Project Steering Committee (PSC)

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peter Keating</td>
<td>Chittenden County Regional Planning</td>
</tr>
<tr>
<td></td>
<td>Commission</td>
</tr>
<tr>
<td>Justin Rabidoux</td>
<td>City of South Burlington</td>
</tr>
<tr>
<td>Paul Conner</td>
<td>City of South Burlington</td>
</tr>
<tr>
<td>Katelin Brewer-Cole</td>
<td>Local Motion</td>
</tr>
<tr>
<td>John Dempsey</td>
<td>Toole Design Group</td>
</tr>
</tbody>
</table>

This scoping study was a collaborative effort of City staff, CCRPC, Local Motion, and Toole Design Group, who possessed a wealth of combined knowledge and expertise regarding project background, history, local insight, and existing conditions. Their valuable insight and assistance was instrumental in developing the implementation strategy.

The preparation of this report has been financed in part through grant from the Federal Highway Administration and Federal Transit Administration, U.S. Department of Transportation, under the State Planning and Research Program, Section 505 [or Metropolitan Planning Program, Section 104(f)] of Title 23, U.S. Code, as well as matching funds provided by Chittenden County’s municipalities and the Vermont Agency of Transportation. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.
# Table of Contents

1.0 **Introduction** ................................................................................. 6  
   1.1 Background .................................................................................. 6  
   1.2 Project Study Area .......................................................................... 6  
   1.3 Project Oversight ............................................................................ 8  
2.0 **Existing Conditions** ................................................................. 8  
   2.1 Site Characteristics .......................................................................... 8  
   2.2 Relevant Plans and Studies ............................................................... 8  
   2.3 Existing Resources .......................................................................... 8  
   2.4 Allen Road Existing Conditions ....................................................... 8  
      2.4.1 Parcel Data and Property Ownership .................................... 10  
      2.4.2 Natural Resources ................................................................. 10  
      2.4.3 Built Environment .................................................................. 11  
      2.4.4 Cultural Resources ............................................................... 11  
   2.5 Dorset Street Existing Conditions .................................................... 11  
      2.5.1 Parcel Data and Property Ownership .................................... 13  
      2.5.2 Natural Resources ................................................................. 13  
      2.5.3 Built Environment .................................................................. 14  
      2.5.4 Cultural Resources ............................................................... 14  
   2.6 Airport Parkway/Lime Kiln Road Existing Conditions .................. 15  
      2.6.1 Parcel Data and Property Ownership .................................... 17  
      2.6.2 Natural Resources ................................................................. 17  
      2.6.3 Built Environment .................................................................. 18  
      2.6.4 Cultural Resources ............................................................... 18  
   2.7 Spear Street Existing Conditions ..................................................... 18  
      2.7.1 Parcel Data and Property Ownership .................................... 20  
      2.7.2 Natural Resources ................................................................. 20  
      2.7.3 Built Environment .................................................................. 21  
      2.7.4 Cultural Resources ............................................................... 21  
3.0 **Concept Alternatives Analysis** .................................................. 22  
   3.1 Project Purpose and Need ............................................................... 22  
      Purpose: ....................................................................................... 22  
      Need: ............................................................................................ 22  
   3.2 Allen Road Concept Alternatives ..................................................... 22  
      3.2.1 Evaluation of Concept Alternatives .................................... 22
3.2.2 Preferred Concept Alternative ................................................................. 23
3.2.3 Opinion of Probable Construction Costs .................................................. 23
3.2.4 Evaluation Matrix ..................................................................................... 23
3.3 Dorset Street Concept Alternatives ............................................................... 25
  3.3.1 Evaluation of Concept Alternatives .......................................................... 25
  3.3.2 Preferred Concept Alternative ................................................................. 25
  3.3.3 Opinion of Probable Construction Costs ............................................... 26
  3.3.4 Evaluation Matrix ..................................................................................... 26
3.4 Airport Parkway/Lime Kiln Road Concept Alternatives ............................... 28
  3.4.1 Evaluation of Concept Alternatives .......................................................... 28
  3.4.2 Preferred Concept Alternative ................................................................. 28
  3.4.3 Opinion of Probable Construction Costs ............................................... 30
  3.4.4 Evaluation Matrix ..................................................................................... 31
3.5 Spear Street Concept Alternatives ............................................................... 33
  3.5.1 Evaluation of Concept Alternatives .......................................................... 33
  3.5.2 Preferred Concept Alternative ................................................................. 33
  3.5.3 Opinion of Probable Construction Costs ............................................... 34
  3.5.4 Evaluation Matrix ..................................................................................... 34
4.0 Project Summary ............................................................................................ 37
  4.1 Conclusion .................................................................................................. 37

Appendices
  Appendix A: South Burlington Planning Commission Meeting Minutes
  Appendix B: Preferred Concept Alignment Alternatives and Typical Cross Sections
  Appendix C: Opinion of Probable Construction Costs
1.0 Introduction

1.1 Background
The Chittenden County Regional Planning Commission (CCRPC) and the City of South Burlington (City) initiated this scoping study to analyze and evaluate the feasibility of additional sidewalk and shared use paths at four (4) proposed study site locations:

- **Allen Road** from the existing shared use path terminus east of Baycrest Drive to Spear Street;
- **Dorset Street** from the existing shared use path north of Autumn Hill Road to Dorset Street/Nowland Farm Road/Old Cross Road intersection;
- **Airport Parkway** from Kirby Road to Lime Kiln Bridge; and
- **Spear Street** from the existing South Burlington shared use path south of Davis Road to US Route 2 Jug Handle/East Terrace.

This report analyzes and evaluates existing conditions, provides conceptual alignment alternatives, and details opinion of probable construction costs. Preferred concept alternative alignments as identified with the Project Steering Committee (PSC), through the public participation and outreach during the scoping study process, are highlighted within this scoping study.

1.2 Project Study Area
The proposed project study site locations are shown in Figure 1.
1.3 Project Oversight
This scoping study project was conducted and coordinated with public involvement through workshops, presentations, and meetings with the steering committee and the South Burlington Planning Commission.

Project meetings and public involvement included the following:

- **Kickoff Meeting:** July 22, 2015 – TDG staff and Steering Committee Members met to discuss project scope, study area limits, and schedule.
- **Alternatives Presentation:** May 10, 2016 – TDG staff presented project alternatives to members of the public and the South Burlington Planning Commission.
- **Preferred Alternatives Presentation:** September 13, 2016 – TDG staff presented the preferred alternative plans and the findings of the Scoping Study to members of the public and the South Burlington Planning Commission.

2.0 Existing Conditions

2.1 Site Characteristics
All base mapping for this scoping study was compiled from Geographic Information System (GIS) and orthographic imagery data as available from the CCRPC, State of Vermont, and the City. No field survey was performed. Site fieldwork was conducted to field verify all topographic features within the project study area and subsequent fieldwork findings were added to the original base mapping.

2.2 Relevant Plans and Studies
The 2005 Airport Drive/Airport Parkway Improvements Scoping Study, 2006 Road Safety Audit Review Airport Parkway/Lime Kiln Intersection and the 2016 South Burlington Comprehensive Plan documents were reviewed and consulted to ensure consistency with this scoping study.

2.3 Existing Resources
The following sections provide a summary assessment of existing resources to understand potential impacts for concept alternatives. Each of the resource types specified in the VTrans Project Scoping Manual are addressed within each study location below. The data referenced was obtained from the City of South Burlington, Vermont Center for Geographic Information, the Vermont Agency of Natural Resources and VTrans Online Map Center.

2.4 Allen Road Existing Conditions
Allen Road (Figure 2) is classified by the Vermont Agency of Transportation (VTrans) as an urban collector with a posted speed limit of 35 MPH and 2012 average annual daily traffic (AADT) of 4,100. It runs in an east-west direction, connecting Spear Street to the east and US Route 7 to the west. Within the study area, Allen Road provides two travel lanes. The existing pavement width is 24 feet and the markings are generally in good condition. Refer to Table 1 for roadway characteristics of Allen Road.
Allen Road is signalized at the Spear Street intersection. There are no crosswalk markings present at this intersection. Spear Street has on-street marked bicycle facilities and a 10 foot shared use path on the east side of the road providing access to the residential development. Allen Road has an existing 8 foot wide shared use path with 28 foot wide grass buffer/setback on the north side of the roadway. The path is provided for approximately 1,200 feet west of Baycrest Drive and approximately 165 feet east of Baycrest Drive.

The intersection with Baycrest Drive is stop-controlled on the side street approach with crosswalk markings connecting the two path segments. The general topography is sloping up from Baycrest Drive to the Allen Road/Spear Street intersection at approximately less than 15 percent.

2.4.1 Parcel Data and Property Ownership
The primary parcel data within the study area consists of single family residential. The study will examine potential alignments within the existing road segment right-of-way, however there are approximately five (5) separate adjacent property owners that may be impacted.

2.4.2 Natural Resources
Lakes/Ponds/Streams/Rivers
There are no lakes, ponds, streams or rivers located within the study area.

Wetlands
There are no classified wetlands within the study area.

Floodplains
The study area is considered a zone of minimal flood hazard.

Soil Conditions
The study area consists of soils classified as potentially highly erodible. West of Baycrest Drive, hydric soils have been identified. No roads in the study area are identified as susceptible to road erosion.
Agricultural Land
The study area contains prime, statewide and statewide (a) agricultural soils.

Forest Land
No forest lands have been identified within the study area and the majority of the site is classified as estuarine scrub/shrub wetland.

Rare, Threatened, or Endangered Species
No rare, threatened or endangered species have been identified within the study area.

2.4.3 Built Environment
Hazardous Waste
There are no parcels containing hazardous waste within the study area.

Utilities
Overhead utility poles are located in the buffer/setback and an existing open drainage swale on the north side of Allen Road within the study area.

2.4.4 Cultural Resources
Historic
There are no historic sites located within the study area.

Archeological
An Archeological Resource Assessment (ARA) is not being conducted as part of this study and is not considered to have historic or precontact sensitivity.

Architectural
The building stock located within the study area consists of residential development of the 20th century.

Section 4(f) and 6(f) properties
There are no Section 4(f) or 6(f) properties within the study area.

2.5 Dorset Street Existing Conditions
Dorset Street (Figure 3) is classified by VTrans as an urban collector with a posted speed limit of 40 MPH and 2012 AADT of 5,000. It runs in a north-south direction providing access to residential developments to the south and City of Burlington to the north. Within the study area, Dorset Street provides two travel lanes. The existing pavement width is 28 feet and the markings are both generally in good condition. Refer to Table 2 for roadway characteristics of Dorset Street.

Dorset Street looking south.
The intersection of Dorset Street/Old Cross Road/Nowland Farm Drive is stop-controlled on Nowland Farm Drive and Old Cross Road. An existing crosswalk is marked across Dorset Street on the north side of the intersection, connecting the existing shared use paths on both sides of the road. All existing shared use path segments are 10 feet wide. The existing crosswalk is emphasized by a Rectangular Rapid Flashing Beacon (RRFB) with supplemental warning sign assemblies. During the time of our fieldwork, the push button of the RRFB on the west side of the intersection was not operational.

There is also currently an 8 foot wide shared use path from Autumn Hill Road north approximately 1,000 feet intersecting with the Dorset Park Recreation Path. Between the intersection of Dorset Street/Old Cross Road/Nowland Farm Drive and Dorset Park Recreation Path within the existing right-of-way, a worn path on the east side on the road indicates pedestrian and bicycle traffic may exist between the two path segments.

A popular destination for pedestrians and bicyclists within the study area is the Mill Market & Deli property located south of Cedar Mill Drive on the east side of Dorset Street.

### 2.5.1 Parcel Data and Property Ownership

The primary parcel data within the study area consists of single family residential with the exception of the Mill Market and Deli property. The study will examine potential alignments within the existing road segment right-of-way, however there are approximately fifteen (15) separate adjacent property owners that may be impacted.

### 2.5.2 Natural Resources

#### Lakes/Ponds/Streams/Rivers

There are no lakes, ponds, streams or rivers located within the study area.

#### Wetlands

Class 2 wetlands can be found north of Nowland Farm Drive/Old Cross Road/Dorset Street
intersection, as well on the east side of Dorset Street starting approximately 300 feet south of Old Cross Road and at the intersection of Dorset Street/Hemlock Lane.

**Floodplains**
The study area is considered a zone of minimal flood hazard.

**Soil Conditions**
The study area consists of soils classified as potentially highly erodible.

**Agricultural Land**
Most of the study area contains statewide agricultural soils. No roads in the study area are identified as susceptible to road erosion.

**Forest Land**
No forest lands have been identified within the study area. The majority of the site is classified as estuarine scrub/shrub wetland and developed, low and medium density.

**Rare, Threatened, or Endangered Species**
No rare, threatened or endangered species have been identified within the study area.

### 2.5.3 Built Environment

**Hazardous Waste**
There are no parcels containing hazardous waste within the study area.

**Utilities**
Utility poles exist and alternate on both sides of the road corridor. During the day of our fieldwork, standing water was observed in the open drainage on the east side of Dorset Street from approximately the Mill Market & Deli to the existing path north of Autumn Hill Road. The Mill Market & Deli property had standing water in the parking area.

### 2.5.4 Cultural Resources

**Historic**
There are no historic sites located within the study area.

**Archeological**
An Archeological Resource Assessment (ARA) is not being conducted as part of this study and is not considered to have historic or precontact sensitivity.

**Architectural**
The building stock located within the study area consists of residential development of the 20th century.

**Section 4(f) and 6(f) properties**
There are no Section 4(f) or 6(f) properties within the study area.
2.6 Airport Parkway/Lime Kiln Road Existing Conditions

Airport Parkway (Figure 4) is classified by VTrans as an urban minor arterial with a posted speed limit of 25 MPH and 2013 AADT of 7,400. It generally runs in a north-south direction providing access to Burlington International Airport, residential neighborhoods in South Burlington, and College Parkway (State Route 15) in the Town of Colchester. Within the study area, Airport Parkway provides a travel lane in each direction. The existing pavement width varies from 31 to 33 feet wide with constrained sections reduced to 22 feet wide located north and south of the intersection of Airport Parkway/Ethan Allen Drive/Lime Kiln Road/Shamrock Road. The markings are generally in good condition. Refer to Table 3 for roadway characteristics of Airport Parkway.

Lime Kiln Road looking south at the terminus of the existing sidewalk.

Table 3: Roadway Characteristics (source: VTrans Route Log Data)

<table>
<thead>
<tr>
<th>Airport Parkway/Lime Kiln Road</th>
<th>Urban Minor Arterial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jurisdiction</td>
<td>City</td>
</tr>
<tr>
<td>Right-of-way width (feet)</td>
<td>60*</td>
</tr>
<tr>
<td>Roadway width (feet)</td>
<td>31-33' (15.5'-16.5' travel lanes)</td>
</tr>
<tr>
<td></td>
<td>22' (11' travel lanes) constrained</td>
</tr>
<tr>
<td>2013 AADT**</td>
<td>7,400</td>
</tr>
<tr>
<td>Posted speed limit</td>
<td>25 MPH</td>
</tr>
</tbody>
</table>

*Approximate Right-of-Way
**AADT= Average Annual Daily Traffic

An existing 5 foot wide sidewalk with 4 foot buffer segment is provided on the west side of Lime Kiln Road from the Lime Kiln Bridge south for approximately 1,000 feet. The sidewalk terminates approximately 100 feet south of an existing residential driveway and directs users to cross Lime Kiln Road at this location. A ramp and detectable warning panel is present, however no crosswalk markings, signage or receiving facility on the other side of Lime Kiln Road is provided.

The intersection of Airport Parkway/Ethan Allen Drive/Lime Kiln Road/Shamrock Road is stop-controlled on Ethan Allen Drive and Shamrock Road. The existing four-leg intersecting road alignment, geometry and topography result in poor intersection sight distance, which is a safety concern for all users. The offset geometry of the side streets combined with the curvature of Lime Kiln Road through the intersection and the island within the intersection result in very confusing intersection operations. No pedestrian or bicycle accommodations are provided at the intersection.
From this intersection traveling south, Lime Kiln Road becomes Airport Parkway. For approximately 600 feet, the road has a constrained width of 22 feet with guardrails on both sides and steep grade. This segment of roadway is built up from the adjacent wetlands with a steep embankment on both sides of the road.

Additional activities along Airport Parkway include a sewage treatment facility and a dog park at the terminus of Kirby Road. An on-going noise abatement study, funded by the Federal Aviation Administration (FAA) is currently underway. Under this study, home acquisition is a voluntary program.

2.6.1 Parcel Data and Property Ownership
The study area has a mix of residential, commercial, industrial, and airport uses along the corridor. The study will examine potential alignments within the existing road segment right-of-way, however there are approximately thirty-six (36) separate adjacent property owners that may be impacted.

2.6.2 Natural Resources
Lakes/Ponds/Streams/Rivers
The Winooski River separates the City of South Burlington and Town of Colchester in the study area. A small lake/pond has been identified between Landfill Road and Airport Parkway.

Wetlands
Class 2 wetlands have been identified on the northside of Airport Parkway at the intersection of Shamrock Road. The areas south and south west of the Airport Parkway/Lime Kiln Road and areas between Shamrock Road/Ethan Allen Drive have been identified as hydric soils within the study area.

Floodplains
Most of the Airport Parkway study area is considered a zone of minimal flood hazard. A small section east of Shamrock Road is considered to have 0.2% annual chance of flood hazard.

Soil Conditions
The study area consists of soils classified as not highly erodible near the airport parcel and potentially highly erodible outside the airport parcel.

Agricultural Land
Most of the study area is identified as statewide, statewide (b) and prime agricultural land. No roads in the study area are identified as susceptible to road erosion.

Forest Land
No forest lands have been identified within the study area and the majority of the site is classified as developed, open space and developed, medium and high density.

Rare, Threatened, or Endangered Species
A habitat block has been identified to the north of Berard Drive and Airport Parkway intersection which also contained identified state-endangered species. Rare species have also been identified from
approximately the intersection of Ethan Allen Drive and Airport Parkway in the study area north until the Winooski River.

2.6.3 Built Environment

Hazardous Waste
The parcel containing 700 and 1205 Airport Parkway is noted as a hazardous waste site.

Utilities
Utility poles exist and alternate on both sides of the road corridor within the study area. Located on the south side of the road there was observed to be an underground utility vault structure that may potentially connect to existing drainage structures within Airport Parkway.

2.6.4. Cultural Resources

Historic
There are no historic sites located within the study area.

Archaeological
An Archeological Resource Assessment (ARA) is not being conducted as part of this study and is not considered to have historic or precontact sensitivity.

Architectural
The building stock located within the study area consists of residential development, commercial and light industrial development of the 20th century.

Section 4(f) and 6(f) properties
There are no Section 4(f) or 6(f) properties within the study area.

2.7 Spear Street Existing Conditions

Spear Street (Figure 5) is classified by VTrans as an urban minor arterial with a posted speed limit of 25 MPH and has a 2013 AADT of 5,600. It runs in a north-south direction providing access to residential developments, City of Burlington to the north, and the University of Vermont (UVM) campus immediately adjacent on the west side. Within the study area, Spear Street provides two travel lanes. The existing pavement width is 28 feet and the markings are generally in good condition. Refer to Table 4 for roadway characteristics of Spear Street.

<table>
<thead>
<tr>
<th>Table 4: Roadway Characteristics (source: VTrans Route Log Data)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spear Street</strong></td>
</tr>
<tr>
<td><strong>Functional classification</strong></td>
</tr>
<tr>
<td><strong>Jurisdiction</strong></td>
</tr>
<tr>
<td><strong>Right-of-way width (feet)</strong></td>
</tr>
<tr>
<td><strong>Roadway width (feet)</strong></td>
</tr>
<tr>
<td><strong>2013 AADT</strong></td>
</tr>
<tr>
<td><strong>Posted speed limit</strong></td>
</tr>
</tbody>
</table>

*Approximate Right-of-Way
**AADT= Average Annual Daily Traffic
At the south end of the project study area exists the South Burlington Recreation Path. This shared use path borders the UVM campus, terminating at Spear Street on the west side. An existing natural surface sidewalk on the east side connects the South Burlington Recreation Path to Davis Road. A midblock crossing with supplemental RRFBs at the Davis Road/Spear Street intersection is provided. This crossing connects with a paved sidewalk that provides access to and from UVM campus to the East Terrace neighborhood.

A short segment of sidewalk is provided on the west side from the PFG Road/Spear Street intersection north for approximately 175 feet. Another crosswalk is provided crossing Spear Street at the termination of this sidewalk segment. The crossing is also supplemented with two RRFBs. Crossing to the east side, a wide paved shoulder is provided, however there is no vertical curbing provided for separation. The large pavement area acts as two slip lanes as vehicles approach the jug handle.

2.7.1 Parcel Data and Property Ownership
The study area site consists of the UVM campus to the west and single family residential on the east side. The study will examine potential alignments within the existing road segment right-of-way, however there are approximately twenty-three (23) separate adjacent property owners that may be impacted.

2.7.2 Natural Resources
Lakes/Ponds/Streams/Rivers
There are no lakes, ponds, streams or rivers located within the study area.

Wetlands
There are no wetlands identified within the study area.
Floodplains
The study area is considered a zone of minimal flood hazard.

Soil Conditions
The study area consists of soils classified as potentially highly erodible.

Agricultural Land
Statewide and statewide (b) agricultural lands have been identified within the study area. No roads in the study area are identified as susceptible to road erosion.

Forest Land
No forest lands have been identified within the study area and the majority of the site is classified as high density, developed.

Rare, Threatened, or Endangered Species
No rare, threatened or endangered species have been identified within the study area.

2.7.3 Built Environment
Hazardous Waste
The parcel containing 82 Spear Street is noted as a hazardous waste site.

Utilities
Utility poles exist primarily on the east side and an open drainage swale exists on the west side within the study area. The overhead utility poles measure approximately 7 feet from the edge of existing pavement. During the day of our fieldwork, standing water was observed in the open drainage swale.

2.7.4 Cultural Resources
Historic
There are no historic sites located within the study area.

Archaeological
An Archeological Resource Assessment (ARA) is not being conducted as part of this study and is not considered to have historic or precontact sensitivity.

Architectural
The building stock located within the study area consists of residential development of the 20th century and contemporary institutional buildings.

Section 4(f) and 6(f) properties
There are no Section 4(f) or 6(f) properties within the study area.
3.0 Concept Alternatives Analysis

3.1 Project Purpose and Need

**Purpose:** The purpose of the South Burlington Pedestrian and Bicycle Feasibility Study is to provide analysis, evaluation, and recommendations for pedestrian and bicyclist facilities at the four (4) study areas previously discussed.

**Need:** Specifically, this feasibility study is needed to:

- Create a preferred alternative for walking and bicycling on Allen Road, Dorset Street, Airport Parkway, and Spear Street corridors within the identified study areas.
- Maximize safety for users walking and bicycling in these corridors.
- Support future connections in the City of South Burlington.
- Provide an estimate of probable construction costs for the preferred alternatives to serve as a basis for the City to apply for grant applications.

The following sections provide further comparison for each conceptual alternative including an analysis, evaluation, and selection of the preferred concept alternative with an evaluation matrix and opinion of probable constructions costs.

3.2 Allen Road Concept Alternatives

3.2.1 Evaluation of Concept Alternatives

The proposed alternatives studied include a 10 foot wide bituminous concrete shared use path with a varying grass buffer on the north side of Allen Road. The proposed shared use path segment would connect an approximate 800 foot gap between the existing path on Allen Road and Spear Street. Shared use path Alternative 1 maintains the existing 10 foot wide path alignment that appears to be outside of the existing Allen Road right-of-way. Shared use path Alternative 2 shifts the majority of the proposed path connection within the existing Allen Road right-of-way. Additional improvements for each alternative include;

- Providing a 6 foot sidewalk segment to connect an approximate 150 foot sidewalk gap between Allen Road East and Spear Street on the south side of Allen Road East (optional);
- Providing ADA-compliant ramps and crosswalk pavement markings across intersecting roadway segments;
- Extending the existing sidewalk on the south side of Allen Road East approximately 150 linear feet to the intersection of Spear Street (optional);
- Providing pedestrian signal heads and accessible push buttons on the existing signal poles at the signalized intersection of Allen Road and Spear Street;
- Providing centerline pavement markings on the proposed shared use path to indicate directional separation (optional);
  - Additional compliant warning signage to alert users of changes in slope; and
  - Additional optional signage reminding users of proper path etiquette, such as announcing when engaging in a passing maneuvers may further assist in reducing conflicts;
- Providing landscape tree plantings as approved by the City; and
- Reconstructing two driveway aprons to accommodate the shared use path.
3.2.2 Preferred Concept Alternative
Evaluating design impacts, input from public involvement through workshops, presentations, and meetings; Alternative 1 has been identified and supported by the Planning Commission as the recommended preferred alternative for Allen Road. The preferred alternative maintains the same general alignment and setback from the edge of pavement as the existing path on Allen Road. This wide buffer provides an increased setback to increase the comfort level of pedestrians and bicyclists from motor vehicle traffic. Alternative 1 also minimizes impacts to existing open drainage systems and existing utility structures. Refer to Figure 2 for the preferred concept alternative cross section. Further coordination and property acquisition will be required if the City selects this concept alternative for implementation.

![Figure 2: Allen Road preferred cross section looking west.](image)

3.2.3 Opinion of Probable Construction Costs
The opinion of probable construction costs for the Allen Road project study area is $310,000. The cost estimate was developed from the preferred concept alternative plans and account for the anticipated construction costs which include engineering, construction, construction administration, and a 20% contingency. The cost estimate does not include potential environmental permitting, easement or property acquisition. For the purposes of this study and in coordination with the City of South Burlington, it was anticipated $10,000 per parcel would be used for right-of-way acquisition costs. Alternative 1 assumes three parcels would need to be acquired for this shared use path alignment.

3.2.4 Evaluation Matrix
All of the anticipated costs, resource impacts, and permit requirements for Allen Road Alternative 1 and Alternative 2 have been summarized in the evaluation matrix below in Table 5.
### Table 5: Allen Road Evaluation Matrix; Alternative 1 and Alternative 2

<table>
<thead>
<tr>
<th>Item</th>
<th>Alternative 1 (Outside Right-of-Way)</th>
<th>Alternative 2 (Inside Right-of-Way)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facility Length</td>
<td>850 LF</td>
<td>860 LF</td>
</tr>
<tr>
<td>Facility Width</td>
<td>10 FT</td>
<td>10 FT</td>
</tr>
<tr>
<td>Buffer Width</td>
<td>24 FT</td>
<td>5 FT</td>
</tr>
<tr>
<td>Proposed Surface</td>
<td>Bituminous Concrete</td>
<td>Bituminous Concrete</td>
</tr>
<tr>
<td>Terrain</td>
<td>Rolling natural slopes</td>
<td>Rolling natural slopes</td>
</tr>
<tr>
<td><strong>Potential Impacts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Lands</td>
<td>None, Previously Disturbed</td>
<td>None, Previously Disturbed</td>
</tr>
<tr>
<td>Archeological Impacts</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Class 2 Wetland Impacts</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Floodplain</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Historic Property Impacts</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Rare, Threatened, Endangered</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Right-of-Way Impacts</td>
<td>Yes</td>
<td>Temporary Easements Required</td>
</tr>
<tr>
<td>Trees- Removed/Replaced</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Utility Impacts- Aerial</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td>Utility Impacts- Underground</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Permits</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACT 250</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>401 Water Quality</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>NEPA</td>
<td>Categorical Exclusion</td>
<td>Categorical Exclusion</td>
</tr>
<tr>
<td>404 Corps of Engineer Permit</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>ANR Wetlands</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Stream Alteration</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Conditional Use Determination</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Stormwater Discharge</td>
<td>No, construction &lt;1 acre</td>
<td>No, construction &lt;1 acre</td>
</tr>
<tr>
<td>Shoreland Encroachment</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Archeological- Phase 1B</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Section 106 / Historic</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>VTRANS Access Permit</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Opinion of Probable Construction Costs</strong></td>
<td>$310,000</td>
<td>$290,000</td>
</tr>
</tbody>
</table>

*Refer to Appendix C- Opinion of Probable Construction Costs for detailed breakdown of unit costs.*
3.3 Dorset Street Concept Alternatives

3.3.1 Evaluation of Concept Alternatives
The proposed alternative studied includes a 10-foot wide bituminous concrete shared use path with a varying grass buffer on the east side of Dorset Street. A constrained section of the shared use path will need to be reduced to 8 feet wide. The proposed shared use path segment would connect an approximate 3,500-foot gap between the existing paths on Dorset Street. There are existing 10-foot shared use paths also present on Nowland Farm Drive and Old Cross Road, connecting with the Dorset Street intersection. Shared use path Alternative 1 utilizes the existing Dorset Street right-of-way for a proposed path connection. During the analysis of conceptual alternatives, the PSC identified and determined a path on the east side was the only viable design solution to provide enhanced connectivity to adjacent facilities and that would also increase benefits to corridor users. Therefore, a second alternative was not considered for this study area. As discussed during the presentation of alternatives, a subset of Alternative 1 was also identified. It was suggested to breakout this project geographically and this approach should also be considered an alternative. Additional improvements for Alternative 1 include:

- Providing ADA-compliant ramps and crosswalk pavement markings across intersecting roadway segments;
- Providing centerline pavement markings on the proposed shared use path to indicate directional separation (optional);
  - Additional compliant warning signage to alert users of changes in slope; and
  - Additional optional signage reminding users of proper path etiquette, such as announcing when engaging in a passing maneuver may further assist in reducing conflicts;
- Implementing access management techniques to remove unwarranted driveways entering or exiting for the Mill Market & Deli property (optional);
  - Providing curb radii reductions for the entrance and exit driveways at the Mill Market & Deli reducing the shared use path crossing distances and increasing visibility for all users;
- Constructing a retaining wall approximately 300 feet south of the Old Cross Road/Nowland Road intersection;
- Implementing a lane diet-reducing the travel lane widths to 10 feet and providing 4-foot shoulders;
- Providing landscape tree plantings as approved by the City; and
- Reconstructing eleven driveway aprons to accommodate the shared use path.

3.3.2 Preferred Concept Alternative
Evaluating design impacts, input from public involvement through workshops, presentations, and meetings; Alternative 1 has been identified and supported by the Planning Commission as the recommended preferred alternative for Dorset Street. The preferred alternative would replace the existing desire line identified during field visits and concept development. During the analysis, it also became apparent a dedicated walking and bicycling facility would provide greater connectivity to destinations along the east side of Dorset Street, as well as better connect users to existing shared use path facilities on the east side. Refer to Figure 3 for the preferred concept alternative cross section.
3.3.3 Opinion of Probable Construction Costs
The opinion of probable construction costs for the Dorset Street project study area is $610,000. The cost estimate was developed from the preferred concept alternative plans and account for the anticipated construction costs which include engineering, construction, construction administration, and a 20% contingency. The cost estimate does not include potential environmental permitting, easement or property acquisition.

3.3.4 Evaluation Matrix
All of the anticipated costs, resource impacts, and permit requirements for Dorset Street Alternative 1 and a No-Build alternative have been summarized in the evaluation matrix below in Table 6.
### Table 6: Dorset Street Evaluation Matrix; Alternative 1 and No-Build Alternative

<table>
<thead>
<tr>
<th>Item</th>
<th>Alternative 1</th>
<th>No-Build Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facility Length</td>
<td>3,350 LF</td>
<td>0 LF</td>
</tr>
<tr>
<td>Facility Width</td>
<td>8-10 FT</td>
<td>0 FT</td>
</tr>
<tr>
<td>Buffer Width</td>
<td>Varies 3-5 FT</td>
<td>0 FT</td>
</tr>
<tr>
<td>Proposed Surface</td>
<td>Bituminous Concrete</td>
<td>Bituminous Concrete</td>
</tr>
<tr>
<td>Terrain</td>
<td>Rolling natural slopes</td>
<td>Rolling natural slopes</td>
</tr>
<tr>
<td>Retaining Wall</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>Potential Impacts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Lands</td>
<td>None, Previously Disturbed</td>
<td>None</td>
</tr>
<tr>
<td>Archeological Impacts</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Class 2 Wetland Impacts</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Floodplain</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Historic Property Impacts</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Rare, Threatened, Endangered</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Right-of-Way Impacts</td>
<td>Temporary Easements Required</td>
<td>None</td>
</tr>
<tr>
<td>Trees- Removed/Replaced</td>
<td>Yes</td>
<td>None</td>
</tr>
<tr>
<td>Utility Impacts- Aerial</td>
<td>Yes</td>
<td>None</td>
</tr>
<tr>
<td>Utility Impacts- Underground</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td><strong>Permits</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACT 250</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>401 Water Quality</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>NEPA</td>
<td>Categorical Exclusion</td>
<td>Categorical Exclusion</td>
</tr>
<tr>
<td>404 Corps of Engineer Permit</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>ANR Wetlands</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Stream Alteration</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Conditional Use Determination</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Stormwater Discharge</td>
<td>Yes, construction &gt;1 acre</td>
<td>No</td>
</tr>
<tr>
<td>Shoreland Encroachment</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Archeological- Phase 1B</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Section 106 / Historic</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>VTRANS Access Permit</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Opinion of Probable Construction Costs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conceptual Cost Estimate</td>
<td>$610,000</td>
<td>$0</td>
</tr>
</tbody>
</table>

*Refer to Appendix C- Opinion of Probable Construction Costs for detailed breakdown of unit costs.
3.4 Airport Parkway/Lime Kiln Road Concept Alternatives

3.4.1 Evaluation of Concept Alternatives
Two alternatives were studied as part of the Airport Parkway/Lime Kiln Road project study area. The proposed alternatives both include a 6 foot wide concrete sidewalk with granite curbing with a varying grass buffer on the Airport side of Airport Parkway/Lime Kiln Road. The proposed alternatives also looked at creating a lane diet by reallocating excessive travel lane width to introduce bicycle lanes for the majority of the project study area. In order to accommodate the proposed concrete sidewalk and on-road bicycle facilities, Airport Parkway/Lime Kiln Road would need to be widened by approximately 8-10 feet for a distance of approximately 1,000 linear feet west of Airport Parkway/Ethan Allen Drive intersection and approximately 850 linear feet east of Airport Parkway/Ethan Allen Drive intersection.

The alternatives also identified alignment and geometry recommendation improvements to the four-leg Airport Parkway/Ethan Allen Drive/Lime Kiln Road/Shamrock Road intersection. Alternative 1 proposes converting this intersection into a modern roundabout which would also include dedicated pedestrian and bicycle facilities. Studies have shown that roundabouts can be more safe than traditional stop sign or signal-controlled intersections. In addition, roundabouts actually move traffic through an intersection more quickly and promote a continuous flow of traffic.

Alternative 2 proposes realigning Ethan Allen Drive to terminate at Shamrock Road at a 90 degree angle and would be stop-controlled on Ethan Allen Drive. Shamrock Road would also be realigned to terminate at Airport Parkway at a 90 degree angle and would be stop-controlled on Shamrock Road. The sidewalk and bicycle facilities would be maintained through the intersection on Airport Parkway/Lime Kiln Road. Additional improvements for Alternative 1 and Alternative 2 include:

- Providing ADA-compliant ramps and crosswalk pavement markings across intersecting roadway segments;
- Constructing a retaining wall approximately 800 feet north of the Airport Parkway/Kirby Road intersection;
- Installing two crosswalks with ADA-compliant ramps crossing Lime Kiln Road with Rectangular Rapid Flashing Beacons (RRFBs) warning signage;
  - One at approximately 418 Lime Kiln Road; and
  - One at approximately 303 Lime Kiln Road;
- Providing landscape tree plantings as approved by the City; and
- Reconstructing five driveway aprons to accommodate the sidewalk facility.

3.4.2 Preferred Concept Alternative
Evaluating design impacts, input from public involvement through workshops, presentations, and meetings; Alternative 1 has been identified and supported by the Planning Commission as the recommended preferred alternative for Airport Parkway. Due to the existing geometry and unique road angles for the Airport Parkway/Ethan Allen Drive/Lime Kiln Road/Shamrock Road intersection, a modern roundabout design would be less expensive than realigning the road geometry to a stop-control condition. A roundabout would likely reduce overall delay, improve traffic flow, and increase safety for all modes of transportation for this intersection. Modern roundabouts also are designed so vehicles are moving at a slower rate of speed. It should be noted, with the proposed roundabout configuration, it's anticipated that this alternative would involve acquiring additional land outside of the existing right-of-way. This may be more challenging given the proposed development slated for the southeast corner of Ethan Allen Road/Lime Kiln Road intersection.

Refer to Figure 4 for the preferred concept alternative cross section and refer to Figure 5 for the preferred concept modern roundabout plan.
Figure 4: Airport Parkway preferred cross section looking north between Kirby Road and Berard Drive.
3.4.3 Opinion of Probable Construction Costs
The opinion of probable construction costs for Airport Parkway Alternative 1 is $2,600,000 and Alternative 2 is $2,810,000. Alternative 2 has a higher anticipated construction cost due in part from the modified road geometry and site topography of Ethan Allen Road and Shamrock Road. At the request of the City, the Airport Parkway/Ethan Allen Drive/Lime Kiln Road/Shamrock intersection treatments for Alternative 1 and Alternative 2 were further broken out to identify only these intersection improvements. The opinion of probable construction costs for Alternative 1 intersection improvements are approximately $750,000. The opinion of probable construction costs for Alternative 2 intersection improvements are approximately $950,000.

The cost estimates were developed from the preferred concept alternative plans and account for the anticipated construction costs which include engineering, construction, construction administration, and a 20% contingency. The cost estimates do not include potential environmental permitting, easement or property acquisition. For the purposes of this study and in coordination with the City of South Burlington, it was anticipated $10,000 per parcel would be used for right-of-way acquisition costs. Alternative 1 and Alternative 2 assume two parcels would need to be acquired for each concept.

Figure 5: Airport Parkway/Ethan Allen Drive/Lime Kiln Road/Shamrock Road modern roundabout preferred concept plan.
3.4.4 Evaluation Matrix
All of the anticipated costs, resource impacts, and permit requirements for Airport Parkway Alternative 1 and Alternative 2 have been summarized in the evaluation matrix below in Table 7.
### Table 7: Airport Parkway Evaluation Matrix; Alternative 1 and Alternative 2

<table>
<thead>
<tr>
<th>Item</th>
<th>Alternative 1 (Roundabout)</th>
<th>Alternative 2 (Stop Control)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pedestrian Facility Length</td>
<td>7,000 LF</td>
<td>7,000 LF</td>
</tr>
<tr>
<td>Bicycle Facility Length</td>
<td>7,000 LF</td>
<td>7,000 LF</td>
</tr>
<tr>
<td>Pedestrian Facility Width</td>
<td>6 FT</td>
<td>6 FT</td>
</tr>
<tr>
<td>Bicycle Facility Width</td>
<td>5-6 FT</td>
<td>5-6 FT</td>
</tr>
<tr>
<td>Vertical Curbing</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Retaining Wall</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Proposed Surface</td>
<td>Bituminous Concrete/Concrete</td>
<td>Bituminous Concrete/Concrete</td>
</tr>
<tr>
<td>Terrain</td>
<td>Rolling natural slopes</td>
<td>Rolling natural slopes</td>
</tr>
<tr>
<td><strong>Potential Impacts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Lands</td>
<td>None, Previously Disturbed</td>
<td>None, Previously Disturbed</td>
</tr>
<tr>
<td>Archeological Impacts</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Class 2 Wetland Impacts</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Floodplain</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Historic Property Impacts</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Rare, Threatened, Endangered</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Right-of-Way Impacts</td>
<td>Yes (Modern Roundabout)</td>
<td>Yes (Roadway Realignment)</td>
</tr>
<tr>
<td>Trees- Removed/Replaced</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Utility Impacts- Aerial</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Utility Impacts- Underground</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Permits</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACT 250</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>401 Water Quality</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>NEPA</td>
<td>Categorical Exclusion</td>
<td>Categorical Exclusion</td>
</tr>
<tr>
<td>404 Corps of Engineer Permit</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>ANR Wetlands</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Stream Alteration</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Conditional Use Determination</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Stormwater Discharge</td>
<td>Yes, construction &gt;1 acre</td>
<td>Yes, construction &gt;1 acre</td>
</tr>
<tr>
<td>Shoreland Encroachment</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Archeological- Phase 1B</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Section 106 / Historic</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>VTRANS Access Permit</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Opinion of Probable Construction Costs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conceptual Cost Estimate</td>
<td>$2,600,000</td>
<td>$2,810,000</td>
</tr>
</tbody>
</table>

*Refer to Appendix C- Opinion of Probable Construction Costs for detailed breakdown of unit costs.*
3.5 Spear Street Concept Alternatives

3.5.1 Evaluation of Concept Alternatives
Three alternatives were studied as part of the Spear Street project study area. Alternative 1 and Alternative 2 include a 6 foot sidewalk facility on the east side of Spear Street connecting with existing sidewalks in the jug handle area and East Terrace neighborhood. The sidewalk alignment for Alternative 1 is located on the west side of the existing utility poles and the sidewalk alignment for Alternative 2 is located on the east side of the existing utility poles. Due to the relative close proximity of the sidewalk layout to the edge of pavement, Alternative 1 utilizes vertical curbing to establish physical separation from pedestrians and vehicles continuing around the jug handle to East Terrace. Alternative 2 provides an approximate 7 foot buffer between the edge of pavement and proposed sidewalk facility alignment continuing around the jug handle to East Terrace. This wide buffer eliminates the use of vertical curbing and the sidewalk would remain flush with the approximate roadway grade. Also as part of Alternative 1 and Alternative 2 is a proposed shared use path on the west side of Spear Street from PFG Road to US Route 2. Alternative 3 includes a shared use path facility on the west side of Spear Street for the entire project study area. The west side of the Spear Street corridor does have physical site constraints including potential additional engineering to address the relatively steep slopes between the edge of pavement and UVM property. This alignment may also impact the existing mature trees along the natural surface walk between Davis Road and the South Burlington Recreation Path. Since the alignment of Alternative 3 would cover the existing open drainage system on the west side of Spear Street, subsurface drainage and stormwater improvements would need to be implemented for this alternative. Additional improvements for Alternative 1, Alternative 2, and Alternative 3 include:

- Providing ADA-compliant ramps and crosswalk pavement markings across intersecting roadway segments;
- Providing centerline pavement markings on the proposed shared use path to indicate directional separation (optional);
  - Additional optional signage reminding users of proper path etiquette, such as announcing when engaging in a passing maneuver may further assist in reducing conflicts;
- Constructing a retaining wall approximately 800 feet north of the Spear Street/Davis Road intersection (limited to Alternative 3 only);
- Installing crosswalk pavement markings with ADA-compliant ramps crossing Spear Street in the location of the S Burlington Recreation Path with Rectangular Rapid Flashing Beacons (RRFBs) warning signage;
- Implementing a curb radius reduction for the UVM entrance road;
- Providing landscape tree plantings as approved by the City; and
- Reconstructing 20 driveway aprons to accommodate the sidewalk facility.

3.5.2 Preferred Concept Alternative
Evaluating design impacts, input from public involvement through workshops, coordination with UVM Campus Planning Services, presentations, and meetings; Alternative 2 has been identified and supported by the Planning Commission as the recommended preferred alternative for Spear Street. Alternative 3 has been identified as the medium to long term conceptual alternative for the project study area. Refer to Figure 6 and Figure 7 for the preferred concept alternative cross sections.
3.5.3 Opinion of Probable Construction Costs
The opinion of probable construction costs for Spear Street Alternative 1 is $732,000, Alternative 2 is $490,000, and Alternative 3 is $711,000. Alternative 1 anticipated construction costs are higher because of the vertical granite curbing. Alternative 3 anticipated construction costs are higher because of both retaining wall feature and a closed drainage system. At the request of the City, the Jug Handle treatments for Alternative 2 were further broken out to identify only these segment improvements. The opinion of probable construction costs for Alternative 2 Jug Handle segment improvements are approximately $120,000.

The cost estimate was developed from the preferred concept alternative plans and account for the anticipated construction costs which include engineering, construction, construction administration, and a 20% contingency. The cost estimate does not include potential environmental permitting, easement or property acquisition.

3.5.4 Evaluation Matrix
All of the anticipated costs, resource impacts, and permit requirements for Spear Street Alternative 1, Alternative 2, and Alternative 3 have been summarized in the evaluation matrix below in Table 8.
Figure 6: Spear Street sidewalk facility preferred cross section looking north.

Figure 7: Spear Street shared use path facility preferred cross section looking north.
### Table 7: Spear Street Evaluation Matrix; Alternative 1, Alternative 2, and Alternative 3

<table>
<thead>
<tr>
<th>Item</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pedestrian Facility Length</td>
<td>2,000 LF</td>
<td>2,000 LF</td>
<td>400 LF</td>
</tr>
<tr>
<td>Bicycle Facility Length</td>
<td>1,200 LF</td>
<td>1,200 LF</td>
<td>2,100 LF</td>
</tr>
<tr>
<td>Pedestrian Facility Width</td>
<td>6 FT</td>
<td>6 FT</td>
<td>6 FT</td>
</tr>
<tr>
<td>Bicycle Facility Width</td>
<td>11 FT</td>
<td>11 FT</td>
<td>11 FT</td>
</tr>
<tr>
<td>Pedestrian Facility Surface</td>
<td>Concrete</td>
<td>Concrete</td>
<td>Concrete</td>
</tr>
<tr>
<td>Bicycle Facility Surface</td>
<td>Bituminous Concrete</td>
<td>Bituminous Concrete</td>
<td>Bituminous Concrete</td>
</tr>
<tr>
<td>Vertical Curbing</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Retaining Wall</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Terrain</td>
<td>Generally, Flat</td>
<td>Generally, Flat</td>
<td>Generally, Flat</td>
</tr>
<tr>
<td><strong>Potential Impacts</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural Lands</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Archeological Impacts</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Class 2 Wetland Impacts</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Floodplain</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Historic Property Impacts</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Rare, Threatened, Endangered</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Right-of-Way Impacts</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Trees- Removed/Replaced</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Utility Impacts- Aerial</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Utility Impacts- Underground</td>
<td>None</td>
<td>None</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Permits</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACT 250</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>401 Water Quality</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>NEPA</td>
<td>Categorical Exclusion</td>
<td>Categorical Exclusion</td>
<td>Categorical Exclusion</td>
</tr>
<tr>
<td>404 Corps of Engineer Permit</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>ANR Wetlands</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Stream Alteration</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Conditional Use Determination</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Stormwater Discharge</td>
<td>No, construction &lt;1 acre</td>
<td>No, construction &lt;1 acre</td>
<td>No, construction &lt;1 acre</td>
</tr>
<tr>
<td>Shoreland Encroachment</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Archeological- Phase 1B</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Section 106 / Historic</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>VTRANS Access Permit</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Opinion of Probable Construction Costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conceptual Cost Estimate</td>
<td>$732,000</td>
<td>$490,000</td>
<td>$711,000</td>
</tr>
</tbody>
</table>

*Refer to Appendix C- Opinion of Probable Construction Costs for detailed breakdown of unit costs.*
4.0 Project Summary

4.1 Conclusion
The South Burlington, VT Pedestrian and Bicycle Feasibility Study was prepared at the request of the CCRPC and the City of South Burlington to analyze and evaluate all concept alternatives for sidewalk and shared use path connections. This report presents the existing conditions data, conceptual design alternatives, selection of the preferred conceptual design alternative, and opinion of probable construction costs for each project study area. At the conclusion of the public participation and outreach process, in which the findings of this report were presented and reviewed, the South Burlington Planning Commission approved the preferred design alternatives identified in this report.

The South Burlington, VT Pedestrian and Bicycle Feasibility Study is an important step in advancing a more walkable, bikeable, and vibrant community. The process which crafted this document is only the beginning and the conversation must continue to real project implementation. It is worth noting for project implementation, individual recommendations may be broken out as smaller projects separate from the entire preferred design alternative project. It’s recommended the City collaborate with the Bicycle and Pedestrian Committee to develop an action plan that identifies potential project timeframes for the recommended improvements. This may be advantageous from a development, funding, and phasing implementation perspective.

The proposed recommendations and preferred design alternatives align with the transportation goals in the South Burlington Comprehensive Plan, 2016 and will continue to develop walking and bicycling infrastructure within the community.
Appendix A
South Burlington Planning Commission Meeting Minutes
SOUTH BURLINGTON PLANNING COMMISSION
MEETING MINUTES
10 MAY 2016

The South Burlington Planning Commission held a regular meeting on Tuesday, 10 May 2016, at 6:00 p.m., in the Conference Room, City Hall, 575 Dorset Street.

MEMBERS PRESENT: J. Louisos, Chair; T. Harrington, T. Riehle, B. Gagnon, S. Quest, D. MacDonald, A. Klugo

ALSO PRESENT: P. Conner, Director of Planning & Zoning; C. LaRose, City Planner; J. Rabidoux, Public Works Director; C. Frank, D. Farr, D. Leban, R. Neuer, B. Britt, Bicycle/Pedestrian Committee; K. Epstein, Energy Committee; E. Langfeldt, T. Barritt, A. Gill, B. Milizia, J. Dempsey, P. Keating, S. Murray, M. Kane

1. **Agenda: Additions, deletions or changes in order of agenda items:**

   No changes were made to the Agenda.

2. **Open to the public for items not related to the agenda:**

   Mr. Barritt asked about standards for duplexes, citing the new duplex near St. John Vianny. He felt there should be standards so the duplexes merge with other buildings on the street. Mr. Conner noted that dimensional and design codes do apply even though duplexes are not reviewed by the DRB.

3. **Planning Commissioner announcements and staff reports:**

   Ms. Harrington: There will be a Chamberlin Neighborhood Airport Committee meeting on Wednesday, 6:30 p.m.

   Mr. Conner: The City Council accepted the amendments approved by the Planning Commission and scheduled a public hearing for 6 June.

4. **Initial Review: Request for amendments to Land Development Regulations related to parking in front of 3-unit townhouse residential buildings in certain circumstances:**

   Mr. Langfeldt noted the requirement is now to have parking/garages to the side or rear of buildings, with certain exceptions. He felt there were certain inherent issues raised by this requirement:
   
   a. There is no difference in the regulations for a 60 unit building and a 3 unit building
   b. There is no provision for a waiver
   c. There are no exceptions for steep slopes
   d. There is no allowance for a backyard in a lower density housing.

   Mr. Langfeldt said this can lead to less green space and more pavements with no backyards. He also noted that most people don’t want their children playing in front of the house near traffic. He then showed a picture of what it could look like with tastefully done front-loading garages. He also noted that some of the nicest neighborhoods have front-loaded garages.

   Mr. Langfeldt then showed a concept of what The Landings could look like if they had to be developed to the existing standards. He said the regulations can lead to less variation, with duplexes repeated over and over again
in a “cookie cutter development.” He felt the current regulations create a missed opportunity for the City to achieve more housing growth as called for in the Comprehensive Plan.

Mr. Langfeldt said the current rules also lead to more impervious surface and more stormwater issues, and, with steep slopes, more chance of erosion. He noted that the site on Old Farm Road is very sloped. He showed a concept of what a development could look like under the current rules and stressed that there is much less green space and the loss of space for a backyard and gardening. Mr. Gill added that there is also more impact to the environment with the loss of more trees. Mr. Langfeldt then showed a concept which would allow front-loading garages. He pointed out that there would be 1 road instead of 3. He stressed they are proposing neighborhood streets, not a Williston Road.

Mr. Langfeldt then presented a list of proposed amendments to the Land Development Regulations as follows:

a. Allow exceptions for townhomes and row homes where average slopes are 10% or more
b. Allow exceptions for townhomes and row homes in districts of 4 units per acre or more
c. Require all parking to be constructed so that garage doors visible from the street are located within a maximum outboard street-side variance of 5 feet.
d. Require that double-loaded garages are not side by side on the street-facing side
e. Allow discretionary DRB waivers of parking requirements within PUDs for qualitative reasons.

Ms. Quest suggested this might be dealt with if there are new PUD standards and new city-wide zoning. Mr. Conner said there are some discrete elements, but other pieces could be explored in the whole concept of the PUD.

Mr. Klugo asked what the next steps are. Ms. Louisos said the goal is for the Commission to gauge how it feels about the issue and how it fits in the Commission’s work plan. It can be put on a future agenda or can wait until the bigger picture is dealt with. It could also be rejected. Mr. Klugo felt it was worth discussion, but he also felt it can depend on how a developer chooses to develop a property. Mr. Gagnon also felt it merited further discussion and goes back to the issue of “unintended consequences.” Mr. Riehle agreed.

Mr. Klugo cited a project with garages that are 90 degrees to the street (duplexes). Mr. Gill noted that the middle units have no garages which makes sale and even financing difficult.

Mr. Conner asked how this applies to the downside slope. Mr. Langfeldt said you are still removing the backyard, and it is not as attractive. Mr. Langfelt said it comes down to the question of whether they are to design homes for the people who live in them or for someone walking by who doesn’t live there.

Members agreed to discuss the question in the near future.

5. Presentation and discussion of multi-site sidewalk/rec path scoping studies for Airport Parkway, Allen Road, Dorset Street and Spear Street Jughandle:

Mr. Rabidoux noted that last year the city got a grant for a scoping analysis for sidewalks. This will help to prioritize projects in the city as there is a big list of desires regarding paths. Mr. Rabidoux then showed a map of the 4 locations being studied. He also noted there is an increased demand with new development, existing gaps, and areas brought to the attention of Public Works by members of the public. The 4 projects being studied are deemed ready to move forward.

Mr. Rabidoux noted they are about to go out to bid on a Hinesburg Road sidewalk which will probably be built this summer. This leaves room to determine the next project.
Mr. Dempsey then reviewed each site as follows:

**Allen Road:**
- **Alternative 1:** fill in the missing gap; a shared use path outside the right-of-way to include a pedestrian activated signal
- **Alternative 2:** Would create a jog to keep within the right-of-way

**Dorset Street:**
- Fill in the gap; a 10’ to 8’ path with 3-5’ buffer from the roadway; at each intersection high-visibility pavement markings; a constrained section where a wall may be needed, still within the right-of-way

**Airport Parkway:**
- **Alternative 1:** striped bikelanes and a 6’ sidewalk on the north side; retail road width; possibly a roundabout with bake lanes of the roadway
- **Alternative 2:** a T-intersection with stop signs; crossing at the bridge site (Mr. Rabidoux noted this project has the potential to get very expensive and might have to be done in segments)

**Spear Street:**
- **Alternative 1:** sidewalk adjacent to the road with 6” curb, continuing to the existing sidewalk. (Mr. Rabidoux noted the challenge is that properties on the east side of the road are very narrow and this could result in issues with property owners).
- **Alternative 2:** sidewalk on east side; a buffer to separate the edge of the road from the sidewalk, continuing to existing sidewalk

Ms. Quest noted that many people don’t want to lose the 15 feet for the path. Ms. Louisos said it is hard to say which side of the road the path should be on.

Mr. Rabidoux noted that this year the city submitted a request for another 4 projects but was turned down. He noted the city now has 30+ miles of rec path and cold probably have 50 or 60 and still not be done.

A member of the audience noted the dangerous conditions on Airport Parkway. He felt the bridge is barely wide enough for 2 vehicles. There will be heavy construction starting soon next to Lime Kiln. He felt stop lights and/or speed bumps are needed to slow people down. Mr. Rabidoux suggested this may be a good place for the city to put its new speed monitoring signs.

6. **Discussion** opportunities for collaboration on 2016-17 work plans with Bicycle-Pedestrian Committee:

Mr. Riehle asked when Committee members felt their bike path map would be ready. Ms. Farr said they felt it would be within the next few months. Mr. Britt added that it will show priorities by quadrant. Mr. MacDonald asked the criteria for prioritization. Mr. Neuer said safety, the number of users, and connectivity. He said they did not consider cost or who would do the work. Ms. Leban added that they did a review of pedestrian crossings in major corridors as well. The only thing they haven’t dealt with are unpaved trails. Ms. Frank noted that one problem in doing things by the number of users is that some paths are so bad they don’t get used. Ms. Leban added that a bridge across I-89 would be very welcome.

Mr. Conner noted that the Chamberlin Airport Committee has a priority of getting overland paths to connect streets with each other.

Ms. Frank cited the need for the committee to give input when there is a development being considered, but they still don’t know the best way to do that. Mr. Conner suggested one opportunity the Planning Commission and
Bike-Ped Committee could work on: the Commission developed a list of street types that could be city-wide. The Bike-Ped Committee could consider how to integrate this into their map.

Mr. Neuer noted the new section of Hinesburg Road is designated as a “neighborhood street/bike boulevard. He read the attributes of that designation and noted that can’t happen in that location.

Mr. Conner noted that the capacity of Public Works is for one of these projects a year. If the city wants more, there would have to be a bike/pedestrian coordinator.

7. Discuss Opportunities for Collaboration on 2016-17 work plans with Energy Committee:

Mr. Epstein noted that the committee has narrowed its focus to concentrate on the Energy Prize.

Mr. Riehle asked what the committee feels is the biggest city issue. Mr. Epstein said it is getting people out of cars and having them feel safe. He felt some of this is development related and putting things like groceries, entertainment, etc., closer to where people live. He said it doesn’t work to have all the residences at one end of the city and all the commercial activity at the other end.

Ms. Harrington asked where the city stands in relation to the energy prize. Mr. Epstein said they are in the middle of the pack, though he wasn’t sure he trusted the markings.

Mr. Riehele asked how many homes there are with solar. Mr. Epstein estimated 150.

Mr. Epstein noted that the Williston Land Development Regulations have requirements in their parking regulations for a minimum number of bike parking spaces. They also require lockers and showers for bikers in work places.

Regarding solar ready roofs, Mr. Epstein felt this could be added to the State’s Energy Stretch Code when it is next revised. Ms. Louisos noted the City Council is interested in that discussion.

Mr. Epstein noted that the Legislature passed the new solar siting bill which gives some deference to communities whose Comprehensive Plan meets certain criteria. He said the Energy Committee will look at the city’s Comprehensive Plan to be sure it meets all of those criteria.

8. Work Session on Planned Unit Development Tools:

Mr. Conner introduced consultants Sharon Murray of Front Porch Community Planning & Design and Mark Kane of SE Group.

Ms. Murray thanked Mr. Conner and City Counselor/State Senator Riehle for helping to get the 8-year planning cycle passed by the State Legislature.

Ms. Murray noted that the deadline for the grant under which they are working is the end of the month. She said they have reviewed the LDRs, Form Based Code, reports from committees (e.g., housing), and identified alternative regulatory tools and approaches. Mr. Conner noted that staff is putting together a large chart of how everything fits together. He also noted there are other funding sources to tie into this, so there will be more done after this grant expires.

Ms. Murray then reviewed the history of PUDs and noted they were a creative response to conventional zoning. They allowed for more flexible, planned communities with mixed uses. They also allowed more community
involvement and provided incentives for development the city desired. Regulations for PUDs must provide: more standards of review, a statement of purpose, the review process to be used, application requirements, standards of review (e.g., uses, density, design), and standards of infrastructure, amenities, and impact fees. These can be mandatory or incentive based. In South Burlington, PUDs are tied in to zoning districts and are more of a waiver tool than a design tool.

Ms. Murray noted where PUDs are allow in the city and where they are prohibited:

a. Must have 10 or more acres
b. Allowed in R-1 (R1-PRD, R-1 Lakeshore, R-1 Lakeview)
c. Allowed in R-2
d. Required in R-12
e. Encouraged in C-1
f. Required in: Airport District; I-O, Institutional Agriculture, Parks and Recreation, and Southeast Quadrant

Ms. Murray suggested using PUDs as a design tool and to define different types of PUDs based on the design type. She also suggested applying PUDs as “floating zones” in relation to development context triggered by location and type of a development. Each type of PUD would have standards that modify or superseded the underlying zoning and subdivision standards (e.g., uses, densities, forms, etc.).

Ms. Murray then identified 4 types of PUDs as follows:

a. Rural (low density, might make sense near Chittenden Cider Mill)
b. Suburban
c. Urban/Mixed Use
d. Transitional

One type of PUD would be a Campus/Office Park which creates a unified pattern within a site and can have shared facilities (e.g., parking). Mr. Kane showed a photo of Technology Park. Mr. Conner noted that there are interests of the property owner that line p with the city interests (e.g., park atmosphere), but the tools don’t line up very well. Mr. Kane showed a picture of the Tilley Drive Campus and cited the importance of connection to resources, especially transit.

Another type of PUD would be the Traditional Neighborhood Development which is characterized by walkability, high density, more residential then commercial development, interconnected streets, transit/bike/ connections. Pictures of South Village illustrated this.

Neighborhood Center Development would feature a commercial node that can be within a certain distance from an intersection. The Farrell Street/Gateway development is an example of this. It is on a transportation route and features a commercial center. It is mostly residential with some office space.

Transit Oriented Development features a transit station as its focal point (Ms. Murray noted this is a CCTA priority). It has reduced parking requirements and is generally a good place for senior and affordable housing. Mr. Conner noted the city has a transit overlay district and there are certain uses that can only be placed there (e.g., senior housing, medical facilities). There can be a requirement for shared parking and a TDM program. Mr. Kane noted that some of the requirements can be used as “carrots.”

Infill Development tries to replicate/upgrade a current pattern in an already developed area. There are often encumbrances that make them difficult to develop. Mr. Kane showed a picture of the Hayes Apartments on Hinesburg Road and Kirby Cottages. This can also apply to converting old shopping malls to turn them into something more modern and interesting. But they are often hard to design. Mr. Kane showed a photo of U Mall.
Ms. Murray then outlined some things for the Commission to consider:

a. Types of PUDs  
b. Use/application (size, context)  
c. Standards (master Plan, Mandates/incentives, design elements)  
d. Review process (public involvement)

Ms. Murray said the Commission should select one type of PUD for her to develop more fully. She said her choice would be the Transit Oriented Development (TOD) though the Traditional Neighborhood Development (TND) would also be a good choice. Mr. Conner noted that both the O’Brien and Hill properties have elements of both.

Mr. Klugo liked the idea of PUDs as a design tool, not a waiver tool. Mr. Conner added it would take the pressure off always having to look at waivers for large setbacks, parking standards, etc.
He also noted that the biggest things the city will be looking at in the next 12 months are the O’Brien, Hill and U Mall developments.

Ms. LaRose suggested members think of each option as a “recipe,” with each one having more of a certain element in it. That doesn’t mean that element will be missing in another option. Mr. Kane added there is also a time-scale issue. With the TND, you have pressures that are current and continuing; the TOD will define long-term development. He also noted that South Burlington is a community that is becoming a city, but it has a long agricultural history.

In a poll, members selected the TND to develop more fully. Mr. Conner agreed to work with the consultants to see if both the TND and TOD can be done.

9. Other Business:

a. **Reconfirm** street names: Black Dog Drive and Windswept Lane

Ms. Quest moved to reconfirm street names Black Dog Drive and Windswept Lane. Mr. Gagnon seconded. Motion passed unanimously.

10. **Minutes** of 26 April 2016:

Mr. Riehle moved to approve the minutes of 26 April as presented. Ms. Quest seconded. Motion passed unanimously.

As there was no further business to come before the Commission, the meeting was adjourned by common consent at 10:05 p.m.

Clerk
The South Burlington Planning Commission held a regular meeting on Tuesday, 13 September 2016, at 7:00 p.m., in the Conference Room, City Hall, 575 Dorset Street.

MEMBERS PRESENT: J. Louisos, Chair; T. Harrington, T. Riehle, S. Quest, D. MacDonald, A. Klugo

ALSO PRESENT: P. Conner, Director of Planning & Zoning; J. Rabidoux, Director of Public Works; S. Dopp, J. Dempsey, T. McKenzie, L. Ravin, C. Snyder, R. Neuer, L. Bresee, D. Leban

1. **Agenda: Additions, deletions or changes in order of agenda items:**

No changes were made to the Agenda.

2. **Open to the public for items not related to the agenda:**

No issues were raised.

3. **Planning Commissioner announcements and staff reports:**

Ms. Harrington: Noted that the city will be holding meetings on the upcoming TIF vote. Informational meetings will be held at the Community Library on 26 September and 26 October, and there will be informational items on upcoming City Council agendas.

Mr. Conner: Staff is working on the scenic views project.

...Attended a forum on the new solar siting criteria. Communities must meet certain standards in order to have a voice in the siting process. The Public Service Board will have a hand in establishing those standards. Mr. Conner added that he was told the letter sent by the Planning Commission, Energy Committee, and City Council was a key piece in getting this going.

...There was a meeting last week with small groups of property owners on Williston Road regarding the future of the road and a possible parallel road to the north. They also discussed what could facilitate good development blocks in conjunction with Form Based Code.

Mr. Riehle: Asked about the pink stakes on a part of Williston Road. Mr. Rabidoux said the state will be repaving that stretch of road. There will be bike lanes as part of that restriping.
Ms. Dopp asked if CCRPC will be coming to the city regarding solar siting. Mr. Conner said this will be on the next Planning Commission agenda (September 27th). Other city committees have been invited to attend that meeting.

4. Reorganization:
   a. Election of Chair, Vice Chair, Clerk
   b. Set regular meeting dates and time

Mr. Conner presided over the election of officers. He opened the floor for nominations.

Mr. Riehle nominated a slate of: Ms. Louisos as Chair, Ms. Harrington as Vice Chair, and Mr. Gagnon as Clerk.

There were no further nominations, and the proposed slate of officers was elected 4-0 with Ms. Louisos and Ms. Harrington abstaining.

Ms. Louisos presided over the remainder of the meeting.

Ms. Harrington moved to set Planning Commission meetings for the second and fourth Tuesdays of the month at 7:00 p.m. at South Burlington City Hall. Ms. Quest seconded. Motion passed 6-0.

5. Presentation of preferred alternatives of scoping of four bike/ped projects; Dorset Street, Allen Road, Airport Parkway, Spear Street/jughandle:

Mr. Dempsey reviewed the history, noting that the purpose is to identify all biking alternatives and to identify a preferred alternative for each project based on maximum safety for all users and support of future walking and bike connections in the city. The project also provided an opinion of probably construction costs to serve as a basis for grant applications.

Mr. Rabidoux said the city will be applying for one project at a time. He then reviewed the options and preferred alternatives for each project as follows:

   a. Allen Road: Of the 2 alternatives shown, the preferred alternative is #1, which is outside of the existing right-of-way. There is an estimated cost of $10,000 per parcel for acquisition of land. There is a 35 mph speed limit on the road.
b. Dorset Street: The posted speed limit is 40 mph. Only one alternative was considered viable to fill in the missing gap within the right-of-way. A short section will require a retaining wall. On a photo of the area, Mr. Rabidoux indicated some access management issues with driveways and showed the location of a striped crosswalk and the retaining wall.

c. Airport Parkway: The posted speed limit is 25 mph. The road is wide enough for striped bike lanes. There would be a different treatment at intersection with Ethan Allen Road and Shamrock Road. Option 1 would be a modified roundabout. Option 2 would be a T-intersection approach with stop control devices. Alternative #1 is preferred. It would include a sidewalk on the Airport side, striped bike lanes all the way, and connection of some existing pieces of sidewalk.

d. Spear Street: The posted speed limit is 25 mph. Three alternatives were considered. #1 included a 6-foot sidewalk on the east side and a shared use path from U.S. Route 2 to the UVM campus. Option #2 would have a 6-foot sidewalk with a 7-foot buffer, and a 10-foot shared use path to UVM. Option #3 would have an 8-11-foot shared use path on the west side on U.S. Route 2 to the South Burlington rec path. A wall would be needed in one area. Ms. Quest noted neighbors don’t like options #1 and #2. Mr. Dempsey showed a photo of Option #2, which would be a short-term alternative, and indicated the connection to the existing path. This is the preferred option from a safety point of view.

Ms. Quest asked about the time-line. Mr. Rabidoux said if Spear Street were to be the first project, an application would be submitted within 6 months. It would then take several years before the project would be on the ground. However, if the city did its own project, it could be faster.

Ms. Quest asked if UVM would chip in for the cost. Ms. Ravin of UVM said they don’t have the funding for this.

Mr. Rabidoux then outlined the estimated costs for each of the projects as follows:

- Allen Road: $310,000
- Dorset Street: $610,000
- Airport Parkway/Lime Kiln Road: $2,600,000
- Spear Street: $490,000
Mr. Bresee asked about wetland issues. Mr. Rabidoux said they have identified all the “red flags.” Mr. Bresee asked if Allen Road will meet grade requirements, noting that they can’t get funding if the standards aren’t met.

Mr. Klugo asked what the cost difference would be if the city did the work. Mr. Rabidoux said probably less than half. Mr. Klugo said that would get projects done faster and reduce the risk to pedestrians.

Ms. Riehle asked about the possibility of a “speed bump” on Hinesburg Road at Hayes Ave. She noted that people don’t stop for pedestrians, even with the flashing yellow lights. Mr. Rabidoux said the city keeps asking the state for a crosswalk at Hayes Avenue, and they are continually turned down as the warrants aren’t met. Mr. Klugo asked if the flashing light could be red instead of yellow. Mr. Rabidoux said it can’t because it is a federal thing.

Mr. Conner noted that residents near Dorset Street came into the office regarding safety concerns. He will forward these to Mr. Rabidoux.

Mr. Conner also noted that as a result of recommendations from the Chamberlin-Airport Committee, there are new bike lands and pedestrian crosswalks.

Mr. Rabidoux asked the Commission for support of the preferred alternatives in order to demonstrate community support in the grant process.

Mr. Klugo moved to accept the preferred alternative for each of the four projects as presented. Mr. Riehle seconded. Motion passed 6-0.

Mr. Riehle felt the Spear Street proposal costs should be shared with UVM as this project concerns the safety of UVM students.

6. **Commission items: Discuss elements of City Center Form Based Code:**

Mr. Klugo said this discussion arose from prompting by people at South Burlington Realty regarding implementation of Form Based Code (FBC) in City Center. Discussions have focused on frontage and adequate parking concerns.

Mr. Klugo then showed a sketch done by Tim McKenzie of one way to build out City Center. He noted that with FBC there is not as much parking provided as with other standards. Mr. Klugo said what he began to understand is that this is a question of transition from a “suburban” to
an “urban” environment and that developers are being asked to build 85% of a block at one
time. He showed a concept of a 160,000 sq. ft. building which would not leave room for
enough parking, and there would not yet be a parking garage because there wasn’t the
development to support it...kind of a “chicken and the egg” situation. He said if you build to the
required 85%, there is no room for parking, storm water, and open space.

Mr. Klugo summed up the challenge as how to get high-quality development with adequate
parking, marketing capacity, and management of the TIF clock.

Mr. McKenzie said the secondary street frontage forces them to use land less efficiently as they
are “going out, not up.”

Mr. Klugo then showed a concept that could meet both the city’s and the developer’s needs. It
included a 5-story building with the lot next door as a walled parking lot, usable until such time
as there is a parking garage. At that time, the “parking lot” could be built on.

Mr. Riehle felt that makes a lot of sense.

Mr. McKenzie stressed that they are as incentivized as the city is to maximize development.

Mr. Snyder said he felt the intent of the FBC can be accomplished; however, in the current
format it is not financeable because of inadequate parking.

Mr. Klugo stressed that City Center is a public/private partnership, and the city may have to
accommodate something in the short term to get what it wants in the long term. He felt there
is an opportunity to be broader in thinking and come up with something that will work for
everyone.

Ms. Harrington said it would help to have diagrams with figures to get beyond the
“conceptual.” Mr. McKenzie said he will provide them.

Mr. Snyder said he has a building read to go, but there is a problem with the secondary street
code (located on Market Street where Mary Street comes in). He cited the irony that the best
and worst for FBC is that it allows no modifications.

Mr. Klugo said the city wants more than just an “efficient” building.
Ms. Leban said she likes the parking phasing idea with buildout over time. She also noted that green rooftops can be used to address storm water concerns. Mr. Klugo noted that the City of Burlington is now requiring new roofs to hold a 1 year, 24-hour storm event.

Ms. Louisos said the Commission really wants City Center to work. This is more of a phasing issue than a conceptual issue.

7. **Discuss Capital Improvement Plan additions/deletions for 2018-2027:**

Mr. Conner explained the nature of the Capital Improvement Plan and how it is updated. The Commission will see a draft for the coming year in November. He noted that additions to the Plan include replacement of the O’Brien Building at JC Park and a pedestrian crossing of Williston Road between Hinesburg Road and Kennedy Drive. He also noted that the Planning Commission can recommend additional projects.

8. **Initial Discussion of Potential Shelburne Road Zoning Amendments – setbacks, heights, glazing:**

Mr. Conner noted that current zoning requires a minimum 50-foot setback from the right-of-way. Because parking in front of buildings is being discouraged or not allowed, applicants are requesting setback waivers.

Mr. Conner showed a picture of the new Credit Union building on Shelburne Rd. It has a 35-foot setback with an entry door on Shelburne Road and a sidewalk leading to that door. He also showed a photo of the old building which did not include the street entrance.

Mr. Conner said the DRB struggles with the waiver requests and has asked for a city policy on this. He then showed pictures of newer buildings on Shelburne Road with no parking in front. They are closer to the street with street-facing doors. These took a lot of waivers from the DRB to achieve. He then showed a picture of a building that got “half way there” (the Goodwill Building). It is closer to the street, but the entrance is on the side, not facing Shelburne Rd.

Mr. Klugo cited the need for better landscaping on Shelburne Road. He cited the good job done at the gas station across from the Goodwill building, and the less than adequate landscaping at Goodwill.
Mr. Conner said staff is going to suggest some reduction in setbacks with a door and windows facing the street, and something “more significant” on corners. Details will be brought to the Commission at a future meeting.

9. Review draft language on amendments discussed at prior meetings:

a. Front porches in R-4, front-yard fence height in residential districts:

Mr. Conner noted that now with a 50-foot setback, there is no room for porches. The city has been reluctant to reduce the setback because porches have a tendency to become enclosed “rooms.” Because of the Chamberlin Neighborhood Committee’s desire to have more of a sense of “neighborhood,” they want opportunities for people to be in front of their houses. Porches could be open, with screening allowed, but without storm windows.

Mr. Klugo felt this could become an enforcement issue.

A second recommendation is to limit the height of fences in front of houses to a maximum of 4 feet. CNAPC felt this made it more inviting to know your neighbors. Mr. Klugo said he felt 8 feet is too high in the back as well. A 7’11” inch fence could block someone’s views.

b. Affordable housing density bonus in the SEQ-NRN:

Mr. Conner noted this applies to the exchanged piece of land in the JM Golf settlement. The bonus is allowed in every other district (except conservation areas) except this one. A resident asked if there could be affordable housing there. Ms. Louisos said she didn’t see why there shouldn’t be. Ms. Dopp expressed concern that this could mean more than the 32 units agreed upon. Mr. Klugo said that brings up the landscaping issue again. He felt there should be other considerations when there is a bonus given. Mr. Conner noted that the intent of the bonus is to defray some of the cost; if you require more landscaping, that cost goes up again. Mr. Klugo said he was OK with the bonus with some standards.

10. Other Business:


b. Colchester Town Plan Amendments, Public Hearing 4 October 2016

c. De minimum application to Public Service Board for wireless telecommunication facility, Spear Street and Hinesburg Road
No issues were raised on any of the three items.

11. Minutes of 9 August 2016 and 23 August 2016:

Ms. Quest moved to approve the Minutes of 9 August and 23 August 2016 as written. Ms. Harrington seconded. Motion passed unanimously.

As there was no further business to come before the Commission, the meeting was adjourned by common consent at 9:30 p.m.

______________________________, Clerk
Appendix B
Preferred Concept Alignment Alternatives and Typical Cross Sections
ALLEN ROAD
SOUTH BURLINGTON, VT

PEDESTRIAN AND BICYCLE SCOPING STUDY

LEGEND

- EXISTING ELECTRICAL LINE
- EXISTING WATER LINE
- EXISTING SEWER LINE
- EXISTING DRAINAGE LINE
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING WETLAND
- EXISTING UTILITY POLE
- EXISTING HYDRANT

ALLEN ROAD
20 400 80

EXISTING STOP SIGN
BAYCREST DRIVE

PROPOSED SHARED USE PATH
PROPOSED CROSSWALK
PROPOSED RECONSTRUCTED DRIVEWAY APRON (TYP)
PROPOSED TREE PLANTING (TYP)
PROPOSED MARKED LINE PATH

DRAFT/NOT FOR CONSTRUCTION
ALLEN ROAD
PEDIESTRIAN AND BICYCLE SCOPING STUDY
SOUTH BURLINGTON, VT

PROPOSED SHARED USE PATH
PROPOSED PEDESTRIAN SIGNAL HEADS AND ACCESSIBLE PUSH BUTTONS ON EXISTING SIGNAL POLES
PROPOSED CURB RAMP (TYP)
PROPOSED SIDEWALK
PROPOSED PEDESTRIAN SIGNAL HEADS AND ACCESSIBLE PUSH BUTTONS ON EXISTING SIGNAL POLES
PROPOSED TREE PLANTING (TYP)
PROPOSED HIGH-VISIBILITY GREEN PAVEMENT MARKINGS
PROPOSED SHARED USE PATH
PROPOSED PEDESTRIAN SIGNAL HEADS AND ACCESSIBLE PUSH BUTTONS ON EXISTING SIGNAL POLES

LEGEND
- EXISTING ELECTRICAL LINE
- EXISTING WATER LINE
- EXISTING SEWER LINE
- EXISTING DRAINAGE LINE
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING WETLAND
- EXISTING UTILITY POLE
- EXISTING HYDRANT

33 BROAD STREET, 4TH FLOOR, BOSTON MA  02109
PHONE: (617) 619-9910   FAX:  (301) 927-2800
www.tooledesign.com
DORSET STREET
PEDESTRIAN AND BICYCLE SCORING STUDY
SOUTH BURLINGTON, VT

EXISTING STOP SIGN
PROPOSED SHARED USE PATH
PROPOSED CROSSWALK
PROPOSED RECONSTRUCTED DRIVEWAY APRON (TYP)
PROPOSED TREE PLANTING (TYP)

EXISTING HYDRANT
EXISTING ELECTRICAL LINE
EXISTING WATER LINE
EXISTING SEWER LINE
EXISTING DRAINAGE LINE
PROPERTY LINE
EXISTING EDGE OF PAVEMENT
EXISTING WETLAND
EXISTING UTILITY POLE

LEGEND
LEGEND

- **EXISTING ELECTRICAL LINE**
- **EXISTING WATER LINE**
- **EXISTING SEWER LINE**
- **EXISTING DRAINAGE LINE**
- **PROPERTY LINE**
- **EXISTING EDGE OF PAVEMENT**
- **EXISTING WETLAND**
- **THREATENED/ENDANGERED SPECIES**
- **RARE SPECIES**
- **HAZARDOUS SITE**
- **EXISTING UTILITY POLE**
- **EXISTING HYDRANT**

PROPOSED SIDEWALK
PROPOSED BIKE LANES
PROPOSED RECONSTRUCTED DRIVEWAY APRON
PROPOSED RETAINING WALL

CONT. ON C3.0
CONT. ON C3.2

APRIL 2004
DRAFT/NOT FOR CONSTRUCTION
AIRPORT PARKWAY PEDESTRIAN AND BICYCLE SCOPING STUDY
SOUTH BURLINGTON, VT

LEGEND
- EXISTING ELECTRICAL LINE
- EXISTING WATER LINE
- EXISTING SEWER LINE
- EXISTING DRAINAGE LINE
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING WETLAND
- THREATENED/ENDANGERED SPECIES
- RARE SPECIES
- EXISTING UTILITY POLE
- EXISTING HYDRANT

PROPOSED SIDEWALK
PROPOSED ROADWAY
WIDENING APPROX. 1,600 FT
PROPOSED BIKE LANES

CONT. ON C3.5
CONT. ON C3.3

PROPOSED RECONSTRUCTED ROADWAY APRAON

12 17
LEGEND

- EXISTING ELECTRICAL LINE
- EXISTING WATER LINE
- EXISTING SEWER LINE
- EXISTING DRAINAGE LINE
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING WETLAND
- THREATENED/ENDANGERED SPECIES
- RARE SPECIES
- EXISTING UTILITY POLE
- EXISTING HYDRANT

PROPOSED CROSSWALK
PROPOSED SIDEWALK
PROPOSED CROSSWALK WITH RECTANGULAR RAPID FLASHING BEACON (RRFB)
PROPOSED BIKE LANES
SPEAR STREET PEDESTRIAN AND BICYCLE SCOPING STUDY SOUTH BURLINGTON, VT

EXISTING STOP SIGN
EXISTING DRIVEWAY APRON
EXISTING SIDEWALK
EXISTING TREE PLANTING
EXISTING RAPID FLASHING BEACON (RRFB)
EXISTING UTILITIES
EXISTING HYDRANT
EXISTING WETLAND
EXISTING EDGE OF PAVEMENT
PROPERTY LINE
EXISTING DRAINAGE LINE
EXISTING SEWER LINE
EXISTING WATER LINE
EXISTING ELECTRICAL LINE

LEGEND

SPEAR STREET PROPOSED CONCEPTUAL ALTERNATIVE

DRAFT/NOT FOR CONSTRUCTION

33 BROAD STREET, 4TH FLOOR, BOSTON MA 02109
PHONE: (617) 619-9910 FAX: (301) 927-2800
www.tooledesign.com
Appendix C
Opinion of Probable Construction Costs
Allen Road | South Burlington, VT
Pedestrian and Bicycle Feasibility Study
Opinion of Probable Construction

Prepared By: Toole Design Group
Date: September 2016

<table>
<thead>
<tr>
<th>Allen Road Alternative 1 - Preferred</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$310,000</td>
</tr>
</tbody>
</table>

**ESTIMATED PROJECT TOTAL**  $310,000

Notes:
Background information is provided on individual tabs.
Cost does not include environmental permitting, easement or property acquisition.

VTrans 5 Year Price List  January 2011 - December 2015
Alternative 1 Improvements- Preferred

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>QTY</th>
<th>UNIT</th>
<th>UNIT PRICE</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearing and Grubbing</td>
<td>5</td>
<td>Acre</td>
<td>$20,000.00</td>
<td>$100,000</td>
</tr>
<tr>
<td>Unclassified Excavation</td>
<td>610</td>
<td>CY</td>
<td>$25.00</td>
<td>$15,300</td>
</tr>
<tr>
<td>Subbase Gravel</td>
<td>525</td>
<td>CY</td>
<td>$28.00</td>
<td>$14,700</td>
</tr>
<tr>
<td>Subbase Sand Borrow</td>
<td>265</td>
<td>CY</td>
<td>$18.00</td>
<td>$4,800</td>
</tr>
<tr>
<td>Bituminous Concrete Path</td>
<td>135</td>
<td>TON</td>
<td>$147.00</td>
<td>$19,900</td>
</tr>
<tr>
<td>Portland Cement Concrete Sidewalk, 5 inch</td>
<td>105</td>
<td>SY</td>
<td>$63.00</td>
<td>$6,700</td>
</tr>
<tr>
<td>Accessible Ramps</td>
<td>6</td>
<td>EA</td>
<td>$3,200.00</td>
<td>$19,200</td>
</tr>
<tr>
<td>Detectable Warning Surface</td>
<td>6</td>
<td>EA</td>
<td>$45.00</td>
<td>$270</td>
</tr>
<tr>
<td>Durable 4&quot; Yellow Line, Type 1 Tape</td>
<td>500</td>
<td>LF</td>
<td>$2.00</td>
<td>$1,000</td>
</tr>
<tr>
<td>Durable 12&quot; White Line, Type I Tape</td>
<td>590</td>
<td>LF</td>
<td>$6.00</td>
<td>$3,540</td>
</tr>
<tr>
<td>Traffic Signs &amp; Posts</td>
<td>6</td>
<td>EA</td>
<td>$120.00</td>
<td>$720</td>
</tr>
<tr>
<td>Loam &amp; Seed</td>
<td>220</td>
<td>SY</td>
<td>$15.00</td>
<td>$3,300</td>
</tr>
<tr>
<td>Tree Plantings</td>
<td>20</td>
<td>EA</td>
<td>$300.00</td>
<td>$6,000</td>
</tr>
<tr>
<td>Pedestrian and bicycle signal improvements</td>
<td>1</td>
<td>LS</td>
<td>$15,000.00</td>
<td>$15,000</td>
</tr>
<tr>
<td>Annual Maintenance</td>
<td>1</td>
<td>LS</td>
<td>$5,000.00</td>
<td>$5,000</td>
</tr>
<tr>
<td>Erosion Control</td>
<td>1</td>
<td>LS</td>
<td>$4,300.00</td>
<td>$4,300</td>
</tr>
<tr>
<td>Traffic Controls</td>
<td>1</td>
<td>LS</td>
<td>$1,000.00</td>
<td>$1,000</td>
</tr>
<tr>
<td>Right-of-Way Acquisition</td>
<td>3</td>
<td>EA</td>
<td>$10,000.00</td>
<td>$30,000</td>
</tr>
<tr>
<td>Mobilization</td>
<td>1</td>
<td>LS</td>
<td>$1,000.00</td>
<td>$1,000</td>
</tr>
</tbody>
</table>

*SUBTOTAL* = $252,000

*CONTINGENCY AND CONSTRUCTION ENGINEERING (20%)* = $50,400

*TOTAL* = $310,000.00
Dorset Street | South Burlington, VT
Pedestrian and Bicycle Scoping Study
Opinion of Probable Construction

Prepared By: Toole Design Group
Date: September 2016

Dorset Street Alternative 1- Preferred  |  Cost  | $610,000

**ESTIMATED PROJECT TOTAL**  |  $610,000

Notes:
Background information is provided on individual tabs.
Cost does not include environmental permitting, easement or property acquisition.
VTrans 5 Year Price List  | January 2011 - December 2015
### Alternative 1 Improvements - Preferred

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>QTY</th>
<th>UNIT</th>
<th>UNIT PRICE</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearing and Grubbing</td>
<td>2</td>
<td>Acre</td>
<td>$20,000.00</td>
<td>$40,000</td>
</tr>
<tr>
<td>Unclassified Excavation</td>
<td>2940</td>
<td>CY</td>
<td>$25.00</td>
<td>$73,500</td>
</tr>
<tr>
<td>Retaining Wall</td>
<td>300</td>
<td>CY</td>
<td>$189.00</td>
<td>$56,700</td>
</tr>
<tr>
<td>Subbase Gravel</td>
<td>2000</td>
<td>CY</td>
<td>$28.00</td>
<td>$56,000</td>
</tr>
<tr>
<td>Subbase Sand Borrow</td>
<td>1000</td>
<td>CY</td>
<td>$18.00</td>
<td>$18,000</td>
</tr>
<tr>
<td>Bituminous Concrete Path</td>
<td>600</td>
<td>TON</td>
<td>$147.00</td>
<td>$88,200</td>
</tr>
<tr>
<td>Accessible Ramps</td>
<td>10</td>
<td>EA</td>
<td>$3,200.00</td>
<td>$32,000</td>
</tr>
<tr>
<td>Detectable Warning Surface</td>
<td>10</td>
<td>EA</td>
<td>$45.00</td>
<td>$450</td>
</tr>
<tr>
<td>Durable 4&quot; Yellow Line, Type 1 Tape</td>
<td>1700</td>
<td>LF</td>
<td>$2.00</td>
<td>$3,400</td>
</tr>
<tr>
<td>Durable 12&quot; White Line, Type 1 Tape</td>
<td>890</td>
<td>LF</td>
<td>$6.00</td>
<td>$5,340</td>
</tr>
<tr>
<td>Utility Pole Relocation</td>
<td>8</td>
<td>EA</td>
<td>$7,500.00</td>
<td>$60,000</td>
</tr>
<tr>
<td>Traffic Signs &amp; Posts</td>
<td>10</td>
<td>EA</td>
<td>$120.00</td>
<td>$1,200</td>
</tr>
<tr>
<td>Loam &amp; Seed</td>
<td>2300</td>
<td>SY</td>
<td>$15.00</td>
<td>$34,500</td>
</tr>
<tr>
<td>Tree Plantings</td>
<td>42</td>
<td>EA</td>
<td>$300.00</td>
<td>$12,600</td>
</tr>
<tr>
<td>Annual Maintenance</td>
<td>1</td>
<td>LS</td>
<td>$5,000.00</td>
<td>$5,000</td>
</tr>
<tr>
<td>Erosion Control</td>
<td>1</td>
<td>LS</td>
<td>$4,300.00</td>
<td>$4,300</td>
</tr>
<tr>
<td>Traffic Controls</td>
<td>1</td>
<td>LS</td>
<td>$5,000.00</td>
<td>$5,000</td>
</tr>
<tr>
<td>Mobilization</td>
<td>1</td>
<td>LS</td>
<td>$5,000.00</td>
<td>$5,000</td>
</tr>
</tbody>
</table>

**SUBTOTAL = $502,000**

**CONTINGENCY AND CONSTRUCTION ENGINEERING (20%) = $100,400**

**TOTAL = $610,000.00**
Airport Parkway & Lime Kiln Road | South Burlington, VT
Pedestrian and Bicycle Scoping Study
Opinion of Probable Construction

<table>
<thead>
<tr>
<th>Airport Parkway Alternative 1- Preferred</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$2,600,000</td>
</tr>
</tbody>
</table>

**ESTIMATED PROJECT TOTAL**  $2,600,000

Notes:
Background information is provided on individual tabs.
Cost does not include environmental permitting, easement or property acquisition.
VTrans 5 Year Price List  January 2011 - December 2015
# Alternative 1 Improvements - Preferred

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>QTY</th>
<th>UNIT</th>
<th>UNIT PRICE</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearing and Grubbing</td>
<td>2.5</td>
<td>Acre</td>
<td>$20,000.00</td>
<td>$50,000</td>
</tr>
<tr>
<td>Unclassified Excavation</td>
<td>6000</td>
<td>CY</td>
<td>$25.00</td>
<td>$150,000</td>
</tr>
<tr>
<td>Excavation of Surfaces and Pavements</td>
<td>35000</td>
<td>CY</td>
<td>$22.00</td>
<td>$770,000</td>
</tr>
<tr>
<td>Retaining Wall</td>
<td>200</td>
<td>CY</td>
<td>$189.00</td>
<td>$37,800</td>
</tr>
<tr>
<td>Subbase Gravel</td>
<td>2000</td>
<td>CY</td>
<td>$28.00</td>
<td>$56,000</td>
</tr>
<tr>
<td>Subbase Sand Borrow</td>
<td>1000</td>
<td>CY</td>
<td>$18.00</td>
<td>$18,000</td>
</tr>
<tr>
<td>Vertical Granite Curb</td>
<td>3500</td>
<td>LF</td>
<td>$32.00</td>
<td>$112,000</td>
</tr>
<tr>
<td>Superpave Bituminous Concrete Pavement</td>
<td>4000</td>
<td>CY</td>
<td>$77.00</td>
<td>$308,000</td>
</tr>
<tr>
<td>Portland Cement Concrete Sidewalk, 5 inch</td>
<td>3345</td>
<td>SY</td>
<td>$63.00</td>
<td>$210,800</td>
</tr>
<tr>
<td>Accessible Ramps</td>
<td>18</td>
<td>EA</td>
<td>$3,200.00</td>
<td>$57,600</td>
</tr>
<tr>
<td>Detectable Warning Surface</td>
<td>18</td>
<td>EA</td>
<td>$45.00</td>
<td>$810</td>
</tr>
<tr>
<td>Durable 4&quot; Yellow Line, Type I Tape</td>
<td>7000</td>
<td>LF</td>
<td>$2.00</td>
<td>$14,000</td>
</tr>
<tr>
<td>Durable 12&quot; White Line, Type I Tape</td>
<td>10000</td>
<td>LF</td>
<td>$6.00</td>
<td>$60,000</td>
</tr>
<tr>
<td>Durable Bicycle Lane Symbol</td>
<td>60</td>
<td>EA</td>
<td>$250.00</td>
<td>$15,000</td>
</tr>
<tr>
<td>Rectangular Rapid Flashing Beacons (RRFBs)</td>
<td>8</td>
<td>EA</td>
<td>$7,500.00</td>
<td>$60,000</td>
</tr>
<tr>
<td>Traffic Signs &amp; Posts</td>
<td>26</td>
<td>EA</td>
<td>$120.00</td>
<td>$3,120</td>
</tr>
<tr>
<td>Loam &amp; Seed</td>
<td>4700</td>
<td>SY</td>
<td>$15.00</td>
<td>$70,500</td>
</tr>
<tr>
<td>Tree Plantings</td>
<td>26</td>
<td>EA</td>
<td>$300.00</td>
<td>$7,800</td>
</tr>
<tr>
<td>Annual Maintenance</td>
<td>1</td>
<td>LS</td>
<td>$5,000.00</td>
<td>$5,000</td>
</tr>
<tr>
<td>Erosion Control</td>
<td>1</td>
<td>LS</td>
<td>$4,300.00</td>
<td>$4,300</td>
</tr>
<tr>
<td>Traffic Controls</td>
<td>1</td>
<td>LS</td>
<td>$59,000.00</td>
<td>$59,000</td>
</tr>
<tr>
<td>Right-of-Way Acquisition</td>
<td>2</td>
<td>EA</td>
<td>$10,000.00</td>
<td>$20,000</td>
</tr>
<tr>
<td>Mobilization</td>
<td>1</td>
<td>LS</td>
<td>$59,000.00</td>
<td>$59,000</td>
</tr>
</tbody>
</table>

**Subtotal** = $2,150,000

**Contingency and Construction Engineering (20%)** = $430,000

**Total** = $2,600,000.00
Spear Street | South Burlington, VT
Pedestrian and Bicycle Feasibility Study
Opinion of Probable Construction

Prepared By: Toole Design Group
Date: September 2016

Spear Street Alternative 2- Preferred  |  Cost  |  $490,000

ESTIMATED PROJECT TOTAL  |  $490,000

Notes:
Background information is provided on individual tabs.
Cost does not include environmental permitting, easement or property acquisition.
VTrans 5 Year Price List  |  January 2011 - December 2015
### Alternative 2 Improvements- Preferred

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>QTY</th>
<th>UNIT</th>
<th>UNIT PRICE</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearing and Grubbing</td>
<td>1.5</td>
<td>Acre</td>
<td>$20,000.00</td>
<td>$30,000</td>
</tr>
<tr>
<td>Unclassified Excavation</td>
<td>1780</td>
<td>CY</td>
<td>$25.00</td>
<td>$44,500</td>
</tr>
<tr>
<td>Subbase Gravel</td>
<td>1665</td>
<td>CY</td>
<td>$28.00</td>
<td>$46,700</td>
</tr>
<tr>
<td>Subbase Sand Borrow</td>
<td>835</td>
<td>CY</td>
<td>$18.00</td>
<td>$15,100</td>
</tr>
<tr>
<td>Bituminous Concrete Path</td>
<td>235</td>
<td>TON</td>
<td>$147.00</td>
<td>$34,600</td>
</tr>
<tr>
<td>Portland Cement Concrete Sidewalk, 5 inch</td>
<td>1345</td>
<td>SY</td>
<td>$63.00</td>
<td>$84,800</td>
</tr>
<tr>
<td>Accessible Ramps</td>
<td>10</td>
<td>EA</td>
<td>$3,200.00</td>
<td>$32,000</td>
</tr>
<tr>
<td>Detectable Warning Surface</td>
<td>10</td>
<td>EA</td>
<td>$45.00</td>
<td>$450</td>
</tr>
<tr>
<td>Durable 4&quot; Yellow Line, Type 1 Tape</td>
<td>600</td>
<td>LF</td>
<td>$2.00</td>
<td>$1,200</td>
</tr>
<tr>
<td>Durable 12&quot; White Line, Type I Tape</td>
<td>580</td>
<td>LF</td>
<td>$6.00</td>
<td>$3,480</td>
</tr>
<tr>
<td>Rectangular Rapid Flashing Beacons (RRFBs)</td>
<td>4</td>
<td>EA</td>
<td>$7,500.00</td>
<td>$30,000</td>
</tr>
<tr>
<td>Traffic Signs &amp; Posts</td>
<td>12</td>
<td>EA</td>
<td>$120.00</td>
<td>$1,440</td>
</tr>
<tr>
<td>Fence (Replace In-kind)</td>
<td>300</td>
<td>LF</td>
<td>$30.00</td>
<td>$9,000</td>
</tr>
<tr>
<td>Wall (Replace In-kind)</td>
<td>250</td>
<td>LF</td>
<td>$75.00</td>
<td>$18,750</td>
</tr>
<tr>
<td>Loam &amp; Seed</td>
<td>1430</td>
<td>SY</td>
<td>$15.00</td>
<td>$21,450</td>
</tr>
<tr>
<td>Tree Plantings</td>
<td>35</td>
<td>EA</td>
<td>$300.00</td>
<td>$10,500</td>
</tr>
<tr>
<td>Annual Maintenance</td>
<td>1</td>
<td>LS</td>
<td>$5,000.00</td>
<td>$5,000</td>
</tr>
<tr>
<td>Erosion Control</td>
<td>1</td>
<td>LS</td>
<td>$4,300.00</td>
<td>$4,300</td>
</tr>
<tr>
<td>Traffic Controls</td>
<td>1</td>
<td>LS</td>
<td>$4,000.00</td>
<td>$4,000</td>
</tr>
<tr>
<td>Mobilization</td>
<td>1</td>
<td>LS</td>
<td>$4,000.00</td>
<td>$4,000</td>
</tr>
</tbody>
</table>

**SUBTOTAL =** $402,000

**CONTINGENCY AND CONSTRUCTION ENGINEERING (20%) =** $80,400

**TOTAL =** $490,000.00