+43.86	LT	32'	3511 COLLEGE ST. SE	DUPLEX - SHARED WITH 3515	REMAIN	MAY BE ABLE TO SHARE WITH 3515
3	118+71.62	LT	25'	3501 TO 3507 COLLEGE ST. SE	SHARED FOR TWO DUPLEXS	REMAIN	
4	119+40.13	LT	24'	3413 AND 3415 COLLEGE ST. SE	DUPLEX	REMAIN	
5	119+61.03	RT	36'	KOMACHIN MIDDLE SCHOOL	SCHOOL	REMAIN	
6	120+54.81	LT	30'	3407 AND 3409 COLLEGE ST. SE	SHARED - RESDENTIAL	REMAIN	
7	120+79.31	RT	22'	3460 TO 3548 COLLEGE ST. SE	SHARED - RESDENTIAL	REMAIN	
8	122+80.21	RT	26'	3320 TO 3430 COLLEGE ST. SE	SHARED - RESDENTIAL	REMAIN	
9	124+46.65	RT	22'	3206 A & B COLLEGE ST. SE	SHARED - RESDENTIAL	REMAIN	
10	125+19.41	LT	40'	3201 COLLEGE ST. SE	RESIDENTIAL	RELOCATE	CONSTRUCT OFF 32ND LANE SE
11	126+24.02	RT	29'	CITY OF LACEY AND RESIDENTS	SHARED	REMAIN	3108, 3110 A&B, AND 3112 AND WATER TOWER ACCESS
12	126+45.64	LT	21'	32ND LN. SE PVT.	SHARED - RESDENTIAL	REMAIN	
13	127+32.95	RT	16'	3106 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
14	127+90.59	LT	20'	4529 MONTCLAIR AVE. SE	RESIDENTIAL	REMAIN	ACCESS OFF MONTCLAIR
15	128+16.88	LT	22'	4530 MONTCLAIR AVE. SE	RESIDENTIAL	REMAIN	ACCESS OFF MONTCLAIR
16	128+96.20	RT	17'			REMAIN	ACCESS OF COLLEGE, GARAGE FACES COLLEGE
17	129+51.46	RT	31'	4601 31ST AVE. SE	RESIDENTIAL	REMAIN	ACCESS OF 31ST
18	129+79.14	RT	21'	4602 31ST AVE. SE	RESIDENTIAL	REMAIN	ACCESS OF 31ST
19				3041 COLLEGE ST. SE	VACANT LOT	FUTURE	
20	131+18.86	LT	21'	3001 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
21	131+61.25	LT	18'				DUAL ACCESS OFF COLLEGE
22	132+14.64	LT	12'	2905 COLLEGE ST. SE	RESIDENTIAL	CONSOLIDATION	DUAL ACCESS OFF COLLEGE
23	131+69.13	RT	10'	3032 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
24	132+96.06	RT	17'	3026 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
25	133+29.15	LT	16'	3015 & 3023 COLLEGE ST. SE	SHARED 2-DUPLEXES	REMAIN	
26	133+52.12	RT	20'	COLLEGE LN HOME OWNERS ASSOC.	SHARED	REMAIN	
27	135+16.02	RT	19'	3006 COLLEGE ST. SE	RESIDENTIAL	REMAIN	VERT. CHALLENGE
28	136+44.85	RT	23'	4605 29TH AVE. SE	RESIDENTIAL	RW FULL TAKE	FULL TAKE FOR ROUNDABOUT
29	136+74.55	RT	16'	4604 29TH AVE. SE	RESIDENTIAL	RW FULL TAKE	FULL TAKE FOR ROUNDABOUT
30	136+77.67	LT	19'	4520 29TH AVE. SE	RESIDENTIAL	RW FULL TAKE	FULL TAKE FOR ROUNDABOUT
31			17'	4517 29TH CT. SE	RESIDENTIAL	RW FULL TAKE	FULL TAKE FOR ROUNDABOUT
32	137+98.33	RT	19'	2822 COLLEGE ST. SE	RESIDENTIAL	RELOCATE/RW FULL TAKE	FULL TAKE DW IMPACT-COULD CONSTRUCT NEW GARAGE 4604
33	138+43.60	LT	28'	2721 COLLEGE ST. SE & OTHERS	SHARED - RESDENTIAL	REMAIN	
34	138+82.14	RT	13'	2818 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
35				4600 28TH AVE. SE	RESIDENTIAL	REMAIN	NEW HOUSE NOT SURE WHERE IT'S AT (OFF 28TH AVE. ?)
36				4604 28TH AVE. SE	RESIDENTIAL	REMAIN	NEW HOUSE NOT SURE WHERE IT'S AT MAY SHARE WITH 4600
37	139+72.18	LT	21'	2719 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
38	141+02.65	LT	24'	2717 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
39	141+71.89	LT	19'	2713 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
40	141+90.66	RT	15'				DUAL ACCESS OFF COLLEGE
41	143+33.82	RT	16'	2706 COLLEGE ST. SE	RESIDENTIAL	CONSOLIDATION	DUAL ACCESS OFF COLLEGE
42	142+12.95	LT	20'	2709 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
43	142+93.38	LT	28'	2705 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
44	143+55.28	RT	14'	2702 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
45	143+67.58	LT	19'	2701 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
46	144+77.53	LT	36'	2617 COLLEGE ST. SE	RESIDENTIAL	REMAIN	DRIVEWAY IS OFF 27TH CT. SE

Attachment A – Detailed Driveway Inventory and Revisions

NUMBER	STATION	OFFSET	EXISTING WIDTH	SITE ADDRESS	SITE USE	DRIVEWAY REVISION	COMMENT
47	144+94.62	RT	12'	2700 COLLEGE ST. SE	RESIDENTIAL	REMAIN	THICK TREES NOT SURE WHATS IN THERE
48	145+40.36	RT	18'	2626 COLLEGE ST. SE	DAYCARE FACILITY	REMAIN	
49	146+84.63	LT	26'	2613 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
50	147+19.20	RT	18'	4805 27TH LN. SE PVT.	RESIDENTIAL	REMAIN	NEW HOUSE THIS LOT
51	147+30.24	RT	20'	27TH LN. SE PVT.	SHARED - RESDENTIAL	REMAIN	27TH LN. SE PVT. - 7 HOUSES
52	147+60.94	LT	23'	2609 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
53	148+72.63	RT	20'	2606 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
54	149+03.51	LT	18'	4529 26TH AVE. SE	RESIDENTIAL	REMAIN	OFF 26TH
55	149+13.19	RT	15'				DUAL ACCESS OFF COLLEGE
56	149+42.68	RT	12'	2602 COLLEGE ST. SE	RESIDENTIAL	CONSOLIDATION	DUAL ACCESS OFF COLLEGE
57	149+33.53	LT	13'	4530 26TH AVE. SE	RESIDENTIAL	REMAIN	DUAL ACCESS OFF 26TH - THIS ONE IS CLOSE TO INTERSECTION
58	149+34.34	LT	13'	4530 26TH AVE. SE	RESIDENTIAL	REMAIN	DUAL ACCESS OFF 26TH AND GO TO GARAGE
59	150+74.65	LT	18'	2509 COLLEGE ST. SE	BUSINESS/RESIDENTIAL ?	REMOVE	DUAL ACCESS US SHARED
60	151+27.34	LT	18'	2505 & 2509 COLLEGE ST. SE	BUSSINESS/RESIDENTIAL ?	SHARED	KEEP THIS ONE
61	151+42.49	LT	12'	2505 COLLEGE ST. SE	BUSINESS/RESIDENTIAL ?	REMOVE	DUAL ACCESS US SHARED
62	152+05.95	LT	34'	2501 & 2505 COLLEGE ST. SE	BUSSINESS - SHARED	REMAIN	
63	150+82.02	RT	7'				FULL TAKE - HAD DUAL ACCESS
64	151+46.79	RT	10'	2506 COLLEGE ST. SE	RESIDENTIAL	RW FULL TAKE	FULL TAKE - HAD DUAL ACCESS
65	152+59.67	RT	22'	2502 COLLEGE ST. SE.	RESIDENTIAL	RW FULL TAKE	ACCESS OFF 25TH
66	153+24.88	LT	14'	2405 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
67	154+26.22	LT	41'	2401 COLLEGE ST. SE	RESIDENTIAL	REMAIN	ACCESS OFF 24TH AVE. SE
68	154+47.43	LT	16'	2315 COLLEGE ST. SE	RESIDENTIAL	REMAIN	ACCESS OFF 24TH AVE. SE
69	155+19.53	RT	20'	2406 COLLEGE ST. SE	RESIDENTIAL	REMAIN	ACCESS OFF 24TH AVE. SE
70	155+46.95	LT	21'	2309 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
71	155+51.41	RT	24'	4602 24TH AVE. SE	RESIDENTIAL	RW FULL TAKE	STRUCT. FULL TAKE ACCESS OFF 24TH AVE. SE
72				4531 23RD AVE. SE	RESIDENTIAL	REMAIN	ACCESS OFF 23RD AVE. SE
73	157+56	LT	20'	4537 23RD AVE. SE	RESIDENTIAL	REMAIN	ACCESS OFF 23RD AVE. SE
74	157+85.94	RT	21'	4603 23RD AVE. SE	RESIDENTIAL	RW FULL TAKE	STRUCT. FULL TAKE ACCESS OFF 23RD AVE. SE
75	158+72.58	LT	20'	2213 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
76	160+83.87	RT	16'	4705 22ND AVE. SE	CHURCH	REMAIN	ACCESS OFF 22ND AVE. SE
77	160+87.79	LT	28'	4525 22ND AVE. SE	BUSINESS	RW FULL TAKE	ROUNDABOUT FULL TAKE ACCESS OFF 22ND AVE.
78	161+09.29	LT	28'	4514 & 4516 22ND AVE. SE	DUPLEX	REMAIN	
79	161+18.65	LT	29'	2121 & 2119 COLLEGE ST. SE	DUPLEX	RW FULL TAKE	ROUNDABOUT FULL TAKE ACCESS IN INTERSECTION OF 22ND AND COLLEGE
80	162+44.84	LT	19'	2121, 2119 & 2117 COLLEGE ST. SE	SHARED	RELOCATE	2117 IS ACTUALLY WEST ON 22ND AVE. CONSTRUCT OFF 22ND
81	162+90.29	LT	23'			REMAIN	
82	165+52.19	LT	25'	2109 COLLEGE ST. SE	CHURCH	REMAIN	DUAL ACCESS - CLOSE TO PED X-ING SIGNAL
83	164+66.30	RT	28'			REMAIN	LT/RT IN - RT OUT ONLY (EXISTING)
84	169+16.51	RT	40'	1900 COLLEGE ST. SE	SCHOOL	REMAIN	EXIT ONLY - MAIN ACCESS OUT FOR SCHOOL
85	166+05.13	LT	22'	1921 COLLEGE ST. SE	BUSINESS	RW FULL TAKE	STRUCT. FULL TAKE ACCESS OFF COLLEGE
86	167+31.63	LT	15'	1915 A & B COLLEGE ST. SE	DUPLEX	REMAIN	
87	169+08.68	LT	30'	1903 COLLEGE ST. SE	DUPLEX	REMAIN	ACCESS IS OFF 19TH AVE. SE ALREADY
88	171+14.97	RT	17'				DUAL ACCESS OFF COLLEGE - THIS ONE GOES TO GARAGE
89	171+54.34	RT	10'	4605 18TH AVE. SE	RESIDENTIAL	CONSOLIDATION	DUAL ACCESS OFF COLLEGE - REMOVE THIS ONE
90	172+29.57	RT	22'	4604 18TH AVE. SE	RESIDENTIAL	REMAIN	ACCESS OF 18TH, BUT TIGHT AT INTERSECTION
91	173+06.04	LT	9'	1705 COLLEGE ST. SE	RESIDENTIAL	RW FULL TAKE	STRUCT. FULL TAKE ACCESS OFF COLLEGE
92	174+33.91	LT	118'				DUAL ACCESS-THIS IS OFF 17TH

Attachment A – Detailed Driveway Inventory and Revisions

NUMBER	STATION	OFFSET	EXISTING WIDTH	SITE ADDRESS	SITE USE	DRIVEWAY REVISION	COMMENT
93	174+98.51	LT	32'	1613 COLLEGE ST. SE	MINI-MART	CONSOLIDATION	DUAL ACCESS-THIS IS OFF COLLEGE - REMOVE BECAUSE OF STRIP TAKE
94	174+84.51	RT	25'	4603 17TH AVE. SE	RESIDENTIAL	REMAIN	TIGHT TO INTERSECTION
95	175+10.42	RT	34'	4604 17TH AVE. SE	RESIDENTIAL	REMAIN	TIGHT TO INTERSECTION
96	175+66.35	LT	14'	1605 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
97	176+07.18	LT	17'			RW FULL TAKE	STRUCT. FULL TAKE ACCESS OFF COLLEGE
98	177+41.66	LT	28'	1601 COLLLEGE ST. SE	BUSINESS	RW FULL TAKE	STRUCT. FULL TAKE ACCESS OF 16TH AVE. SE
99	177+44.64	RT	14'	4603 16TH AVE. SE	RESIDENTIAL	RW FULL TAKE	ROUNDABOUT FULL TAKE ACCESS OFF 16TH AVE. SE
100	177+62.58	LT	14'	4524 16TH AVE. SE	RESIDENTIAL	RW FULL TAKE	ROUNDABOUT FULL TAKE ACCESS OFF 16TH AVE. SE
101	179+04.43	LT	18'	1507 COLLEGE ST. SE	RESIDENTIAL	REMAIN	
102	177+68.74	RT	38'	1510 COLLEGE ST. SE	APARTMENT COMPLEX	REMAIN	ACCESS OFF OF 16TH AVE. SE
103	179+32.51	RT	25'	1510 COLLEGE ST. SE	APARTMENT COMPLEX	REMAIN	ACCESS OFF OF COLLEGE
104	180+29.49	RT	31'				OFFICE DUAL ACCESS - MAY BE ABLE TO REDUCE TO ONE
105	181+42.47	RT	28'	1510 COLLEGE ST. SE	APARTMENT COMPLEX	CONSOLIDATION	OFFICE DUAL ACCESS - MAY BE ABLE TO REDUCE TO ONE
106	182+31.66	RT	24'	1510 COLLEGE ST. SE	APARTMENT COMPLEX	REMAIN	ACCESS OFF COLLEGE
107	180+22.65	LT	34'	4525 15TH AVE SE	RESIDENTIAL	REMAIN	
108	180+44.47	LT	29'				DUAL ACCESS - THIS IS OFF 15TH
109	181+36.23	LT	27'	1423 COLLEGE ST. SE	RESIDENTIAL	RELOCATE	DUAL ACCESS - THIS IS OFF COLLEGE AND TO GARAGE MAY BE ABLE TO CLOSE
110	181+75.53	LT	18'				DUAL ACCESS - THIS IS OFF COLLEGE AND TO GARAGE MAY BE ABLE TO CLOSE
111	182+55.28	LT	15'	1419 COLLEGE ST. SE	RESIDENTIAL	RELOCATE	DUAL ACCESS - THIS IS OFF 14TH WAY
112	182+79.74	LT	21'	1415 COLLEGE ST. SE	BUSINESS	REMAIN	ACCESS IS OFF 14TH WAY
113	184+13.72	RT	23'	4601 14TH AVE. SE	RESIDENTIAL	RW FULL TAKE	STRUCT. FULL TAKE ACCESS OFF 14TH AVE. SE
114	184+19.16	LT	29'	1415, 1407 & OTHERS COLLEGE ST. SE	RESIDENTIAL & BUSINESS	REMAIN	
115	184+39.88	RT	26'	4602 14TH AVE. SE	RESIDENTIAL	RW FULL TAKE	STRUCT. FULL TAKE ACCESS OFF 14TH AVE. SE
116	185+66.56	LT	40'	1407 COLLEGE ST. SE	BUSINESS	REMAIN	ACCESS IS OFF 14TH AVE. SE
117	185+96.18	LT	10'	4560 14TH AVE. SE	RESIDENTIAL	REMAIN	DUAL ACCESS - THIS GOES TO HOUSE
118	186+20.38	RT	20'	1328 COLLEGE ST. SE	RESIDENTIAL	RW FULL TAKE	STRUCT FULL TAKE ACCESS OFF COLLEGE
119	186+46.46	RT	10'	1326 COLLEGE ST. SE	VACANT LOT	VACANT	
120	186+84.48	RT	10'	1324 COLLEGE ST. SE	VACANT LOT	VACANT	
121	187+35.80	LT	16'	RIGHT-OF-WAY	RESIDENTIAL & BUSINESS	REMAIN	
122	188+12.21	RT	30'	1320 COLLEGE ST. SE	RESIDENTIAL	RW FULL TAKE	STRUCT. FULL TAKE - ACCESS IS OFF 13TH CT.
123	188+51.27	RT	70'	1308 COLLEGE ST. SE	BUSINESS	RW FULL TAKE	STRUCT. FULL TAKE - ACCESS IS OFF 13TH CT.
124	188+56.19	LT	22'				DUAL ACCESS - THIS GOES TO PARKING LOT
125	189+13.46	LT	18'	1307 COLLEGE ST. SE	BUSINESS	CONSOLIDATION	REMOVE, DON'T THINK THIS IS USED
126	189+70.48	RT	32'	1302 COLLEGE ST. SE	BUSINESS	RW FULL TAKE	DW FULL TAKE UNLESS WE USE 1308 PARCEL AND REBUILD A PORTION
127	190+31.88	LT	40'	1303 COLLEGE ST. SE	BUSINESS	REMAIN	ACCESS IS OFF 13TH AVE. SE

Appendix D

WHPacific

724 Columbia Street NW, Suite 140

Olympia, Washington 98501

360.754.3375 ◆ fax 360.754.1195

TECHNICAL MEMORANDUM

Date:	October 10, 2008 Rev 4/17/09	**RE:**	**Improvements Phasing Plan**
To:	Martin Hoppe, P.E., PTOE	**From:**	Scott Sawyer, P.E.
Company:	City of Lacey	**Title:**	Sr. Project Manager
Phone:	360.438.2681	**Phone:**	360.918.5305
Fax:	360.456.7799	**Fax:**	360.754.1195
Address:	420 College Street SE		
	Lacey, WA 98509-3400	**Project #:**	34709
		Project Name:	College Street Improvement Report

Purpose

The purpose of this technical memorandum is (1) present a recommended phasing for improvements to College Street, and (2) to summarize planning-level project cost estimates for each phase.

Summary

We evaluated alternative construction phasing options for improvements to College Street from 37th Avenue SE to Lacey Boulevard. We based the phasing options based on operational benefit and practical project size. First, we gave priority to projects providing more operational benefit. Second, we defined project limits to keep the costs for individual projects between $1M and $5M (in 2008 dollars), specifically to match a range of project sizes typically funded by grant opportunities. We developed two viable approaches as shown in Attachment A. Note that any of the identified projects could be increased or decreased in scope to match funding opportunities.

Both approaches construct the roundabouts first, and the three roundabouts are ordered by highest entering volumes (22nd Avenue SE first, 29th Avenue SE second, and 16th Avenue SE third). The roundabouts are constructed first to provide u-turn opportunities for properties before center medians are constructed and access points are modified. The segments between roundabouts are ordered from north to south, since the traffic volumes are higher for the northerly segments.

Option 1 has seven phases ranging in cost from $2.1M to $5.7M. Option 2 has five phases ranging in cost from $3.1M to $7.5M.

Table 1
Phasing Options with Phase Costs

Option 1			Option 2		
Phase	**Cost[1]**	**Description**	**Phase**	**Cost[1]**	**Description**
Phase 1	$2,050,000	22nd Ave RAB	Phase 1	$4,990,000	22nd & 29th RABs
Phase 2	$2,940,000	29th Ave RAB	Phase 2	$7,463,000	16th RAB/Lacey to 16th
Phase 3	$3,100,000	16th Ave RAB	Phase 3	$3,060,000	16th to 22nd
Phase 4	$4,363,000	Lacey to 16th	Phase 4	$5,736,000	22nd to 29th
Phase 5	$3,060,000	16th to 22nd	Phase 5	$4,754,000	29th to 37th
Phase 6	$5,736,000	22nd to 29th	----	----	
Phase 7	$4,754,000	29th to 37th	----	----	
TOTALS	**$26,003,000**			**$26,003,000**	

1. Costs are in 2008 dollars

Background

Existing Conditions

College Street from Lacey Boulevard to 37th Avenue SE is a four-lane National Highway System (NHS) principal arterial with a general right-of-way width of 60 feet. The existing street width is approximately 45 feet from curb to curb. There are narrow sidewalks located along the corridor on each side of the street. The corridor is a built environment fronted by homes, small businesses, apartments, and schools.

College Street provides a primary north-south link for traffic, transit, pedestrians, and bicyclists within the City from south Thurston County to Interstate 5. The corridor currently carries 21,000 (2005 traffic count) and is projected to carry 32,000 vehicles per day by 2020 according to the Lacey Transportation Plan (College Street is identified as a Strategy Corridor in the Lacey Transportation Plan[1]). The corridor also provides local access to many homes fronting the street and provides access to several local streets and collectors.

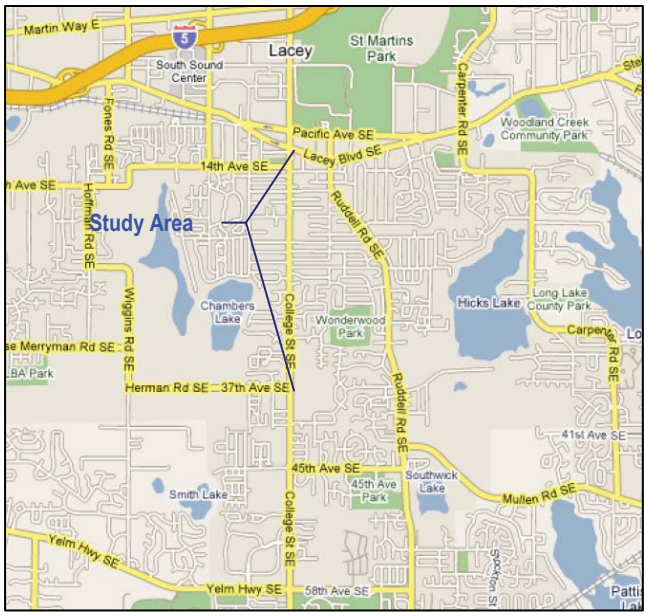


Figure 1 - Vicinity Map

Traffic is heavy along the corridor and congested during peak hours. Vehicles turning left from College Street to homes or local streets increase congestion by occupying the inside through-lane while waiting for breaks in traffic. There are approximately 130 driveways 24 T-intersections, and four 4-way intersection collectively generating significant turn volumes. There are high-frequency collision locations along the corridor due to conflicts between turning vehicles and high volumes of through traffic. Narrow sidewalks, high volumes, and a lack of bike lanes discourage use by pedestrians and bicyclists. A lack of

[1] City of Lacey, *2004 Lacey Transportation Plan*, page 55.

street amenities (i.e., planter strips/vegetation, decorative street lighting, street furniture) conflicts with community values articulated by City staff and City Council.

Previous Work

Previous study work resulted in a report, "College Street, Evaluation of Options", August 2005. This report documented a comprehensive alternatives analysis that scored and ranked ten options (nine build and one no-build) for improvements to College Street that addressed the corridor needs. The report recommended Option 9 as the preferred option, because it best provides a blend of corridor capacity, neighborhood connectivity, non-motorized uses, and corridor aesthetics. The cross-section included a planted center median to control access and provide space for left-turn lanes at key intersections; wide sidewalks with tree wells to promote walk-ability; space for commuting bicycles; and roundabouts at major intersections to provide intersection control. The overall right-of-way width of 72 feet widens to 76 feet at left-turn lane locations.

The current study work began in February 2008 and consists of the following tasks:

- *Alternatives Analysis* to define the recommended dimensions of the cross-sectional elements;
- *Horizontal Alignment and Right-of-Way* to define the recommended alignment;
- *Neighborhood Circulation and Access* to define recommended changes to street access and/or driveway access; and
- *Improvements Phasing Plan* to estimate project costs and define recommended phasing for the improvements.

WHPacific prepared an *Alternatives Analysis* technical memorandum, dated April 11, 2008. The memorandum presented ranges of dimensions for roadway cross-sectional elements (median width, left-turn lane width, through-lane width, space for bicyclists, planter/tree well width, and sidewalk width), and recommended a proposed cross-section for College Street for use in subsequent study work. The recommended cross-section is shown in Figure 2.

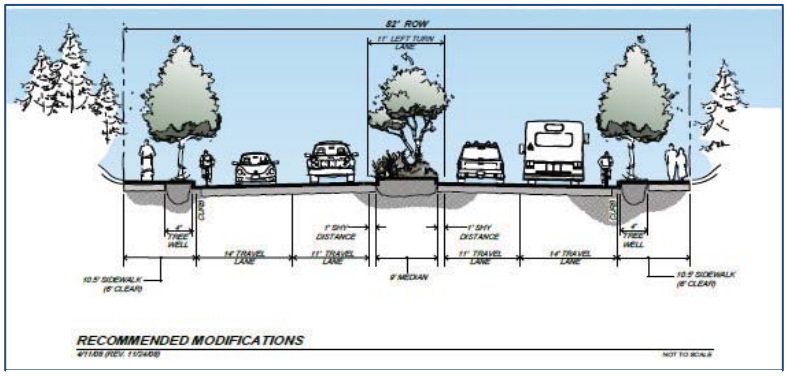


Figure 2 – Recommended Alternative

WHPacific prepared a *Horizontal Alignment and Right-of-Way Limits* technical memorandum dated July 29, 2008. The memo recommended aligning the cross-section shown in Figure 2 as follows:

- Segment 1 (37th Ave SE to 29th Ave SE) - Aligned against the easterly right-of-way line;
- Segment 2 (29th Ave SE to 22nd Ave SE) - Aligned against the westerly right-of-way line;
- Segment 3 (22nd Ave SE to 16th Ave SE) - Aligned against the easterly right-of-way line; and
- Segment 4 (16th Ave SE to Lacey Boulevard SE) - Aligned against the westerly right-of-way line.

Lastly, WHPacific prepared a *Neighborhood Circulation and Access* technical memorandum dated August 7, 2008. The memo recommended access management strategies (center medians, median-beak locations, driveway modifications, and street connections), and reported traffic operational performance for the recommended roundabout locations.

Median breaks are recommended at the following intersections:

- College Park Apartments

- Montclair Avenue SE
- 27th Lane SE Private
- 18th Ave SE
- Diamond Head Apartments/14th Way SE (west leg)

The potential street connections are as follows:

- Connect Lakeside Drive and Lakeview Drive and connect Muriel Dr to Lakeview Drive
- Connect 17th Ave SE (west leg) to Golf Club Road SE
- Connect 18th Ave SE (east leg) to Judd Street SE

The all legs of the proposed roundabouts are predicted to operate at Level of Service C or better in the Build-Out condition (2030).

Recommended Phasing

Approach

Traffic Operational Benefit

Precedent was given to improvements that provide the best operational benefit. The primary operational deficiency in the corridor is the high number of left-turns degrading through-put and increasing collisions. Controlling access with center medians is the recommended solution. However, we are recommending construction of the roundabouts before the center medians. If the roundabouts are built first, they provide opportunities for vehicles to u-turn as soon as the center-median construction alters access. Therefore, we recommend construction of the roundabouts first. We phased the roundabouts in order of highest traffic volume with 22nd Avenue SE built first, 29th Avenue SE built second, and 16th Avenue SE built third. After the roundabouts we phased the segments (roadway improvements between roundabouts) from north to south, since the corridor experiences the highest volumes at the north end of the corridor.

Rough Order of Magnitude (ROM) Costs for Defining Project Limits

We sought to size the projects between $1M and $5M in project costs to keep projects are at a practical size for funding and City staffing. We developed rough order of magnitude (ROM) cost estimates to help us define project limits falling within the desired size range. We use the following assumptions/methods to develop the ROM estimates:

- We used right-of-way costs from the *Horizontal Alignment and Right-of-Way Limits* technical memorandum.
- We used City-provided quantities from the College/45th roundabout project and updated unit costs to current market rates using bid tabs from Mullen Road and other sources to estimate the construction cost for the roundabouts.
- We used project costs from the Mullen Road project to estimate costs for the following items based on prorating the square-footage of pavement for College Street compared to Mullen Road:
    - storm drainage; and
    - channelization.
- We generated an estimated per linear foot cost for roadway improvements by calculating rough quantities over a mile long road segment with assumptions based on City of Lacey, *Development Guidelines and Public Works Standards*, July 2005. We also refined our assumptions based a field walk through. We calculated quantities for the following bid items:
    - roadway excavation – assumed 1’ depth;
    - embankment compaction – assumed 1’ depth;
    - street lights;

- street trees and tree grates;
- median planting (shrubs and plants per square foot costs and street trees);
- median irrigation per square foot;
- curb and gutter – a percentage of the total distance of the one mile segment;
- traffic curb for medians – a percentage of the total distance of the one mile segment;
- sidewalks – a percentage of the total distance of the one mile segment;
- driveways – a percentage of the total distance of the one mile segment;
- driveway approaches;
- asphalt and crushed rock based on horizontal alignment comparison cost breakdown from the *Horizontal Alignment and Right-of-Way Limits* technical memorandum;
- clear and grub;
- Puget Sound Energy conversion, joint trench, and electrical conversion;
- curb, sidewalk, and driveway removal based on a percentage of the total distance of the one mile segment; and
- seeding for yards based on assumed impact for excavation and embankment;

Findings

Based on traffic operational benefit and project sizing, we recommended the following two options for phasing the improvements to College Street between Lacey Boulevard and 37th Avenue SE.

Option 1

Option 1 has seven phases ranging in cost from $2.1M to $5.7M.

- Phase 1 – construct the roundabout at 22nd Avenue SE;
- Phase 2 – construct the roundabout at 29th Avenue SE;
- Phase 3 – construct the roundabout at 16th Avenue SE;
- Phase 4 – construct the roadway segment between Lacey Boulevard and 16th Avenue SE;
- Phase 5 – construct the roadway segment between 16th Avenue SE and 22nd Avenue SE;
- Phase 6 – construct the roadway segment between 22nd Avenue SE and 29th Avenue SE;
- Phase 7 – construct the roadway segment between 29th Avenue SE and 37th Avenue SE.

Option 2

Option 2 has five phases ranging in cost from $3.1M to $7.5M.

- Phase 1 – construct the roundabouts at 22nd Avenue SE and 29th Avenue SE;
- Phase 2 – construct the roundabout at 16th Avenue SE and the roadway segment between Lacey Boulevard and 16th Avenue SE;
- Phase 3 – construct the roadway segment between 16th Avenue SE and 22nd Avenue SE;
- Phase 4 – construct the roadway segment between 22nd Avenue SE and 29th Avenue SE;
- Phase 5 – construct the roadway segment between 29th Avenue SE and 37th Avenue SE.

Phasing Cost Estimates

Approach

We developed planning-level cost estimates for the recommended phases using the following assumptions and methodologies:

- We used right-of-way costs from the *Horizontal Alignment and Right-of-Way Limits* technical memorandum.

- We used City-provided quantities from the College/45th roundabout project and updated unit costs to current market rates to estimate the construction cost for the roundabouts.
- We generated quantities for each segment with assumptions per City of Lacey, *Development Guidelines and Public Works Standards*, July 2005. We also refined our assumptions based a field walk through. We calculated quantities for the following bid items:
    - roadway excavation and embankment compaction – generated rough areas per sections from the work performed for cross-section analyses reported in the *Horizontal Alignment and Right-of-Way Limits* technical memorandum;
    - street lights;
    - street trees and tree grates;
    - median planting (shrubs and plants per square foot costs and street trees);
    - median irrigation per square foot;
    - curb and gutter;
    - traffic curb for medians;
    - sidewalks;
    - driveways;
    - driveway approaches – based on driveway modifications reported in the *Neighborhood Circulation and Access* and technical memorandum;
    - asphalt and crushed rock based on the work performed for cross-section analyses reported in the *Horizontal Alignment and Right-of-Way Limits* technical memorandum;
    - Puget Sound Energy conversion, joint trench, and electrical conversion;
    - storm drainage conveyance based on basic calculations to size facilities;
    - storm drainage water quality based on basic calculations to size facilities (including land costs);
    - storm drainage outfall assuming existing conveyance systems can handle additional flows;
    - channelization;
    - curb, sidewalk, and driveway removal; and
    - seeding for yards based on estimated excavation.

Findings

The planning-level project costs for the recommended phases are shown in Table 2.

Table 2
Phasing Options with Phase Costs

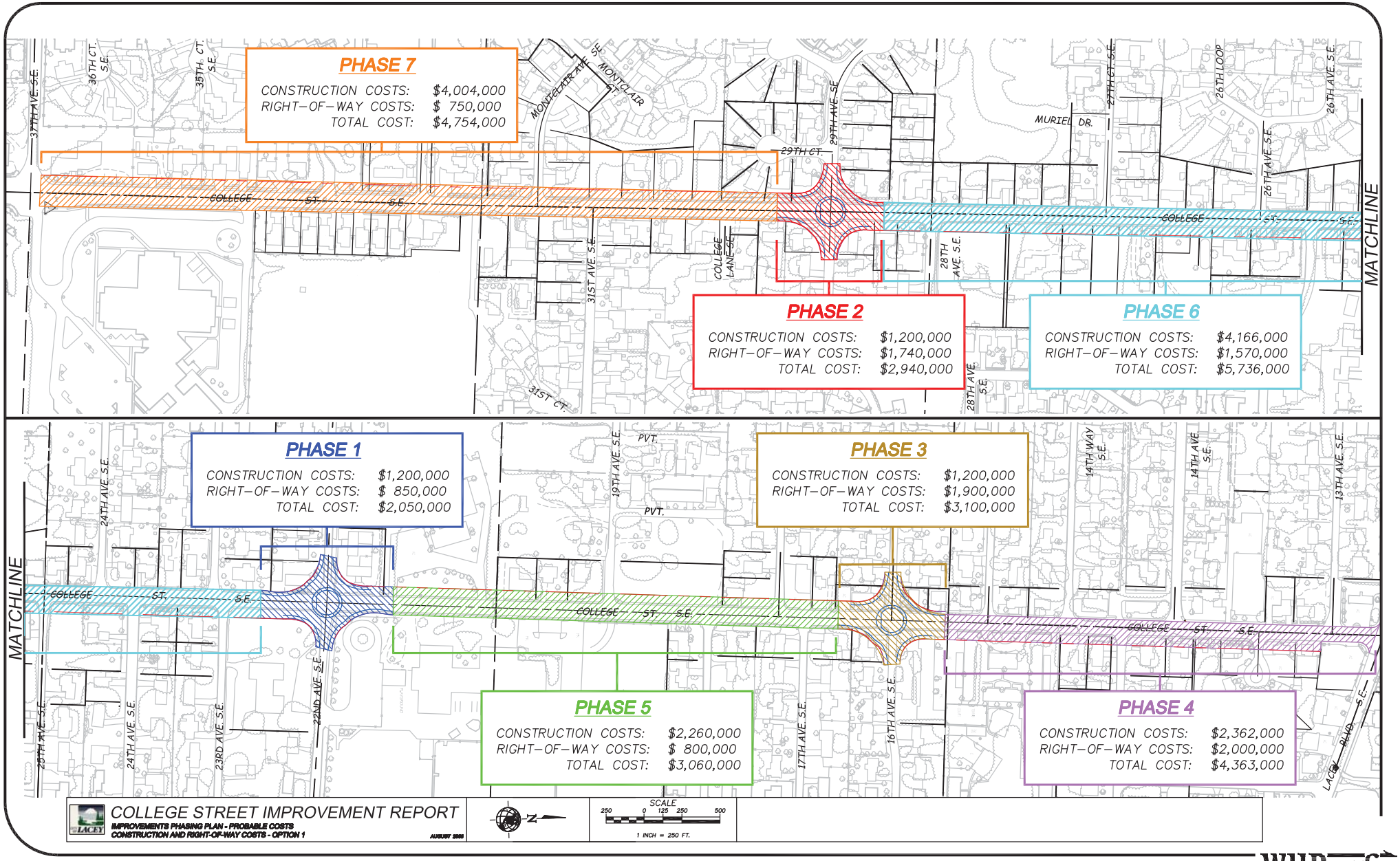
	Option 1			Option 2	
Phase	**Cost[1]**	**Description**	**Phase**	**Cost[1]**	**Description**
Phase 1	$2,050,000	22nd Ave RAB	Phase 1	$4,990,000	22nd & 29th RABs
Phase 2	$2,940,000	29th Ave RAB	Phase 2	$7,463,000	16th RAB/Lacey to 16th
Phase 3	$3,100,000	16th Ave RAB	Phase 3	$3,060,000	16th to 22nd
Phase 4	$4,363,000	Lacey to 16th	Phase 4	$5,736,000	22nd to 29th
Phase 5	$3,060,000	16th to 22nd	Phase 5	$4,754,000	29th to 37th
Phase 6	$5,736,000	22nd to 29th	----	----	
Phase 7	$4,754,000	29th to 37th	----	----	
TOTALS	**$26,003,000**			**$26,003,000**	

1. Costs are in 2008 dollars

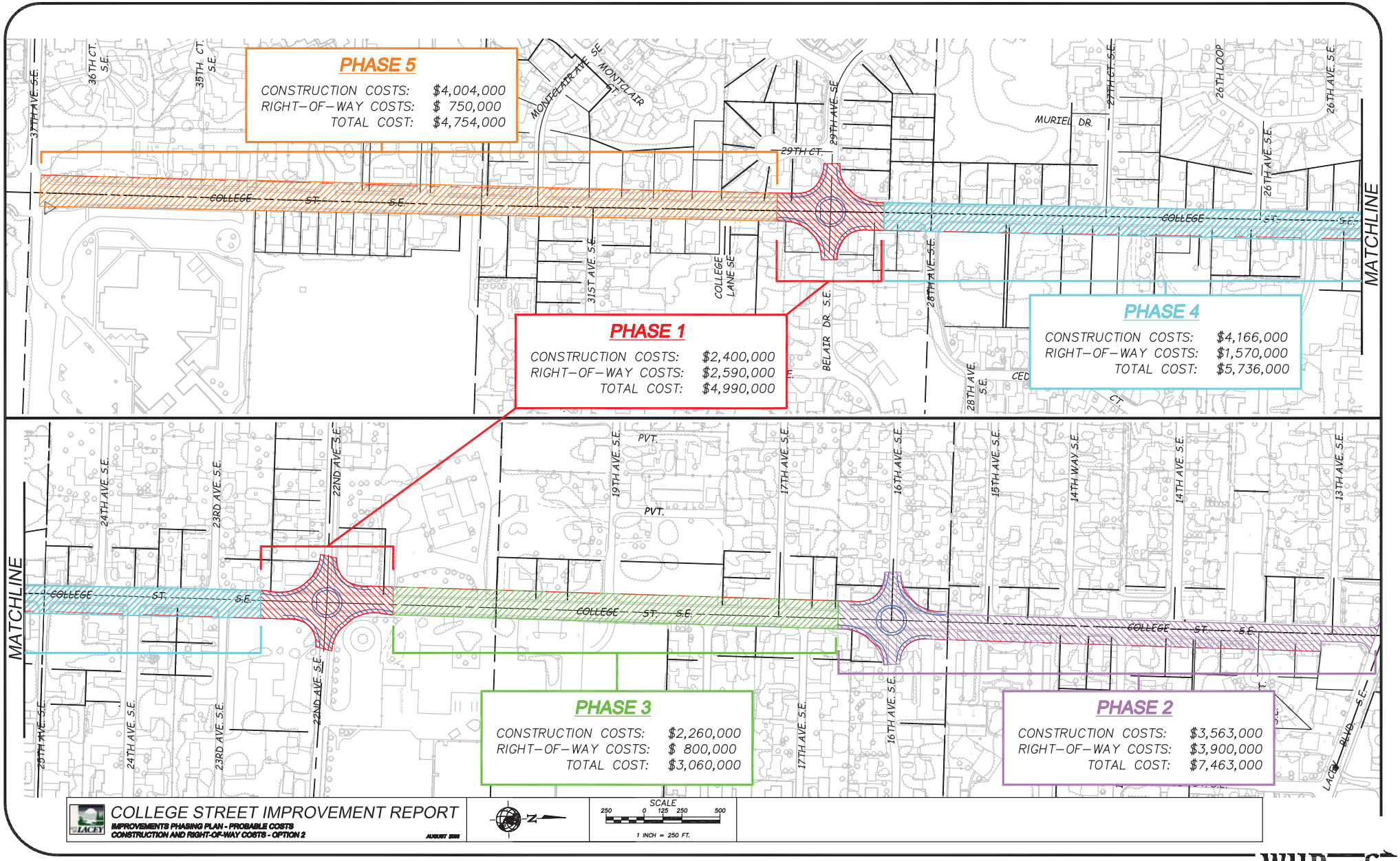
Attachments

Attachment A – Improvements Phasing Plan, Construction and Right-of-Way Costs – Option 1 and Option 2

Attachment B – Planning-Level Cost Estimate Back-up Data


PHASE 7
CONSTRUCTION COSTS: $4,004,000
RIGHT-OF-WAY COSTS: $ 750,000
TOTAL COST: $4,754,000
PHASE 2
CONSTRUCTION COSTS: $1,200,000
RIGHT-OF-WAY COSTS: $1,740,000
TOTAL COST: $2,940,000
PHASE 6
CONSTRUCTION COSTS: $4,166,000
RIGHT-OF-WAY COSTS: $1,570,000
TOTAL COST: $5,736,000
PHASE 1
CONSTRUCTION COSTS: $1,200,000
RIGHT-OF-WAY COSTS: $ 850,000
TOTAL COST: $2,050,000
PHASE 3
CONSTRUCTION COSTS: $1,200,000
RIGHT-OF-WAY COSTS: $1,900,000
TOTAL COST: $3,100,000
PHASE 5
CONSTRUCTION COSTS: $2,260,000
RIGHT-OF-WAY COSTS: $ 800,000
TOTAL COST: $3,060,000
PHASE 4
CONSTRUCTION COSTS: $2,362,000
RIGHT-OF-WAY COSTS: $2,000,000
TOTAL COST: $4,363,000
MATCHLINE
MATCHLINE
COLLEGE ST. S.E.
MONTCLAIR AVE. SE
29TH CT.
29TH AVE. SE
MURIEL DR.
27TH CT. S.E.
26TH LOOP
26TH AVE. S.E.
36TH CT. S.E.
35TH CT. S.E.
37TH AVE. S.E.
31ST AVE. S.E.
COLLEGE LANE SE
28TH AVE. S.E.
31ST CT.
PVT.
19TH AVE. S.E.
14TH WAY S.E.
14TH AVE. S.E.
13TH AVE. S.E.
24TH AVE. S.E.
25TH AVE. S.E.
23RD AVE. S.E.
22ND AVE. S.E.
17TH AVE. S.E.
16TH AVE. S.E.
LACEY BLVD. S.E.
COLLEGE STREET IMPROVEMENT REPORT
IMPROVEMENTS PHASING PLAN - PROBABLE COSTS
CONSTRUCTION AND RIGHT-OF-WAY COSTS - OPTION 1
AUGUST 2008
LACEY
N
SCALE
250 0 125 250 500
1 INCH = 250 FT.

WHPacific


PHASE 5
CONSTRUCTION COSTS: $4,004,000
RIGHT-OF-WAY COSTS: $ 750,000
TOTAL COST: $4,754,000
PHASE 1
CONSTRUCTION COSTS: $2,400,000
RIGHT-OF-WAY COSTS: $2,590,000
TOTAL COST: $4,990,000
PHASE 4
CONSTRUCTION COSTS: $4,166,000
RIGHT-OF-WAY COSTS: $1,570,000
TOTAL COST: $5,736,000
PHASE 3
CONSTRUCTION COSTS: $2,260,000
RIGHT-OF-WAY COSTS: $ 800,000
TOTAL COST: $3,060,000
PHASE 2
CONSTRUCTION COSTS: $3,563,000
RIGHT-OF-WAY COSTS: $3,900,000
TOTAL COST: $7,463,000
MATCHLINE
MATCHLINE
COLLEGE ST. S.E.
MONTCLAIR AVE. SE
29TH CT.
29TH AVE. SE
MURIEL DR.
26TH LOOP
26TH AVE. S.E.
27TH CT. S.E.
31ST AVE. S.E.
COLLEGE LANE SE
BELAIR DR. S.E.
28TH AVE. S.E.
37TH AVE. S.E.
36TH CT. S.E.
35TH CT. S.E.
24TH AVE. S.E.
23RD AVE. S.E.
22ND AVE. S.E.
19TH AVE. S.E.
17TH AVE. S.E.
16TH AVE. S.E.
15TH AVE. S.E.
14TH WAY S.E.
14TH AVE. S.E.
13TH AVE. S.E.
PVT.
LACEY BLVD. S.E.
COLLEGE STREET IMPROVEMENT REPORT
IMPROVEMENTS PHASING PLAN - PROBABLE COSTS
CONSTRUCTION AND RIGHT-OF-WAY COSTS - OPTION 2
AUGUST 2020
SCALE
250 0 125 250 500
1 INCH = 250 FT.

WHPacific

Bid Tabulation

Agency: SnoMeas Hamilton
Federal Aid Project Number:
WSDOT Contract Number:
TIB Contract Number:
Prepared By: JMB/EJM
Checked By: MJJ
Prepared Date: October 7, 2008

Contractor: Engineer
DO-NOT-MODIFY
DO-NOT-MODIFY
DO-NOT-MODIFY

PHASE 4 - COLLEGE STREET IMPROVEMENTS

Quantity	Unit	Item ID	Item Description	Unit Price	Extended Price	Provision	COMMENT
1	LS	109-010	Mobilization	$288,565.00	$288,565.00	WSDOT 1-09	7% => 0.07 x $4,122,356.00 = $288,665.00
1	LS	107-010	SPCC Plan	$5,000.00	$5,000.00	WSDOT 1-07	
1	LS	801-010	Temporary Water Pollution/Erosion Control	$30,000.00	$30,000.00	WSDOT 8-01	0%
1700	LF	801-000	Silt Fence	$6.00	$10,200.00	CITY 8-01	
60	DAYS		ESC Lead	$100.00	$6,000.00		
700	LF	830-010	Clearing Limit Fence	$4.00	$2,800.00	CITY 2-01	
1	LS	110-010	Project Temporary Traffic Control	$100,000.00	$100,000.00	WSDOT 1-10	
3000	HR	110-030	Flaggers and Spotters	$38.00	$114,000.00	WSDOT 1-10	
800	SF	110-100	Construction Signs Class A	$20.00	$16,000.00	WSDOT 1-10	
1	LS	201-040	Clearing and Grubbing	$7,200.00	$7,200.00	CITY 2-01	
1	LS	202-030	Removal of Structures and Obstructions	$75,000.00	$75,000.00	CITY 2-02	
800	SY		Sidewalk and Driveway Removal	$10.00	$8,000.00		
1200	LF		Curb and Gutter Removal	$5.00	$6,000.00		
1700	SY		Approach Removal	$15.00	$25,500.00		
1827	CY	203-030	Roadway Excavation Incl. Haul	$20.00	$36,540.00	CITY 2-03	
982	CY	203-090	Embankment Compaction	$5.00	$4,900.00	CITY 2-03	
1843	TN	404-020	Crushed Surfacing	$25.00	$46,100.00	WSDOT 4-04	
2119	TN	504-030	HMA Cl. 1/2" PG. 64-22	$90.00	$190,800.00	CITY 5-04	
45	TN		Commercial HMA	$140.00	$6,300.00	WSDOT 5-04	
222	SY		6 Inch Cement Conc. Driveway Entrance	$40.00	$8,880.00	WHP 8-06	
1364	LF	213-010	Joint Trench	$30.00	$40,920.00	CITY 2-13	
61	CY	213-020	Vault Excavation	$25.00	$1,500.00	CITY 2-13	
19	EA		Electrical Service Conversion	$1,000.00	$19,000.00	CITY 2-14	
1	LS	206-030	Trench Safety System	$10,000.00	$10,000.00	CITY 2-05	
50	HR		Utility Potholing	$100.00	$5,000.00	CITY 7-05	
5	EA	705-100	Catch Basin Type 1	$1,300.00	$6,500.00	CITY 7-05	Storm
6	EA	705-110	Catch Basin Type 1L	$1,750.00	$10,500.00	CITY 7-05	Storm
5	EA	705-200	Catch Basin Type 2 - 48 In. Diam.	$3,000.00	$15,000.00	CITY 7-05	Storm
1	EA		Oil/Water Separator	$30,000.00	$30,000.00	CITY 7-05	Storm
547	LF	704-050	12 Inch Diameter Storm Sewer Pipe	$70.00	$38,300.00	CITY 7-04	Storm- add $10/lf to pipe costs to cover bedding and backfill
645	LF	704-057	18 Inch Diameter Storm Sewer Pipe	$65.00	$41,900.00	CITY 7-04	Storm- add $10/lf to pipe costs to cover bedding and backfill
1700	LF	804-030	Cement Conc. Traffic Curb	$15.00	$25,500.00	WSDOT 8-04	
2400	LF	804-040	Cement Conc. Traffic Curb and Gutter	$15.00	$36,000.00	WSDOT 8-04	
150	LF		Double Faced Cement Concrete Traffic Curb	$40.00	$6,000.00	WHP 8-04	
2483	SY	814-070	Cement Concrete Sidewalk	$30.00	$74,500.00	CITY 8-14	
16	EA	814-080	Cement Concrete Sidewalk Ramp	$1,250.00	$20,000.00	CITY 8-14	
1	LS	806-030	Lawn and Landscape Restoration	$25,000.00	$25,000.00	GSP 8-06	
878	CY	802-200	Topsoil Type A	$35.00	$30,700.00	GSP 8-02	
88	CY	802-121	Bark Mulch	$35.00	$3,100.00	GSP 8-02	
0.21	AC	801-040	Seeding, Fertilizing, and Mulching	$8,000.00	$1,600.00	WSDOT 8-01	
94	EA	802-???	Street Trees	$400.00	$37,700.00	GSP 8-02	
69	EA	802-???	Tree Grates	$800.00	$54,900.00	GSP 8-02	
1	LS	802-???	Shrubs and Plants	$10,740.00	$10,700.00	GSP 8-02	
1	LS	803-030	Irrigation System	$41,900.00	$41,900.00	GSP 8-03	
4	EA	803-100	Irrigation System Modification and Adjustment	$1,000.00	$4,000.00	CITY 8-03	approx. (1) for every 5 homes along College St
1	LS	820-042	Luminaire System	$103,100.00	$103,100.00	CITY 8-20	
53	HUND	809-030	Raised Pavement Marker Type 1	$250.00	$1,300.00	WSDOT 8-09	
35	HUND	809-040	Raised Pavement Marker Type 2	$350.00	$1,200.00	WSDOT 8-09	
2180	LF	822-092	Plastic Wide Line	$1.00	$2,200.00	WSDOT 8-22	
4	EA	822-200	Plastic Traffic Letter	$60.00	$240.00	WSDOT 8-22	
4	EA	822-180	Plastic Traffic Arrow	$75.00	$300.00	WSDOT 8-22	
14	EA	822-065	Plastic Bicycle Lane Symbol	$125.00	$1,800.00	WSDOT 8-22	
70	LF	822-040	Plastic Stop Line	$5.00	$350.00	CITY 8-22	
4900	LF	823-010	Temporary Pavement Marking	$0.25	$600.00	WSDOT 8-23	
2400	LF	823-015	Removing Temporary Pavement Marking	$0.10	$240.00	WSDOT 8-23	same value as Temporary Pavement Marking = 2400ft
6	EA	813-040	Monument Case and Cover	$400.00	$2,400.00	CITY 8-13	locate at each intersection
1	MC	104-100	Minor Change	$20,000.00	$20,000.00		
1	LS	104-100	Miscellaneous Items	$14,400.00	$14,400.00	WSDOT 1-04	

	Schedule A Subtotal:	$1,764,495.00
20%	Contingency:	$352,899.00
12%	Cons. Engineer:	$211,700.00
	PSE Conversion:	$33,900.00
	Right-of-way	$2,000,000.00
	Schedule Total:	$4,362,994.00

Project Summary

Schedule Contract Subtotal:	$2,362,994.00
Schedule Right-of-way:	$2,000,000.00
	$4,362,994.00

I hereby certify this to be a true and correct tabulation of bids received and opened on _____

_____
Signature

COLLEGE STREET IMPROVEMENT #034709
COST ESTIMATE

PHASE 4 — B2 Section = 700
STA 179+00 to 191+00 = 1200 LF — E Section = 500

HMA (assume Section E and B2)

	Volume (c.y.) = (area (sf) x length (l.f.) /27)	CY to T Factor	Tons = Volume/ (CYxT Factor)	Unit Price (tons)	Cost	Volume Calculation (refer to E and B2 typical cross section)
HMA WEARING COURSE (2" DEPTH)	385	2.05	790	$90.00	$71,067	((26+2)*(2/12)*1200)/27
HMA LEVELING COURSE (4" DEPTH)	281	2.05	577	$90.00	$51,933	((9*(4/12)*1200)/27
HMA LEVELING COURSE (DEPTH VARIES)	367	2.05	753	$90.00	$67,753	[(8.68+0.92)*700]-[(3.94+5.25)*(500)]=367
		TOTAL (tons) =	2119	TOTAL =	$190,753	

CRUSHED ROCK (assume Section E and B2)

	Volume (c.y.) = (area (sf) x length (l.f.) /27)	CY to T Factor	Tons = Volume/ (CYxT Factor)	Unit Price (tons)	Cost	Volume Calculation (refer to E and B2 typical cross section)
CRUSHED ROCK (12" DEPTH) for Roadway	911	1.85	1686	$25.00	$42,139	(20.5*segment length =1200)/27
CRUSHED ROCK (2" DEPTH) for Driveway	10	1.85	19	$25.00	$471	((2/12)* D/W area =1650)/27
CRUSHED ROCK (1" DEPTH) for Sidewalk	75	1.85	139	$25.00	$3,476	((1/12)*(sidewalk area =(2483*9)+D/W entrance area=2222*9))/27 = 75
		TOTAL (tons) =	1843	TOTAL =	$46,086	

ROADWAY EXCAVATION

	X-SECTION AREA (SF)	LENGTH (LF)				Volume (c.y.) = (area (sf) x length (l.f.) /27)	Unit Price (c.y.)	Cost	Volume Calculation (refer to E and B2 typical cross section)
B2 =	45	700				1154	$20.00	$23,074	B2 = (44.5*700)/27
E =	21	500				389	$20.00	$7,778	E = (21.0*500)/27
							Sub total =	$30,852	
MEDIAN									
Area (sf) =	8.58					284	$20.00	$5,688	(5.58+3.05)*895)/27 =284
Lenth (lf) = 1200 L.F. - 55ft for one median breaks @ 55ft - 250 ft for one left turn lane @ 250ft ea =					895				
							Sub total =	$5,688	
					TOTAL =	1827	TOTAL =	$36,540	

CURB AND GUTTER REMOVAL

						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
B2 Length (lf) =	700					700	$5.00	$3,500	B2=C+G IN FILL ON ONE SIDE ONLY PER X-SECTION
E Length (lf) =	500					500	$5.00	$2,500	E=C+G IN FILL ON ONE SIDE ONLY PER X-SECTION
					TOTAL =	1200	TOTAL =	$6,000	

SIDEWALK AND DRIVEWAY REMOVAL

				Length (l.f.)		Area (s.y.)	Unit Price (s.y.)	Cost	Assumptions
B2 Length (lf) =	700			700		800	$10.00	$8,000	SIDEWALK WIDTH = 6FT
E Length (lf) =	500			500					B2=S+D IN FILL ON ONE SIDE ONLY PER X-SECTION E=S+D IN FILL ON ONE SIDE ONLY PER X-SECTION
		TOTAL (LF) =	1200	TOTAL =		800	TOTAL =	$8,000	

APPROACH REMOVAL

						Area (s.y.)	Unit Price (s.y.)	Cost	Assumptions
D/W REMOVAL (sf) =	13650					1517	$15.00	$25,500	see *DrivewayRemovalAreas* tab for breakdown of areas; AREA = SF/9
D/W REMAIN (sf) =	1650					183			
					TOTAL =	1700	TOTAL =	$25,500	

EMBANKMENT COMPACTION

FILL IN REMOVAL OF APPROACH

						Volume (c.y.) = (area (sf) x depth (ft.))/27	Unit Price (c.y.)	Cost	Assumptions
D/W REMOVAL (sf) =	13650					253	$5.00	$1,417	*D/W AND APPROACH DEPTH = 0.5ft
D/W REMAIN (sf) =	1650					31			*see 'Driveway Removal Areas' tab for breakdown of areas
					SUB-TOTAL =	283	Sub total =	$1,417	

FILL IN REMOVAL OF CURB AND GUTTER

						Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
B2 Length (lf) =	700					29	$5.00	$250	*length from curb/gutter removal
E Length (lf) =	500					21			*gutter width = 1.5ft and depth = 0.75ft
					SUB-TOTAL =	50	Sub total =	$250	

FILL IN REMOVAL OF SIDEWALK

						Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
B2 Length (lf) =	700					29	$5.00	$250	*sidewalk width = 6ft and depth = 0.33 ft
E Length (lf) =	500					21			
					SUB-TOTAL =	50	Sub total =	$250	

CURB, GUTTER, AND SIDEWALK

						Volume (c.y.) = (area (sf) x length (l.f.) /27	Unit Price (c.y.)	Cost	Volume Calculation
B2 Length (lf) =	700	11.0				301	$5.00	$2,994	*assume 1ft depth
E Length (lf) =	500	16.1				298			
					SUB-TOTAL (c.y.) =	599	Sub total =	$2,994	
				TOTAL EMBANKMENT COMPACTION =		982	TOTAL =	$4,911	

GRAVEL BORROW INCL. HAUL

						Volume (c.y.)	Unit Price (c.y.)	Cost	Assumptions
Embank. Comp. (c.y.) =		982				N/A	$20.00	N/A	*assume all excavated material can be used for embankment compaction
Roadway Excav. (c.y.) =		1827							ROADWAY EXCAV > EMBANK COMP => NO BORROW
					TOTAL =	N/A	TOTAL =	N/A	

COMMERCIAL HMA

			Volume (c.y.) = (length x width x depth (ft.) /27)	CY To T Factor	Tons = Volume((CY)xT Factor)	Unit Price (tons)	Cost	Assumptions
Sum of Driveways to Remain widths (ft) =	165		22	2.05	45	$140.00	$6,303	*HMA depth = 2in = 0.17ft
Assumed Approach length (ft) =	10							*assume 10ft length for approach
Depth (ft) =	0.17							* See *DrivewayRemovalAreas* tab for "Sum of Driveways to Remain widths"
Relocate D/W's (sf) = 1908				TOTAL =	45	TOTAL =	$6,303	* Add 1908 sf for RELOCATE D/W's

6 in CEMENT CONCRETE DRIVEWAY ENTRANCE

					Area (s.y.)	Unit Price (s.y.)	Cost	Assumptions
Sum of Driveways to Remain widths (ft) =	165				222	$40.00	$8,889	*Entrance width = driveway width + 5ft PER D/W * 2 D/W's (See *DrivewayRemovalAreas* tab)
Length (ft) =	10							* Area = (sum of entrance widths x length)/9
				TOTAL =	222	TOTAL =	$8,889	*10 length

CURB AND GUTTER

						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (lf) =	2400					2400	$15.00	$36,000	1200x 2 = 2400 l.f. = curb/gutter length for removal
					TOTAL =	2400	TOTAL =	$36,000	

TRAFFIC CURB									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (lf) =	1790					1790	$15.00	$26,850	*Traffic curb runs along median *Length = median length x 2 (both sides) = 895 x 2 = 1790 ft
					TOTAL =	1790	TOTAL =	$26,850	

DOUBLE FACED CEMENT CONCRETE TRAFFIC CURB									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (lf) =	150					150	$40.00	$6,000	*One left turn lane at median breaks = 150ft (see City of Lacey Detail)
					TOTAL =	150	TOTAL =	$6,000	

CEMENT CONCRETE SIDEWALK RAMP									
							Unit Price (ea.)	Cost	Assumptions
# of Ramps	16					16	$1,250.00	$20,000	*2 ramps at T-intersection NOT at median break; 4 instead of 6 at median break due to break not being at an intersection
					TOTAL =	16	TOTAL =	$20,000	

SIDEWALK										
				Length (l.f.)	Area (s.f.)	Area (s.y.)	Unit Price (s.y.)	Cost	Assumptions
Length (lf) =	2400			2235	22350	2483	$30.00	$74,500	* Sidewalk width = 10ft *1200 x 2 = 2400 l.f. - REMAINING driveway widths = SIDEWALK LENGTH
Sum of remaining D/W WIDTHS =	165								
Width (ft) =	10								
					TOTAL =	2,483	TOTAL =	$74,500	

STREET TREES								
					# of TREES	Unit Price (ea.)	Cost	Assumptions
Median Length (ft) =	895				26	$400.00	$10,229	*tree spacing = 35ft O.C. *trees on both sides of roadway and in median
Roadway Edge Length (ft) =	2400				69	$400.00	$27,429	
				TOTAL =	94	TOTAL =	$37,657	

TREE GRATES									
						# of TREES	Unit Price (ea.)	Cost	Assumptions
						69	$800.00	$54,857	*one grate for each tree along roadway edge
					TOTAL =	69	TOTAL =	$54,857	

SHRUBS AND PLANTS								
					Area (s.f.)	Unit Price (s.f.)	Cost	Assumptions
Median Length (ft) =	895				7160	$1.50	$10,740	*shrubs and plants in median only = 9ft - 1ft for curb = 8ft width
Median Width (ft) =	8							
				TOTAL =	7160	TOTAL =	$10,740	

IRRIGATION								
					Area (s.f.)	Unit Price (s.f.)	Cost	Assumptions
Median Area (s.f.) =	7160				16760	$2.50	$41,900	* median width = 9ft - 1ft for curb = 8ft *140 s.f. per tree along roadway = 140 x 69 = 9600s.f.
Roadway Edge Area (s.f.) =	9600							
				TOTAL =	16760	TOTAL =	$41,900	

TOPSOIL

					Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
Median Area (s.f.) =	7160				398	$35.00	$13,922	* 18 in = 1.5ft depth for entire median and roadway edge trees (4ftx4ft tree well) -> 16 sf x 69 trees = 1104s.f. * 6 in = 0.5ft depth for embankment/excavation limits *Roadway Edge Tree Area = 16sf x 69 trees= 1104 sf *Embank/Excav Area = 4.5ft (width) x 2235ft (length) - 1104sf (Roadway Edge Tree Area) = 9471sf
Median Depth (ft.) =	1.5							
Roadway Edge Tree Area (s.f.) =	1104				61	$35.00	$2,147	
Roadway Edge Depth (ft) =	1.5							
Embank/Excav Area (s.f.) =	8954				166	$35.00	$5,803	
Embank/Excav Depth (ft) =	0.5							
D/W Removal (s.f.) =	13650				253	$35.00	$8,847	
D/W Removal Depth (ft) =	0.5							
				TOTAL (c.y.) =	878	TOTAL =	$30,719	

SEEDING/MULCHING/FERTILIZER

					Area (acre)	Unit Price (acre)	Cost	Assumptions
Embank/Excav Area (s.f.) =	8954				0.21	$8,000.00	$1,644	*Seeding/Mulching/Fertilizer area = Embank/Excav Area
				TOTAL =	0.21	TOTAL =	$1,644	

BARK MULCH

					Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
Median Area (s.f.) =	7160				88	$35.00	$3,063	*median only * depth = 4in = 0.33ft
Median Depth (ft.) =	0.33							
				TOTAL =	88	TOTAL =	$3,063	

JOINT TRENCH

					# of Crossings	Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (ft) =	1200				2	1364	$30.00	$40,920	*only on one side of roadway * crossing every 800ft * proposed R/W = 82ft width
Trench Spacing (ft) =	800								
R/W width (ft) =	82								
					TOTAL =	1364	TOTAL =	$40,920	

ELECTRICAL CONVERSION

						Unit Price (ea.)	Cost	Assumptions
# of Conversions =	14					$4,000.00	$56,000	*Counted addresses on "College St. Driveway Tabulation" sheet that fall within limits of Phase 4 - FULL TAKES to obtain number of conversions * Added $1000.00 to conversion unit price to cover cost of service trench
				TOTAL =	14	TOTAL =	$56,000	

VAULT EXCAVATION

					# of Crossings	Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
Length (ft) =	1200				2	50	$25.00	$1,522	*only on one side of roadway *excavate area = 15ft x 15ft every 800ft *excavate area = 7ft x 7ft at every crossing *excavation depth = 4ft Volume = (# crossings x depth xexcavate area)/27
Vault Spacing (ft) =	800					11			
Depth (ft) =	4								
				TOTAL =	61	TOTAL =	$1,522		

PEE CONVERSION COSTS

						Unit Price (l.f.)	Cost
Length (ft) =	1200					$28.25	$33,900
				TOTAL =	1200	TOTAL =	$33,900

STREET LIGHTS

					# of Lights	Unit Price (ea.)	Cost	Assumptions
Length (ft) =	2400				20	$5,500.00	$110,000	* full length, both sides of roadway = 1050x 2 = 2100ft * 240ft spacing * add 10 lights to cover costs of intersection adjustments
Light Spacing (ft) =	240							
				TOTAL =	20	TOTAL =	$110,000	

PLASTIC WICE LINE

						Unit Price (l.f.)	Cost	Assumptions
Length (ft) =	2180					$1.00	$2,180	* length = (1200x2) - cross street widths cross street width total = approx 220ft
				TOTAL =	2180	TOTAL =	$2,180	

PLASTIC TRAFFIC LETTER									
							Unit Price (ea.)	Cost	Assumptions
# letters =	4						$60.00	$240	* "ONLY" per left turn lane x (1) left turn lanes = 1; 1 x 4 = 4 letters
					TOTAL =	4	TOTAL =	$240	

PLASTIC TRAFFIC ARROW									
							Unit Price (ea.)	Cost	Assumptions
# Arrows =	4						$75.00	$300	* (2) arrows per left turn lane x (1) left turn lanes = 2; also assume 2 additional at Lacey Blvd intersection
					TOTAL =	4	TOTAL =	$300	

PLASTIC BICYCLE LANE SYMBOL									
							Unit Price (ea.)	Cost	Assumptions
# Symbols=	14						$125.00	$1,750	* (1) at after each break in bike lane at intersections = 14
					TOTAL =	14	TOTAL =	$1,750	

PLASTIC STOP LINE									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
# Stop Lines =	7					70	$5.00	$350	* (1) at each intersection = 7 * assume lane width = 10 ft
Lane width (ft) =	10								
					TOTAL =	70	TOTAL =	$350	

TEMPORARY STRIPING									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (ft) =	2400					2400	$0.25	$600	* only lane striping =1200 x 2 =2400
					TOTAL =	2400	TOTAL =	Cost	

RETAINING WALL									
						Area (s.f.)	Unit Price (s.f.)	Cost	Assumptions
Length of wall (ft) =	0					0	$110.00	N/A	
Avg. Height (ft) =	0								
					TOTAL =	0	TOTAL =	N/A	

STORM DRAINAGE
see calc's by J. Brannin

CLEAR AND GRUB									
						Area (acre)	Unit Price (acre)	Cost	Assumptions
Length (ft) =	1707					1.4	$5,000.00	$7,250	* Prop. Total width = 92ft
Width (ft) =	37								* Improvement width = 55ft
					TOTAL =	1.4	TOTAL =	$7,250	* length = both sides of roadway for full length of segment - cross streets and existing D/W's = 2400 - (165 +312) -216 = 1707

SILT FENCE									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
B2 Length (lf) =	700	ONE SIDE				700			
E Length (lf) =	500	TWO SIDES				1000	$6.00	$6,000	* fill along ONE SIDE FOR B2 = 700 ft; fill along TWO SIDES FOR E = 1000 ft;
					TOTAL =	1700	TOTAL =	$6,000	* Length = 700+1000

RAISED PAVEMENT MARKERS									
		# TYPE 1 along median	# TYPE 1 for lane stripe	# TYPE 2 along median	# TYPE 2 for lane stripe	Unit Price (HUND)	Cost	Assumptions
Length for Line Striping (ft) =	2400	383	150	128	225	$250.00	$1,331	* Along Median: (3) TYPE 1 per 15ft length; (1) TYPE 2 per 16ft length * Lane Stripe: (2) TYPE 1 per stripe; (3) TYPE 2 per stripe; Stripe spacing = 20ft *Length for striping = 1200 x 2 =2400ft *Length along median = (895 x2) + 250 for two left turn lanes at 250ft ea. = 2040
Length Along Median (ft) =	2040					$350.00	$1,234	
		TYPE 1 TOTAL =	533	TYPE 2 TOTAL =	353	TOTAL =	$2,565	

CLEARING LIMIT FENCE									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumption:
B2 Length (lf) =	700	ONE SIDE				700	$4.00	$2,800	* Applies where there is no silt fence in place
E Length (lf) =	0								
					TOTAL =	700	TOTAL =	$2,800	

Bid Tabulation

Ladey Control# Number: | Contractor: | Engineer
Federal Aid Project Number: | | DO-NOT-MODIFY
WSDOT Contract Number: | | DO-NOT-MODIFY
TIB Contract Number: | | DO-NOT-MODIFY
Prepared By: JMB/EJM
Checked By: MJJ
Prepared Date: October 8, 2008

PHASE 5-COLLEGE STREET IMPROVEMENTS

Quantity	Unit	Item ID	Item Description	Unit Price	Extended Price	Provision	COMMENT
1	LS	109-010	Mobilization	$213,333.00	$213,333.00	WSDOT 1-09	7% => 0.07 x 3,047,613.00 = $213,333.00
1	LS	107-010	SPCC Plan	$5,000.00	$5,000.00	WSDOT 1-07	
1	LS	801-010	Temporary Water Pollution/Erosion Control	$30,000.00	$30,000.00	WSDOT 8-01	0%
2600	LF	801-090	Silt Fence	$6.00	$15,600.00	CITY 8-01	
60	DAYS		ESC Lead	$100.00	$6,000.00		
0	LF	630-010	Clearing Limit Fence	$4.00	$0.00	CITY 2-01	
1	LS	110-010	Project Temporary Traffic Control	$100,000.00	$100,000.00	WSDOT 1-10	
3000	HR	110-030	Flaggers and Spotters	$38.00	$114,000.00	WSDOT 1-10	
800	SF	110-100	Construction Signs Class A	$20.00	$16,000.00	WSDOT 1-10	
1	LS	201-040	Clearing and Grubbing	$9,400.00	$9,400.00	CITY 2-01	
1	LS	202-030	Removal of Structures and Obstructions	$75,000.00	$75,000.00	CITY 2-02	
867	SY		Sidewalk and Driveway Removal	$10.00	$8,700.00		
1300	LF		Curb and Gutter Removal	$5.00	$6,500.00		
330	SY		Approach Removal	$16.00	$7,900.00		
1015	CY	203-030	Roadway Excavation Incl. Haul	$20.00	$20,300.00	CITY 2-03	
869	CY	203-060	Embankment Compaction	$5.00	$4,300.00	CITY 2-03	
2000	TN	404-020	Crushed Surfacing	$25.00	$50,000.00	WSDOT 4-04	
2450	TN	604-030	HMA CL 1/2" PG 64-22	$90.00	$220,500.00	CITY 5-04	
25	TN		Commercial HMA	$140.00	$3,600.00	WSDOT 5-04	
288	SY		6 Inch Cement Conc. Driveway Entrance	$40.00	$10,700.00	WHP 8-06	
1433	LF	213-010	Joint Trench	$30.00	$43,000.00	CITY 2-13	
56	CY	213-020	Vault Excavation	$25.00	$1,600.00	CITY 2-13	
11	EA		Electrical Service Conversion	$4,000.00	$44,000.00	CITY 2-14	
1	LS	205-030	Trench Safety System	$10,000.00	$10,000.00	CITY 2-05	
50	HR		Utility Potholing	$100.00	$5,000.00	CITY 7-08	
7	EA	705-100	Catch Basin Type 1	$1,300.00	$9,100.00	CITY 7-05	Storm
3	EA	705-110	Catch Basin Type 1L	$1,750.00	$5,300.00	CITY 7-05	Storm
5	EA	705-200	Catch Basin Type 2 - 48 In. Diam.	$3,000.00	$15,000.00	CITY 7-05	Storm
1478	LF	704-057	18 Inch Diameter Storm Sewer Pipe	$50.00	$73,900.00	CITY 7-04	Storm- added $10/ft to pipe costs to cover bedding and backfill
1990	LF	604-030	Cement Conc. Traffic Curb	$15.00	$29,900.00	WSDOT 8-04	
2600	LF	604-040	Cement Conc. Traffic Curb and Gutter	$15.00	$39,000.00	WSDOT 8-04	
150	LF		Double Faced Cement Concrete Traffic Curb	$40.00	$6,000.00	WHP 8-04	
2666	SY	514-070	Cement Concrete Sidewalk	$30.00	$80,000.00	CITY 8-14	
12	EA	514-080	Cement Concrete Sidewalk Ramp	$1,250.00	$15,000.00	CITY 8-14	
1	LS	808-030	Lawn and Landscape Restoration	$25,000.00	$25,000.00	GSP 8-05	
737	CY	802-200	Topsoil Type A	$35.00	$25,800.00	GSP 8-02	
97	CY	802-121	Bark Mulch	$35.00	$3,400.00	GSP 8-02	
0.22	AC	801-040	Seeding, Fertilizing, and Mulching	$8,000.00	$1,800.00	WSDOT 8-01	
103	EA	802-???	Street Trees	$400.00	$41,100.00	GSP 8-02	
74	EA	802-???	Tree Grates	$800.00	$59,400.00	GSP 8-02	
1	LS	802-???	Shrubs and Plants	$11,900.00	$11,900.00	GSP 8-02	
1	LS	803-030	Irrigation System	$45,800.00	$45,800.00	GSP 8-03	
2	EA	803-100	Irrigation System Modification and Adjustment	$1,000.00	$2,000.00	CITY 8-03	approx. (1) for every 5 homes along College St
1	LS	820-042	Luminaire System	$130,600.00	$130,600.00	CITY 8-20	
5.8	HUND	808-030	Raised Pavement Marker Type 1	$250.00	$1,500.00	WSDOT 8-09	
3.8	HUND	809-040	Raised Pavement Marker Type 2	$350.00	$1,300.00	WSDOT 8-09	
2486	LF	822-092	Plastic Wide Line	$1.00	$2,500.00	WSDOT 8-22	
4	EA	822-200	Plastic Traffic Letter	$60.00	$240.00	WSDOT 8-22	
2	EA	822-180	Plastic Traffic Arrow	$75.00	$200.00	WSDOT 8-22	
8	EA	822-065	Plastic Bicycle Lane Symbol	$125.00	$1,000.00	WSDOT 8-22	
40	LF	822-040	Plastic Stop Line	$5.00	$200.00	CITY 8-22	
2600	LF	823-010	Temporary Pavement Marking	$0.25	$700.00	WSDOT 8-23	
2600	LF	823-015	Removing Temporary Pavement Marking	$0.10	$260.00	WSDOT 8-23	same value as Temporary Pavement Marking = 2600ft
4	EA	813-040	Monument Case and Cover	$400.00	$1,600.00	CITY 8-13	
1	MC	104-100	Minor Change	$20,000.00	$20,000.00		
1	LS	104-100	Miscellaneous Items	$14,200.00	$14,200.00	WSDOT 1-04	

	Schedule A Subtotal:	$1,694,200.00
20%	Contingency:	$338,800.00
12%	Cons. Engineer:	$202,104.00
	PSE Conversion:	$36,725.00
	Right-of-way	$800,000.00
	Schedule Total	$3,059,829.00

Project Summary

Schedule Contract Subtotal:	$2,259,829.00
Schedule Right-of-way:	$800,000.00
	$3,059,829.00

I hereby certify this to be a true and correct tabulation of bids received and opened on _____

_____
Signature

COLLEGE STREET IMPROVEMENT #034709
COST ESTIMATE

PHASE 5 — F Section = 250 + 750 = 1000

STA 163+00 to 176+00 = 1300 LF — C2 Section = 300

HMA (assume Section F and C2):

	Volume (c.y.) = (area (sf) x length (l.f.) /27)	CY to T Factor	Tons = Volume/ (CYxT Factor)	Unit Price (tons)	Cost	Volume Calculation (refer to F and C2 typical cross section)
HMA WEARING COURSE (2" DEPTH)	417	2.05	855	$90.00	$76,989	(26+26)*(2/12)*1300)/27 = 417
HMA LEVELING COURSE (4" DEPTH)	305	2.05	625	$90.00	$56,261	(19*(4/12)*1300)/27 = 305
HMA LEVELING COURSE (DEPTH VARIES)	473	2.05	970	$90.00	$87,269	((5.3743.62)*1000)+((8.21+5.06)*300))/27 =473
		TOTAL (tons) =	2450	TOTAL =	$220,519	

CRUSHED ROCK (assume Section F and C2):

	Volume (c.y.) = (area (sf) x length (l.f.) /27)	CY to T Factor	Tons = Volume/ (CYxT Factor)	Unit Price (tons)	Cost	Volume Calculation (refer to F and C2 typical cross section)
CRUSHED ROCK (12" DEPTH) for Roadway	987	1.85	1826	$25.00	$45,650	(205*segment length =1300)/27 = 987
CRUSHED ROCK (2" DEPTH) for Driveway	12	1.85	23	$25.00	$574	((2/12)* D/W area =2010)/27 = 12
CRUSHED ROCK (1" DEPTH) for Sidewalk	81	1.85	151	$25.00	$3,769	((1/12)*(sidewalk area = 2666*9)+ D/W entrance = 208*9)/27 = 81
		TOTAL (tons) =	2000	TOTAL =	$49,993	

ROADWAY EXCAVATION

	X-SECTION AREA (SF)	LENGTH (LF)	Volume (c.y.) = (area (sf) x length (l.f.) /27)	Unit Price (c.y.)	Cost	Volume Calculation (refer to F and C2 typical cross section)
F =	21	1000	781	$20.00	$15,630	F = (21*1000)/27
C2 =	10.9	300	121	$20.00	$2,420	C2 = (10.9*300)/27
				Sub total =	$18,050	
MEDIAN						
Area (sf) =	3.06		113	$20.00	$2,255	((0.1+2.96)*1300)/27 = 113
Lenth (lf) = 1300 L.F. - 55ft for one median breaks @ "55ft/break - 250 ft for two left turn lane @ 250ft ea =			995			
				Sub total =	$2,255	
		TOTAL =	1015	TOTAL =	$20,305	

CURB AND GUTTER REMOVAL

		Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
F Length (lf) =	1000	1000	$5.00	$5,000	F=C+G IN FILL OR ONE SIDE ONLY PER X-SECTION
C2 Length (lf) =	300	300	$5.00	$1,500	C2=C+G IN FILL ON ONE SIDE ONLY PER X-SECTION
	TOTAL =	1300	TOTAL =	$6,500	

SIDEWALK AND DRIVEWAY REMOVAL

		Length (l.f.)	Area (s.y.)	Unit Price (s.y.)	Cost	Assumptions
F Length (lf) =	1000	1000	867	$10.00	$8,667	SIDEWALK WIDTH = 4FT F=S+D IN FILL ON ONE SIDE ONLY PER X-SECTION C2=S+D IN FILL ON ONE SIDE ONLY PER X-SECTION
C2 Length (lf) =	300	300				
TOTAL =		1300	TOTAL =	867	TOTAL =	$8,667

APPROACH REMOVAL

		Area (s.y.)	Unit Price (s.y.)	Cost	Assumptions
D/W REMOVAL (sf) =	2758	306	$15.00	$7,947	see *DrivewayRemovalAreas* tab for breakdown of areas; AREA = SF/9
D/W REMAIN (sf) =	2010	223			
	TOTAL =	530	TOTAL =	$7,947	

EMBANKMENT COMPACTION

FILL IN REMOVAL OF D/W AND APPROACH

		Volume (c.y.) = (area (sf) x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
D/W REMOVAL (sf) =	2758	92	$5.00	$441	*D/W AND APPROACH DEPTH = 0.5ft *see "Driveway Removal Areas" tab for breakdown of areas
D/W REMAIN (sf) =	2010	67			
	SUB-TOTAL =	88	Sub total =	$441	

FILL IN REMOVAL OF CURB AND GUTTER

		Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
F Length (lf) =	1000	42	$5.00	$271	*length from curb/gutter removal *gutter width = 1.5ft and depth = 0.75ft
C2 Length (lf) =	300	13			
	SUB-TOTAL =	54	Sub total =	$271	

FILL IN REMOVAL OF SIDEWALK

		Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
F Length (lf) =	1000	42	$5.00	$208	*length= east sidewalk - east D/W and street crosaings *sidewalk width = 6ft and depth = 0.33 ft
C2 Length (lf) =	300	13			
	SUB-TOTAL =	54	Sub total =	$208	

CURB, GUTTER, AND SIDEWALK									
						Volume (c.y.) = (area (sf) x length (l.f.) /27)	Unit Price (c.y.)	Cost	Volume Calculation
F Length (lf) =	1000	14.8				548	$5.00	$3,314	*assume 1ft depth
C2 Length (lf) =	300	10.31				115			
					SUB-TOTAL (c.y.) =	663	Sub total =	$3,314	
				TOTAL EMBANKMENT COMPACTION =		859	TOTAL =	$4,234	

GRAVEL BORROW INCL. HAUL								
						Volume (c.y.)	Unit Price (c.y.)	Cost	Assumptions
Embank. Comp. (c.y.) =		859				N/A	$20.00	N/A	*assume all excavated material can be used for embankment compaction
Roadway Excav. (c.y.) =		1015							ROADWAY EXCAV > EMBANK COMP => NO BORROW
							TOTAL =	N/A	

COMMERCIAL HMA								
		Volume (c.y.) = (length x width x depth (ft) /27]		CY To T Factor	Tons = Volume/ (CYxT Factor)	Unit Price (tons)	Cost	Assumptions
Sum of Driveways to Remain widths (ft) =	201		12	2.05	25	$140.00	$3,561	*HMA depth = 2in = 0.17ft
Assumed Approach length (ft) =	10							*assume 10ft length for approach
Depth (ft) =	0.17							* See *DrivewayRemovalAreas* tab for "Sum of Driveways to Remain widths"
				TOTAL =	25	TOTAL =	$3,561	

6 in CEMENT CONCRETE DRIVEWAY ENTRANCE								
					Area (s.y.)	Unit Price (s.y.)	Cost	Assumptions
Sum of Driveways to Remain widths (ft) =	201				268	$40.00	$10,711	*Entrance width = driveway width + 5ft PER D/W * 8 D/W's (See DrivewayRemovalAreas tab) * Area = (sum of entrance widths x length)/9
Length (ft) =	10							*10 length
				TOTAL =	268	TOTAL =	$10,711	

CURB AND GUTTER								
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (lf) =	2600					2600	$15.00	$39,000	1300x 2 = 2600 l.f. = curb/gutter length for removal
					TOTAL =	2600	TOTAL =	$39,000	

TRAFFIC CURB								
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (lf) =	1990					1990	$15.00	$29,850	*Traffic curb runs along median *Length = median length x 1 (both sides) = 995 x 2 = 1990 ft
					TOTAL =	1990	TOTAL =	$29,850	

DOUBLE FACED CEMENT CONCRETE TRAFFIC CURB								
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (lf) =	150					150	$40.00	$6,000	*ONE left turn lanes at median breaks = 150ft x 1 = 150ft (see City of Lacey Detail)
					TOTAL =	150	TOTAL =	$6,000	

CEMENT CONCRETE SIDEWALK RAMP								
							Unit Price (ea.)	Cost	Assumptions
# of Ramps	12					12	$1,250.00	$15,000	*2 ramps at T-intersection NOT at median break; 6 at T-intersection at median break
					TOTAL =	12	TOTAL =	$15,000	

SIDEWALK

					Length (l.f.)	Area (s.y.)	Unit Price (s.y.)	Cost	Assumptions
Length (lf) =	2600				2399	2666	$30.00	$79,967	* Sidewalk width = 10ft *1300x2 = 2600 l.f. - driveway widths = sidewalk length for removal
Sum of remaining D/W WIDTHS =	201								
Width (ft) =	10								
					TOTAL =	2666	TOTAL =	$79,967	

STREET TREES

					# of TREES	Unit Price (ea.)	Cost	Assumptions
Median Length (ft) =	995				28	$400.00	$11,371	*tree spacing = 35ft O.C.
Roadway Edge Length (ft) =	2600				74	$400.00	$29,714	*trees on both sides of roadway and in median
				TOTAL =	103	TOTAL =	$41,086	

TREE GRATES

					# of TREES	Unit Price (ea.)	Cost	Assumptions
					74	$800.00	$59,429	*one grate for each tree along roadway edge
				TOTAL =	74	TOTAL =	$59,429	

SHRUBS AND PLANTS

					Area (s.f.)	Unit Price (s.f.)	Cost	Assumptions
Median Length (ft) =	995				7960	$1.50	$11,940	*shrubs and plants in median only = 9ft - 1ft for curb = 8ft width
Median Width (ft) =	8							
				TOTAL =	7960	TOTAL =	$11,940	

IRRIGATION

					Area (s.f.)	Unit Price (s.f.)	Cost	Assumptions
Median Area (s.f.) =	7960				18360	$2.50	$45,900	* median width = 9ft - 1ft for curb = 8ft *140 s.f. per tree along roadway = 140 x 74 = 10360s.f.
Roadway Edge Area (s.f.) =	10400							
				TOTAL =	18360	TOTAL =	$45,900	

TOPSOIL

					Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
Median Area (s.f.) =	7960				442	$35.00	$15,478	* 18 in = 1.5ft depth for entire median and roadway edge trees (4ftx4ft tree well) --> 16 sf x 74 trees = 1184 s.f. * 6 in = 0.5ft depth for embankment/excavation limits
Median Depth (ft.) =	1.5							
Roadway Edge Tree Area (s.f.) =	1189				66	$35.00	$2,311	
Roadway Edge Depth (ft) =	1.5							
Embank/Excav Area (s.f.) =	9607				178	$35.00	$6,227	*Roadway Edge Tree Area = 16sf x 74 trees = 1184 sf *Embank/Excav Area = 4.5ft (width) x 2399ft (length) - 1504sf (Roadway Edge Tree Area) = 9607
Embank/Excav Depth (ft) =	0.5							
D/W Removal (s.f.) =	2758				51	$35.00	$1,788	
D/W Removal Depth (ft) =	0.5							
				TOTAL =	737	TOTAL =	$25,803	

SEEDING/MULCHING/FERTILIZER

					Area (acre)	Unit Price (acre)	Cost	Assumptions
Embank/Excav Area (s.f.) =	9607				0.22	$8,000.00	$1,764	*Seeding/Mulching/Fertilizer area = Embank/Excav Area
				TOTAL =	0.22	TOTAL =	$1,764	

BARK MULCH

					Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
Median Area (s.f.) =	7960				97	$35.00	$3,405	*median only * depth = 4in = 0.33ft
Median Depth (ft.) =	0.33							
				TOTAL =	97	TOTAL =	$3,405	

JOINT TRENCH									
					# of Crossings	Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (ft) =	1300				2	1433	$30.00	$42,998	*only on one side of roadway * crossing every 800ft proposed R/W = 82ft width
Trench Spacing (ft) =	800								
R/W width (ft) =	82								
					TOTAL =	1433	TOTAL =	$42,998	

ELECTRICAL CONVERSION								
						Unit Price (ea.)	Cost	Assumptions
# of Conversions =		11				$4,000.00	$44,000	*Counted addresses on "College St. Driveway Tabulation" sheet that fall within limits of Phase 4 - FULL TAKES to obtain number of conversions * Added $1000.00 to conversion unit price to cover cost of service trench
					TOTAL =	11	TOTAL =	$44,000	

VAULT EXCAVATION									
					# of Crossings	Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
Length (ft) =	1300				2	54	$25.00	$1,649	*only on one side of roadway *excavate area = 15ft x 15ft every 800ft *excavate area = 7ft x 7ft at every crossing *excavation depth = 4ft Volume = (# crosings x depth x excavate area)/27
Vault Spacing (ft =	800					12			
Depth (ft) =	4								
					TOTAL =	66	TOTAL =	$1,649	

PSE CONVERSION COSTS								
							Unit Price (l.f.)	Cost
Length (ft) =	1300						$28.25	$36,725
					TOTAL =	1300	TOTAL =	$36,725

STREET LIGHTS									
						# of Lights	Unit Price (ea.)	Cost	Assumptions
Length (ft) =	2600					21	$5,500.00	$114,583	* full length, both sides of roadway = 1300 x 2 = 2600ft * 240ft spacing add 10 lights to cover costs of intersection adjustments
Light Spacing (ft) =	240								
					TOTAL =	21	TOTAL =	$114,583	

PLASTIC WIDE LINE									
							Unit Price (l.f.)	Cost	Assumptions
Length (ft) =	2466						$1.00	$2,466	* length = (1300x2) - cross street widths * cross street width total = approx 134ft
					TOTAL =	2466	TOTAL =	$2,466	

PLASTIC TRAFFIC LETTER									
							Unit Price (ea.)	Cost	Assumptions
# letters =	4						$60.00	$240	* "ONLY" per left turn lane x (1) left turn lanes = 1; 1 x 4 = 4 letters
					TOTAL =	4	TOTAL =	$240	

PLASTIC TRAFFIC ARROW									
							Unit Price (ea.)	Cost	Assumptions
# Arrows =	2						$75.00	$150	* (2) arrows per left turn lane x (1) left turn lanes = 2
					TOTAL =	3	TOTAL =	$150	

PLASTIC BICYCLE LANE SYMBOL									
							Unit Price (ea.)	Cost	Assumptions
# Symbols=	8						$125.00	$1,000	* (1) at after each break in bike lane at intersections = 12
					TOTAL =	8	TOTAL =	$1,000	

PLASTIC STOP LINE									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
# Stop Lines =	4					40	$5.00	$200	* (1) at each intersection = 5 assume lane width = 10 ft
Lane width (ft) =	10								
					TOTAL =	40	TOTAL =	$200	

TEMPORARY STRIPING

						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (ft) =	2600					2600	$0.25	$650	* only lane striping = 1300x 2 =2600
					TOTAL =	2600	TOTAL =	Cost	

RETAINING WALL

						Area (s.f.)	Unit Price (s.f.)	Cost	Assumptions
Length of wall (ft) =	0					0	$110.00	N/A	
Avg. Height (ft) =	0								
					TOTAL =	0	TOTAL =	N/A	

STORM DRAINAGE

see calc's by J. Brannin

CLEAR AND GRUB

						Area (acre)	Unit Price (acre)	Cost	Assumptions
Length (ft) =	2224					1.9	$5,000.00	$9,445	* Prop. Total width = 92ft
Width (ft) =	37								* Improvement width = 55ft
					TOTAL =	1.9	TOTAL =	$9,445	* length = both sides of roadway for full length of segment - cross streets and existing D/W's = 2600 - (301+441+434+424)

SLT FENCE

						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
F Length (lf) =	1000	TWO SIDES				2000			
C2 Length (lf) =	300	TWO SIDES				600	$6.00	$15,600	* fill along TWO SIDES FOR F = 2000 ft; fill along TWO SIDES FOR C2 = 600ft;
					TOTAL =	2600	TOTAL =	$15,600	* Length = 2000+600

RAISED PAVEMENT MARKERS

		# TYPE 1 along median	# TYPE 1 for lane stripe	# TYPE 2 along median	# TYPE 2 for lane stripe	Unit Price (HUND)	Cost	Assumptions
Length for Line Striping (ft) =	2600	420	163	140	244	$250.00	$1,456	* Along Median: (3) TYPE 1 per 16ft length; (1) TYPE 2 per 16ft length * Lane Stripe: (2) TYPE 1 per stripe; (3) TYPE 2 per stripe; Stripe spacing = 20ft
Length Along Median (ft) =	2240					$350.00	$1,343	*Length for striping = 1300 x 2 =2600ft *Length along median = (995x2) + 250 for two left turn lanes at 250ft ea. = 2240
		TYPE 1 TOTAL =	583	TYPE 2 TOTAL =	384	TOTAL =	$2,799	

CLEARING LIMIT FENCE

						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
F Length (lf) =	0								* opposite side of roadway of silt fence
C2Length (lf) =	0					0	$4.00	$0	
					TOTAL =	0	TOTAL =	$0	

Bid Tabulation

Local Contract Number: Contractor: Engineer
Federal Aid Project Number: DO-NOT-MODIFY
WSDOT Contract Number: DO-NOT-MODIFY
TIB Contract Number: DO-NOT-MODIFY
Prepared By:JMB/EJM
Checked By: MMJ
Prepared Date: October 8, 2008

PHASE 6 - COLLEGE STREET IMPROVEMENTS

Quantity	Unit	Item ID	Item Description	Unit Price	Extended Price	Provision	COMMENT
1	LS	109-010	Mobilization	$367,554.00	$367,554.00	WSDOT 1-09	7% => 0.07 x 5,250,770 = $367,554.00
1	LS	107-010	SPCC Plan	$5,000.00	$5,000.00	WSDOT 1-07	
1	LS	801-010	Temporary Water Pollution/Erosion Control	$30,000.00	$30,000.00	WSDOT 8-01	0%
2850	LF	801-030	Silt Fence	$6.00	$17,100.00	CITY 8-01	
60	DAYS		ESC Lead	$100.00	$6,000.00		
700	LF	830-010	Clearing Limit Fence	$4.00	$2,800.00	CITY 2-01	
1	LS	110-010	Project Temporary Traffic Control	$100,000.00	$100,000.00	WSDOT 1-10	
3000	HR	110-030	Flaggers and Spotters	$38.00	$114,000.00	WSDOT 1-10	
800	SF	110-100	Construction Signs Class A	$20.00	$16,000.00	WSDOT 1-10	
1	LS	201-040	Clearing and Grubbing	$14,249	$14,249	CITY 2-01	
1	LS	202-030	Removal of Structures and Obstructions	$75,000.00	$75,000.00	CITY 2-02	
233	SY		Sidewalk and Driveway Removal	$10.00	$2,300.00		
2100	LF		Curb and Gutter Removal	$5.00	$10,500.00		
1081	SY		Approach Removal	$15.00	$16,200.00		
3379	CY	203-030	Roadway Excavation Incl. Haul	$20.00	$67,600.00	CITY 2-03	
4482	CY		Pond Excavation Incl. Haul	$20.00	$89,600.00	CITY 2-03	
1382	CY	203-060	Embankment Compaction	$5.00	$6,900.00	CITY 2-03	
3248	TN	404-020	Crushed Surfacing	$25.00	$81,200.00	WSDOT 4-04	
3684	TN	504-030	HMA Cl. 1/2" PG. 64-22	$90.00	$332,500.00	CITY 5-04	
58	TN		Commercial HMA	$140.00	$8,100.00	WSDOT 5-04	
627	SY		6 Inch CeMent Conc. Driveway Entrance	$40.00	$25,100.00	WHP 8-06	
2315	LF	213-010	Joint Trench	$30.00	$69,500.00	CITY 2-13	
197	CY	213-020	Vault Excavation	$25.00	$2,700.00	CITY 2-13	
35	EA		Electrical Service Conversion	$4,000.00	$140,000.00	CITY 2-14	
1	LS	205-030	Trench Safety System	$10,000.00	$10,000.00	CITY 2-05	
50	HR		Utility Potholing	$100.00	$5,000.00	CITY 7-08	
8	EA	705-100	Catch Basin Type 1	$1,300.00	$10,400.00	CITY 7-05	Storm
15	EA	705-110	Catch Basin Type 1L	$1,750.00	$26,300.00	CITY 7-05	Storm
10	EA	705-200	Catch Basin Type 2 - 48 In. Diam.	$3,000.00	$30,000.00	CITY 7-05	Storm
1090	LF	704-057	18 Inch Diameter Storm Sewer Pipe	$50.00	$79,500.00	CITY 7-04	Storm- add $10/ft to pipe costs to cover bedding and backfill
850	LF	704-060	30 Inch Diameter Storm Sewer Pipe	$76.00	$64,600.00	CITY 7-04	Storm- add $10/ft to pipe costs to cover bedding and backfill
3390	LF	604-030	Cement Conc. Traffic Curb	$15.00	$50,900.00	WSDOT 8-04	
4200	LF	604-040	Cement Conc. Traffic Curb and Gutter	$15.00	$63,000.00	WSDOT 8-04	
150	LF		Double Faced Cement Concrete Traffic Curb	$40.00	$6,000.00	WHP 8-04	
4157	SY	814-070	Cement Concrete Sidewalk	$30.00	$124,700.00	CITY 8-14	
24	EA	814-080	Cement Concrete Sidewalk Ramp	$1,250.00	$30,000.00	CITY 8-14	
1	LS	808-030	Lawn and Landscape Restoration	$25,000.00	$25,000.00	GSP 8-05	
1276	CY	802-200	Topsoil Type A	$35.00	$44,700.00	GSP 8-02	
170	CY	802-121	Bark Mulch	$35.00	$6,100.00	GSP 8-02	
0.34	AC	801-040	Seeding, Fertilizing, and Mulching	$8,000.00	$2,700.00	WSDOT 8-01	
28	EA	802-???	Street Trees	$400.00	$11,000.00	GSP 8-02	
120	EA	802-???	Tree Grates	$800.00	$96,000.00	GSP 8-02	
1	LS	802-???	Shrubs and Plants	$21,540.00	$21,500.00	GSP 8-02	
1	LS	803-030	Irrigation System	$77,900.00	$77,900.00	GSP 8-03	
5	EA	803-100	Irrigation System Modification and Adjustment	$1,000.00	$5,000.00	CITY 8-03	approx. (1) for every 5 homes along College St
1	LS	820-042	Luminaire System	$151,300.00	$151,300.00	CITY 8-20	
8.8	HUND	809-030	Raised Pavement Marker Type 1	$250.00	$2,500.00	WSDOT 8-09	
6.3	HUND	809-040	Raised Pavement Marker Type 2	$350.00	$2,200.00	WSDOT 8-09	
4520	SF		Conc. Retaining Wall w/ Architectural Surface	$110.00	$497,200.00	WSDOT 6-02	
3955	LF	622-062	Plastic Wide Line	$1.00	$4,000.00	WSDOT 8-22	
4	EA	622-200	Plastic Traffic Letter	$60.00	$240.00	WSDOT 8-22	
2	EA	622-180	Plastic Traffic Arrow	$75.00	$200.00	WSDOT 8-22	
18	EA	622-085	Plastic Bicycle Lane Symbol	$125.00	$2,300.00	WSDOT 8-22	
96	LF	622-040	Plastic Stop Line	$5.00	$480.00	CITY 8-22	
4200	LF	623-010	Temporary Pavement Marking	$0.25	$1,100.00	WSDOT 8-23	
4200	LF	623-015	Removing Temporary Pavement Marking	$0.10	$420.00	WSDOT 8-23	same value as Temporary Pavement Marking = 4200ft
9	EA	813-040	Monument Case and Cover	$400.00	$3,600.00	CITY 8-13	locate at each intersection
1	MC	104-100	Minor Change	$20,000.00	$20,000.00		
1	LS	104-100	Miscellaneous Items	$32,400.00	$32,400.00	WSDOT 1-04	

	Schedule A Subtotal:	$3,111,112.74
20%	Contingency:	$622,222.55
12%	Cons. Engineer:	$373,300.00
	PSE Conversion:	$59,300.00
	Right-of-way	$1,570,000.00
	Schedule Total:	$5,735,935.28

Project Summary

Schedule Contract Subtotal:	$4,165,935.28
Schedule Right-of-way:	$1,570,000.00
	$5,735,935.28

I hereby certify this to be a true and correct tabulation of bids received and opened on _____

_____
Signature

COLLEGE STREET IMPROVEMENT #034709
COST ESTIMATE

PHASE 6 — B Section = 950 + 400 = 1350
STA 138+00 to 159+00 = 2100 LF — E Section = 250 + 500 = 750

HMA (assume Sections E and B):

	Volume (c.y.) = (area (sf) x length (l.f.) /27)	CY to T Factor	Tons = Volume/ (CYxT Factor)	Unit Price (tons)	Cost	Volume Calculation (refer to E and B typical cross section)
HMA WEARING COURSE (2" DEPTH)	674	2.05	1382	$90.00	$124,367	((26+26)*(2/12)*2350)/27 = 754
HMA LEVELING COURSE (4" DEPTH)	493	2.05	1010	$90.00	$90,883	(19*(4/12)*2350)/27 = 551
HMA LEVELING COURSE (DEPTH VARIES)	635	2.05	1302	$90.00	$117,209	[(6.68+0.92)*1350] +[(3.94+5.25)*(250+500)]=635
		TOTAL (tons) =	3694	TOTAL =	$332,459	

CRUSHED ROCK (assume Sections E and B):

	Volume (c.y.) = (area (sf) x length (l.f.) /27)	CY To T Factor	Tons = Volume/ (CYxT Factor)	Unit Price (tons)	Cost	Volume Calculation (refer to E and B typical cross section)
CRUSHED ROCK (12" DEPTH) for Roadway	1594	1.85	2950	$25.00	$73,743	(20.5*segment length =2100)/27 = 1594
CRUSHED ROCK (2" DEPTH) for Driveway	28	1.85	52	$25.00	$1,310	((2/12)* D/W area =4590)/27 = 28
CRUSHED ROCK (1" DEPTH) for Sidewalk	133	1.85	246	$25.00	$6,145	((1/12)*(sidewalk area =(4157*9)+D/W entrances= (627*9))/27 = 133
		TOTAL (tons) =	3248	TOTAL =	$81,199	

ROADWAY EXCAVATION

	X-SECTION AREA (SF)	LENGTH (LF)				Volume (c.y.) = (area (sf) x length (l.f.) /27)	Unit Price (c.y.)	Cost	Volume Calculation (refer to E and B typical cross section)
B =	45	1350				2225	$20.00	$44,500	B2 = (44.5*1350)/27
E =	21	750				583	$20.00	$11,667	E = (21.0*750)/27
							Sub total =	$56,167	
MEDIAN									
Area (sf) =	8.58					570	$20.00	$11,408	(5.53+3.05)*1795)/27 =570
Lenth (lf) = 2100 L.F. - 55ft for one median breaks - 250ft for one left turn lane @ 250ft ea =					1795				
							Sub total =	$11,408	
					TOTAL =	3379	TOTAL =	$67,575	

CURB AND GUTTER REMOVAL

						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
B Length (lf) =	1350					1350	$5.00	$6,750	B=C+G IN FILL ON ONE SIDE ONLY PER X-SECTION
E Length (lf) =	750					750	$5.00	$3,750	E=C+G IN FILL ON ONE SIDE ONLY PER X-SECTION
					TOTAL =	2100	TOTAL =	$10,500	

SIDEWALK AND DRIVEWAY REMOVAL

				Length (l.f.)		Area (s.y.)	Unit Price (s.y.)	Cost	Assumptions
B Length (lf) =	1350			1350		233	$10.00	$2,333	SIDEWALK WIDTH = 6FT
E Length (lf) =	750			750					B=S+D IN FILL ON ONE SIDE ONLY PER X-SECTION E=S+D IN FILL ON ONE SIDE ONLY PER X-SECTION
		TOTAL (LF) =		2100	TOTAL =	233	TOTAL =	$2,333	

APPROACH REMOVAL

						Area (s.y.)	Unit Price (s.y.)	Cost	Assumptions
D/W REMOVAL (sf) =	5142					571	$15.00	$16,220	see *DrivewayRemovalAreas* tab for breakdown of areas; AREA = sf/9
D/W REMAIN (sf) =	4590					510			
					TOTAL =	1081	TOTAL =	$16,220	

EMBANKMENT COMPACTION

FILL IN REMOVAL OF D/W AND APPROACH

						Volume (c.y.) = (area (sf) x depth (i.f.))/27	Unit Price (c.y.)	Cost	Assumptions
D/W REMOVAL (sf) =	5142					95	$5.00	$901	*D/W AND APPROACH DEPTH = 0.5ft *see "Driveway Removal Areas" tab for breakdown of areas
D/W REMAIN (sf) =	4590					85			
					SUB-TOTAL =	180	Sub total =	$901	

FILL IN REMOVAL OF CURB AND GUTTER

						Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
B Length (lf) =	1350					56	$5.00	$438	*length from curb/gutter removal *gutter width = 1.5ft and depth = 0.75ft
E Length (lf) =	750					31			
					SUB-TOTAL =	88	Sub total =	$438	

FILL IN REMOVAL OF SIDEWALK

						Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
B2 Length (lf) =	1350					56	$5.00	$438	*sidewalk width = 6ft and depth = 0.33 ft
E Length (lf) =	750					31			
					SUB-TOTAL =	88	Sub total =	$438	

CURB, GUTTER, AND SIDEWALK

						Volume (c.y.) = (area (sf) x length (i.f.) /27)	Unit Price (c.y.)	Cost	Volume Calculation
B Length (lf) =	1350	11.6				580	$5.00	$5,136	*assume 1ft depth
E Length (lf) =	750	16.1				447			
					SUB-TOTAL (c.y.) =	1027	Sub total =	$5,136	
					TOTAL EMBANKMENT COMPACTION =	1382	TOTAL =	$6,912	

GRAVEL BORROW INCL. HAUL

						Volume (c.y.)	Unit Price (c.y.)	Cost	Assumptions
Embank. Comp. (c.y.) =		1382				N/A	$20.00	N/A	*assume all excavated material can be used for embankment compaction ROADWAY EXCAV > EMBANK COMP => NO BORROW
Roadway Excav. (c.y.) =		3379							
							TOTAL =	N/A	

COMMERCIAL HMA

			Volume (c.y.) = (length x width x depth (ft.) /27)	CY To T Factor	Tons = Volume/ (CY*T Factor)	Unit Price (tons)	Cost	Assumptions
Sum of Driveways to Remain Widths (ft) =	459		28	2.05	58	$140.00	$8,132	*HMA depth = 2in = 0.17ft *assume 10ft length for approach * See *DrivewayRemovalAreas* tab for "Sum of Driveways to Remain Widths"
Assumed Approach length (ft) =	10							
Depth (ft) =	0.17							
				TOTAL =	58	TOTAL =	$8,132	

6 in CEMENT CONCRETE DRIVEWAY ENTRANCE

					Area (s.y.)	Unit Price (s.y.)	Cost	Assumptions
Sum of Driveways to Remain Widths (ft) =	459				627	$40.00	$25,067	*Entrance width = driveway width + 5ft PER D/W * 21 D/W's (See DrivewayRemovalAreas tab) * Area = (sum of entrance widths x length)/9 *10 length
Length (ft) =	10							
				TOTAL =	627	TOTAL =	$25,067	

CURB AND GUTTER

						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (lf) =	4200					4200	$15.00	$63,000	2100x 2 = 4200 l.f. = curb/gutter length for removal
					TOTAL =	4200	TOTAL =	$63,000	

TRAFFIC CURB									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (lf) =	3590					3590	$15.00	$53,850	*Traffic curb runs along median *Length = median length x 2 (both sides) = 1795 x 2 = 3590ft
					TOTAL =	3590	TOTAL =	$53,850	

DOUBLE FACED CEMENT CONCRETE TRAFFIC CURB									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (lf) =	150					150	$40.00	$6,000	*One left turn lane at median breaks = 150ft = 150ft (see City of Lacey Detail)
					TOTAL =	150	TOTAL =	$6,000	

CEMENT CONCRETE SIDEWALK RAMP									
							Unit Price (ea.)	Cost	Assumptions
# of Ramps	24					24	$1,250.00	$30,000	*2 ramps at T-intersection NOT at median break; 6 at T-intersection at median break
					TOTAL =	24	TOTAL =	$30,000	

SIDEWALK									
					Length (l.f.)	Area (s.y.)	Unit Price (s.y.)	Cost	Assumptions
Length (lf) =	4200				3741	4157	$30.00	$124,700	* Sidewalk width = 10ft *2100 x 2 = 4200 Lf. - REMAINING driveway widths = SIDEWALK LENGTH
Sum of remaining D/W WIDTHS =	459								
Width (ft) =	10								
					TOTAL =	4157	TOTAL =	$124,700	

STREET TREES								
					# of TREES	Unit Price (ea.)	Cost	Assumptions
Median Length (ft) =	1795				51	$400.00	$20,514	*tree spacing = 35ft O.C. *trees on both sides of roadway and in median
Roadway Edge Length (ft) =	4200				120	$400.00	$48,000	
				TOTAL =	171	TOTAL =	$68,514	

TREE GRATES									
						# of TREES	Unit Price (ea.)	Cost	Assumptions
						120	$800.00	$96,000	*one grate for each tree along roadway edge
					TOTAL =	120	TOTAL =	$96,000	

SHRUBS AND PLANTS								
					Area (s.f.)	Unit Price (s.f.)	Cost	Assumptions
Median Length (ft) =	1795				14360	$1.50	$21,540	*shrubs and plants in median only = 9ft - 1ft for curb = 8ft width
Median Width (ft) =	8							
				TOTAL =	0	TOTAL =	$21,540	

IRRIGATION								
					Area (s.f.)	Unit Price (s.f.)	Cost	Assumptions
Median Area (s.f.) =	14360				31160	$2.50	$77,900	* median width = 9ft - 1ft for curb = 8ft *140 s.f. per tree along roadway = 140 x 120 = 16800s.f.
Roadway Edge Area (s.f.) =	16800							
				TOTAL =	31160	TOTAL =	$77,900	

TOPSOIL

					Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
Median Area (s.f.) =	14360				798	$35.00	$27,922	* 18 in = 1.5ft depth for entire median and roadway edge trees (4ftx4ft tree well) --> 16 sf x 120 trees = 1920 s.f.
Median Depth (ft.) =	1.5							
Roadway Edge Tree Area (s.f.) =	1920				107	$35.00	$3,733	* 6 in = 0.5ft depth for embankment/excavation limits
Roadway Edge Depth (ft) =	1.5							
Embank/Excav Area (s.f.) =	14915				276	$35.00	$9,667	*Roadway Edge Tree Area = 16sf x 120 trees = 1920 sf
Embank/Excav Depth (ft) =	0.5							*Embank/Excav Area = 4.5ft (width) x 4157ft (length) - 1920sf (Roadway Edge Tree Area) = 14915
D/W Removal (s.f.) =	5142				95	$35.00	$3,333	
D/W Removal Depth (ft) =	0.5							
				TOTAL (c.y.) =	1276	TOTAL =	$44,655	

SEEDING/MULCHING/FERTILIZER

					Area (acre)	Unit Price (acre)	Cost	Assumptions
Embank/Excav Area (s.f.) =	14915				0.34	$8,000.00	$2,739	*Seeding/Mulching/Fertilizer area = Embank/Excav Area
				TOTAL =	0.34	TOTAL =	$2,739	

BARK MULCH

					Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
Median Area (s.f.) =	14360				176	$35.00	$6,143	*median only
Median Depth (ft.) =	0.33							* depth = 4in = 0.33ft
				TOTAL =	176	TOTAL =	$6,143	

JOINT TRENCH

					# of Crossings	Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (ft) =	2100				3	2315	$30.00	$69,458	*only on one side of roadway
Trench Spacing (ft) =	800								* crossing every 800ft proposed R/W = 82ft width
R/W width (ft) =	82								*Length = (3 x 82) + 2100 = 2315ft
					TOTAL =	2315	TOTAL =	$69,458	

ELECTRICAL CONVERSION

						Unit Price (ea.)	Cost	Assumptions
# of Conversions =	35					$4,000.00	$140,000	*Counted addresses on "College St. Driveway Tabulation" sheet that fall within limits of Phase 4 FULL TAKES to obtain number of conversions
				TOTAL =	35	TOTAL =	$140,000	* Added $1000.00 to conversion unit price to cover cost of service trench

VAULT EXCAVATION

					# of Crossings	Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
Length (ft) =	2100				3	88	$25.00	$2,664	*only on one side of roadway
Vault Spacing (ft) =	800					19			*excavate area = 15ft x 15ft every 800ft *excavate area = 7ft x 7ft at every crossing
Depth (ft) =	4								*excavation depth = 4ft Volume = (# crossings x depth x excavate area)/27
					TOTAL =	107	TOTAL =	$2,664	

PSE CONVERSION COSTS								
							Unit Price (l.f.)	Cost
Length (ft) =	2100						$28.25	$59,325
					TOTAL =	2100	TOTAL =	$59,325

STREET LIGHTS									
						# of Lights	Unit Price (ea.)	Cost	Assumptions
Length (ft) =	4200					28	$5,500.00	$151,250	* full length, both sides of roadway = 2100 x 2 = 4200ft *
Light Spacing (ft) =	240								240ft spacing *
					TOTAL =	28	TOTAL =	$151,250	add 10 lights to cover cost for intersection adjustments

PLASTIC WIDE LINE									
							Unit Price (l.f.)	Cost	Assumptions
Length (ft) =	3955						$1.00	$3,955	* length = (2100x2) - cross street widths
					TOTAL =	3955	TOTAL =	$3,955	* cross street width total = approx 245ft

PLASTIC TRAFFIC LETTER									
							Unit Price (ea.)	Cost	Assumptions
# letters =	4						$60.00	$240	* "ONLY" per left turn lane x (1) left turn lanes = 1;
					TOTAL =	4	TOTAL =	$240	1 x 4 = 4 letters

PLASTIC TRAFFIC ARROW									
							Unit Price (ea.)	Cost	Assumptions
# Arrows =	2						$75.00	$150	* (2) arrows per left turn lane x (1) left turn lanes = 2
					TOTAL =	2	TOTAL =	$150	

PLASTIC BICYCLE LANE SYMBOL									
							Unit Price (ea.)	Cost	Assumptions
# Symbols=	18						$125.00	$2,250	* (1) at after each break in bike lane at intersections = 18
					TOTAL =	18	TOTAL =	$2,250	

PLASTIC STOP LINE									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
# Stop Lines =	9					90	$5.00	$450	* (1) at each intersection = 9 *
Lane width (ft) =	10								assume lane width = 10 ft
					TOTAL =	90	TOTAL =	$450	

TEMPORARY STRIPING									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (ft) =	4200					4200	$0.25	$1,050	* only lane striping = 2100 x 2 =4200
					TOTAL =	4200	TOTAL =	$1,050	

RETAINING WALL									
						Area (s.f.)	Unit Price (s.f.)	Cost	Assumptions
Length of wall (ft) =	1130					4520	$110.00	$497,200	* assume wall starts at 149+20 and runs to roundabout at 160+50 = 1130 ft * Avg
Avg. Height (ft) =	4								height = 4ft forsurface area
					TOTAL =	4520	TOTAL =	$497,200	

STORM DRAINAGE
see calc's by J. Brannin

CLEAR AND GRUB									
						Area (acre)	Unit Price (acre)	Cost	Assumptions
Length (ft) =	3355					2.8	$5,000.00	$14,249	* Prop. Total width = 92ft * Improvement width = 55ft * length = both sides of roadway for full length of segment - cross streets and existing D/W's = 4200 - (459 +141) -245 = 3355
Width (ft) =	37								
					TOTAL =	2.8	TOTAL =	$14,249	

SILT FENCE									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
B Length (lf) =	1350	ONE SIDE				1350	$6.00	$17,100	* fill along ONE SIDE FOR B = 1350ft; fill along TWO SIDES FOR E = 3500 ft; Length = 1350+1500
E Length (lf) =	750	TWO SIDES				1500			
					TOTAL =	2850	TOTAL =	$17,100	

RAISED PAVEMENT MARKERS								
		# TYPE 1 along median	# TYPE 1 for lane stripe	# TYPE 2 along median	# TYPE 2 for lane stripe	Unit Price (HUND)	Cost	Assumptions
Length for Line Striping (ft) =	4200	720	263	240	394	$250.00	$2,456	* Along Median: (3) TYPE 1 per 10ft length; (1) TYPE 2 per 16ft length Lane Stripe: (2) TYPE 1 per stripe; (3) TYPE 2 per stripe; Stripe spacing = 20ft *Length for striping = 2100 x 2 =4200ft *Length along median = (1795x2) + 250 for two left turn lanes at 250ft ea. =3840
Length Along Median (ft) =	3840					$850.00	$2,218	
		TYPE 1 TOTAL =	983	TYPE 2 TOTAL =	634	TOTAL =	$4,674	

CLEARING LIMIT FENCE									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
B Length (lf) =	700	ONE SIDE				700	$4.00	$2,800	* opposite side of roadway of silt fence
E Length (lf) =	0								
					TOTAL =	700	TOTAL =	$2,800	

Bid Tabulation

Lacey Contract Number: | Contractor: | Engineer
Federal Aid Project Number: | | DO-NOT-MODIFY
WSDOT Contract Number: | | DO-NOT-MODIFY
TIB Contract Number: | | DO-NOT-MODIFY
Prepared By: JMB/EJM
Checked By: MMJ
Prepared Date: October 9, 2008

PHASE 7-COLLEGE STREET IMPROVEMENTS

Quantity	Unit	Item ID	Item Description	Unit Price	Extended Price	Provision	COMMENT
1	LS	109-010	Mobilization	$304,652.00	$304,652.00	WSDOT 1-09	7% => 0.07 x 4,352,164 = $304,652.00
1	LS	107-010	SPCC Plan	$5,000.00	$5,000.00	WSDOT 1-07	
1	LS	801-010	Temporary Water Pollution/Erosion Control	$30,000.00	$30,000.00	WSDOT 8-01	0%
1950	LF	801-080	Silt Fence	$6.00	$11,700.00	CITY 8-01	
60	DAYS		ESC Lead	$100.00	$6,000.00		
1950	LF	830-010	Clearing Limit Fence	$4.00	$7,800.00	CITY 2-01	
1	LS	110-010	Project Temporary Traffic Control	$100,000.00	$100,000.00	WSDOT 1-10	
3000	HR	110-090	Flaggers and Spotters	$38.00	$114,000.00	WSDOT 1-10	
800	SF	110-100	Construction Signs Class A	$20.00	$16,000.00	WSDOT 1-10	
1	LS	201-040	Clearing and Grubbing	$13,500.00	$13,500.00	CITY 2-01	
1	LS	202-030	Removal of Structures and Obstructions	$75,000.00	$75,000.00	CITY 2-02	
1300	SY		Sidewalk and Driveway Removal	$10.00	$13,000.00		
1950	LF		Curb and Gutter Removal	$5.00	$9,750.00		
862	SY		Approach Removal	$15.00	$12,930.00		
700	CY	203-030	Roadway Excavation Incl. Haul	$20.00	$15,300.00	CITY 2-03	
285	CY	203-070	Gravel Borrow Incl. Haul	$20.00	$5,700.00	WSDOT 9-03	
1051	CY	203-080	Embankment Compaction	$5.00	$5,300.00	CITY 2-03	
3010	TN	404-020	Crushed Surfacing	$25.00	$76,200.00	WSDOT 4-04	
4186	TN	504-030	HMA Cl. 1/2" PG. 64-22	$90.00	$376,700.00	CITY 5-04	
60	TN		Commercial HMA	$140.00	$8,400.00	WSDOT 5-04	
512	SY		6 Inch Cement Conc. Driveway Entrance	$40.00	$20,500.00	WHP 8-06	
2150	LF	213-010	Joint Trench	$30.00	$64,500.00	CITY 2-13	
99	CY	213-020	Vault Excavation	$25.00	$2,500.00	CITY 2-13	
23	EA		Electrical Service Conversion	$4,000.00	$92,000.00	CITY 2-14	
1	LS	205-030	Trench Safety System	$10,000.00	$10,000.00	CITY 2-05	
50	HR		Utility Potholing	$100.00	$5,000.00	CITY 7-08	
15	EA	705-100	Catch Basic Type 1	$1,300.00	$19,500.00	CITY 7-05	Storm
8	EA	705-110	Catch Basin Type 1L	$1,750.00	$14,000.00	CITY 7-05	Storm
4	EA	705-200	Catch Basin Type 2 - 48 In. Diam.	$3,000.00	$12,000.00	CITY 7-05	Storm
2092	LF	704-057	18 Inch Diameter Storm Sewer Pipe	$55.00	$115,100.00	CITY 7-04	Storm- add $10/ft to pipe costs to cover bedding and backfill
2680	LF	604-030	Cement Conc. Traffic Curb	$15.00	$40,200.00	WSDOT 8-04	
3900	LF	604-040	Cement Conc. Traffic Curb and Gutter	$15.00	$58,500.00	WSDOT 8-04	
300	LF		Double Faced Cement Concrete Traffic Curb	$40.00	$12,000.00	WHP 8-04	
3910	SY	814-070	Cement Concrete Sidewalk	$30.00	$117,300.00	CITY 8-14	
16	EA	814-080	Cement Concrete Sidewalk Ramp	$1,250.00	$20,000.00	CITY 8-14	
1	LS	806-030	Lawn and Landscape Restoration	$25,000.00	$25,000.00	GSP 8-05	
1028	CY	802-200	Topsoil Type A	$35.00	$36,000.00	GSP 8-02	
3538	CY	802-121	Bark Mulch	$35.00	$123,800.00	GSP 8-02	
0.32	AC	801-040	Seeding, Fertilizing, and Mulching	$8,000.00	$2,600.00	WSDOT 8-01	
150	EA	802-???	Street Trees	$400.00	$59,900.00	GSP 8-02	
111	EA	802-???	Tree Grates	$800.00	$89,100.00	GSP 8-02	
1	LS	802-???	Shrubs and Plants	$16,000.00	$16,100.00	GSP 8-02	
1	LS	803-030	Irrigation System	$65,800.00	$65,800.00	GSP 8-03	
5	EA	803-100	Irrigation System Modification and Adjustment	$1,000.00	$5,000.00	CITY 8-03	approx. (1) for every 5 homes along College St
1	LS	820-042	Luminaire System	$144,400.00	$144,400.00	CITY 8-20	
7.2	HUND	809-030	Raised Pavement Marker Type 1	$250.00	$1,800.00	WSDOT 8-09	
3.5	HUND	809-040	Raised Pavement Marker Type 2	$350.00	$1,300.00	WSDOT 8-09	
5000	SF		Conc. Retaining Wall w/ Architectural Surface	$110.00	$550,000.00	WSDOT 6-02	
3627	LF	822-092	Plastic Wide Line	$1.00	$3,600.00	WSDOT 8-22	
8	EA	822-200	Plastic Traffic Letter	$60.00	$480.00	WSDOT 8-22	
4	EA	822-180	Plastic Traffic Arrow	$75.00	$300.00	WSDOT 8-22	
12	EA	822-065	Plastic Bicycle Lane Symbol	$125.00	$1,500.00	WSDOT 8-22	
50	LF	822-040	Plastic Stop Line	$5.00	$250.00	CITY 8-22	
3900	LF	823-010	Temporary Pavement Marking	$0.25	$1,000.00	WSDOT 8-23	same value as Temporary Pavement Marking = 3900ft
3900	LF	823-015	Removing Temporary Pavement Marking	$0.10	$390.00	WSDOT 8-23	locate at each intersection
3	EA	813-040	Monument Case and Cover	$400.00	$1,200.00	CITY 8-13	
1	MC	104-100	Minor Change	$20,000.00	$20,000.00		
1	LS	104-100	Miscellaneous Items	$33,300.00	$33,300.00	WSDOT 1-04	

	Schedule A Subtotal:	$2,991,822.00
20%	Contingency:	$598,364.40
12%	Cons. Engineer:	$358,018.64
	PSE Conversion:	$56,100.00
	Right-of-way	$750,000.00
	Schedule Total:	$4,754,305.04

Project Summary

Schedule Contract Subtotal:	$4,004,305.04
Schedule Right-of-way:	$750,000.00
	$4,754,305.04

I hereby certify this to be a true and correct tabulation
of bids received and opened on _____

_____
Signature

COLLEGE STREET IMPROVEMENT #034709 COST ESTIMATE

PHASE 7

STA 115+50 to 135+00 = 1950 LF C1 Section = 1950

HMA (assume Section C1):

	Volume (c.y.) = (area (sf) x length (l.f.) /27)	CY To T Factor	Tons = Volume/ (CYxT Factor)	Unit Price (tons)	Cost	Volume Calculation (refer to C1 typical cross section)
HMA WEARING COURSE (2" DEPTH)	626	2.05	1283	$90.00	$115,483	((26+26)*(2/12)*1950)/27 = 626
HMA LEVELING COURSE (4" DEPTH)	457	2.05	938	$90.00	$84,392	(19*(4/12)*1950)/27 = 457
HMA LEVELING COURSE (DEPTH VARIES)	958	2.05	1965	$90.00	$176,823	((8.2145.06)*1950)/27 = 958
		TOTAL (tons) =	4186	TOTAL =	$376,698	

CRUSHED ROCK (assume Section C1):

	Volume (c.y.) = (area (sf) x length (l.f.) /27)	CY To T Factor	Tons = Volume/ (CYxT Factor)	Unit Price (tons)	Cost	Volume Calculation (refer to C1 typical cross section)
CRUSHED ROCK (12" DEPTH) for Roadway	1481	1.85	2739	$25.00	$68,476	(20.5"segment length =1950)/27 = 1481
CRUSHED ROCK (2" DEPTH) for Driveway	24	1.85	44	$25.00	$1,088	((2/12)* D/W area =3810)/27 = 24
CRUSHED ROCK (1" DEPTH) for Sidewalk	123	1.85	227	$25.00	$5,681	
		TOTAL (tons) =	3010	TOTAL =	$75,245	((1/12)*(sidewalk area =3910*3+D/W entrance=$12*9)/27 =124

ROADWAY EXCAVATION

	X-SECTION AREA (SF)	LENGTH (LF)				Volume (c.y.) = (area (sf) x length (l.f.) /27)	Unit Price (c.y.)	Cost	Volume Calculation (refer to C1 typical cross section)
C1 =	10.54	1950				761	$20.00	$15,224	(10.54*1950)/27 = 761
							Sub total =	$15,224	
MEDIAN									
Area (sf) =	0.1					5	$20.00	$99	(0.1*1340)/27 = 5
Lenth (lf) = 1950 L.F. - 110ft for two median breaks @ ~55ft/break - 500ft for two left turn lanes @ 250ft ea =					1340				
							Sub total =	$99	
					TOTAL (c.y.) =	766	TOTAL =	$15,324	

CURB AND GUTTER REMOVAL

					Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
C1 Length (lf)=	1950				1950	$5.00	$9,750	C1=C+G IN FILL ON ONE SIDE ONLY PER X-SECTION
				TOTAL =	1950	TOTAL =	$9,750	

SIDEWALK AND DRIVEWAY REMOVAL

				Length (l.f.)	Area (s.y.)	Unit Price (s.y.)	Cost	Assumptions
Length (lf) =	1950			1950	1300	$10.00	$13,000	SIDEWALK WIDTH = 6FT C1=S+D IN FILL ON ONE SIDE ONLY PER X-SECTION
			TOTAL =	1950	1300	TOTAL =	$13,000	

APPROACH REMOVAL

				Length (l.f.)		Area (s.y.)	Unit Price (s.y.)	Cost	Assumptions
D/W REMOVAL (sf) =	3946			3946		862	$15.00	$12,927	see *DrivewayRemovalAreas* tab for breakdown of areas; AREA = SF/9
D/W REMAIN (sf) =	3810			3810					
			TOTAL =	7756	TOTAL =	862	TOTAL =	$12,927	

EMBANKMENT COMPACTION

FILL IN REMOVAL OF D/W AND APPROACH

						Volume (c.y.) = (area (sf) x depth (ft.))/27	Unit Price (c.y.)	Cost	Assumptions
D/W REMOVAL (sf) =	3946					73	$5.00	$718	*D/W AND APPROACH DEPTH = 0.5ft *see "Driveway Removal Areas" tab for breakdown of areas
D/W REMAIN (sf) =	3810					71			
					SUB-TOTAL =	144	Sub total =	$718	

FILL IN REMOVAL OF CURB AND GUTTER

						Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
C1Length (lf) =	1950					81	$5.00	$406	*length from curb/gutter removal *gutter width = 3.5ft and depth = 0.75ft
					SUB-TOTAL =	81	Sub total =	$406	

FILL IN REMOVAL OF SIDEWALK

						Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
C1Length (lf) =	1950					81	$5.00	$406	*sidewalk width = 6ft and depth = 0.33 ft
					SUB-TOTAL =	81	Sub total =	$406	

CURB, GUTTER, AND SIDEWALK

						Volume (c.y.) = (area (sf) x length (l.f.) /27)	Unit Price (c.y.)	Cost	Volume Calculation
C1 Length (lf) =	1950	10.31				745	$5.00	$3,723	*assume 1ft depth
					SUB-TOTAL (c.y.) =	745	Sub total =	$3,723	
				TOTAL EMBANKMENT COMPACTION =		1051	TOTAL =	$5,254	

GRAVEL BORROW INCL. HAUL

						Volume (c.y.)	Unit Price (c.y.)	Cost	Assumptions
Embank. Comp. (c.y.) =		1051				285	$20.00	$5,691	*assume all exavated material can be used for embankment compaction * Borrow = Embankment compaction RoadwayExcavation
Roadway Excav. (c.y.) =		766							
					TOTAL =	285	TOTAL =	$5,691	

COMMERCIAL HMA

				Volume (c.y.) = (length x width x depth (ft.) /27)	CY To T Factor	Tons = Volume/ (CYxT Factor)	Unit Price (tons)	Cost	Assumptions
Sum of Driveways to Remain widths (ft) =		381		29	2.05	60	$140.00	$8,380	* HMA depth = 2in = 0.17ft *assume 10ft length for approach * See *DrivewayRemovalAreas* tab for "Sum of Driveways to Remain Widths" * Add 920sf for RELOCATE D/W's
Assumed Approach length (ft) =		10							
Depth (ft) =		0.17							
Relocate D/W's (sf) =	920								
					TOTAL =	60	TOTAL =	$8,380	

6 in CEMENT CONCRETE DRIVEWAY ENTRANCE

					Area (s.y.)	Unit Price (s.y.)	Cost	Assumptions
Sum of Driveways to Remain widths (ft) =		381			512	$40.00	$20,489	*Entrance width = driveway width + 5ft PER D/W * 16 D/W's (See DrivewayRemovalAreas tab) * Area = (sum of entrance widths x length)/9 *10 length
Length (ft) =		10						
				TOTAL =	512	TOTAL =	$20,489	

CURB AND GUTTER									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (lf) =	3900					3900	$15.00	$58,500	1950x 2 = 3900 Lf. = curb/gutter length for removal
					TOTAL =	3900	TOTAL =	$58,500	

TRAFFIC CURB									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (lf) =	2680					2680	$15.00	$40,200	*Traffic curb runs along median *Length = median length x 2 (both sides) = 1340 x 2 = 2680ft
					TOTAL =	2680	TOTAL =	$40,200	

DOUBLE FACED CEMENT CONCRETE TRAFFIC CURB									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (lf) =	300					300	$40.00	$12,000	*Two left turn lanes at median breaks = 150ft x 2 = 300ft (see City of Lacey Detail)
					TOTAL =	300	TOTAL =	$12,000	

CEMENT CONCRETE SIDEWALK RAMP									
							Unit Price (ea.)	Cost	Assumptions
# of Ramps	16					16	$1,250.00	$20,000	*2 ramps at T-intersection NOT at median break; 6 at T-intersection at median break
					TOTAL =	16	TOTAL =	$20,000	

SIDEWALK									
					Length (l.f.)	Area (s.y.)	Unit Price (s.y.)	Cost	Assumptions
Length (lf) =	3900				3519	3910	$30.00	$117,300	* Sidewalk width = 10ft *1950 x 2 = 3900 Lf. - REMAINING driveway widths = SIDEWALK LENGTH
Sum of remaining D/W WIDTHS =	381								
Width (ft) =	10								
				TOTAL =	3910	TOTAL =	$117,300		

STREET TREES								
					# of TREES	Unit Price (ea.)	Cost	Assumptions
Median Length (ft) =	1340				38	$400.00	$15,314	*tree spacing = 35ft OC. *trees on both sides of roadway and in median
Roadway Edge Length (ft) =	3900				111	$400.00	$44,571	
				TOTAL =	150	TOTAL =	$59,886	

TREE GRATES								
					# of TREES	Unit Price (ea.)	Cost	Assumptions
					111	$800.00	$89,143	*one grate for each tree along roadway edge
				TOTAL =	111	TOTAL =	$89,143	

SHRUBS AND PLANTS								
					Area (s.f.)	Unit Price (s.f.)	Cost	Assumptions
Median Length (ft) =	1340				10720	$1.50	$16,080	*shrubs and plants in median only = 9ft - 1ft for curb = 8ft width
Median Width (ft) =	8							
				TOTAL =	10720	TOTAL =	$16,080	

IRRIGATION								
					Area (s.f.)	Unit Price (s.f.)	Cost	Assumptions
Median Area (s.f.) =	10720				26320	$2.50	$65,800	* median width = 9ft - 1ft for curb = 8ft *140 s.f. per tree along roadway = 140 x 111 = 15540 s.f.
Roadway Edge Area (s.f.) =	15600							
				TOTAL =	26320	TOTAL =	$65,800	

TOPSOIL								
					Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
Median Area (s.f.) =	10720				596	$35.00	$20,844	* 18 in = 1.5ft depth for entire median and roadway edge trees (4ftx4ft tree well) --> 16 sf x 111 trees = 1776 s.f. * 6 in = 0.5ft depth for embankment/excavation limits *Roadway Edge Tree Area = 16sf x 111 trees = 1776 sf *Embank/Excav Area = 4.5ft (width) x 3910ft (length) - 1776sf (Roadway Edge Tree Area) = 14053
Median Depth (ft.) =	1.5							
Roadway Edge Tree Area (s.f.) =	1783				99	$35.00	$3,467	
Roadway Edge Depth (ft) =	1.5							
Embank/Excav Area (s.f.) =	14053				260	$35.00	$9,108	
Embank/Excav Depth (ft) =	0.5							
D/W Removal (s.f.) =	3946				73	$35.00	$2,558	
D/W Removal Depth (ft) =	0.5							
				TOTAL (c.y.) =	1028	TOTAL =	$35,977	

SEEDING/MULCHING/FERTILIZER								
					Area (acre)	Unit Price (acre)	Cost	Assumptions
Embank/Excav Area (s.f.) =	14053				0.32	$8,000.00	$2,581	*Seeding/Mulching/Fertilizer area = Embank/Excav Area
				TOTAL =	0.32	TOTAL =	$2,581	

BARK MULCH								
					Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
Median Area (s.f.) =	10720				3538	$35.00	$123,816	*median only * depth = 4in = 0.33ft
Median Depth (ft.) =	0.33							
				TOTAL =	3538	TOTAL =	$123,816	

JOINT TRENCH									
					# of Crossings	Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (ft) =	1950				2	2150	$30.00	$64,496	*only on one side of roadway * crossing every 800ft proposed R/W = 82ft width *Length = (2 x 82) + 1950 = 2150ft
Trench Spacing (ft) =	800								
R/W width (ft) =	82								
					TOTAL =	2150	TOTAL =	$64,496	

ELECTRICAL CONVERSION								
						Unit Price (ea.)	Cost	Assumptions
# of Conversions =	23					$4,000.00	$92,000	*Counted addresses on "College St. Driveway Tabulation" sheet that fall within limits of Phase 7 - FULL TAKES to obtain number of conversions * Added $1000.00 to conversion unit price to cover cost of service trench
				TOTAL =	23	TOTAL =	$92,000	

VAULT EXCAVATION

					# of Crossings	Volume (c.y.) = (length x width x depth (ft))/27	Unit Price (c.y.)	Cost	Assumptions
Length (ft) =	1950				2	81	$25.00	$2,474	*only on one side of roadway *excavate area = 15ft x 15ft every 800ft
Vault Spacing (ft) =	800					18			*excavate area = 7ft x 7ft at every crossing
Depth (ft) =	4								*excavation depth = 4ft * Volume = (# crossings x depth x excavate area)/27
					TOTAL (c.y.) =	99	TOTAL =	$2,474	

PSE CONVERSION COSTS

							Unit Price (l.f.)	Cost
Length (ft) =	1950						$28.25	$55,088
					TOTAL =	1950	TOTAL =	$55,088

STREET LIGHTS

						# of Lights	Unit Price (ea.)	Cost	Assumptions
Length (ft) =	3900					26	$5,500.00	$144,375	* full length, both sides of roadway = 1950 x 2 = 3900ft
Light Spacing (ft) =	240								* 240ft spacing * add 10 lights to cover costs for intersection adjustments
					TOTAL =	26	TOTAL =	$144,375	

PLASTIC WIDE LINE

							Unit Price (l.f.)	Cost	Assumptions
Length (ft) =	3627						$1.00	$3,627	* length = (1950x2) - cross street widths
					TOTAL =	3627	TOTAL =	$3,627	* cross street width total = approx 273ft

PLASTIC TRAFFIC LETTER

							Unit Price (ea.)	Cost	Assumptions
# letters =	8						$60.00	$480	* "ONLY" per left turn lane x (2) left turn lanes = 2; 2 x 4 = 8 letters
					TOTAL =	8	TOTAL =	$480	

PLASTIC TRAFFIC ARROW

							Unit Price (ea.)	Cost	Assumptions
# Arrows =	4						$75.00	$300	* (2) arrows per left turn lane x (2) left turn lanes = 4
					TOTAL =	4	TOTAL =	$300	

PLASTIC BICYCLE LANE SYMBOL

							Unit Price (ea.)	Cost	Assumptions
# Symbols=	12						$125.00	$1,500	* (1) at after each break in bike lane at intersections = 12
					TOTAL =	12	TOTAL =	$1,500	

PLASTIC STOP LINE									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
# Stop Lines =	5					50	$5.00	$250	* (1) at each intersection = 5 * assume lane width = 10 ft
Lane width (ft) =	10								
					TOTAL =	50	TOTAL =	$250	

TEMPORARY STRIPING									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (ft) =	3900					3900	$0.25	$975	* only lane striping = 1950 x 2 =3900
					TOTAL =	3900	TOTAL =	$975	

RETAINING WALL									
						Area (s.f.)	Unit Price (s.f.)	Cost	Assumptions
Length of wall (ft) =	1000					5000	$110.00	$550,000	* assume wall starts at 126+50 and runs to roundabout at 136+50 = 1000 ft * Avg height = 5ft for surface area
Avg. Height (ft) =	5								
					TOTAL =	5000	TOTAL =	$550,000	

STORM DRAINAGE
see calc's by J. Brannin

CLEAR AND GRUB									
						Area (acre)	Unit Price (acre)	Cost	Assumptions
Length (ft) =	3172					3	$5,000.00	$13,472	* Prop. Total width = 92ft * Improvement width = 55ft * length = both sides of roadway for full length of segment - cross streets and existing D/W's = 3900 - (381+74) -273 = 3355
Width (ft) =	37								
					TOTAL =		TOTAL =	$13,472	

SILT FENCE									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
C1 Length (ft) =	1950	ONE SIDE				1950	$6.00	$11,700	* fill along ONE SIDE FOR C1 = 1950 * Length = 1950
					TOTAL =	1950	TOTAL =	$11,700	

RAISED PAVEMENT MARKERS								
		# TYPE 1 along median	# TYPE 1 for lane stripe	# TYPE 2 along median	# TYPE 2 for lane stripe	Unit Price (HUND)	Cost	Assumptions
Length for Line Striping (ft) =	1950	596	122	199	183	$250.00	$1,795	* Along Median: (3) TYPE 1 per 16ft length; (1) TYPE 2 per 16ft length * Lane Stripe: (2) TYPE 1 per stripe; (3) TYPE 2 per stripe; Stripe spacing = 20ft *Length for striping = 1950 x 2 =3900ft *Length along median = (1340x2) + 250 for two left turn lanes at 250ft ea. =3180
Length Along Median (ft) =	3180					$350.00	$1,335	
		TYPE 1 TOTAL =	718	TYPE 2 TOTAL =	382	TOTAL =	$3,131	

CLEARING LIMIT FENCE									
						Length (l.f.)	Unit Price (l.f.)	Cost	Assumptions
Length (ft) =	1950					1950	$4.00	$7,800	* opposite side of roadway of silt fence
					TOTAL =	1950	TOTAL =	$7,800	

SEGMENT #1 (Phase 7) STA 115+80 TO 135+00

PORTION TO REMOVE FROM DRIVEWAYS TO REMAIN					FULL REMOVAL				
Address	Width (ft)	Length (ft) assume L = 10ft	Area (sf)	Area (sy)	Address	Width (ft)	Length (ft) approx. length measured in CAD	Area (sf)	Area (sy)
3911 College St SE	12	10	120	13	3818 College St SE	22	27	594	66
3901 to 3907 College St SE	33	10	250	28	3801 College St SE	40	76	3040	338
3413 to 3415 College St SE	24	10	240	27	2905 College St SE	12	26	312	35
ROMACHIN Mr.	34	10	340	38					
3407 TO 3409 College St SE	30	10	300	33					
3403 TO 3405 College St SE	32	10	220	24					
3320 TO 3430 College St SE	26	10	260	29					
3206 A&B College St SE	22	10	220	24					
CITY OF LACEY AND RESIDENTS	29	10	290	32					
3106 College St SE	16	10	160	18					
3001 College St SE	17	10	170	19					
3001 College St SE	21	10	210	23					
2909 College St SE	18	10	180	20					
3032 College St SE	10	10	100	11					
3020 College St SE	17	10	170	19					
3015 & 3025 College St SE	15	10	150	17					
College To U.S.A.	20	10	200	22					
SUB TOTAL =	381	TOTAL =	3810	423	SUB TOTAL =	74	TOTAL =	3946	438

SEGMENT #2 (Phase 6) STA 135+00 TO 159+00

PORTION TO REMOVE FROM DRIVEWAYS TO REMAIN					FULL REMOVAL				
Address	Width (ft)	Length (ft) assume L = 10ft	Area (sf)	Area (sy)	Address	Width (ft)	Length (ft) approx. length measured in CAD	Area (sf)	Area (sy)
2721 & others College St SE	28	10	280	31	2706 College St SE	15	63	930	103
2719 College St SE	13	10	130	14	2607 College St SE	12	31	372	41
2719 College St SE	21	10	210	23	2505 College St SE	18	26	468	52
2717 College St SE	24	10	240	27	2505 College St SE	12	25	300	33
2713 College St SE	19	10	190	21	2606 College St SE	7	51	357	40
2708 College St SE	16	10	160	18	2506 College St SE	10	27	270	30
2709 College St SE	20	10	200	22	2502 College St SE	12	77	594	66
2705 College St SE	28	10	280	31	4602 College St SE	24	30	864	96
2702 College St SE	14	10	140	16	4603 College St SE	21	47	987	110
2701 College St SE	19	10	190	21					
2617 College St SE	36	10	360	40					
2700 College St SE	12	10	120	13					
2626 College St SE	18	10	180	20					
2613 College St SE	26	10	260	29					
2609 College St SE	23	10	230	26					
2606 College St SE	20	10	200	22					
2602 College St SE	15	10	150	17					
2505 & 2509 College St SE	18	10	180	20					
2501 & 2505 College St SE	34	10	340	38					
2405 College St SE	14	10	140	16					
2209 College St SE	21	10	210	23					
2213 College St SE	20	10	200	22					
SUB TOTAL =	459	TOTAL =	4590	510	SUB TOTAL =	141	TOTAL =	5142	571

SEGMENT #3 (Phase 5) STA 163+00 TO 176+00

PORTION TO REMOVE FROM DRIVEWAYS TO REMAIN					FULL REMOVAL				
Address	Width (ft)	Length (ft) assume L = 10ft	Area (sf)	Area (sy)	Address	Width (ft)	Length (ft) approx. length measured in CAD	Area (sf)	Area (sy)
2100 College St SE	25	10	250	28	1921 College St SE	23	135	2810	257
2000 College St SE	28	10	280	31	4600 18th Ave SE	10	25	250	28
1900 College St SE	40	10	400	44	1705 College St SE	9	22	198	22
1905 A&B College St SE	15	10	150	17					
1901 College St SE	30	10	300	33					
4600 18th Ave SE	17	10	170	19					
1613 College St SE	32	10	320	36					
1605 College St SE	14	10	140	16					
SUB TOTAL =	201	TOTAL =	2010	223	SUB TOTAL =	41	TOTAL =	2758	306

SEGMENT #4 (Phase 4) STA 179+00 TO 191+00

PORTION TO REMOVE FROM DRIVEWAYS TO REMAIN					FULL REMOVAL				
Address	Width (ft)	Length (ft) assume L = 10ft	Area (sf)	Area (sy)	Address	Width (ft)	Length (ft) approx. length measured in CAD	Area (sf)	Area (sy)
1507 College St SE	16	10	160	18	1618 College St SE	28	10	280	31
1510 College St SE	25	10	250	28	1423 College St SE	27	10	270	30
1510 College St SE	31	10	310	34	1419 College St SE	18	10	180	20
1510 College St SE	24	10	240	27	4601 College St SE	23	40	920	102
1501, 1505 & others College St SE	29	10	290	32	4603 College St SE	28	42	2006	119
Building at STA 187+35.00	16	20	160	18	1220 College St SE	20	15	300	33
1207 College St SE	27	10	270	34	1326 College St SE	10	28	280	31
					1324 College St SE	10	18	180	20
					1220 College St SE	30	86	9888	320
					1308 College St SE	70	83	5810	646
					1307 College St SE	18	22	396	44
					1302 College St SE	87	34	3088	121
SUB TOTAL =	155	TOTAL =	1650	183	SUB TOTAL =	312	TOTAL =	18638	1517

Appendix E

COLLEGE CORRIDOR STUDY -- PUBLIC INPUT

1. **How did you learn about tonight's Open House?**
   - ☐ Direct Mailing
   - ☐ Friend / Neighbor
   - ☐ Newspaper
   - ☐ Other: _____

2. **What situation describes you best:**
   - ☐ I live/work adjacent to College Street
   - ☐ I live/work in the general vicinity of College Street
   - ☐ I commute along the College Street Corridor
   - ☐ Other: _____

3. **How would you rate the current congestion/safety of College Street?**

Mode	*Poor*	*Below Average*	*Average*	*Above Average*	*Excellent*
Motor Vehicle	☐	☐	☐	☐	☐
Bicycle	☐	☐	☐	☐	☐
Pedestrian	☐	☐	☐	☐	☐

4. **Do you agree with the proposed plan? What changes would you make?**

   _____
   _____
   _____

5. **What phase would you like to see constructed first?**

   1st _____
   2nd _____
   3rd _____

6. **When would you like to see these improvements constructed?**

5-10 years	☐	15-20 years	☐
10-15 years	☐	20 +	☐

7. **Comments / Suggestions?**

   _____
   _____
   _____
   _____
   _____
   _____
   _____

November 5, 2008
4:30 to 7:30 pm
Mountain View Elementary School

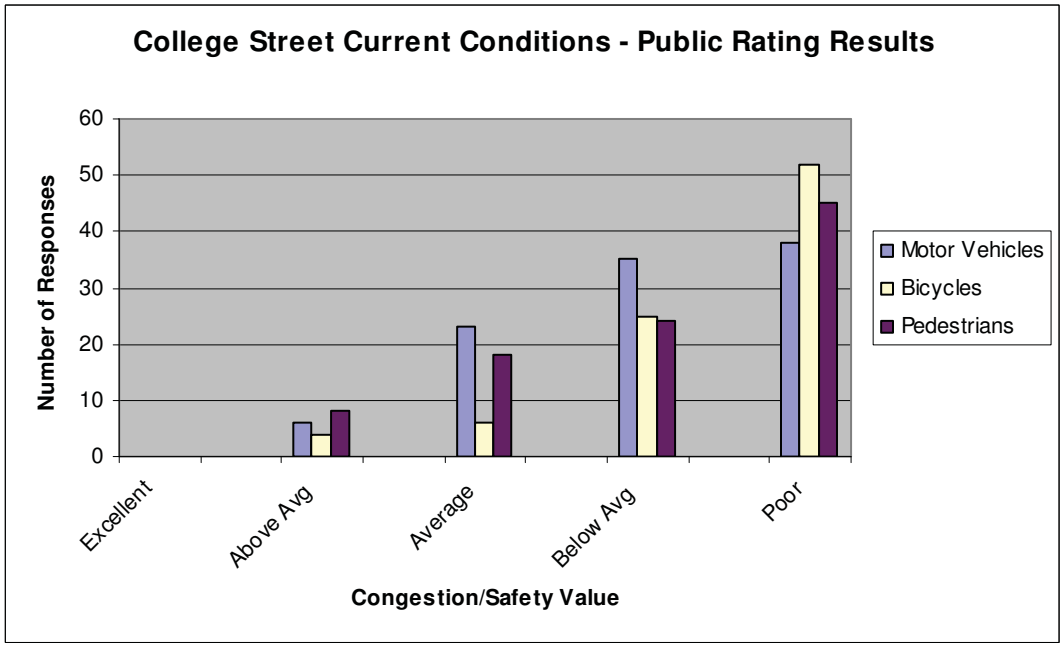
COLLEGE CORRIDOR STUDY

Public Feedback Summary – Combined from Oct. 9 and Nov. 5

1. **How did you learn about tonight's Open House?**
   - ❑ **Direct Mailing (73)**
   - ❑ **Newspaper (33)**
   - ❑ **Friend/Neighbor (7)**
   - ❑ **Other: (8)**
     1. **School Flyer (4)**
     2. **Online (2)**
     3. **Radio (1)**
     4. **City Staff (1)**

2. **What situation describes you best?**
   - ❑ **I live/work adjacent to College St (61)**
   - ❑ **I live/work in the general vicinity of College St (39)**
   - ❑ **I commute along the College Street Corridor (29)**
   - ❑ **Other: (8)**
     1. **Own property on 22nd Ave**
     2. **Walk and Bicycle**
     3. **Have regional focus on alternative transportation**
     4. **Elderly mother lives adjacent to College**
     5. **Sister lives on College**
     6. **Daughter goes to Mt View Elementary**
     7. **Lives on other side of Ruddell**
     8. **unspecified**

3. **How would you rate the current congestion/safety of College Street?**



4. Do you agree with the proposed plan? What changes would you make?

- ❑ **Agree (58)**
- ❑ **Disagree (14)**

Suggested changes include:

- **Increase Bike Lane width (7)**
- **Signalized intersections instead of Roundabouts (3)**
- **No Landscaping (3)**
- **Roundabouts are good solution (3)**
- **More and/or lighted crosswalks (2)**
- **Signal at 22nd instead of Roundabout (2)**
- **Turn Lane instead of Median (2)**
- **Position Roundabouts where most traffic turns (2)**
- **Use shrubs instead of trees in median (2)**
- **Make College a one-way street (2)**
- **More Bus Shelters and Benches (2)**
- **Move 16th Roundabout to 14th (1)**
- **4-Way Stop at 22nd (1)**
- **Install Roundabout at 37th (1)**
- **Turn Lane instead of median between 19th and 22nd (1)**
- **Crosswalks near Bus Stops (1)**
- **Consider pedestrian overpasses at Mt View and 16th (1)**
- **Install Roundabout at 22nd as soon as possible (1)**
- **Green line – connector roads should be priority (1)**
- **These improvements would be great asset for growth of the community (1)**
- **Concern about financing given current state of economy (1)**

5. What phase would you like to see constructed first if funding becomes available?

The following construction phases are ranked in order of popularity

- ❑ **Phase 1 - 22nd and College Roundabout**
- ❑ **Phase 3 - 16th and College Roundabout**
- ❑ **Phase 2 - 29th and College Roundabout**
- ❑ **Phase 4 - Corridor section between Lacey Blvd and 16th Ave**
- ❑ **Phase 5 - Corridor section between 16th and 22nd**
- ❑ **Phase 7 - Corridor section between 29th and 37th**
- ❑ **Phase 6 – Corridor section between 22nd and 29th**

6. Comments/ Suggestions?

Some comments and suggestions include:

- **Widen Bike Lanes (4)**
- **Install Signals instead of Roundabouts (4)**
- **Drivers do not yield right of way in Roundabouts (4)**
- **Concern about tax increases (3)**
- **Make College safer for Pedestrians (3)**

cont'd

- **Turn Lane instead of Medians (2)**
- **Install flashing crosswalks (2)**
- **Reconsider Landscaping due to cost and long term maintenance (2)**
- **Use shrubs instead of trees in median (2)**
- **Well conceived plan (2)**
- **Build as soon as possible (2)**
- **Interest in environmental impact (2)**
- **Lower Speed Limit (2)**
- **Elderly and young drivers not familiar with Roundabouts (1)**
- **Install flashers in Pedestrian crossings at Roundabouts (1)**
- **Make Bus Stops and Public Transportation more attractive (1)**
- **Concern about emergency vehicles once improvements completed (1)**
- **How will traffic be affected during construction? (1)**
- **Open up dead ends on side streets (1)**
- **How is property value affected? (1)**
- **Concern about increased traffic noise (1)**
- **Address need for Pedestrian education (1)**
- **Much needed project to alleviate congestion and increase safety (1)**
- **Roundabouts are a waste of tax dollars (1)**
- **Existing street adequate except for cross traffic turns (1)**
- **Street tree additions, especially in median, look good (1)**
- **Encourage more use of Ruddell, Carpenter, and Boulevard (1)**
- **Incorporate Pedestrian overpasses (1)**
- **Extend school zones (1)**
- **What is the progress of the Mullen Rd extension?**
- **Thanks for being so prepared, and having so many available to answer questions. (1)**
- **I trust a red light more than a yield sign to stop traffic for children (1)**
- **Thanks for the opportunity to see what's going on (1)**
- **Make the left hand turnouts long enough for at least 4 cars (1)**
- **Provide right turn only lane from Lacey Blvd to College southbound (2)**
- **Provide as many as possible left turns (1)**
- **How many million will it cost and who will pay for it? (1)**
- **I agree with the plan 100%, it is very much needed (1)**
- **I would like to see fewer roundabouts in Lacey, not more (1)**
- **School Bus movements should be considered (1)**
- **Leave the midblock crosswalk at the School (1)**
- **As is, College St is dangerous and poorly lit (1)**

Appendix F

WHPacific

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Olympia, Washington 98501
360.754.3375 ◆ fax 360.754.1195

TECHNICAL MEMORANDUM

Date:	December 10, 2008 Rev 4/17/09	**RE:**	**Bike Lane Technical Memorandum**
To:	Martin Hoppe, P.E., PTOE	**From:**	Scott Sawyer, P.E.
Company:	City of Lacey	**Title:**	Sr. Project Manager
Phone:	360.438.2681	**Phone:**	360.918.5305
Fax:	360.456.7799	**Fax:**	360.754.1195
Address:	420 College Street SE		
	Lacey, WA 98509-3400	**Project #:**	34709
		Project Name:	College Street Improvement Report

Purpose

The purpose of this technical memorandum is (1) to address the public opinions concerning the space provided for bicycles, and (2) to present the costs associated with widening the roadway four feet to provide space for a Class II, five-foot wide bike lane.

Summary

The City of Lacey held public open houses on October 9 and November 5, 2008 to present the preferred design for College Street and to give opportunity for the public to voice comments and concerns. The City received some public concerns about the width provided for bicycles.

Because of these public concerns, the City asked WHPacific to prepare cost estimates for increasing the curb to curb width to provide space for a Class II bike lane. We estimate the total additional costs at $1.7M to provide Class II bike lanes. Also, the five-foot bike lanes require full parcel acquisition of three additional homes sites.

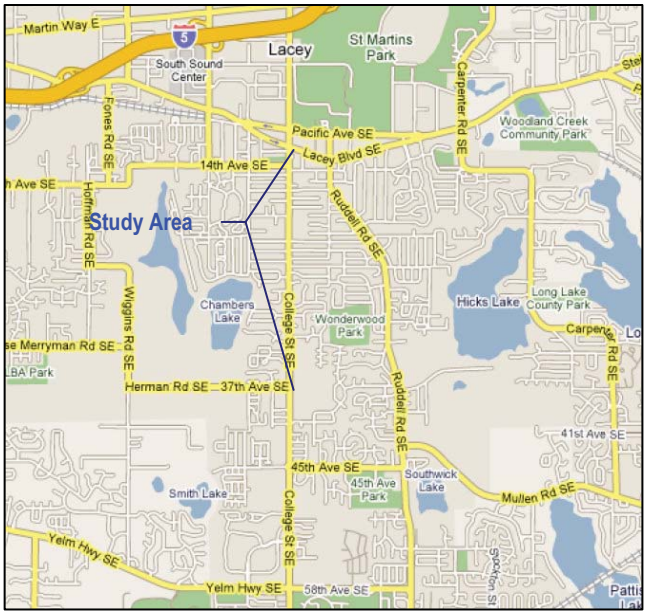

Figure 1 - Vicinity Map

Background

Previous Work

Previous study work resulted in a report, "College Street, Evaluation of Options", August 2005. This report documented a comprehensive alternatives analysis that scored and ranked ten options (nine build and one no-build) for improvements to College Street that addressed the corridor needs. The report recommended Option 9 as the preferred option, because it best provides a blend of corridor capacity, cost, neighborhood connectivity, non-motorized uses, and corridor aesthetics. The cross-section included a planted center median to control access and provide space for left-turn lanes at key intersections; wide sidewalks with tree wells to

promote walk-ability; space for commuting bicycles; and roundabouts at major intersections to provide intersection control. The overall right-of-way width of 72 feet widens to 76 feet at left-turn lane locations.

The current study work began in February 2008 and consisted of the following tasks:

- *Alternatives Analysis* to define the recommended dimensions of the cross-sectional elements;
- *Horizontal Alignment and Right-of-Way* to define the recommended alignment;
- *Neighborhood Circulation and Access* to define recommended changes to street access and/or driveway access; and
- *Improvements Phasing Plan* to estimate project costs and define recommended phasing for the improvements.

WHPacific prepared an *Alternatives Analysis* technical memorandum, dated April 11, 2008. The memorandum presented ranges of dimensions for roadway cross-sectional elements (median width, left-turn lane width, through-lane width, space for bicyclists, planter/tree well width, and sidewalk width), and recommended a proposed cross-section for College Street for use in subsequent study work. The recommended cross-section is shown in Figure 2.

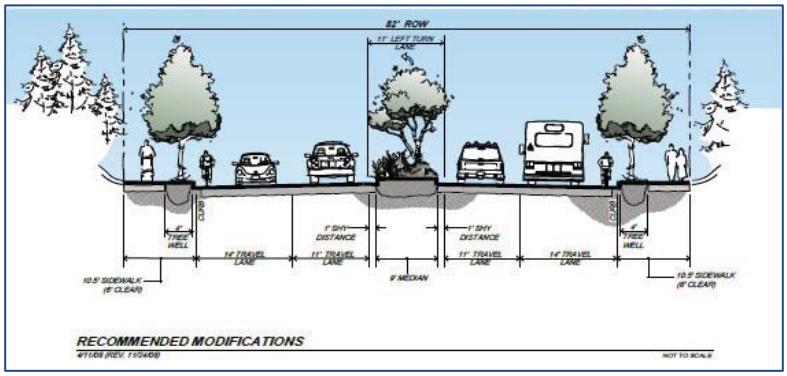

Figure 2 – Recommended Alternative

The *Alternative Analysis* technical memorandum recommended shared roadways with a 14-foot outside lane for two principal reasons, (1) there is a multi-use trail (Chehalis-Western Trail) paralleling the corridor to the west, and (2) the 14-foot outside lanes reduce right-of-way impacts – less home displacements and less costs. The recommendation was supported by the expectation most bicyclists will be Type A users (advanced or experienced riders), as defined by the AASHTO, *Guide for the Development of Bicycle Facilities*.[1] The recommended width matches bike routes on shared roadways used by the City of Lacey (enhanced Class III routes).

The *Alternative Analysis* technical memorandum recommended 11-foot travel lanes as a practical minimum width (since the 10-foot lanes provide no buffer for trucks and/or buses considering their width from outside of mirror to outside of mirror).

WHPacific subsequently prepared a *Horizontal Alignment and Right-of-Way Limits* technical memorandum, dated July 28, 2008, to determine the horizontal alignment with the least impact to right-of-way for the cross-section shown in Figure 2.

The least impactful horizontal alignment by segment is:

- Segment 1 - Aligned against the existing easterly right-of-way line;
- Segment 2 - Aligned against the existing westerly right-of-way line;
- Segment 3 - Aligned against the existing easterly right-of-way line; and
- Segment 4 - Aligned against the existing westerly right-of-way line.

[2]AASHTO, *Guide for the Development of Bicycle Facilities*, 1999, page 6.

Cost Evaluation

Approach

We evaluated the additional costs for widening the curb to curb dimension to provide space for Class II bike lanes. We used the same approach for determining the least impactful horizontal alignment as documented in the *Horizontal Alignment and Right-of-Way Limits* technical memorandum. We widened the overall right-of-way width from 82 to 86 feet to provide additional space for the bike lanes.

Findings

The least impactful horizontal alignment is not affected by the additional right-of-way width. The alignment by segment remains as stated above.

The five-foot bike lanes require full parcel acquisition of 3more home sites. The bike lanes also add construction costs (additional roadway and minor retaining walls behind the sidewalks), and right-of-way costs.

The three additional full parcel acquisitions are shown in Tables 1 and 2. The estimated construction costs are approximately $500,000. The estimated right-of-way costs at roughly $1.20 M are shown in Table 3.

We recommend $1.7M as a reasonable planning level estimate to provide five-foot bike lanes. This equates to approximately $210 per linear foot using a project length of 8,100 feet.

Table 1
Full Parcel Acquisitions for Structures and/or Driveways Impacted (Including Roundabouts)

Segment	Current Full Takes	Additional Full Takes	Evaluated Full Takes
1	3	1	4
2	8	2	10
3	5	0	5
4	7[1]	0	7[1]
Total	**23**	**3**	**26**

1. Assumes a full parcel acquisition is not required for the apartment buildings at 1510 College Street SE, assuming three building can be remodeled to remove six end units.

Table 2
Additional Full Parcel Acquisitions Due to Bike Lane Widening[1]

Parcel Number	Site Address	Existing Parcel (SQFT)
58090006700	4513 29th Court SE	10,693
84850000100	2602 College Street SE	21,162
11828220205	4805 27th Lane SE	5,283

1. Each parcel is impacted by encroachment on an existing structure.

Table 3
Estimated Right-of-Way Acquisition Costs (Including Roundabout Impacts)

Segment	Current Cost	Additional Cost	Evaluated Cost
1	$1,501,194	$374,701	$1,875,895
2	$3,042,376	$747,998	$3,790,374
3	$1,912,530	$61,164	$1,973,694
4	$3,141,860	$20,703	$3,162,563
Total	**$9,597,960**	**$1,204,566**	**$10,802,526**