

**SECTION III**

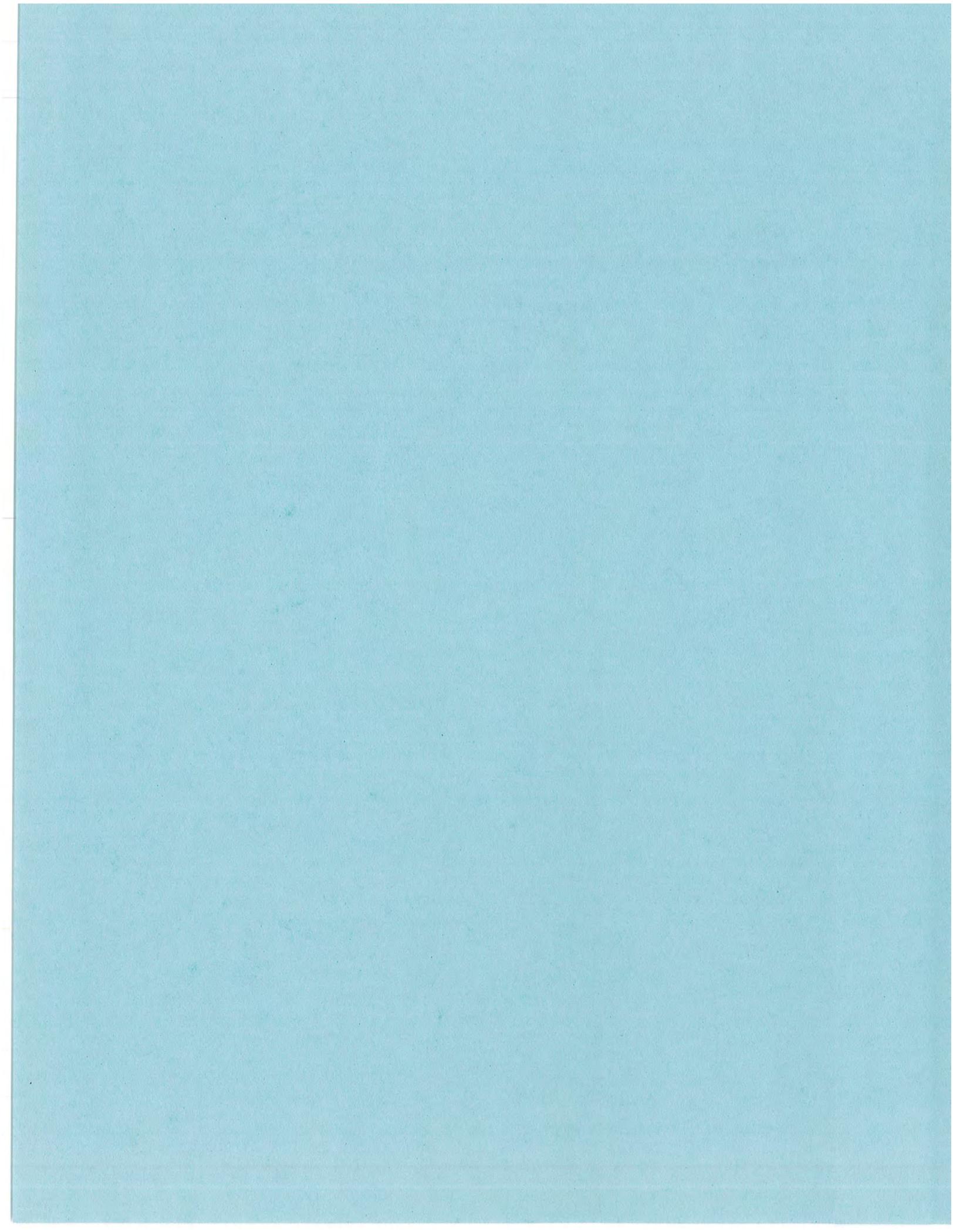
**ALTERNATIVES**



BUILDING THE FUTURE

**Winston-Salem**

BUSINESS 40



### III. ALTERNATIVES

#### A. CONSTRUCTION METHOD ALTERNATIVES

NCDOT made an early decision to first determine how to build the project (construction method) followed by what to build (alternatives).

One of the recommendations from the Accelerated Construction Technology Transfer (ACTT), see Section I.B [Historical Resume and Project Status], Workshop in Winston-Salem was to completely close US 421/I-40 Business during the reconstruction of the mainline for a shorter period of time, approximately 2 years, versus standard construction with partial closure, approximately six years. The time duration of six years for standard construction is based on the narrow project corridor, i.e. substandard inside and outside shoulders widths and the location of existing bridge bents/supports which prohibits the ability to shift traffic in order to maintain the existing lanes during construction, requiring partial closure to one (1) lane of traffic in each direction. To better understand the community's concerns and to facilitate active public participation in the project development process with the project, an aggressive public involvement campaign began in May 2006. The initial outreach consisted of five (5) components: Community Outreach, Neighborhood Businesses Outreach, Downtown Businesses Outreach, Commuter Outreach and Government/Institution Outreach. Starting in October 2007 and continuing through May 2008 the US 421/I-40 Business Project Team began conducting surveys of residents, businesses and employees in the sixteen (16) neighborhoods that surround the project. The surveys were used to gather a host of information from the public regarding but not limited to mode(s) of transportation used, did the individual use US 421/I-40 Business, frequency of use of US 421/I-40 Business, what bridges did the individual use to cross US 421/I-40 Business and whether they favored a partial or full closure during construction. The two (2) construction method alternatives are as follows:

##### 1. Partial Closure Construction Alternative

Partial closure of US 421/I-40 Business for up to six (6) years includes the following:

- One lane will be open on US 421/I-40 Business in each direction (on one side of the median) between US 52 and Peters Creek Parkway.
- Entrance and exit ramps in this area will need to be closed at various times during construction, so access will be limited to downtown from US 421/I-40 Business.
- Full or directional closure will be necessary at various times during construction.

## **2. Full Closure Construction Alternative**

US 421/I-40 Business and all entrance and exit ramps will be closed between US 52 and Peters Creek Parkway for up to two (2) years during construction.

It is important to note that with either construction alternative, construction in downtown will last longer than the two (2) - or six (6) -year periods mentioned above. Additionally, it will be necessary to do some work prior to lane closures and after lane closures. As a result, there will be considerable construction going on in downtown Winston-Salem for several years. Other information about both options include:

- Bridges on local north/south streets over US 421/I-40 Business will be closed at various times during construction (Fourth Street, Green Street, Broad Street, Spruce Street, Marshall Street, Cherry Street, Main Street, and Church Street).
- Some nighttime construction will occur.
- As a result of construction, there will be more traffic on most of the local streets during the road closure.

The results of the surveys were presented to the public at the June 2008 Corridor-wide meetings. The survey resulted in 11,500 plus responses in which 69.86 percent favored full closure, 26.98 percent favored partial closure, 2.61 percent had no preference and 0.55 percent did not answer the question. A detailed listing of the results of the surveys may be found in Section VI.A.2.a [Surveys] of this document.

Regardless of the construction alternative chosen, the reconstruction of the Peters Creek Parkway Interchange would need to be constructed first to provide a primary north-south access into the downtown from the west. Other projects adjacent to or within the project study area would also need to be completed prior to primary work on US 421/I-40 Business beginning. The required other projects are as follows:

STIP Project U-2826B - US 52 Operational Improvements from I-40 to the NC 65, involves widening and improving the existing US 52 roadway, shoulders, and interchanges.

STIP Project U-2925 – Salem Creek Connector from SR 4326 (Rams Drive) to SR 4325 (Martin Luther King Drive), constructing a new location roadway and other transportation improvements.

STIP Project U-4918 - Research Park Boulevard from SR 4326 (Rams Drive (formerly Stadium Drive)) to Third Street, involves constructing a new location roadway and other transportation improvements within the proposed Wake Forest Innovation Quarter.

STIP Project U-5020 – Winston-Salem Interim Signal System Improvements.

STIP Project C-4981 – Install Intelligent Transportation System (ITS) Devices at Selected Locations in Winston-Salem.

STIP Project C-5142 – Interim Winston-Salem Traffic Signal System Upgrades In Two Phases.

STIP Project C-5224 – Upgrade City of Winston-Salem Signal System.

In 2009 NCDOT commissioned a traffic forecast analysis of the two (2) construction alternatives to determine the existing roadway network's ability to handle the traffic shifts. The analysis indicated that with minor intersection improvements, Downtown Winston-Salem would be able to accommodate the detour traffic, within acceptable limits of traffic flow conditions, if the US 421/I-40 Business facility were to be fully closed for reconstruction. However, in order to accommodate the detour traffic, US 52 Interim Improvements and the Salem Creek Connector/Research Park Boulevard project would need to be completed before construction. Also, significant upgrades would be required to the existing Winston-Salem traffic signal system.

Based on the input received from the public, via surveys, neighborhood meetings, the June 2008 Corridor-wide meetings, and the traffic forecast analysis, NCDOT selected the Full Closure Construction Alternative in January 2010.

## **B. PRELIMINARY STUDY ALTERNATIVES**

### **1. No-Build Alternative**

A No-Build Alternative can be either short term minor activities (related to safety and operations) or a "no action" activity.

- a. No-Build Alternative - Short Term Minor Activities (Operation and Safety)** Minor improvements to this type of roadway facility typically include improving radii on ramps and loops, improving the length of ramps and loops, removing select ramps and/or loops improving shoulder widths and/or raising existing structures.

Improving the radii on and/or the length of ramps and loops are not feasible since due to the existing topography and geometric constraints, doing so would result in shorter ramps and loops. Removing select ramps and loops, to improve weave distances, is not feasible without overburdening the remaining constrained ramps and loops. Improving shoulder widths is not possible without decreasing lane widths due to the spacing of existing bridge bents/supports. Raising the existing structures, to improve vertical clearance, is not feasible since it will result in the change of grade on secondary streets resulting in loss of access to properties and adverse impacts to historic properties.

- b. No-Build Alternative – No Action Activity** A No Action alternative is not practicable since NCDOT is required to maintain any/all projects constructed under Title 23 - Highway of the United States Code until the project is no longer part of the Federal-aid system, 23 USC 116.

A No Action alternative is not practicable since taking No Action will not improve the operational and safety deficiencies along US 421/I-40 Business.

## **2. Alternative Modes of Transportation**

Alternative modes of transportation (bicycle, pedestrian accommodations and transit options) are not practicable since using these modes of transportation will not improve the operational and safety deficiencies and therefore would not meet the purpose and need for the project.

## **3. Travel Demand Management (TDM) (e.g., ride sharing, park & ride, vanpooling)**

Travel Demand Management (TDM) (e.g., ride sharing, park & ride, vanpooling) is not practicable since using TDM will not improve the operational and safety deficiencies and therefore would not meet the purpose and need for the project.

## **4. Mass Transit**

Mass Transit is not practicable since using it will not improve the operational and safety deficiencies and therefore would not meet the purpose and need for the project.

## **5. Transportation Systems Management (TSM) (e.g., HOV, “hot lanes”, etc.)**

Transportation Systems Management (TSM) (e.g., HOV, “hot lanes”, etc.) is not practicable since using TSM will not improve the operational and safety deficiencies and therefore would not meet the purpose and need for the project.

## **6. Improve Existing Facility**

NCDOT and City of Winston Salem staff formed design teams for the US 421/I-40 Business project. These groups met several times in 2009 to discuss and develop conceptual ideas for configuring the improvements to US 421/I-40 Business. These meetings led to the development of several different Design Ideas for the project. The Design Ideas had no engineering design completed for them and were meant to be a starting point for determining initial alternatives to be studied.

In May, 2010, the Design Ideas were initially presented to the public during a combined meeting of the I-40 Business Working Groups, see Section VI.A.2.e [Working Group Meetings], and were subsequently presented in the Winston Salem Journal. The Design

Ideas were further refined and presented to the general public in 2010 at the Corridor-wide meetings for the project. The public was asked to comment on their opinions about the Design Ideas as they were presented. The project was broken into four (4) sections with different design ideas.

The Design Ideas, as presented October 2010, are as follows:

#### Section 1 – Fourth Street and Peters Creek Parkway, Figure 9

Design Idea A, see Figure 9A, contains the following elements:

- Replace the Fourth Street Overpass;
- Remove eastbound off-ramp to southbound Peters Creek Parkway;
- Remove/replace existing Peters Creek Parkway bridge with a wider structure and revise existing ramps and loop;
- Add an eastbound off-ramp loop, and;
- Cul-de-sac Gregory and Apple Streets.

Design Idea B, see Figure 9B, contains the following elements:

- Remove the Fourth Street Overpass and cul-de-sac Fourth Street;
- Extend the existing eastbound off-ramp;
- Add new westbound on-ramp from Peters Creek Parkway to US 421/I-40 Business;
- Remove/replace existing Peters Creek Parkway bridge with a wider structure and revise existing ramps and loop;
- Add an eastbound off-ramp loop, and;
- Cul-de-sac Gregory and Apple Streets.

#### Section 2 – Green and Broad Streets, Figure 10

Design Idea A, see Figure 10A, contains the following elements:

- Replace the Green Street Overpass with a Pedestrian/Utility Bridge;
- Cul-de-sac the southern portion of Green Street;
- Replace the Broad Street Bridge, and;
- Refurbish the existing Broad Street Interchange ramps and loops.

Design Idea B, see Figure 10B, contains the following elements:

- Replace the Green Street Overpass with a Pedestrian/Utility Bridge;
- Cul-de-sac the southern portion of Green Street;
- Replace the Broad Street Bridge, and;
- Remove the Broad Street Interchange ramps and loops.

Design Idea C, see Figure 10C, contains the following elements:

- Replace the Green Street Overpass with a Pedestrian/Utility Bridge;
- Cul-de-sac the southern portion of Green Street;
- Replace the Broad Street Bridge, and;

- Replace the Broad Street Interchange ramps and loops with a westbound off-ramp to Broad Street with an extension to Green Street and an east-bound on-ramp from Broad Street to US 421/I-40 Business.

Section 3 – Brookstown Avenue, Popular, Spruce, Marshall and Cherry Streets, Figure 11

Design Idea A, see Figure 11A, contains the following elements:

- Replace the US 421/I-40 Business Overpass of Brookstown Avenue;
- Remove the Spruce Street Bridge;
- Cul-de-sac the northern portion of Spruce Street;
- Close the section of High Street from Brookstown Avenue to eastbound off-ramp; modify the High Street off-ramp location;
- Refurbish the existing east and westbound on-ramps from Marshall Street to US 421/I-40 Business, and;
- Replace the Marshall and Cherry Streets Bridges.

Design Idea B, see Figure 11B, contains the following elements:

- Replace the US 421/I-40 Business Overpass of Brookstown Avenue;
- Remove the Spruce Street Bridge;
- Remove the westbound on-ramp from Marshall Street to US 421/ I-40 Business;
- Add a frontage road north of US 421/ I-40 Business connecting Popular, Spruce and Marshall Streets;
- Close the section of High Street from Brookstown Avenue to eastbound off-ramp; Modify the existing High Street off-ramp to provide a split ramp to High Street and to Marshall Street with a connecting on-ramp to US 421/ I-40 Business, and;
- Replace the Marshall and Cherry Streets Bridges.

Design Idea C, see Figure 11C, contains the following elements:

- Replace the US 421/ I-40 Business Overpass of Brookstown Avenue;
- Remove the Spruce Street Bridge;
- Cul-de-sac the northern portion of Spruce Street;
- Close the section of High Street from Brookstown Avenue to eastbound off-ramp;
- Modify the High Street off-ramp location;
- Modify the Marshall Street off-ramp to US 421/ I-40 Business;
- Remove the Marshall Street on-ramp to US 421/ I-40 Business,
- Replace the Marshall and Cherry Streets Bridges, and;
- Revert Marshall and Cherry Streets from one-way to two-way traffic.

Design Idea D, see Figure 11D, contains the following elements:

- Replace the US 421/ I-40 Business Overpass of Brookstown Avenue;
- Remove the Spruce Street Bridge;
- Cul-de-sac the northern portion of Spruce Street;

- Remove eastbound off-ramp from US 421/ I-40 Business to High Street;
- Modify the Marshall Street off-ramp to US 421/ I-40 Business;
- Provide a new eastbound off-ramp to Marshall Street with a connecting on-ramp to US 421/ I-40 Business, and;
- Replace the Marshall and Cherry Streets Bridges.

#### Section 4 – Cherry, Liberty, Main and Church Streets, Figure 12

Design Idea A, see Figure 12A, contains the following elements:

- Shifts US 421/I-40 Business east of Cherry Street to west of Church Street southward;
- Provide bridging over the Strollway;
- Replace the US 421/ I-40 Business Overpass bridge of Liberty Street;
- Refurbish the existing eastbound off-ramp from US 421/ I-40 Business to Main Street and continues under Church Street with a connecting on-ramp to US 421/ I-40 Business;
- Remove the eastbound off-ramp from US 421/ I-40 Business to southbound Liberty Street;
- Refurbish the existing westbound off-ramp from US 421/ I-40 Business under Church Street intersecting Main Street and provide a new crossing over of Liberty Street to a modified connection to Cherry Street;
- Modify the southbound Liberty Street ramp to westbound US 421/ I-40 Business, and;
- Replace the Main and Church Street bridges.

Design Idea B, see Figure 12B, contains the following elements:

- US 421/I-40 Business remains in its existing location;
- Provide bridging over the Strollway;
- Replace the US 421/ I-40 Business Overpass bridge of Liberty Street;
- Provide an eastbound off-ramp from US 421/ I-40 Business crossing over Liberty Street intersecting Main Street crossing under Church Street and connecting back to the eastbound on-ramp US 421/ I-40 Business;
- Provide a new connection between Liberty Street and Main Street to the south of I-40 Business is optional;
- Refurbish the existing westbound off-ramp from US 421/ I-40 Business under Church Street intersecting Main Street;
- Revert Main Street from one-way to two-way traffic;
- Allow for a connection from southbound Liberty Street to Main Street and to eastbound US 421/ I-40 Business;
- Modify the southbound on-ramp from Liberty Street to westbound US 421/ I-40 Business;
- Refurbish the connection from westbound US 421/ I-40 Business to Cherry Street, and;
- Replace the Main and Church Street bridges.

Design Idea C, see Figure 12C, contains the following elements:

- Shifts US 421/I-40 Business east of Cherry Street to east of Church Street southward;
- Provide bridging over the Strollway;
- Replace the US 421/ I-40 Business Overpass bridge of Liberty Street with a shorter bridge;
- Provide a ramp eastbound from Cherry Street to US 421/I-40 Business;
- Provide a relocated eastbound off-ramp from US 421/I-40 Business to Main Street connecting to Church Street and back to an eastbound on-ramp to US 421/I-40 Business;
- Modify the existing westbound off-ramp from US 421/ I-40 Business to intersect with Church Street continuing to Main Street with a new crossing over of Liberty Street that provides a split ramp to a modified connection to Cherry Street or on-ramp westbound to US 421/I-40 Business, and;
- Replace the Main and Church Street bridges.

Design Idea D, see Figure 12D, contains the following elements:

- US 421/I-40 Business remains in its existing location;
- Provide bridging over the Strollway;
- Replace the US 421/ I-40 Business Overpass bridge of Liberty Street;
- Provide a relocated eastbound off-ramp from US 421/ I-40 Business to Liberty Street;
- Refurbish the existing eastbound off-ramp from US 421/ I-40 Business to Main Street and continues under Church Street with a connecting on-ramp to US 421/ I-40 Business;
- Remove the existing eastbound off-ramp from US 421/ I-40 Business to southbound Liberty Street;
- Refurbish the existing westbound off-ramp from US 421/ I-40 Business under Church Street intersecting Main Street;
- Provide a connection (service road) between Main Street and Cherry Street over Liberty Street, the southbound Liberty Street ramp to westbound US 421/ I-40 Business will be modified, and;
- Replace the Main and Church Street bridges.

Though developed independently by Section; the Design Ideas from the four (4) Sections were to be combined in varying combinations to form different alternatives. It became apparent that some of Design Ideas worked better together than others, i.e. Section 1 Design Ideas, A or B, worked with any of the three (3) Design Ideas of Section 2, while others did not work together.

## C. DETAILED STUDY ALTERNATIVES

Based on input received on the Design Ideas from the Working Groups and Corridor Wide Meetings), see Section VI.A.2. [Current Outreach Efforts], in 2010 and geometric design constraints, NCDOT staff began to eliminate Design Ideas in the development of alternatives. Due to spacing requirements between interchange ramps and loops it became apparent that there were only two (2) access options, either an interchange at Cherry/Marshall or Liberty/Main, to serve the downtown area of Winston-Salem. The following detailed alternatives were developed:

### 1. **Alternative 1 - Cherry/Marshall (primary access to downtown Winston-Salem) Shallow Cut**

This alternative provides for a full interchange at Peters Creek Parkway, a full interchange at Cherry/Marshall (via two partial interchanges acting as a full interchange) and partial interchange at Main Street. The design elements include replacing the Peters Creek Parkway interchange and bridge, replacing the Green Street bridge with a pedestrian/utility bridge, closing the Broad Street ramps, replacing the Broad Street bridge, replacing the Brookstown Avenue bridge, removing of the Spruce Street bridge, constructing new ramp at Marshall and Cherry Streets, replacing the Marshall and Cherry Street bridges, closing the Liberty Street ramps, shifting US 421/I-40 Business south (from Marshall to Main Streets), replacing the Main Street bridge and ramps, shift Main Street west to improve bridge clearance, replacing the Church Street bridge, improving exterior shoulder width and center median/barrier, constructing retaining walls and provide for aesthetics improvements. This alternative lowers US 421/I-40 Business 6-7 feet to improve bridge clearances and will require the change of grade on some of the secondary streets resulting in loss of access to properties and adverse impacts to historic properties.

### 2. **Alternative 2 - Liberty/Main (primary access to downtown Winston-Salem) Shallow Cut**

This alternative provides for a full interchange at Peters Creek Parkway, a partial interchange at Broad Street and a full interchange at Liberty/Main (via two partial interchanges acting as a full interchange). The design elements include replacing the Peters Creek Parkway interchange and bridge, replacing the Green Street bridge with a pedestrian/utility bridge, reconfiguring the Broad Street interchange to a partial interchange, replacing the Broad Street bridge, replacing the Brookstown Avenue bridge, replacing the Spruce Street bridge, closing the Marshall and Cherry Street ramps, replacing the Marshall and Cherry Street bridges, replacing the Liberty Street bridge and ramps, replacing the Main Street bridge and ramps, shift Main Street west to improve bridge clearance, replacing the Church Street bridge, improving exterior shoulder width and center median/barrier, constructing retaining walls and provide for aesthetics improvements. This alternative lowers US 421/I-40 Business 6-7 feet to improve bridge clearances and will

require the change of grade on some of the secondary streets resulting in loss of access to properties and adverse impacts to historic properties.

### **3. Alternative 3 - Liberty/Main (primary access to downtown Winston-Salem) Deep Cut**

This alternative provides for a full interchange at Peters Creek Parkway, a partial interchange at Broad Street and a full interchange at Liberty/Main (via two partial interchanges acting as a full interchange). The design elements include replacing the Peters Creek Parkway interchange and bridge, replacing the Green Street bridge with a pedestrian/utility bridge, reconfiguring the Broad Street interchange to a partial interchange, replacing the Broad Street bridge, replacing the Brookstown Avenue bridge, replacing the Spruce Street bridge, closing the Marshall and Cherry Street ramps, replacing the Marshall and Cherry Street bridges, flips Liberty Street from currently going under US 421/I-40 Business to going over US 421/I-40 Business, replacing the Liberty Street ramps, bridging over the Strollway, replacing the Main Street bridge and ramps, replacing the Church Street bridge, improving exterior shoulder width and center median/barrier, constructing retaining walls and provide for aesthetics improvements. This alternative lowers US 421/I-40 Business up to 20 feet to improve bridge clearances.

And

### **4. Alternative 4 - Cherry/Marshall (primary access to downtown Winston-Salem) Deep Cut**

This alternative provides for a full interchange at Peters Creek Parkway, a full interchange at Cherry/Marshall (via two partial interchanges acting as a full interchange) and partial interchange at Main Street. The design elements include replacing the Peters Creek Parkway interchange and bridge, replacing the Green Street bridge with a pedestrian/utility bridge, closing the Broad Street ramps, replacing the Broad Street bridge, replacing the Brookstown Avenue bridge, removing of the Spruce Street bridge, constructing new ramp at Marshall and Cherry Streets, replacing the Marshall and Cherry Street bridges, closing the Liberty Street ramps, flips Liberty Street from currently going under US 421/I-40 Business to going over US 421/I-40 Business, replacing the Main Street bridge and ramps, shift Main Street west to improve bridge clearance, replacing the Church Street bridge, improving exterior shoulder width and center median/barrier, constructing retaining walls and provide for aesthetics improvements. This alternative lowers US 421/I-40 Business up to 20 feet to improve bridge clearances.

### **Proposed Alternatives – Conflict Points**

Currently, there are six interchanges within the 1.2-mile corridor between West Fourth Street and Main Street, with a total of 20 conflict points.

- Alternatives 1 and 4 - By removing the ramps at Liberty Street, removing the ramps and loop at Broad Street, and reconfiguring the ramps at Marshall and Cherry

Streets, the Cherry/Marshall Alternative for US 421/I-40 Business will reduce the number of conflict points to 10, see Figure 13.

- Alternatives 2 and 3 - By removing the ramps at Marshall and Cherry Streets, reconfiguring the Broad Street interchange to a westbound off ramp and an eastbound on ramp, and reconfiguring the ramps at Liberty and Main Streets, the Liberty/Main Alternative for US 421/I-40 Business will reduce the number of conflict points to 10, see Figure 14.

It is anticipated that reducing conflict points by all alternatives will improve safety along this corridor.

#### **D. NCDOT ALTERNATIVES CARRIED FORWARD**

Based on a review of project constructability, the ability to construct the project within existing right-of-way with minimal acquisitions, preliminary cost analysis and review of the alternatives by NCDOT and City of Winston-Salem it was determined to carry forward Alternatives 3 and 4, as noted below.

##### **Alternative 3 - Liberty/Main (primary access to downtown Winston-Salem)**

This alternative, as shown in Figure 15, provides for a full interchange at Peters Creek Parkway, a partial interchange at Broad Street and a full interchange at Liberty/Main (via two partial interchanges acting as a full interchange). A detail description of the design elements for Alternative 3 is as follows:

- Starting just east of the I-40 Business overpass of Crafton Street, I-40 Business will be lowered to improve the vertical clearance of the Fourth Street bridge to 17 feet;
- The current Peters Creek Parkway Interchange is comprised of an EB off slip ramp to southbound Peters Creek Parkway (PCP), an EB on ramp, a WB off ramp, a WB on loop, a four-lane bridge with sidewalks in each direction. The proposed interchange will include an EB off loop, an EB on ramp, a WB off ramp, a WB on loop, a seven lane bridge with 5.5 foot sidewalks in each direction. The addition of the EB loop and moving out of the EB on ramp will require either providing a new connector between Apple and Gregory Streets or cul-de-sacing the two;
- Replace the Green Street Bridge with a pedestrian/utility bridge. I-40 Business will be lowered to improve the vertical clearance of the proposed bridge to 17 feet ;
- Reconfigure the Broad Street interchange to a partial interchange with WB off ramp and EB on ramp only. The replacement bridge will be narrowed to three lanes. I-40 Business will be lowered to improve the vertical clearance of the proposed bridge to 17 feet ;
- Replace the Brookstown Avenue bridge, reduce length;
- Major cut of the main line , approximately 20 feet at the deepest point, of the vertical alignment on US 421/I-40 Business from west of Spruce Street to west of the

I-40 Business overpass of East Salem Avenue . This lowering will improve the vertical clearance of the Spruce, Marshall, Cherry, Main and Church Street bridges to a minimum 17 feet;

- Spruce Street will remain open in this alternative. Replace the Spruce Street Bridge with a narrower structure;
- Remove the Cherry and Marshall Street ramps;
- Replace the Cherry and Marshall Street Bridges with longer structures;
- Construct new bridges over the Strollway;
- Flips Liberty Street from currently going under US 421/I-40 Business to going over US 421/I-40 Business;
- Simplifies the EB off ramp providing access to Liberty and Main Streets, removes need for split;
- Keeps Main Street ramps (westbound (WB) off ramp and eastbound (EB) on ramp with a shift to align with the EB off ramp to Liberty Street);
- DOES NOT require a shift of Main Street to the west, thus retaining the funeral home;
- Narrows Church Street bridge on the west side to aid in improving vertical clearance of the Main Street ramps, City of Winston-Salem is in agreement with this change;
- Extensive retaining walls will be required;
- Improve exterior shoulder width;
- Improve center median/barrier, and;
- Provide for aesthetics improvements.

and

#### **Alternative 4 - Cherry/Marshall (primary access to downtown Winston-Salem)**

This alternative, as shown in Figure 16, provides for a full interchange at Peters Creek Parkway, a full interchange at Cherry/Marshall (via two partial interchanges acting as a full interchange) and partial interchange at Main Street. A detail description of the design elements for Alternative 4 is as follows:

- Starting just east of the I-40 Business overpass of Crafton Street, I-40 Business will be lowered to improve the vertical clearance of the Fourth Street bridge to 17 feet;
- The current Peters Creek Parkway Interchange is comprised of an eastbound (EB) off slip ramp to southbound Peters Creek Parkway (PCP), an EB on ramp, a westbound (WB) off ramp, a WB on loop, a four-lane bridge with sidewalks in each direction. The proposed interchange will include an EB off loop, an EB on ramp, a WB off ramp, a WB on loop, a seven lane bridge with 5.5 foot sidewalks in each direction. The addition of the EB loop and moving out of the EB on ramp will require either providing a new connector between Apple and Gregory Streets or cul-de-sacing the two;
- Replace the Green Street Bridge with a pedestrian/utility bridge. I-40 Business will be lowered to improve the vertical clearance of the proposed bridge to 17 feet ;

- Close/remove the Broad Street ramps due to ramp spacing and weave length. The replacement bridge will be narrowed to three lanes. I-40 Business will be lowered to improve the vertical clearance of the proposed bridge to 17 feet ;
- Replace the Brookstown Avenue bridge, reduce length;
- Major cut of the main line , approximately 20 feet at the deepest point, of the vertical alignment on US 421/I-40 Business from west of Spruce Street to west of the I-40 Business overpass of East Salem Avenue . This lowering will improve the vertical clearance of the Marshall, Cherry, Main and Church Street bridges to a minimum 17 feet;
- Reconfigure EB off ramp to Marshall Street via High Street. Close High Street from Brookstown Avenue to the ramp;
- Closure/removal of the Spruce Street Bridge, cul-de-sac Spruce Street north of US 421/I-40 Business and closure of Spruce Street south of the bridge to High Street;
- Remove the existing Marshall Street EB on ramp;
- Remove the existing Cherry Street WB off ramp and replaces it on new alignment;
- Construct new Cherry Street EB on ramp which replaces the existing Marshall Street EB on ramp;
- Closure of the Liberty Street ramps (WB on ramp and EB off ramp);
- Replace the Cherry Street Bridge with shorter structure;
- Construct new bridges over the Strollway;
- Flips Liberty Street from currently going under US 421/I-40 Business to going over US 421/I-40 Business;
- Keeps Main Street ramps WB off ramp and EB on ramp under Church Street Bridge;
- Narrows Church Street bridge on the west side to aid in improving vertical clearance of the Main Street ramps, City of Winston-Salem is in agreement with this change;
- Major cut, approximately 20 feet, of the vertical alignment on US 421/I-40 Business which vastly improves the vertical clearance of cross street bridges at Main, Liberty, Cherry and Marshall;
- Extensive retaining walls will be required;
- Improve exterior shoulder width;
- Improve center median/barrier, and;
- Provide for aesthetics improvements.

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