

I-81 VIADUCT PROJECT

CHAPTER 4

CONSTRUCTION MEANS AND METHODS

This chapter describes the potential means and methods for constructing the Viaduct and Community Grid Alternatives. It presents the anticipated construction schedule, the phases of construction, estimates of equipment to be used and the number of construction employees, and measures that may be implemented to minimize disruptions to the traveling public and the surrounding communities during construction. The information presented in this chapter was used to assess construction effects, which are documented in **Chapter 5, Transportation and Engineering and Considerations** and **Chapter 6, Social, Economic, and Environmental Considerations**.

4.1 INTRODUCTION

To minimize the duration of construction effects of the Interstate 81 (I-81) Viaduct Project (the “Project”), the New York State Department of Transportation (NYSDOT) has established schedules that assume the completion of the Viaduct Alternative construction in seven years and the completion of the Community Grid Alternative construction in six years.

The construction means and methods presented in this chapter are based on the current level of engineering design for the Project alternatives, discussions with construction specialists, and experience on similar projects. The techniques, phasing, and schedules ultimately implemented during the actual construction of the Project may vary to some degree from those presented here; however, the process described below presents the most likely scenario for construction of the Project. Phases of this Project may be advanced as Design-Bid-Build contracts or as Design-Build contracts. If elements of the project developed during final design substantially vary from the boundaries of this evaluation, additional environmental documentation may be necessary.

Most construction activities and associated disturbance would occur within NYSDOT’s right-of-way and would be subject to the standard requirements, specifications, and policies of a NYSDOT project. As construction contracts are awarded, different contractors may arrange for use of properties outside of NYSDOT’s right-of-way for various uses, such as construction staging areas, office/administrative and support space, disposal and borrow sites, temporary batch plants, bridge demolition, new bridge substructure construction, and new bridge superstructure construction. In these instances, the Contractor would be subject to normal city, county, and state building and zoning regulations and be fully responsible for obtaining any necessary permits and environmental approvals for the proposed use. In addition, numerous street rehabilitation projects within the city (refer to **Chapter 5, Transportation and Engineering Considerations**) are in the planning phase. The scope and/or timing of these other projects is not anticipated to affect the construction phasing or work zone traffic control (WZTC) plans developed for the I-81 Viaduct Project, although coordination with the City of Syracuse would continue.

Construction equipment types, the durations of use, and the estimated number of construction workers anticipated to be required for the construction of each alternative are quantified to enable the assessment of construction-related air quality and noise effects and short-term economic benefits in **Chapter 6, Social, Economic, and Environmental Considerations** and of traffic effects in **Chapter 5, Transportation and Engineering Considerations**. In the text that follows, the specific roadway elements to be constructed during each phase, the duration of each phase, the work zone traffic control requirements during each phase, and general estimates of equipment and construction workers are presented first for the Viaduct Alternative and then for the Community Grid Alternative.

4.2 NO BUILD ALTERNATIVE

The No Build Alternative would maintain the highway in its existing configuration. To keep the highways and bridges in a state of good repair and ensure the safety of the traveling public, continual maintenance and repairs would be performed, requiring ongoing construction. Structural deficiencies and safety considerations would be addressed as part of NYSDOT's ongoing maintenance program. Routine maintenance efforts, which would be undertaken as part of NYSDOT's annual maintenance program, would include filling pavement cracks, patching holes in bridge decks, cleaning drainage systems, and operational considerations (e.g., signage and other low-cost improvements). The maintenance and repair program would comply with NYSDOT's existing construction specifications and protocols. As the facility continues to deteriorate, the level of effort and associated costs would increase.

4.3 VIADUCT ALTERNATIVE

4.3.1 CONSTRUCTION PHASING AND WORK ZONE TRAFFIC CONTROL (WZTC)

The Viaduct Alternative would involve the reconstruction of I-81 between Dr. Martin Luther King, Jr. East (MLK, Jr. East) and Hiawatha Boulevard, including the removal and replacement of the existing viaduct between the New York, Susquehanna and Western (NYS&W) Railway Bridge near Renwick Avenue and I-690. The portion of I-690 between Leavenworth Avenue and Lodi Street, including the I-690/I-81 interchange, would also be reconstructed.

To achieve a seven-year construction schedule while minimizing impacts, segments of I-81 and I-690 would be closed during select periods. The preliminary construction phasing plan sets forth a construction sequence consisting of three phases:

- During **Phase 1**, the preparatory phase, several improvements would be undertaken that are designed to enable the maintenance of traffic during subsequent phases of construction.
- During **Phase 2** the reconstruction of I-690 would occur, consisting of two subphases (Phases 2A and 2B). This work would include the I-690 construction through the complex I-81/I-690 interchange, which would occur while a minimum of two lanes of traffic in each direction is maintained on I-81. Phase 2A would consist of the reconstruction of eastbound I-690, while Phase 2B would entail the reconstruction of westbound I-690.

- **Phase 3**, the final phase, would consist of the reconstruction of the I-81 viaduct, completion of the I-81/I-690 interchange, and completion of the I-81 northern segment.

Figure 4-1 provides a summary of the three construction phases described above. More detailed preliminary phasing plans and phasing notes prepared for the primary phases and subphases are included in **Appendix A**. **Figure 4-2** provides a preliminary construction schedule, including estimated durations of each phase and subphase. Utility relocations, drainage improvements, building demolition activities, and intelligent transportation systems (ITS) would be initiated early in Phase 1 and would likely continue through all phases.

Traffic demand management (TDM) techniques would potentially be used to aid in managing the movement of traffic during construction. These techniques would be evaluated as design progresses and are discussed further in **Chapter 5, Transportation and Engineering Considerations**.

The phases are described in greater detail below.

Phase 1—Preparatory Phase

As explained in **Chapter 5, Transportation and Engineering Considerations**, traffic analyses were conducted to assess operating conditions and identify temporary roadway improvements that would be necessary during construction of the Viaduct Alternative. Under the Viaduct Alternative, the greatest construction effects would occur under Phases 2 and 3. Phase 2A would require an 18-month closure of eastbound I-690 and consequent detour of that interstate's traffic onto local streets and Phase 3 entails a two-year closure of northbound and southbound I-81 between MLK, Jr. East and Butternut Street. For the purposes of analysis, Phase 3 was selected as the worst-case scenario for the Viaduct Alternative. The worst-case scenario analysis was conducted to verify that adequate traffic operations could be maintained during construction. Based on this analysis, improvements needed to address congestion during construction were identified. These improvements would include permanent and/or temporary improvements to local streets, highways, and certain bridges and interchanges. As further described below, improvements would also be needed to prepare for the Phase 2A detour, which would be completed in Phase 1. Phase 3 detour improvements would be made near the end of Phase 2B.

The majority of Phase 1 would be complete within 24 months and focuses on those improvements that would be intended to ensure the ability to successfully maintain and protect traffic during subsequent construction phases. During Phase 1, there would be very little work on the interstate mainlines, thereby minimizing interstate traffic impacts. All existing interstate ramps would remain open, except for the northbound I-81 to eastbound I-690 ramp, which would be closed throughout Phase 1. Localized, temporary lane shifting would also be required adjacent to several individual ramps to allow room for construction to proceed.

The primary elements of Phase 1 are:

- The construction of a new partial interchange on I-81 at MLK, Jr. East;
- Construction of new I-690 on- and off-ramps at Catherine Street;
- Reconstruction and/or realignment of the four bridges across I-81 north of its interchange with I-690;



Viaduct Alternative:
Construction Phasing Overview
Figure 4-1

	Year 1			Year 2			Year 3			Year 4			Year 5			Year 6			Year 7		
PHASE 1																					
Construct MLK interchange																					
Construct Catherine St. interchange																					
Replace Spencer and Bear St. bridges, begin mainline widening																					
Reconstruct North Clinton St.																					
Construct Northern Segment ramp consolidation																					
Relocate Butternut St. and Burnet Ave. combined sewers																					
Replace Butternut St. and Court St. bridges, continue mainline widening																					
Prepare Phase 2A detour																					
Construct trunk sewer line segment- from MLK Jr. East to Onondaga Creek outlet																					
Reconstruct MLK, Jr. East and Van Buren St.																					
Reconstruct Almond St., Fayette St. to I-690																					
Convert Crouse Ave. to two-way street																					
Open and Maintain Phase 2A detour																					
Reconstruct Eastbound I-690																					
Construct new SB exit to Harrison St.																					
Temporary widening of EB off-ramp																					
Construct WB bypass																					
Construct portion of WB I-690																					
Reconstruct West St.																					
Almond St. utility relocations, Van Buren to Fayette Streets																					
Reconstruct Westbound I-690																					
Construct new WB I-690 to NB I-81 ramp																					
Construct the new SB I-81 to WB I-690 ramp																					
Prepare Phase 3 detour																					
Open and Maintain Phase 3 detour																					
Complete and open SB I-81 to Harrison St. and SB I-81 to EB I-690 ramps																					
Reconstruct I-81 Viaduct, MLK, Jr. East to I-690, and complete the NBI-81 to WB I-690 ramp																					
Complete Northern Segment construction																					
Complete reconstruction of Almond St.																					
Complete local street construction																					

Viaduct Alternative: Preliminary Construction Schedule
Figure 4-2

- Temporary and/or permanent improvements along various local Downtown streets; and
- Completion of building demolition activities and start of utility relocations, drainage improvements, and ITS.

An overview of these improvements is shown in **Figure 4-3**. Phase 1 elements, and associated WZTC efforts, are described below.

New Partial Interchange on I-81 at MLK, Jr. East and Associated I-81 Reconstruction

Once constructed, this partial I-81 interchange would accommodate most traffic to and from the south that is destined for Downtown or University Hill, easing the traffic impacts anticipated during the closure of I-81 in Phase 3. Phase 1 would consist of the construction of a new off-ramp from northbound I-81 to MLK, Jr. East, a new on-ramp from MLK, Jr. East to southbound I-81, and the section of I-81 between a point north of Colvin Street and the NYS&W Railway Bridge at Renwick Avenue. These new ramps would be open to traffic before the start of the next phase. No road closures or detours would be required during this phase. The I-81 reconstruction work would require temporary lane shifting and a minimum of two lanes of traffic would be maintained in each direction.

Construction of I-690 Partial Interchange at Almond Street/Catherine Street Area

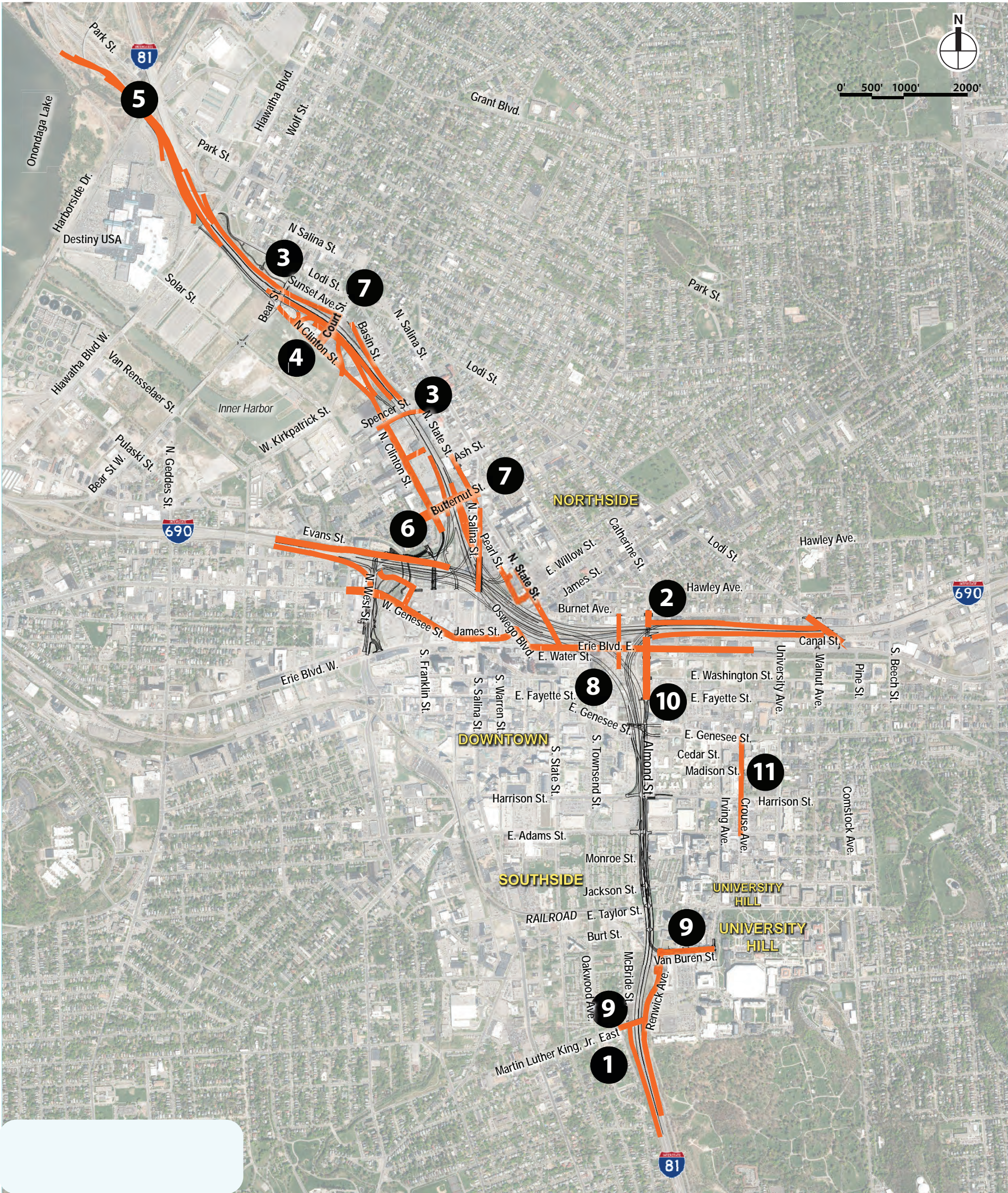
A new off-ramp from westbound I-690 to Catherine Street and a new on-ramp from Catherine Street to eastbound I-690 would be constructed, replacing the existing westbound I-690 ramp to Townsend Street and the existing on-ramp from McBride Street to eastbound I-690. Both existing ramps would remain open until the new ramps are open to traffic, which would occur by the end of Phase 1, after which the existing ramps would be demolished. To allow construction of the new eastbound on-ramp from Catherine Street to proceed, the existing connector ramp from northbound I-81 to eastbound I-690 would be closed early in this phase. Traffic that would normally use the northbound I-81 to eastbound I-690 ramp would be diverted to either the existing McBride Street ramp or the new Catherine Street ramp to access eastbound I-690.

Reconstruction of Almond Street between East Fayette Street and Burnet Avenue

Most of the reconstruction of Almond Street between East Fayette Street and Burnet Avenue would be completed during this phase; the reconstruction of Almond Street in the I-690 area would not be included. Although all or most of Almond Street would be open to traffic during Phase 1, there may be temporary lane reductions or short-term lane closures. These improvements would facilitate WZTC in Phase 2.

I-81 Northern Segment between Clinton Street/Salina Street (Interchange 19) and Westbound Route 370 to Liverpool (Interchange 24)

This phase involves construction of the south end of Destiny USA Drive, the reconstruction of North Clinton Street, the construction of the new southbound I-81 on-ramp from North Clinton Street, and the replacement of the four bridges over I-81 to facilitate the widening and realignment of I-81 in future phases. All interstate mainline lanes and ramps would remain open; for example, the existing southbound I-81 on-ramp from Genant Drive would remain open until the new ramp from North Clinton Street is open to traffic. Replacement of the existing Bear and Spencer bridges would start



1										
2	Construct Catherine St. Interchange									
3	Replace Spencer and Bear St. bridges, begin mainline widening									
4										
5	Construct Northern Segment ramp consolidation									
6										
7	Replace Butternut St. and Court St. bridges, continue mainline widening									
	Prepare Phase 2A Detour									
8	Reconstruct MLK, Jr. East and Van Buren St.									
9										
1	Convert Crouse Ave. to two-way street									

early in this phase. When traffic would be prohibited on these two bridges, it would cross I-81 using Court and Butternut Street bridges. Replacement of the Butternut and Court Street bridges would begin upon completion of the Bear and Spencer Street bridges. Replacement of the Butternut Street bridge would start after the combined sewer relocation work in the vicinity of the Butternut Street/Burnet Avenue area has been completed. During replacement of the Court and Butternut Street bridges, east-west local traffic across I-81 would use the Bear Street and Spencer Street overpasses as well as other local streets, such as Clinton Street, Sunset Avenue, State Street, and Salina Street.

Preparation of Eastbound I-690 Phase 2A Detour

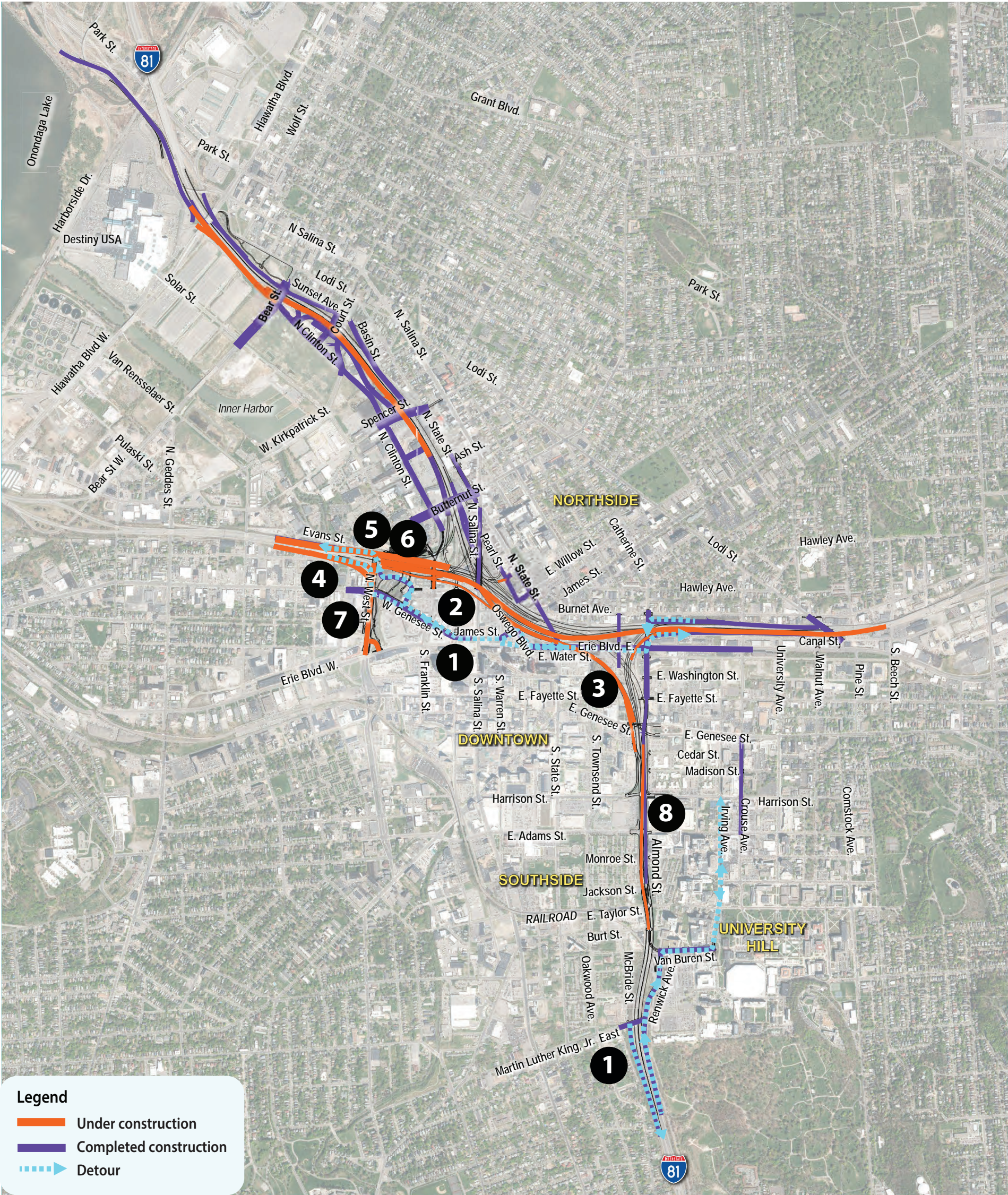
As explained in greater detail in **Chapter 5, Transportation and Engineering Considerations**, the entire city grid network was analyzed for its ability to accommodate the temporary traffic increases anticipated to occur as a result of the closure of eastbound I-690. Based on this analysis, a primary detour route was evaluated and established, as shown in **Figures 4-4 and 4-5**, which would be used during Phases 2A and 2B. (Refer to **Chapter 5, Transportation and Engineering Considerations**, for a detailed discussion of traffic impacts during construction and to **Chapter 6, Social, Economic, and Environmental Considerations** for more detailed discussion of the environmental effects during construction.) As a result of this analysis, a number of temporary improvements were identified that would need to be implemented along the detour route and at other select locations to enable adequate traffic operations during construction. All other local streets would have enough capacity, without any improvements, to accommodate the projected increases in traffic demand during construction. The required temporary improvements that would be made during Phase 1 are listed in **Table 4-1** and shown on the Detour Plans in **Appendix A-1**.

The primary eastbound I-690 detour route would follow West Street to West Genesee Street, to James Street, to Oswego Boulevard, to Erie Boulevard, and to Catherine Street, at which point traffic could re-enter eastbound I-690. This detour route would also support eastbound traffic headed into Downtown, as well as Downtown traffic headed west via the westbound I-690 on-ramp at West Street.

Additionally, any potential truck diversions that would occur during Phase 2A were analyzed, and the necessary temporary improvements to accommodate these are included in **Table 4-1**. A separate analysis of truck diversions during Phase 3 of the Viaduct Alternative is described under Phase 3 Detour below.

Local Street Improvements

In addition to the local street improvements needed for the Phase 2A detour route, **Table 4-1** lists other local streets that would be improved during Phase 1 to facilitate maintenance of traffic in later phases. Improvements would include the temporary reconfiguration of travel lanes, addition of turn bays, installation of temporary signals, and ramp modifications. Permanent improvements either initiated or completed during this phase would include the rehabilitation of Van Buren Street, the conversion of Crouse Avenue from one- to two-way traffic, and other minor improvements. Short-term local traffic detours as well as lane shifts would be implemented.



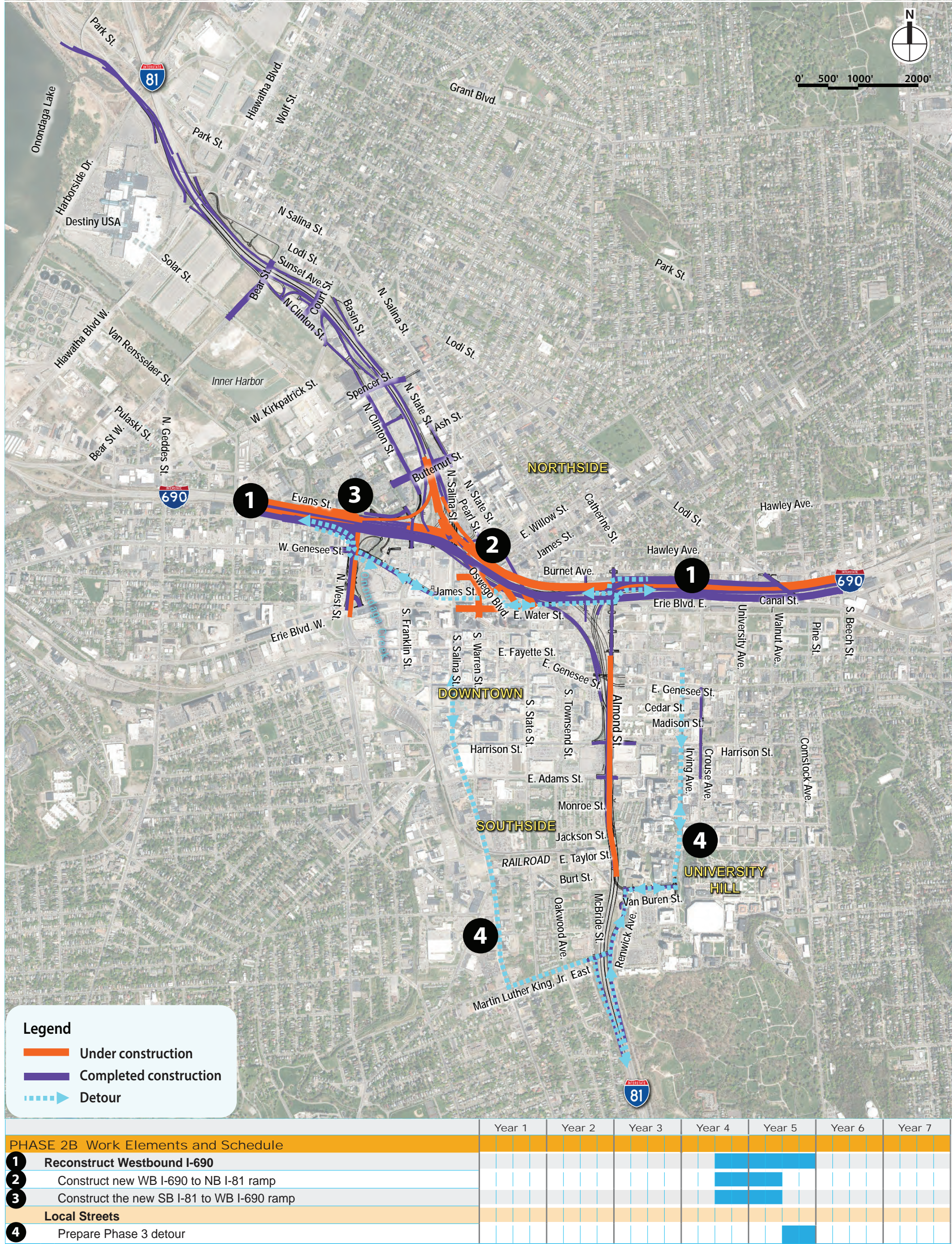
Legend

Under construction

Completed construction

Detour

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
PHASE 2A Work Elements and Schedule							
1 Open and Maintain Phase 2A detour							
2 Reconstruct EB I-690							
3 Construct new SB exit to Harrison St.							
West Street Interchange							
4 Temporary widening of EB off-ramp							
5 Construct WB bypass							
6 Construct portion of WB I-690							
7 Reconstruct West St.							
Local Streets							
8 Almond St. utility relocations, Van Buren to Fayette Streets							



I-81 VIADUCT PROJECT

Table 4-1

Viaduct Alternative: Temporary Improvements for Maintaining Traffic

Location	Temporary Improvements for Maintaining Traffic ¹
Southbound I-81 on-ramp from MLK, Jr. East	New ramp would be temporarily striped as a two-lane ramp that would merge into a single lane ramp before merging with mainline I-81
Intersection of MLK, Jr. East and southbound I-81 on-ramp	Construct temporary eastbound right-turn bay (approx. 150' long) on MLK, Jr. East on west approach to ramp
Northbound I-81 on-ramp from Pearl Street	Construct temporary widening of existing ramp to provide two lanes on the ramp at the intersection of Pearl and Hickory Streets; these would merge into a single lane before merging with northbound I-81 mainline
Intersection of Pearl and Hickory Streets	Install temporary signal and restripe two northbound approach lanes to provide a left-turn lane and a left/through/right lane
Southbound I-81 off-ramp to Clinton Street	Construct temporary widening of the existing Clinton Street off-ramp to provide two lanes on the ramp, from the mainline to the signal at Herald Place
Southbound I-81 off-ramp to Salina Street	Construct temporary realignment of the southbound I-81 off-ramp to Salina Street and install a temporary signal at the intersection of the ramp and Salina Street
Southbound I-81 off-ramp to Butternut Street	Construct temporary realignment of the southbound I-81 off-ramp to Butternut Street to connect to Genant Drive/North Franklin Street
North Clinton Street, southbound ramp intersection to Court Street	Prior to closing the Bear Street bridge over I-81 for replacement, temporarily widen North Clinton Street to three lanes (one northbound and two southbound) between the new southbound ramp intersection and the relocated Court Street intersection. At the Court Street intersection, provide an exclusive left turn lane and a shared left/through lane in the southbound direction
Court Street between North Clinton Street to Sunset Avenue	Prior to closing the Bear Street bridge over I-81 for replacement, temporarily stripe Court Street to provide three lanes (two eastbound and one westbound) between North Clinton Street and Sunset Avenue. At the Sunset Avenue intersection, provide a temporary traffic signal and provide for an exclusive left turn lane and a shared left/through lane in the eastbound direction.
West Genesee Street between Franklin and Wallace Streets	Temporarily reallocate existing parking lane on north side of West Genesee Street to be an additional travel lane to provide for two westbound travel lanes and two eastbound travel lanes
Intersection of West Genesee and Wallace Streets	Restripe two westbound approach lanes to provide a westbound through/left lane and a through/right lane
Intersection of West Genesee and Franklin Streets	Temporarily lengthen westbound right turn lane an additional 75 ft. by reallocating four existing parking spaces on the north side of West Genesee Street. Restripe westbound approach to provide for two westbound approach lanes (one a left/through lane and one a through/right lane) and two eastbound travel lanes
Intersection of James and State Streets	Modify existing signal to add a protected eastbound left-turn signal phase
West Street interchange	Construction of a temporary westbound bypass, construction of temporary widening of the existing eastbound off-ramp, and construction of a temporary westbound connection between West Genesee Street and the existing westbound on-ramp along Wallace Street and Herald Place
Temporary signal retiming	Numerous existing signals would be retimed along Phase 2A detour route
I-81/I-481 north and south interchanges	Prior to Phase 3, the existing ramps connecting I-81 to I-481 would be temporarily re-striped to provide for a minimum of two lanes of traffic in both directions. I-481 would be signed as the Phase 3 I-81 detour
Harrison and Townsend Streets	Temporary closure of the southbound I-81 off-ramp spur to Almond Street and temporary improvements, including signal retiming, to the Harrison Street/Townsend Street intersection to provide a detour for traffic that normally turns left from Almond Street onto Adams Street
Columbus Avenue between East Fayette Street to Erie Boulevard	Temporarily widen to four lanes (two lanes in each direction). At the Columbus Avenue/East Fayette Street intersection, provide an exclusive left turn lane and a shared through/right lane in the southbound direction.
Note: ¹ Refer to Chapter 5, Transportation and Engineering Considerations , for discussion of temporary traffic impacts and temporary parking impacts during construction and Chapter 6, Social, Economic, and Environmental Considerations , for discussion of temporary environmental impacts during construction.	

Phase 2A—Eastbound I-690 Closure and Reconstruction

Phase 2A, which would take approximately 18 months to complete, would consist of the reconstruction of approximately two miles of eastbound I-690 between Leavenworth Avenue and Lodi Street, improvements to interchange ramps, and various other improvements as described below.

The reconstruction of eastbound I-690 would require the closure of the eastbound highway between West Street and Catherine Street. Eastbound I-690 traffic would instead travel along a detour route on city streets, improved during Phase 1 and the early stages of Phase 2A to accommodate this traffic. Westbound I-690 would remain open throughout this phase. The West Street interchange, partially reconfigured during the early stages of Phase 2A, would provide access to I-690 to and from the west, and the Catherine Street ramps constructed in Phase 1 would provide I-690 access to and from the east.

As previously described, the primary detour route has been analyzed for its ability to adequately handle this traffic during construction (refer to **Chapter 5, Transportation and Engineering Considerations**, for a detailed discussion of traffic impacts during construction) as well as any environmental effects during construction (see **Chapter 6, Social, Economic, and Environmental Consideration**). Locations identified as needing temporary improvements are listed in **Table 4-1**; all other local streets were determined to have enough capacity, without improvements, to accommodate the projected increases in traffic demand during construction.

These improvements and associated WZTC plans are described below and are presented in **Figure 4-4**. For additional detail, refer to the Conceptual Construction Phasing and Maintenance and Protection of Traffic Plans in **Appendix A-1**.

Eastbound I-690

Reconstruction of the eastbound I-690 mainline and associated ramps would be performed during this phase, with completion of the eastbound mainline anticipated by the end of the phase. Shifting of traffic lanes along eastbound I-690 would be required at both ends of the detour zone to direct traffic to the local streets. Eastbound traffic would exit I-690 before or at the West Street interchange. Traffic destined for Downtown or University Hill would continue south on West Street or travel eastward along West Genesee Street and Erie Boulevard. Traffic headed north of I-690 would take either the Bear Street/Geddes Street interchange or the West Street interchange to Genesee Street and turn north on Salina Street. Traffic headed to East Syracuse would access eastbound I-690 via the new Catherine Street on-ramp or continue along Erie Boulevard to the Teall Avenue interchange. These detours would be in effect during both Phases 2A and 2B (see **Figure 4-4**).

I-690 at West Street (Interchange 11) and West Genesee Street (Interchange 12)

Before eastbound I-690 can be closed, preparation work would be required at the existing I-690/West Street interchange before the start of Phase 2A. During construction of the temporary improvements in Phase 2A0, West Street would remain open to traffic at all times. The temporary improvements listed in **Table 4-1** and described below would be constructed to maintain traffic and interstate connections during subsequent phases:

- A temporary, two-lane westbound I-690 bypass on the north side of Interchange 11/12 (West Street/West Genesee Street) would be constructed to accommodate westbound I-690 traffic

during subsequent phases. To construct this bypass, the existing two-lane northbound West Street to westbound I-690 on-ramp would be partially demolished and reduced to one lane. While temporary closures of shoulders and lane shifting may be needed on westbound I-690 where the bypass would connect to the existing westbound I-690 mainline, existing lanes on westbound I-690 would remain open throughout this phase.

- The eastbound I-690 off-ramp to West Genesee Street (Interchange 12) would be widened temporarily, from one lane to two lanes, in preparation for the next phase of construction. Construction of this ramp would require temporary closures of shoulders, but the existing eastbound I-690 travel lanes, the existing Interchange 11 (West Street) off-ramp, and the existing Interchange 12 (West Genesee Street) off-ramp would remain open at all times. A short section of Belden Avenue near the ramp would need to be temporarily narrowed from two lanes to one lane; however, since traffic volumes on this section are very low, it would be possible to maintain two-way traffic with the installation of a temporary signal.

Westbound I-690 between Plum and North Franklin Streets (the section adjacent to the temporary bypass constructed during Phase 1) would be reconstructed. The eastbound I-690 ramps to and from West Street/Genesee Street and the westbound I-690 on-ramp from West Street/Genesee Street would be fully constructed, and the westbound I-690 off-ramp to West Street/Genesee Street would be partially constructed. The full West Street/Genesee Street intersection, except for a proposed parking area on the west side, would be constructed. Finally, a portion of the ramp connecting eastbound I-690 to southbound I-81 would be constructed.

During this phase, westbound I-690 traffic between Clinton Street and Leavenworth Avenue would be shifted onto a two-lane temporary bypass. West Street and I-690 access to and from the west would be maintained at all times. During this phase, the following ramps also would be closed or modified:

- **West Street On-Ramp to Eastbound I-690:** This ramp, as well as the spur to Herald Place, would be closed starting early in Phase 2A. Motorists generally would use the same detour routes, described above, as would eastbound I-690 traffic.
- **Westbound I-690 Off-Ramp to West Street:** This ramp would be closed following the shift of traffic from westbound I-690 onto the temporary bypass. Vehicles traveling from the east would use either the new off-ramp to Catherine Street or the existing off-ramp to Geddes Street and then travel along local streets to Downtown.
- **Eastbound I-690 Off-Ramp to West Street:** The at-grade portion of this ramp, which would serve as the last access point for Downtown traffic during the closure of I-690, would remain open throughout Phase 2A. The spur to Genesee Street would be temporarily widened from a one- to a two-lane ramp, and the new eastbound I-690 off-ramp would be configured to temporarily serve as the westbound on-ramp during Subphases 2A2 and 2A3.
- **West Street On-Ramp to Westbound I-690:** This ramp, which would be the primary interstate access point for motorists traveling west from Downtown and University Hill during the closure of I-690, would be striped as a two-lane ramp and remain open throughout Phase 2A. Once constructed, the new eastbound I-690 off-ramp to West Street would temporarily serve as the westbound I-690 on-ramp during Subphases 2A2 and 2A3, which would allow for the demolition

of the existing and completion of the new westbound on-ramp during this phase. Construction of the I-690 bridges over West Street would also occur during this phase.

- **West Street:** Both directions of West Street would remain open during this phase, but some shifting of traffic would be necessary. Traffic would be shifted initially to the southbound lanes and then to the northbound lanes while the removal of the overpass bridges and embankments takes place.

I-81 Northern Segment between Clinton Street/Salina Street (Interchange 19) and Westbound Route 370 to Liverpool (Interchange 24)

The reconstruction of North Clinton Street would be completed. Once the new southbound I-81 on-ramp from North Clinton Street (constructed in Phase 1) is open, the section of Genant Drive just south of Bear Street would be closed and the new southbound I-81 off-ramp to North Clinton Street would be constructed and opened. The existing Bear Street and Spencer Street overpasses on I-81 would be closed and reconstructed during this phase. During closure of the Bear Street bridge over I-81, temporary improvements would be required along North Clinton Street and Court Street (see description of temporary improvements listed in **Table 4-1**). Motorists traveling east-west across I-81 would use the newly completed Butternut Street and Court Street overpasses and local streets such as Clinton Street, Sunset Avenue, State Street, and Salina Street. In addition, any roadway grading, widening, ramp realignments, and construction of retaining walls that could be undertaken while I-81 is fully open would take place during this phase. While the I-81 mainline would remain open, some ramps may be closed for one- or two-week periods as traffic is shifted to the new ramps.

Southbound I-81 within the I-690 Interchange

Portions of southbound I-81 and the ramp connecting eastbound I-690 to southbound I-81 would be constructed during Phase 2A. Since most of this work is outside the limits of existing I-81, it would not impact maintenance of traffic on the existing I-81.

I-81 Off-Ramp at Harrison Street

The existing ramp from southbound I-81 to Harrison Street and Almond Street would remain open throughout Phase 2A, and the portion of the new I-81 ramp that serves westbound Harrison Street would be built. The existing ramp to westbound Harrison Street would be temporarily widened and the shoulders closed during construction.

Phase 2B—Westbound I-690 Reconstruction

Phase 2B, which would take about 18 months to complete, would consist of the reconstruction of westbound I-690 on a new alignment, improvements to interchange ramps, and other improvements, described below, along the two miles of I-690 between Leavenworth Avenue and Lodi Street.

Once completed (at the end of Phase 2A), the new eastbound I-690 would be opened with one eastbound lane and two westbound lanes, allowing the demolition and construction of the new westbound I-690 to proceed.

At the conclusion of Phase 2B, westbound I-690 traffic would be moved onto the newly constructed section of westbound I-690, and eastbound I-690 would assume its final configuration.

These improvements and associated WZTC plans are described below and presented in **Figure 4-5**. For additional detail, refer to the Conceptual Construction Phasing and Maintenance and Protection of Traffic Plans in **Appendix A-1**.

Westbound I-690

During Phase 2B, the remaining portions of westbound I-690, including the mainline and ramps, would be reconstructed. To accomplish this construction, westbound I-690 traffic would be shifted onto the new section of the eastbound highway near Crouse Avenue. Westbound traffic would continue through the I-81/I-690 interchange area and then shift back onto the existing westbound highway near Leavenworth Avenue. The reconstruction of the westbound I-690 to northbound I-81 ramp also would be completed during this phase. Shifts in traffic during Phase 2B would include:

- **Westbound I-690 to Northbound I-81 Ramp:** Once westbound I-690 traffic is shifted onto the newly constructed eastbound highway, the existing ramp connecting westbound I-690 to northbound I-81 would be closed and reconstructed. Traffic from westbound I-690 would need to exit at Catherine Street and use Erie Boulevard and State Street or Burnet Avenue and State Street to reach the northbound I-81 on-ramp at Pearl Street or Butternut Street. To accommodate these detoured vehicles, as well as other traffic detours during the subsequent phase of construction, the existing Butternut Street/State Street on-ramp would remain open, and the existing Pearl Street on-ramp would be temporarily widened from one to two lanes.
- **Westbound I-690 to Southbound I-81 Ramp:** The existing ramp would be closed at the beginning of this phase to allow completion of the new westbound I-690 lanes. The ramp would remain closed until the new ramp between westbound I-690 and southbound I-81 and the new I-81 viaduct over Almond Street are completed in Phase 3. Motorists who currently use this ramp would instead be encouraged to travel on I-481 to reach points south of Syracuse, or they could use the new off-ramp at Catherine Street and continue south, via Almond Street or Townsend Street, to MLK, Jr. East, where they would use the on-ramp to rejoin southbound I-81.

I-690 at West Street (Interchange 11) and West Genesee Street (Interchange 12)

The new I-690 interchange at West Street and the new at-grade intersection between West Street and West Genesee Street would be substantially complete by the end of Phase 2A. During Phase 2B, the temporary eastbound I-690 off-ramp would be removed and Evans Street, including the Evans Street bridge over Onondaga Creek, would be constructed. Westbound I-690 east of the West Street interchange would be reconstructed during this phase; therefore, the westbound off-ramp to West Street would remain closed. All other ramps at this interchange would remain open throughout this phase.

Southbound I-81 within the I-690 Interchange

Once westbound I-690 traffic is shifted onto the new eastbound highway section, and reconstruction of westbound I-690 is under way, an additional segment of new southbound I-81 could also be constructed in the area of westbound I-690. This additional segment would further extend the portion of new southbound I-81 that was completed during Phase 2A. Since this new section of southbound I-81 is on new alignment, there would be no impacts to existing southbound I-81 traffic.

Southbound I-81 Off-Ramp at Clinton Street

The construction of the realigned off-ramp from southbound I-81 to Clinton Street, initiated during Phase 2A, would largely occur during this phase. The off-ramp would be widened from one to two lanes, and a connection to existing Franklin and Salina Street off-ramps would be constructed to facilitate traffic movement during Phase 3. Construction would be sequenced and the existing I-81 off-ramps at Clinton Street, Salina Street, and Franklin Street would be maintained.

Phase 3—Closure of the Existing I-81 Viaduct and Construction of the New I-81 Viaduct

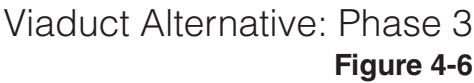
Phase 3, which would take approximately 24 months to complete, would include the replacement of the I-81 viaduct between the NYS&W Railway and the I-81/I-690 interchange, additional improvements to I-81 north of I-690, and improvements along Almond Street.

To facilitate accelerated construction of the new viaduct, existing I-81 would be closed between MLK, Jr. East and Butternut Street during Phase 3. Prior to this closure, the Phase 3 detour, described below, would be activated. Maintaining traffic during the closure of I-81 would be facilitated by the elements completed during previous construction phases. For example, by the beginning of this phase, the westbound I-690 to northbound I-81 ramp, and the eastbound I-690 to southbound I-81 ramp, would be open, with the latter providing access only to the Harrison Street off-ramp. The southbound I-81 to eastbound I-690 ramp would also be completed and opened early in this phase, as described below. Additionally, the I-690 interchanges at West Street and Catherine Street would be fully open, as would all other existing I-690 interchanges (i.e., the Teall Avenue and Midler Avenue interchanges to the east and the Geddes Street, Bear Street, and Hiawatha Boulevard interchanges to the west). The segment of I-81 north of Butternut Street also would remain open (see description below). Phase 3 improvements are described below and depicted in **Figure 4-6**.

Phase 3 Detour

Prior to the closure of the I-81 viaduct, I-481 between Exit 16A (the I-81/I-481 south interchange) and Exit 29 (the I-81/I-481 north interchange) would be improved. These improvements, listed in **Table 4-1**, would include restriping of existing ramps connecting I-81 to I-481 to temporarily provide at least two lanes of traffic in both directions and the installation of temporary signage along I-481. Following completion of these I-481 improvements, I-81 through traffic would be rerouted to I-481. Local traffic heading to Downtown would use a combination of interchanges and local streets, improved in prior phases.

As explained in greater detail in **Chapter 5, Transportation and Engineering Considerations**, the entire city grid network was analyzed for its ability to accommodate the temporary traffic increases anticipated to occur as a result of the closure of I-81 between MLK, Jr. East and Butternut Street. (Refer to **Chapter 5, Transportation and Engineering Considerations**, for a detailed discussion of traffic impacts during construction and to **Chapter 6, Social, Economic, and Environmental Considerations**, for more detailed discussion of environmental effects of construction.) This analysis resulted in the identification of a number of temporary improvements on city streets that would need to be implemented to support traffic during construction. All other local streets were determined to have enough capacity, without any improvements, to accommodate the projected increases in traffic demand during construction. The required temporary improvements are listed in **Table 4-1**.



While the I-81 viaduct is closed, traffic to and from the south destined to Downtown, adjacent neighborhoods, and University Hill would use the new partial interchange at MLK, Jr. East and would primarily use Salina Street to access Downtown and adjacent neighborhoods, or would use Renwick Avenue, Van Buren Street, and Irving Avenue to access the University Hill area. In addition, portions of Almond Street would remain open, providing access to the various east-west streets connecting to Downtown and University Hill, as well as to the new I-690 Catherine Street ramps.

Traffic destined to Downtown and adjacent neighborhoods to and from the north would use the reconfigured Clinton Street off-ramp and the reconfigured Pearl Street on-ramp. Access to Downtown would also be provided via the new southbound ramps at North Clinton Street and the existing northbound on-ramps at Butternut, State, and Court Streets. Additionally, the new southbound I-81 to eastbound I-690 ramp would provide access to the existing Teall Avenue interchange as an option for traffic to and from the north. The Teall Avenue interchange would provide access to the eastern side of University Hill via Teall Avenue and Erie Boulevard.

Traffic destined to and from the west would primarily use the new I-690/West Street interchange to reach western Downtown and adjacent neighborhoods and the I-690/Teall Avenue interchange to access the University Hill area. Traffic to and from the east would primarily use the I-690 interchanges at Teall Avenue and Catherine Street for access to University Hill and eastern Downtown, and the new I-690/West Street interchange for western Downtown. Many of the temporary improvements made to accommodate the Phase 2A detour would remain in place in Phase 3, and some signals would be retimed.

Three of the six existing ramps between I-81 and I-690 (westbound I-690 to southbound I-81, northbound I-81 to eastbound I-690, and northbound I-81 to westbound I-690) would be closed during most of Phase 3. Traffic that normally would use these ramps would instead use the interchanges and local streets described above and depicted on **Figure 4-6**.

For the Viaduct Alternative, a potential truck diversion analysis was performed for Phase 3, which was identified as the worst-case scenario during construction. As described above, during Phase 3, I-81 would be shut down between MLK, Jr. East and I-690. The analysis determined the maximum diversion potentials for truck traffic would be diverted from I-81 to other parallel roadways. Depending on the trip origins and destinations (O-D), some of the I-81 truck traffic would be diverted to I-481 and I-690, some would be diverted to local roads, and some truck traffic between specific O-D pairs might not involve route diversion during construction. Refer to the detailed analysis in **Chapter 5, Transportation and Engineering Considerations**, which identifies the temporary improvements and mitigation measures necessary to facilitate maintaining truck traffic during construction.

I-81 Viaduct over Almond Street between MLK, Jr. East and East Genesee Street

The viaduct demolition and reconstruction would commence upon closure of the segment of I-81 between MLK, Jr. East and I-690. Reconstruction of Almond Street would continue concurrently with the removal of the existing I-81 viaduct and construction of the new structure. While Almond Street would remain open, temporary lane shifts and lane closures would be necessary, but at a minimum, three lanes (one lane southbound and two lanes northbound) would be maintained from Adams Street northward, and two lanes (one lane in each direction) of traffic would be maintained between Burt and Adams Streets. Traffic detours, described above, would be in place. In the latter part of Phase 3,

sections of I-81 could potentially reopen to traffic as they are completed. The existing I-81 ramps at Adams and Harrison Streets, except for the eastbound I-690 to southbound I-81 off-ramp to Harrison Street, would be closed during Phase 3. Vehicles that normally travel on these ramps would be directed to the next open interchange.

Northbound I-81 between East Genesee and Butternut Streets

Most of the section of northbound I-81 between East Genesee Street and Butternut Street would be built early in Phase 3. The opening of the northbound I-81 portion near the I-81/I-690 interchange, and the opening of the Harrison Street on-ramp, would allow traffic to enter the Harrison Street on-ramp and access northbound I-81 and westbound I-690, which would reduce the pressure on the Pearl Street ramp. In addition, the portion of northbound I-81 adjacent to the Pearl Street ramp would be completed. The Phase 3 detour routes, described earlier, would be in effect. As soon as the remaining work on the I-81 viaduct was completed, through traffic would be able to use northbound I-81.

Southbound I-81 between Genesee and Butternut Streets

Most of the new section of southbound I-81 between Genesee Street and Butternut Street would be on a new alignment. By Phase 3, most of its construction would be complete, but it would not be opened to traffic. Early in Phase 3, existing southbound I-81 would be closed to traffic, and the connection between existing southbound I-81 and new southbound I-81 would be constructed. During this closure, southbound traffic would use one of the northern segment ramps described above (i.e., Clinton Street, Pearl Street, North Clinton Street, and the existing northbound on-ramps at Butternut, State, and Court Streets). Once the connection between existing southbound I-81 and new southbound I-81 is complete, access would be available from southbound I-81 to Downtown destinations by way of the new Harrison Street off-ramp. Additionally, the ramp connection between southbound I-81 and eastbound I-690 would also be completed early in this phase, restoring access between the northern I-81 segment and University Hill via the Teall Avenue interchange. The temporary two-lane width of the Clinton Street off-ramp and the Salina Street off-ramp would remain in place until completion of the Harrison Street off-ramp. Once the remaining work on the I-81 viaduct is completed, through traffic would be able to use southbound I-81.

Clinton Street Off-Ramp

The Clinton Street off-ramp from southbound I-81, which would serve as the last southbound exit during Phase 3, would be modified from a one- to a two-lane ramp. The two-lane ramp would remain in service until the new southbound I-81 off-ramp to Harrison Street is reopened, and then it would become a one-lane ramp. The existing southbound off-ramp to Butternut Street/Franklin Street, the temporary southbound off-ramp to Salina Street, and the temporary signal at the intersection of the southbound I-81 off-ramp and Salina Street (see **Table 4-1**) would remain until the completion of the southbound off-ramp to Harrison Street, the southbound I-81 to eastbound I-690 ramp, and the Clinton Street off-ramp.

I-81 Northern Segment between Clinton Street/Salina Street (Interchange 19) and Westbound Route 370 to Liverpool (Interchange 24)

Three lanes of traffic in each direction would be available during the sequenced reconstruction of the I-81 northern segment mainline. The outer portion of southbound I-81 would be constructed first, followed by the outer edge of northbound I-81. Concurrently, the ramp connections to Bear Street, Court Street, Spencer Street, Park Street, State Route 370, and Old Liverpool Road would be finalized. The pavement along the median area of I-81 would then be reconstructed. The existing access ramps from Pearl Street and Butternut Street/State Street to northbound I-81 and from southbound I-81 to Butternut Street/Franklin Street, Clinton Street, and Salina Street would be open to traffic with minor modifications until the section of I-81 through Downtown Syracuse is open.

Southbound I-81 to Eastbound I-690 Ramp

Most of this ramp would be constructed during Phase 2, but it cannot be finished until the removal of the existing I-81 mainline over James Street. Once southbound I-81 is demolished, early in this phase, the ramp would be finished and opened. The opening of the ramp would allow southbound I-81 traffic to access eastbound I-690 as well as Downtown and University Hill destinations via the Teall Avenue interchange, and it would relieve some of the pressure on the Clinton Street, Salina Street, and Butternut Street/Franklin Street off-ramps.

I-81 Southbound Off-Ramp to Harrison Street

Once the portion of southbound I-81 through the middle of the I-81/I-690 interchange is completed as described above, the southbound I-81 off-ramp to Harrison Street, including a new connection to Almond Street, would be completed and opened. The opening of the ramp would alleviate demand at the Clinton Street, Salina Street, and Butternut Street/Franklin Street off-ramps. The existing off-ramp to Almond Street would initially be closed, and traffic destined to the east side of Almond Street would be detoured to Townsend Street and Adams Street. The temporary measures designed to facilitate traffic movements are included in **Table 4-1**.

Harrison Street On-Ramp to Northbound I-81

The Harrison Street on-ramp to northbound I-81 would be completed early in Phase 3. This ramp could open once the portion of proposed northbound I-81 through the middle of the interchange has been completed. This would alleviate demand at the Pearl Street on-ramp.

Pearl Street and Butternut Street/State Street On-Ramps

Once the Harrison Street northbound I-81 on-ramp is closed, the Pearl Street on-ramp would serve as the primary access point for Downtown traffic headed northbound on I-81. Temporary local street improvements (see **Table 4-1**), including the restriping of the northbound approach and installation of a signal at the intersection of Pearl and Hickory Streets, would be needed to accommodate traffic. The Pearl Street ramp would remain open during its reconstruction, which is anticipated early in Phase 3. The portion of mainline I-81 adjacent to the Pearl Street ramp also would be completed early in this phase. In addition, the existing Butternut Street/State Street ramp would remain open, but it would be closed once the Pearl Street and Harrison Street on-ramps are opened.

Reconstruction of the Remaining Three Existing Ramps Connecting I-81 and I-690 (Northbound I-81 to Eastbound I-690, Westbound I-690 to Southbound I-81, and Northbound I-81 to Westbound I-690)

These three existing ramps would be closed during Phase 3 and reconstructed concurrently with adjacent sections of the I-81 mainline. Traffic would use the Phase 3 detour routes previously described.

Completion of the Two New Ramps Connecting I-81 and I-690 (Southbound I-81 to Westbound I-690 and Eastbound I-690 to Northbound I-81)

While the construction of these new ramps would be largely completed during Phase 2, they would not be opened to traffic until all other work on I-81 has been completed in Phase 3.

4.3.2 CONSTRUCTION MEANS AND METHODS

This section describes the primary means and methods to construct the Viaduct Alternative. As explained in **Section 4-1**, the development of specific construction means and methods would be proposed by the Contractor. The means and methods discussed below are some of the techniques that the Contractor may consider. If advanced, the Viaduct Alternative could be modified somewhat as it is further developed. It is expected that the impacts of the final design alternative would not vary notably from those of the designs developed to date, which are evaluated within the FDR/FEIS, and, therefore, the design and associated environmental evaluation would remain sound as design progresses. If elements of the project developed as design progresses vary beyond the boundaries of this evaluation, the environmental effects will be studied, and, if necessary, a reevaluation will be submitted.

Construction Staging Areas

Construction of the Viaduct Alternative would entail a wide range of construction activities throughout the Project Area, requiring space to complete these numerous tasks. During construction, the Contractor would likely establish temporary areas, such as laydown areas, storage areas, and staging areas, for various purposes in relative proximity to the Project. For purposes of this discussion, these potential types of sites are referred to as “staging areas.” Unassembled construction equipment would be delivered to and assembled within these staging areas, and space to service and maintain the equipment would also be necessary throughout the duration of the construction. Light-duty bridge and wall components would be delivered to and stored within the staging areas until they are ready to be used in the construction, and larger bridge elements would be prepared and/or further assembled in the areas until they are ready for placement. In addition, temporary shielding, utility hangers, and conduits likely would be pre-constructed in the staging areas.

The Contractor would be responsible for identifying construction staging areas. Since most construction activities and associated disturbance are likely to occur within the NYSDOT right-of-way, the Contractor would be subject to NYSDOT’s standard requirements, specifications, and policies. The Contractor may seek additional sites outside of the NYSDOT right-of-way for staging, fabrication, and other activities. In these instances, the Contractor would be subject to city, county, and state land use regulations and would be fully responsible for obtaining any necessary permits and environmental approvals for each site. Deliveries of materials, equipment, and supplies would be made by road and would be subject to load and dimension limits for the affected roadways. The Contractor

would be required to prepare a delivery plan that addresses the potential effects on roadways, the means and methods of coordination, and any required permitting for the delivery of oversized loads.

Office/Administrative and Support Space

Office space would be required for construction administration, inspection, and engineering staff. The Contractor may opt for interconnected trailers adjacent to the assembly sites or rent office space in nearby communities. The Contractor also may allot designated, on-site parking for employees; alternatively, the Contractor may elect to shuttle employees from remote parking areas to the construction sites.

Disposal and Borrow Sites

The Contractor would identify disposal and borrow sites (where material has been excavated for use in another location), which would most likely be outside of the Project Area. Use of disposal and borrow sites would be subject to standard NYSDOT specifications and policies, as well as city, county, and state environmental regulations, zoning laws, and permit requirements. Due to the high cost of disposal and borrow, the Contractor generally would seek to phase earthwork tasks to reuse material to the greatest extent possible. If the Project is divided into multiple construction projects, the opportunity to reuse material within the Project Area may be reduced. Therefore, to present a more conservative scenario for analysis, the equipment and staff have been estimated with the assumption that each phase would be constructed as a separate contract.

Concrete Batch Plant

Depending on the amount of cast-in-place concrete that the Contractor plans to use, one or more concrete batch plants would provide the concrete needed to construct the bridge foundation, piers, and deck. Typically, a batch plant would occupy approximately three acres of land. The location(s) of the plant would be close enough to the construction site to allow the concrete to be poured in place before curing initially sets, which occurs within 90 minutes after the concrete is mixed. Given these requirements and the urban nature of the Project Area, the batch plant(s) likely would be located outside of the Project Area, although a local concrete provider could be used if available. The Contractor would be responsible for securing any needed permits, as well as any necessary environmental review, to locate the batch plant(s).

Bridges and Buildings Demolition

Much of I-81 and I-690, including their ramps in Downtown Syracuse, would be demolished and reconstructed as part of the Viaduct Alternative. This demolition generally would occur within the existing and proposed highway boundary and would be phased as described above. Temporary shielding of the roadways and temporary short-term road closures may be required during the demolition. City streets likely would be used to deliver and remove materials and for construction workers to travel to and from the work zones. Based on the design to date, the Viaduct Alternative would require the demolition of 24 existing buildings and a smokestack structure, which also would require temporary shielding. The building demolitions likely would occur early in Phase 1. The demolition would provide space needed for interim staging and laydown areas and, ultimately, for the

Viaduct Alternative improvements (see **Chapter 3, Alternatives**, for a discussion of the Viaduct Alternative's transportation footprint, which is larger than that of the existing viaduct).

To reduce air and noise issues in the direct vicinity of the work sites, it may be possible to process smaller elements such as pier columns, pier caps, bridge beams, etc. off site. A lead and/or asbestos survey would be required during prior to construction to identify, locate, and quantify materials that would need abatement prior to demolition (see **Section 6-4-9, Asbestos**, and **Section 6-4-10, Hazardous Wastes and Contaminated Materials**). In addition, extensive coordination with the affected utility agencies would be required prior to demolition.

The exact means and methods to carry out the demolition of the structures would be determined by the Contractor and would depend on the type of element. Demolition of existing bridges in an urban environment, especially where the bridges span local streets with active traffic, would require traffic detours, and the demolition may need to be phased. To protect the affected streets from debris, protective shielding would be installed under the concrete bridge decks prior to their removal. One option would be to saw-cut the deck and remove it from the structure, then remove the existing girders using an overhead crane, which would be located on the local street. Existing girders would be cut into manageable lengths so they could be transported out of the job site. The concrete substructures also could be saw-cut and removed in segments. An alternative approach, which NYSDOT has used previously, would involve the use of a hoe ram to remove the deck and place it either on a demolition blanket, which would be supported by shielding, or on a street with a one-foot bed of sand; the deck would then be loaded onto a truck. The City of Syracuse previously has permitted street closures for short durations to accommodate this construction technique.

New Bridge Substructure Construction

The design of the new substructures along the portions of I-81, I-690, and ramps that would be rebuilt would be developed as design advances. To minimize impacts during construction, the following construction schedules will be considered: Reduced On-Site Construction, Compressed On-Site Construction, and Accelerated On-Site Construction. The designer would determine the location, type of substructure, foundation type, and construction methods that would best meet the requirements of the project.

For the purposes of this analysis, the following materials and methods were assumed. It was assumed that piers would be cast-in-place multi-columns with concrete bents or steel straddle (cap beam) bents. Steel straddle bents would be used primarily at locations where vertical clearance is critical or placement of the foundations directly beneath the superstructure would be impractical. The concrete pier bents would be supported by pile foundations attached through a concrete pile cap wherever practical. Drilled shaft foundations would be used in areas sensitive to vibration and noise and would be an efficient technique at selected pier bents. Abutments would be semi-integral, thereby eliminating the deck joint at the end of the bridge. Abutment and wingwalls footings would be founded on piles as well.

Existing soil borings data and studies of the existing bridge record plans have indicated that the underlying soils in the Project Area are variable and primarily consist of silt and clay with underlying bedrock or shale. In the Project Area, the depth of bedrock varies from approximately 20 to 70 feet below ground. As noted above, the specific foundation treatment would be determined as design progresses and, depending on the location of the proposed substructures and the underlying soils at

those locations, the substructures may be founded on deep foundations, spread footings, and/or rock. For this analysis, it was assumed that the new structures would be supported on pile foundations. Where the bedrock is shallow, piles or drilled shafts for the new bridges would bear on bedrock, and where the bedrock is deep, a deep pile foundation would be used.

The abutments and piers of the existing I-81 viaduct, I-690 mainline, and associated interchange ramps would be removed to the top of footing elevation, and the pile foundations would be abandoned in place. All new bridge foundations would be constructed and positioned to avoid the existing pile foundations.

Impact hammers would be used to drive piles to required design foundation depth. Cast-in-place concrete pile caps would be installed to support the column above. Rotary augers and steel casings would be employed in the construction of the drilled shaft foundations. After the full-depth excavation, the base of each shaft would be cleaned, inspected, and approved before the placement of reinforcement and concrete.

To cast columns, formwork would be installed, and then the pier cap would be constructed. Similarly, if steel straddle bents are used, the complete fracture-critical steel cap beam would be fabricated in an approved steel fabrication facility, assembled on-site, and lifted in place by a crane as soon as the columns are ready to support the beam.

Alternate construction methods may be used. For example, the use of prefabricated precast pier caps with mechanical couplers would be advantageous for substructures located adjacent to or above traffic or railways, as well as where there are strict time and space limitations. Use of prefabricated elements would allow the Contractor to perform the work within a limited timeframe.

New Bridge Superstructure Construction

Construction of the new I-81 viaduct, the I-690 mainline, and associated ramps superstructure would involve completing piers, columns, deck, roadway finishes, and lighting. As noted above, to minimize construction effects, the following construction schedules will be considered as design advances: Reduced On-Site Construction, Compressed On-Site Construction, and Accelerated On-Site Construction. The designer would determine the type of superstructure and construction methods that would best meet the requirements of the project.

For this analysis, it was assumed that much of the material would be pre-fabricated or pre-cast at various locations and delivered to the project site via truck; further pre-assembly on site may be possible to add temporary shielding and utility hangers. At the construction site, these elements for the most part would be lifted into place by cranes, with self-propelled modular transporters used for smaller spans at critical locations.

The curvature and geometry of the proposed roadway may preclude the use of straight precast girders for some of the bridges, but many of the bridges could be constructed with straight girders. For some of the long, multi-span bridges in the I-81/I-690 interchange area, the superstructure type was assumed to consist of multiple segments of continuous spans of straight and curved steel multi-girders. The girders and deck would be made continuous at the piers, where practical, to minimize the number of deck joints.

Plate girders would be assembled on site and lifted in position by overhead crane or from local streets. Cast-in-place concrete decking would then be installed, span by span, in segments. Alternate construction methods may be used. The use of prefabricated elements would expedite the constructability of a bridge, especially on sites that have constraints. The use of prefabricated bridge deck panels could minimize or eliminate the need for workers to install and remove formwork. This would be especially beneficial in the construction of bridges over water or active highways.

4.3.3 CONSTRUCTION EQUIPMENT AND EMPLOYMENT

Table 4-2 lists the equipment that could be used on site during construction. The equipment would be used primarily for the heavy civil and structural activities associated with the Project (e.g., demolition, superstructure construction and earthworks), which could have the greatest effects in terms of air emissions, particulates, and/or noise generation. For each equipment type, **Table 4-2** lists engine type (diesel, gasoline, or electric), engine size (horsepower), the number of units to be employed, the percentage of time during a typical eight-hour workday that each equipment type would likely be in use, and the percentage of time that each equipment type would likely be in use during the duration of each task. As shown in **Table 4-2**, demolition activities associated with the Viaduct Alternative would begin early in the seven-year construction period and continue until project completion. Superstructure construction, however, would not begin until after Phase 1 of the Project has been completed and would then continue until the end of construction. Some earthwork activities would occur throughout Project construction, while others would begin after Phase 1.

One of the factors used to estimate the on-site construction equipment and their durations of use is the number of on-site staff hours by category of workers involved in the construction of the heavy civil and structural elements of the Project. Estimates were developed based on the expertise and experience of construction estimators and various factors typically used by such estimators. Estimates were primarily used to develop the number of hours of heavy vehicle usage and construction activities that would have the greatest effect on air quality and noise.

Table 4-3 shows estimates of construction employment for on-site construction workers directly involved in the actual demolition and/or construction of the Project. Staff hours associated with ancillary functions, such as office/administrative work, material deliveries, construction inspection, construction management, landscaping, design engineering, safety oversight, and various vendor activities, are not included in this estimate. In addition, the indirect and induced employment associated with the manufacture of materials to be used on-site, shipping of materials, and local services to accommodate the construction workers have not been estimated.

As shown in **Table 4-3**, 8,213,000 staff hours, spread across four phases and seven years of total construction, are estimated for the completion of the Viaduct Alternative. Of this total, 2,564,028 staff hours would be involved in demolition activities, while 5,648,972 staff hours would be involved in new construction activities. Assuming a standard work year of 2,080 hours (40 hours per week for 52 weeks), the overall total number of staff hours for the entire Project would be equivalent to more than 3,949 staff years of employment. This estimate assumes year-round work and accounts for potential slowdowns or other interruptions due to inclement weather.

I-81 VIADUCT PROJECT

Table 4-2

Viaduct Alternative: Potential Construction Equipment

Work Task	Start Date	End Date	Equipment Type	Engine type	Size (hp)	Qty	Daily Use*	Average Use**
Demolition	Month 1	Month 84	Hydraulic Excavator, 1 CY	Diesel	150	2	80%	2%
Demolition	Month 1	Month 84	Backhoe Loader, 48 hp	Diesel	48	2	80%	2%
Demolition	Month 1	Month 84	Backhoe Loader, 80 hp	Diesel	80	6	80%	20%
Demolition	Month 1	Month 84	Vibrating Plate, Gas, 21"	Gasoline	5	1	50%	3%
Demolition	Month 1	Month 84	Lead, 90' high	N/A	-	1	80%	25%
Demolition	Month 1	Month 84	Concrete Hammer Attach.	N/A	-	4	80%	33%
Demolition	Month 1	Month 84	Dump Truck, 12 CY, 400 hp	Diesel	400	1	80%	33%
Demolition	Month 1	Month 84	Cutting Torch	N/A	-	4	75%	35%
Demolition	Month 1	Month 84	Welder, Gas Engine, 300 amp	Gasoline	300A	1	80%	5%
Demolition	Month 1	Month 84	Lattice Boom Crane, 150 Ton	Diesel	300	1	80%	10%
Demolition	Month 1	Month 84	Acetylene Torches, 5", 1/2" weld size	N/A	-	2	20%	12%
Superstructure	Month 25	Month 84	Concrete Bucket, 1 CY	N/A	-	2	80%	12%
Superstructure	Month 25	Month 84	Concrete Pump (Small)	Diesel	400	2	100%	40%
Superstructure	Month 25	Month 84	Concrete Vibrator	Electric	20A	4	70%	75%
Superstructure	Month 25	Month 84	Lead, 90' high	N/A	-	5	80%	60%
Superstructure	Month 25	Month 84	Hammer, Diesel, 41k ft-lb	Diesel	220	2	85%	55%
Superstructure	Month 25	Month 84	Cutting Torch	N/A	-	7	75%	75%
Superstructure	Month 25	Month 84	Pickup Truck, 3/4 Ton	Diesel	300	15	100%	30%
Superstructure	Month 25	Month 84	Welder, Gas Engine, 300 amp	Gasoline	300A	7	80%	80%
Superstructure	Month 25	Month 84	Crawler Crane, 75 Ton	Diesel	250	4	100%	25%
Superstructure	Month 25	Month 84	Lattice Boom Crane, 150 Ton	Diesel	300	4	80%	20%
Superstructure	Month 25	Month 84	Hydraulic Crane, 25 Ton	Diesel	250	2	80%	15%
Superstructure	Month 25	Month 84	Hydraulic Crane, 55 Ton	Diesel	300	2	80%	15%
Superstructure	Month 25	Month 84	S.P. Crane, 4x4, 12 Ton	Diesel	200	1	35%	10%
Superstructure	Month 25	Month 84	Hand Tools	Electric	20A	40	80%	40%
Superstructure	Month 25	Month 84	Acetylene Torches, 5", 1/2" weld size	N/A	-	5	20%	40%
Earthworks	Month 25	Month 84	Hydraulic Excavator, 1 CY	Diesel	150	5	80%	10%
Earthworks	Month 1	Month 84	Hydraulic Excavator, 3.5 CY	Diesel	200	4	80%	5%
Earthworks	Month 25	Month 84	Backhoe Loader, 48 hp	Diesel	48	1	80%	30%
Earthworks	Month 25	Month 84	Vibrating Plate, Gas, 21"	Gasoline	5	1	50%	25%
Earthworks	Month 1	Month 84	Sheepsfoot Roller, 240 hp	Diesel	240	2	85%	5%
Earthworks	Month 1	Month 84	Dozer, 300 H.P.	Diesel	300	1	80%	45%
Earthworks	Month 25	Month 84	Loader, Skid Steer, 30 hp	Diesel	30	1	80%	20%
Earthworks	Month 1	Month 84	Dump Truck, 12 CY, 400 hp	Diesel	400	20	80%	40%
Earthworks	Month 25	Month 84	Light Truck, 1.5 Ton	Diesel	450	1	100%	40%

Notes:

* Daily Usage Percentage = Percentage of time that the equipment is in use during a typical 8-hour workday. Example: 75% daily use equals 75% of an 8-hour workday, or 6 hours.

** Average Use Percentage = Percentage of time that the equipment is in use during the duration of the task. Example: For a task that lasts 4 quarters, 50% average use means that the equipment is in use half the time during the 4-quarter construction period, or 2 quarters.

CY=cubic yard; hp=horsepower; S.P.=self-propelled

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Table 4-3

Viaduct Alternative: Construction Staff Hours and Staff Years Generated

Description	Construction Staff Hours (per Phase)					Demolition Staff Hours (per Phase)					Total
	1	2A	2B	3	Total	1	2A	2B	3	Total	
Carpenters	-	354,349	214,276	1,031,256	1,599,881	-	35,713	22,555	108,637	166,905	1,766,786
Concrete Finishers/Masons	-	64,475	38,684	182,413	285,572	-	-	-	-	-	285,572
Common Building Laborers	10,541	221,052	128,098	558,750	918,441	-	229,810	139,453	647,208	1,016,471	1,934,912
Equipment Operators, Crane or Shovel	6,485	50,388	26,405	125,023	208,301	-	13,693	7,783	39,110	60,586	268,887
Equipment Operators, Light Equipment	8,119	6,427	3,120	1,001	18,667	-	-	-	-	-	18,667
Equipment Operators, Medium Equipment	-	37,638	12,841	54,819	105,298	-	108,333	65,625	303,529	477,487	582,785
Equipment Operators, Oilers	-	26,315	14,979	65,858	107,152	-	5,452	3,120	15,127	23,699	130,851
Helpers Average (5 trades)	-	21,806	8,294	58,656	88,756	-	21,806	12,479	60,509	94,794	183,550
Pile Drivers	-	70,947	41,197	163,113	275,257	-	-	-	-	-	275,257
Rodmen (Reinforcing), Foreman	-	56,589	34,440	157,991	249,020	-	-	-	-	-	249,020
Rodmen (Reinforcing)	-	216,879	121,942	603,938	942,759	-	-	-	-	-	942,759
Rodmen (Reinforcing), Apprentice	-	56,589	34,440	157,991	249,020	-	-	-	-	-	249,020
Skilled Workers Average (35 trades)	-	2,576	1,162	942	4,680	-	105,065	63,823	293,162	462,050	466,730
Structural Steel Workers	-	32,703	12,434	87,980	133,117	-	32,703	18,719	90,771	142,193	275,310
Welders, Structural Steel	-	678	258	1,834	2,770	-	678	388	1,892	2,958	5,728
Truck Drivers, Heavy	201,016	138,362	24,377	96,526	460,281	-	26,573	16,148	74,164	116,885	577,166
Total Staff Hours	226,161	1,357,773	716,947	3,348,091	5,648,972	-	579,826	350,093	1,634,109	2,564,028	8,213,000
Total Staff Years	109	653	345	1,610	2,716	-	279	168	786	1,233	3,949

4.4 COMMUNITY GRID ALTERNATIVE

4.4.1 CONSTRUCTION PHASING AND WORK ZONE TRAFFIC CONTROL (WZTC)

The Community Grid Alternative would involve the removal of the existing I-81 viaduct between the NYS&W Railway bridge near Renwick Avenue and I-690. Existing I-81 through the City of Syracuse would be de-designated from the interstate system and existing I-481 would be re-designated as the new I-81 (see **Chapter 3, Alternatives**). In addition, as discussed in **Chapter 3, Alternatives**, the portion of existing I-81 between its northern and southern intersections with I-481, including a section through Downtown that would be on city streets, would be re-designated as a business loop of I-81 and be named Business Loop 81 (BL 81). The Community Grid Alternative would involve the reconstruction of several city streets and disperse traffic throughout the city grid by promoting broader use of the existing street network. A portion of I-690 between Leavenworth Avenue and Beech Street, including the I-690/existing I-81 interchange, would be reconstructed.

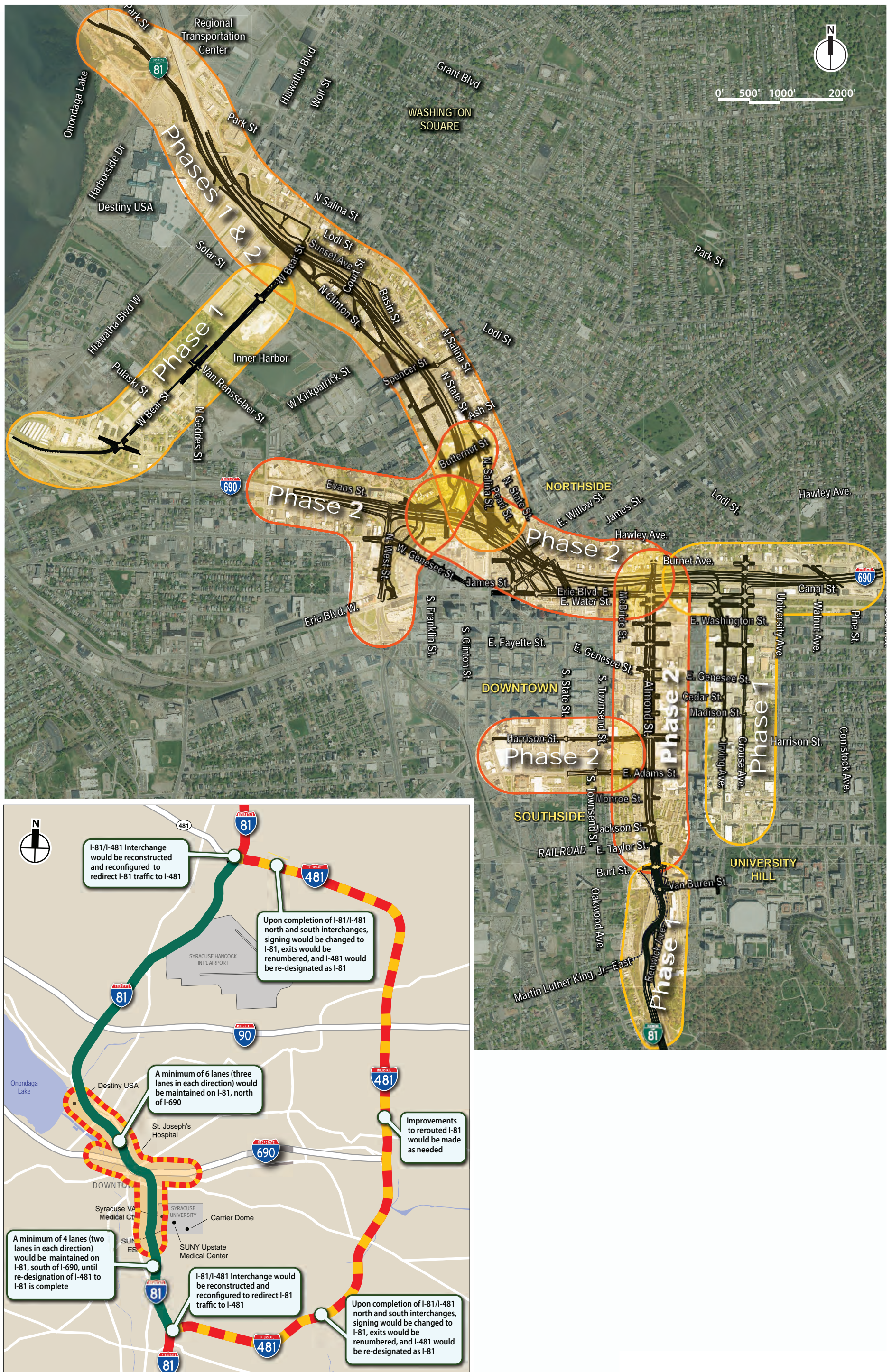
To achieve the six-year construction schedule while minimizing impacts, segments of existing I-81 and I-690 would be closed during select periods. The preliminary construction phasing plan sets forth a construction sequence consisting of two phases, one of which has two subphases, as described below (see **Figure 4-7**). In addition, more detailed preliminary phasing plans and phasing notes for each primary phase and subphase are included in **Appendix A**.

- **Phase 1** comprises the completion of the I-481 to I-81 conversion. All work necessary to re-designate I-481 as I-81 would be done before demolition of the existing I-81 viaduct can begin. This phase also includes preparatory work in the downtown area for Phase 2 such as the reconstruction of the eastern portion of I-690 including the completion of the new I-690 interchange at Crouse and Irving Avenues; several improvements designed to enable the maintenance of traffic during Phase 2 of construction; and the removal of the portion of existing I-81 between the NYS&W Railway bridge at Renwick Avenue and Burt Street.
- **Phase 2**, consisting of two separate subphases, includes the continued demolition of the existing I-81 viaduct between Burt Street and the I-690/I-81 interchange, the reconstruction of I-690, and the reconstruction of the existing I-81/I-690 interchange. Phase 2A would entail the reconstruction of eastbound I-690, the continued construction of BL 81, and the removal of the existing viaduct, while Phase 2B would entail the reconstruction of westbound I-690.

Utility relocations, drainage improvements, building demolition activities, and ITS would be initiated early in Phase 1 and likely continue into Phase 2B.

TDM techniques would potentially be used to aid in managing the movement of traffic during construction. TDM techniques would be evaluated during final design and are discussed further in **Chapter 5, Transportation and Engineering Considerations**.

Figure 4-8 provides a preliminary construction schedule, including estimated durations of each of the Community Grid Alternative's construction phases and subphases. The phases and proposed WZTC elements are discussed below.



Community Grid Alternative:
Construction Phasing Overview

Figure 4-7

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
PHASE 1							
Construct I-81/I-481 South Interchange							
Construct I-81/I-481 North Interchange							
Construct I-481 East Corridor improvements including Interchange 3 and Lyndon Corners							
I-481 is redesignated as I-81							
Crouse Ave./Irving Ave. interchange							
Reconstruct/rehabilitate Crouse Ave. and Irving Ave.							
Construct new I-690 interchange at Crouse and Irving Avenues							
Northern Segment							
Replace Spencer, Court St., and Bear St. bridges, complete West Bear St. improvements, begin mainline widening							
Reconstruct North Clinton St.							
Construct Northern Segment ramp consolidation							
BL 81/Almond Street							
Construct the new NB Colvin St. off-ramp and open to traffic upon completion							
Construct BL 81 from approx. MLK, Jr. East to Van Buren St., including new RR bridge							
Construct trunk sewer line segment- from MLK Jr. East to about Burt St.							
Transition freeway traffic to new BL 81/Almond Street between Colvin St. and Burt St.							
Remove existing I-81 between MLK, Jr. East and Burt St.							
Complete railroad track relocation							
Local Streets							
Prepare Phase 2A detour							
PHASE 2A							
Open and Maintain Phase 2A Detour							
Reconstruct EB I-69, Leavenworth Ave. to Forman Ave.							
West Street Interchange							
Temporary widening of EB off-ramp							
Construct WB bypass							
Construct portion of WB I-690							
Reconstruct West St.							
Northern Segment							
Begin mainline reconstruction, including Oswego Blvd. and Pearl St. ramps							
BL 81/Almond Street							
Begin reconstruction of BL 81/Almond St., Burt St. to Burnet Ave.							
Remove existing I-81 between Burt St. and I-690							
Construct trunk sewer line segment, Burt St. to Onondaga Creek outlet							
Local Streets							
Combined sewer relocation in vicinity of Butternut St. and Burnet Ave.							
Reconstruct West and Butternut Streets including the new Butternut St. bridge							
Begin reconstruction of James, Willow, Warren, and Pearl Streets							
PHASE 2B							
Reconstruct Westbound I-690, Leavenworth Ave. to Forman Ave.							
Construct new WB I-690 to NB I-81 ramp							
Northern Segment							
Complete mainline reconstruction, including Oswego Blvd. and Pearl St. ramps							
BL 81/Almond Street							
Complete reconstruction of Almond St., Burt St. to Burnet Ave.							
Local Streets							
Reconstruct Evans St. and Websters Landing							
Complete reconstruction of James, Willow, Warren, and Pearl Streets							

Community Grid Alternative: Preliminary Construction Schedule

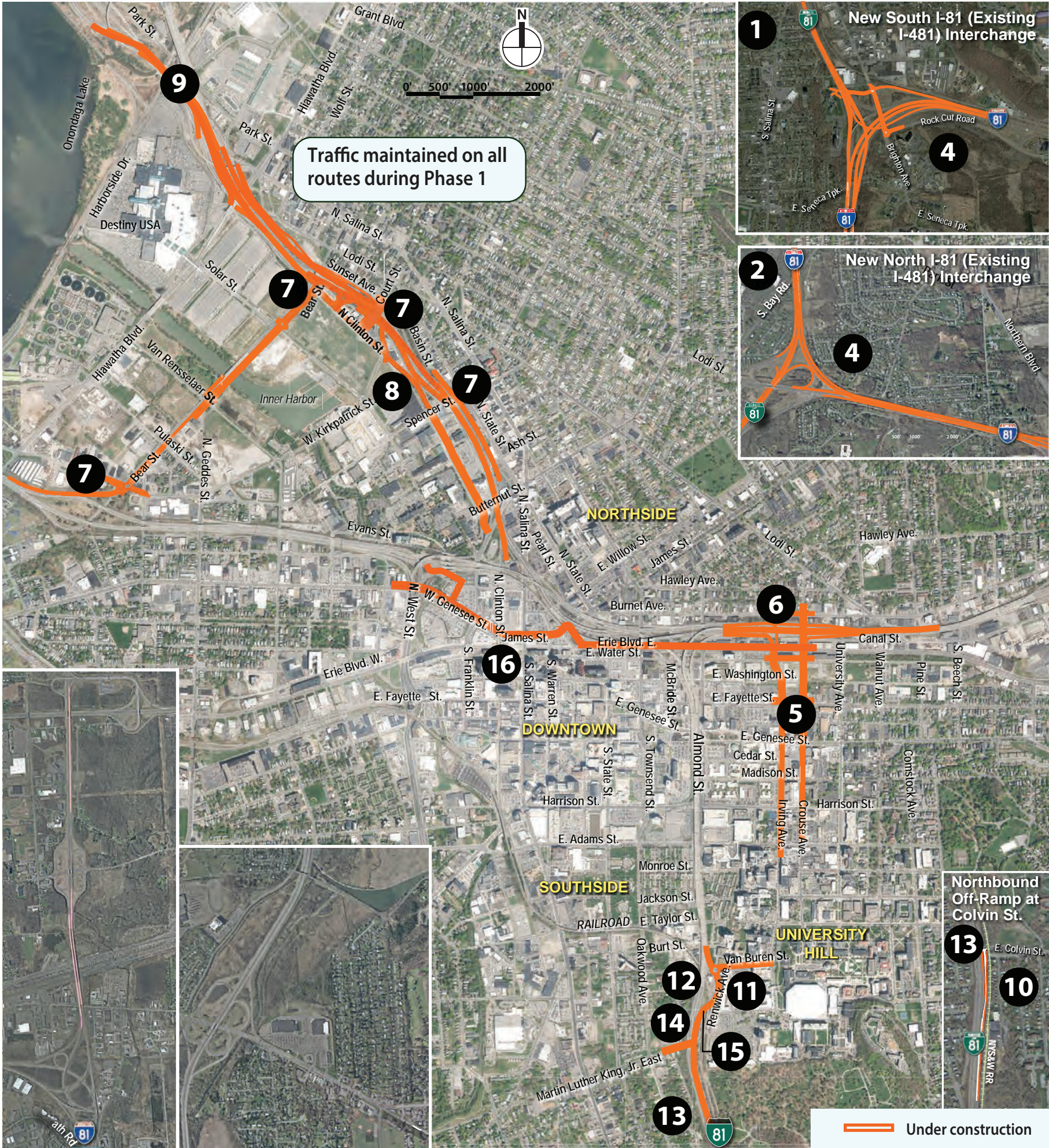
Phase 1—Preparatory Phase

- As explained in **Chapter 5, Transportation and Engineering Considerations**, traffic analyses were conducted to assess operating conditions and identify temporary roadway improvements that would be necessary during construction of the Community Grid Alternative. Construction Phase 2A was studied as the worst-case scenario for the Community Grid Alternative, which entails an 18-month construction period where eastbound I-690 traffic would be diverted onto the city street detour route. Based on this analysis, which was intended to verify that adequate traffic operations could be maintained during construction, improvements needed to address congestion during construction were identified. These improvements, which would include permanent and/or temporary improvements to local streets, highways, and certain bridges and interchanges, would be implemented during Phase 1. Phase 1 is anticipated to be completed within 36 months and focus on those improvements that would be intended to ensure the ability to successfully maintain and protect traffic during subsequent construction phases. Removal of the existing I-81 viaduct and reconstruction of Almond Street/BL-81 would begin toward the end of Phase 1, once I-481 has been re-designated as I-81 and existing I-81 has been de-designated. The primary elements (see **Figure 4-9**) include:
- Construction of the east portion of I-690 including completion of the new Crouse Avenue/Irving Avenue interchange;
- The conversion of existing I-481 to I-81 with associated improvements (reconstruction of the existing I-81/I-481 north and south interchanges and miscellaneous improvements in the East Study Area);
- The construction of a new northbound off-ramp to Colvin Street and construction of the southern section of Almond Street/BL-81 between approximately East Kennedy Street and Burt Street;
- Permanent and temporary local street improvements to accommodate movement of traffic during subsequent phases; and
- Completion of building demolition activities and start of utility relocations, drainage improvements, and ITS.

The following actions would be accomplished in Phase 1.

Existing I-81/I-481 North Interchange (Interchange 29)

Improvements to I-481, including interchange reconstruction and widening of the roadway at select areas, would be required to accommodate the re-designation of I-481 as I-81. Interchange 29 would be largely reconstructed and reconfigured and would involve re-routing existing I-81 to connect with existing I-481. The new I-81 would carry a minimum of four travel lanes (two in each direction) of through traffic and meet 70 mph design standards. The ramps that currently connect existing northbound I-481 to existing northbound I-81 and existing southbound I-81 to existing southbound I-481 would be demolished, and these movements would be made on the mainline of the newly re-designated I-81. The remaining existing I-81 section connecting to Downtown south of this interchange would be re-designated as a business route (BL 81) and would need to be in place before the closure of existing I-81. During construction of these interchange improvements, a minimum of



	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
PHASE 1 Work Elements and Schedule							
1 Construct I-81/I-481 South Interchange							
2 Construct I-81/I-481 North Interchange							
3 Construct I-481 East Corridor improvements including Interchange 3 and Lyndon Corners							
4 I-481 is redesignated as I-81							
Crouse Ave./Irving Ave. interchange							
5 Reconstruct/rehabilitate Crouse Ave. and Irving Ave.							
6 Construct new I-690 interchange at Crouse and Irving Avenues							
Northern Segment							
7 Replace Spencer, Court St., and Bear St. bridges, complete West Bear St. improvements, begin mainline widening							
8 Reconstruct North Clinton St.							
9 Construct Northern Segment ramp consolidation							
BL 81/Almond Street							
10 Construct the new NB Colvin St. off-ramp and open to traffic upon completion							
11 Construct BL 81 (approx. MLK, Jr. East to Van Buren St., including new RR bridge							
12 Construct trunk sewer line segment from MLK Jr. East to about Burt St.							
13 Transition freeway traffic to new BL 81/Almond St. between Colvin St. and Burt St.							
14 Remove existing I-81 between MLK, Jr. East and Burt St.							
15 Complete railroad track relocation							
Local Streets							
16 Prepare Phase 2A detour							

two lanes of traffic in each direction would be maintained on the interstate system, and all ramp connections would remain open through the use of phased construction and temporary widening.

Existing I-81/I-481 South Interchange (Interchange 16)

Interchange 16 would be completely reconstructed and reconfigured and would involve re-routing existing I-81 to connect with existing I-481. The new I-81 would carry a minimum of four travel lanes (two in each direction) of through traffic and meet 70 mph design standards. The existing ramps that connect existing northbound I-81 to northbound I-481 and southbound I-481 to existing southbound I-81 would be demolished, and these movements would be made on the mainline of newly re-designated I-81. The remaining existing I-81 section connecting to Downtown from just north of this interchange would be re-designated as a business route (BL 81). A new interchange would be installed on BL 81 at East Glen Avenue, which would be realigned to provide full directional access to East Brighton Avenue. The existing East Brighton Avenue bridge within the interchange area, between the intersections of Rock Cut Road and East Glen Avenue, would also be reconstructed. This work would be completed prior to the re-designation of I-481 to I-81 and prior to the closure of the existing I-81 viaduct. During construction of this interchange, a minimum of two lanes in each direction would be maintained on existing I-81 and I-481, and most ramp connections would remain open, except for the existing southbound I-81 to northbound I-481 ramp and the existing southbound I-481 to southbound I-81 ramp. During the closure of these ramps, traffic would use Exit 17 on existing I-81 and Brighton Avenue as a detour. An analysis of the detour route determined that the existing roadways have enough capacity to accommodate the projected increases in traffic demand during construction. These traffic detours would be eliminated once the new ramps associated with the new interchange are completed by the end of Subphase 1B. The East Brighton Road Bridge would be replaced using staged construction, with traffic in each direction open throughout construction. The existing East Glen Avenue bridge would remain open until the new bridge is constructed and open to traffic.

I-481 Corridor

In addition to the improvements at the existing I-481/I-81 interchanges described above, other improvements along existing I-481 would be required. These improvements would occur between the north and south interchanges and include the addition of a third (auxiliary) lane in each direction between Kirkville Road (Interchange 5) and I-690 (Interchange 4), the addition of a third northbound (auxiliary) lane between Kirkville Road (Interchange 5) and I-90 (Interchange 6), replacement of the existing I-481 signage with new I-81 signage, and renumbering of the I-481 interchanges. This work would be completed before the closure of existing I-81 for the removal of the viaduct. Most work in this corridor would likely be carried out along the shoulder areas, which would be closed, although some lanes would be closed occasionally during off-peak hours to facilitate delivery of construction materials and equipment.

I-481/Route 5 and 92 Interchange (Interchange 3)

Improvements at the I-481/New York State Routes 5 and 92 interchange (Interchange 3) and at the Lyndon Corners (Routes 5/92) intersection would also be included in this phase. The interchange improvements would include a reconfiguration of the southbound off-ramps to Routes 5/92,

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extension (lengthening) of the northbound I-481 on-ramp from westbound Routes 5/92, and improvements to East Genesee Street (Routes 5/92), including the installation of new and replacement traffic signals, within the interchange area. The Lyndon Corners intersection improvements would include the addition of a right turn lane and replacement of the traffic signal. In addition, the existing I-481 signage would be replaced with new I-81 signage. This work would be completed before the closure of existing I-81 for the removal of the viaduct. Most work in this corridor would likely be carried out along the shoulder areas, which would be closed, although some lanes would be closed occasionally during off-peak hours to facilitate delivery of construction materials and equipment.

I-690/Crouse and Irving Avenues Interchange

The new I-690 interchange with Crouse and Irving Avenues, including its four on- and off-ramps, would be fully constructed in Phase 1. The new interchange would be open to traffic by the end of Phase 1 to accommodate traffic destined for University Hill that would have used the Harrison Street ramps. The Harrison Street ramps would be demolished at the beginning of Phase 2, after the opening of the new ramps at Crouse and Irving Avenues.

Some travel lane reductions, shifting and shoulder closures on I-690 would be necessary during construction. Construction would be phased while Crouse Avenue and Irving Avenue are converted to two-way streets. The new extension of Irving Avenue between Fayette Street and Erie Boulevard would be completed by the end of Phase 1.

Existing I-81 between Colvin Street and East Kennedy Street

Between Colvin Street and East Kennedy Street, the existing highway would be modified to calm traffic as I-81 transitions from a 55 mph to a 30 mph speed limit. These modifications include removal of the median-side lane in both directions, resulting in two lanes in each direction and a grass median area that could be landscaped. The shoulders would be narrowed in steps, and curbing at the edge of shoulder would be introduced to further encourage traffic calming on the mainline. During construction of these improvements, lane shifting would enable two lanes of existing I-81 traffic in each direction to be maintained. In addition, the new northbound BL 81 off-ramp to Colvin Street would be constructed in this phase. Colvin Street would be widened to accommodate an eastbound left turn lane and the installation of a new traffic signal at the intersection of Colvin Street with the northbound on- and off-ramps. The new northbound off-ramp would include construction of a retaining wall between the BL 81 edge of shoulder and the new off-ramp. The acceleration lane for the existing northbound on-ramp from Colvin Street would be shortened as part of the traffic calming measures.

Almond Street between East Kennedy Street and Burt Street

The portion of I-81 between East Kennedy Street and Burt Street would be replaced by a new 30 mph city street section with a divided, grassed median and include a new roundabout at the Almond and Van Buren Street intersection. This segment would become a permanent part of BL 81. Construction work in this segment includes reconstruction of the highway between East Kennedy Street and Burt Street, replacement of the NYS&W Railway bridge over Renwick Avenue, and relocation of the railroad tracks. The reconstruction would need to be done in phases to maintain traffic. During the

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first part of this phase, the northbound side of BL 81, and the new railroad bridge adjacent to the existing railroad bridge, would be constructed while maintaining traffic on the existing I-81 highway segment. Once I-481 has been re-designated as I-81, the northbound traffic on BL 81 would be redirected onto the newly constructed section of BL 81 between East Kennedy Street and Burt Street. Southbound traffic would continue to be maintained on the existing section of existing southbound I-81. With northbound existing I-81 traffic shifted onto the newly constructed BL 81 segment, demolition of the northbound existing I-81 embankment and viaduct would begin, which would free up the space needed to construct the southbound connection between the new section of BL 81 and existing southbound BL 81. Once the southbound section of BL 81 is opened to southbound traffic, demolition of the southbound portion of the existing I-81 embankment and viaduct would begin. Once constructed and opened to traffic, the new street level section of BL 81 would carry most of the traffic to and from the south that is destined for Downtown or University Hill.

During this phase, Renwick Avenue and the portion of Fineview Place between Renwick Avenue and East Raynor Avenue would be permanently closed. The Dr. King Elementary School driveway on MLK, Jr. East would remain open throughout construction. Replacement of the NYS&W Railway bridge over Renwick Avenue and relocation of the railroad tracks also would occur in phases, with limited, short-term impacts to railroad operations.

Removal of Existing I-81 Viaduct

As noted earlier, demolition of the existing I-81 embankment and viaduct section between MLK, Jr. East and Burt Street would begin late in this phase once I-481 has been re-designated as I-81 and northbound traffic is shifted onto BL 81.

By the end of Phase 1, the existing viaduct between the existing I-81 bridge over the NYS&W Railway and Burt Street, the existing I-81 bridges over MLK, Jr. East, and portions of the existing I-81 embankment between East Kennedy Street and the NYS&W Railway would be demolished and traffic to and from the south would use the new section of BL 81 to access the local street network.

Existing I-81 Northern Segment between West Street/Franklin Street (Interchange 20) and Westbound Route 370 to Liverpool (Interchange 24)

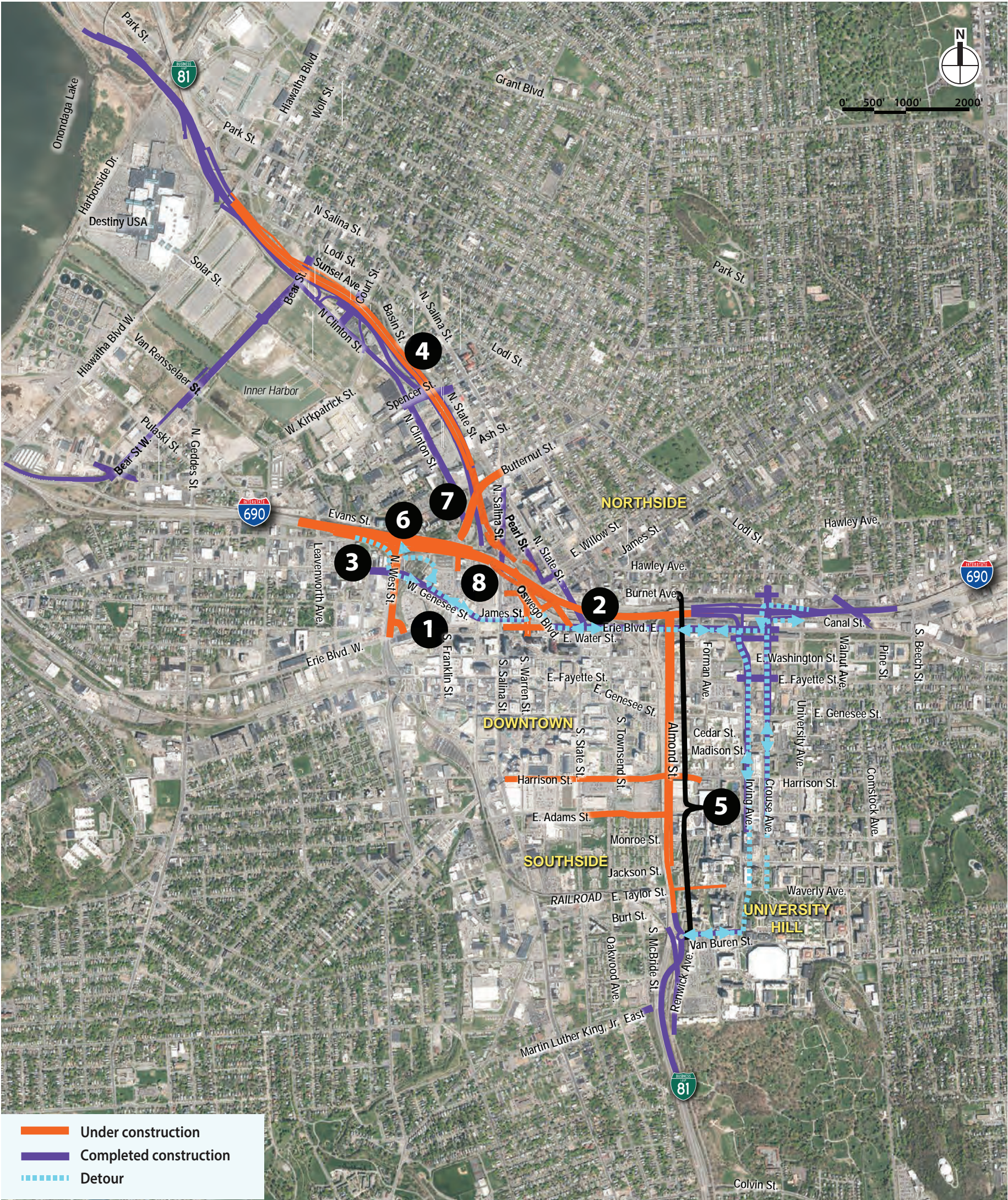
Improvements to existing I-81 between Interchanges 20 and 24 would be initiated during Phase 1. During the first half of this phase, the south end of Destiny USA Drive and approximately half of the North Clinton Street reconstruction work would be completed, and the new southbound on-ramp from North Clinton Street to existing I-81 (future BL 81) would be constructed. The existing southbound on-ramp from Genant Drive would remain open until the new southbound on-ramp from North Clinton Street is completed and opened to traffic. Upon closure of the existing southbound on-ramp from Genant Drive, construction of the new southbound BL 81 off-ramp to North Clinton Street would be constructed. As soon as the new southbound BL 81 off-ramp to North Clinton Street has been completed, the existing southbound off-ramp to Genant Drive/Spencer Street would be closed. During the second half of this phase, the remaining North Clinton Street reconstruction work would be completed. In addition, this phase would include reconstruction, realignment, and/or other improvements associated with the four overpasses crossing this segment of existing I-81 (i.e., Butternut Street, Spencer Street, Court Street, and Bear Street) and any off-line construction work, including grading, widening, ramp realignments, and retaining walls that could be

completed while maintaining the existing capacity of the existing I-81 mainline and ramps. The existing ramps connecting existing I-81 to Butternut/State, Spencer, Franklin, Clinton, and Salina Streets would remain in place with minor modifications until replacement ramps could be constructed and opened to meet the same traffic needs.

East-west local traffic across the northern segment of existing I-81 would be maintained through the use of staged construction and by keeping at least two of the four bridges open to traffic. The Court Street bridge would be demolished and reconstructed first, followed by the Bear Street and Spencer Street bridges. Also, a number of other improvements along the Bear Street corridor, between I-690 to the south and Lodi Street to the north, would be completed. Traffic would use the Spencer Street and the Bear Street bridges while the Court Street bridge is being reconstructed, and then would use the new Court Street bridge and existing Butternut Street bridge while the Bear Street and Spencer Street bridges are being reconstructed. The Bear Street corridor would remain open throughout this phase (except for the temporary closure of the Bear Street bridge over existing I-81) and traffic would be accommodated through minor lane shifts as needed. To accommodate the closure of the Bear Street bridge over BL 81, temporary improvements would be required along North Clinton Street and Court Street (see description of temporary improvements listed in **Table 4-4**). Construction would be sequenced so that all ramps in this segment would remain open, with some occasional short closures (of less than or approximately two weeks). Interstate access to and from Destiny USA would be maintained at all times during construction.

Eastbound I-690 Phase 2A Detour

During Phase 2A, eastbound I-690 traffic would be detoured to city streets between the West Street and the new Crouse Avenue interchanges. As explained in greater detail in **Chapter 5**, the city street network was analyzed for its ability to accommodate the temporary traffic increases anticipated to occur as a result of the closure of eastbound I-690. Based on this analysis, a primary detour route was established, as shown in **Figure 4-10**, which would be used during Phase 2A. (For additional detail, refer to the Conceptual Construction Phasing and Maintenance and Protection of Traffic Plans in **Appendix A-1**.) This primary detour route also was analyzed for its ability to accommodate the temporary traffic increases anticipated to occur as a result of the eastbound I-690 closure. (Refer to **Chapter 5, Transportation and Engineering Considerations**, for a detailed discussion of traffic impacts during construction and to **Chapter 6, Social, Economic, and Environmental Considerations**, for more detailed discussion of the environmental effects during construction.) As a result of this analysis, a number of temporary improvements were identified that would need to be implemented along the detour route and at other select locations to enable adequate traffic operations during construction. All other local streets were determined to have enough capacity, without any improvements, to accommodate the projected increases in traffic demand during construction. The required temporary improvements are listed in **Table 4-4** and would be made during Phase 1.



	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
PHASE 2A Work Elements and Schedule							
1 Open and Maintain Phase 2A Detour							
2 Reconstruct EB I-690, Leavenworth Ave. to Forman Ave.							
3 West Street Interchange							
Temporary widening of EB off-ramp							
Construct WB bypass							
Construct portion of WB I-690							
Reconstruct West St.							
4 Northern Segment							
Begin mainline reconstruction, including Oswego Blvd. and Pearl St. ramps							
5 BL 81/Almond Street							
Begin reconstruction of BL 81/Almond St., Burt St. to Burnet Ave.							
Remove existing I-81 between Burt St. and I-690							
Construct trunk sewer line segment, Burt St. to Onondaga Creek outlet							
Local Streets							
6 Combined sewer relocation in vicinity of Butternut St. and Burnet Ave.							
7 Reconstruct West and Butternut Streets including the new Butternut St. bridge							
8 Begin reconstruction of James, Willow, Warren, and Pearl Streets							

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Table 4-4

Community Grid Alternative: Temporary Improvements for Maintaining Traffic¹

Location	Temporary Improvements for Maintaining Traffic
Existing northbound I-81 on-ramp from Pearl Street	Construct temporary widening of the existing ramp so once the existing NB I-81 viaduct is closed, the ramp would provide two lanes starting from the intersection of Pearl and Hickory Streets, and continuing onto the mainline of existing northbound I-81
Intersection of Pearl and Hickory Streets	Install temporary signal and restripe Pearl Street northbound approach to provide a left turn lane and a left/through/right lane
Existing southbound I-81 off-ramp to Clinton Street	Construct temporary widening of the existing Clinton Street off-ramp to provide two lanes on the ramp, from the mainline to the signal at Herald Place
Existing southbound I-81 off-ramp to Salina Street	Construct temporary realignment of the existing southbound I-81 off-ramp to Salina Street and install a temporary signal at the Intersection of the ramp and Salina Street
Existing southbound I-81 off-ramp to Genant/Franklin Street	Construct temporarily connection between the existing southbound I-81 off-ramp to Butternut Street and Genant Drive/North Franklin Street
North Clinton Street, southbound ramp intersection to Court Street	Prior to closing the Bear Street bridge over BL 81 for replacement, temporarily widen North Clinton Street to three lanes (one northbound and two southbound) between the new southbound ramp intersection and the relocated Court Street intersection. At the Court Street intersection, provide an exclusive left turn lane and a shared left/through lane in the southbound direction
Court Street between North Clinton Street to Sunset Avenue	Prior to closing the Bear Street bridge over BL 81 for replacement, temporarily stripe Court Street to provide three lanes (two eastbound and one westbound) between North Clinton Street and Sunset Avenue. At the Sunset Avenue intersection, provide a temporary traffic signal and provide for an exclusive left turn lane and a shared left/through lane in the eastbound direction
West Genesee Street between Franklin and Wallace Streets	Temporarily reallocate existing parking lane on north side of West Genesee Street to be an additional travel lane to provide two westbound travel lanes and two eastbound travel lanes
Intersection of West Genesee and Wallace Streets	Restripe two westbound approach lanes to provide a westbound through/left/ lane and a through/right lane
West Genesee and Franklin Streets westbound approach	Lengthen westbound right turn lane an additional 75 ft. by reallocating four existing parking spaces on the north side of West Genesee Street. Restripe westbound approach to provide for two westbound approach lanes, one a left/through lane and one a through/right lane, and two eastbound travel lanes
Oswego Boulevard	Restripe northbound lanes to provide a left turn lane and a right turn lane
Erie Boulevard and Oswego Boulevard	Restripe existing westbound lanes to provide a through/left lane and a right turn lane
Erie Boulevard and State Street	Construct temporarily widening of Erie Boulevard to create a westbound right-turn bay lane for a total of four westbound lanes and two eastbound lanes on the westbound approach. Restripe the westbound approach lanes to provide a left turn lane, a through lane, a through/right lane, and a right turn lane
Erie Boulevard and Crouse Avenue	Restripe eastbound approach to provide three lanes (exclusive left turn lane, shared left/through lane, and a through/right lane)
Crouse Avenue between Water Street and Erie Boulevard	Construct temporary widening of Crouse Avenue to create a third northbound travel lane for a total width of five lanes in this section and provide two southbound lanes, one northbound through/left lane, one northbound through lane, and one northbound through/right lane
Crouse Avenue between Washington and Water Streets	Construct temporary widening to create a third northbound lane starting approx. 100 feet south of Water Street, and provide two southbound lanes, one northbound through/left lane, one northbound through lane, and one northbound through/right lane
Crouse Avenue between Erie Boulevard and eastbound on-ramp to I-690	Construct temporary widening of Crouse Avenue to create a third northbound travel lane for a total width of five lanes in this section, and provide two southbound lanes, one northbound through lane, one northbound through/right lane, and one northbound right lane
Crouse Avenue and eastbound on-ramp to I-690	Temporarily prohibit southbound left turns from Crouse Avenue onto the new eastbound I-690 on-ramp
Eastbound on-ramp from Crouse Ave to I-690	Temporarily stripe the new eastbound on-ramp to provide two lanes, starting at the Crouse Avenue intersection and continuing onto I-690
Crouse Avenue and westbound on-ramp to I-690	Temporarily provide for two northbound lanes (exclusive left turn lane and a shared left/through lane)

Table 4-4 (cont'd)

Community Grid Alternative: Temporary Improvements for Maintaining Traffic¹

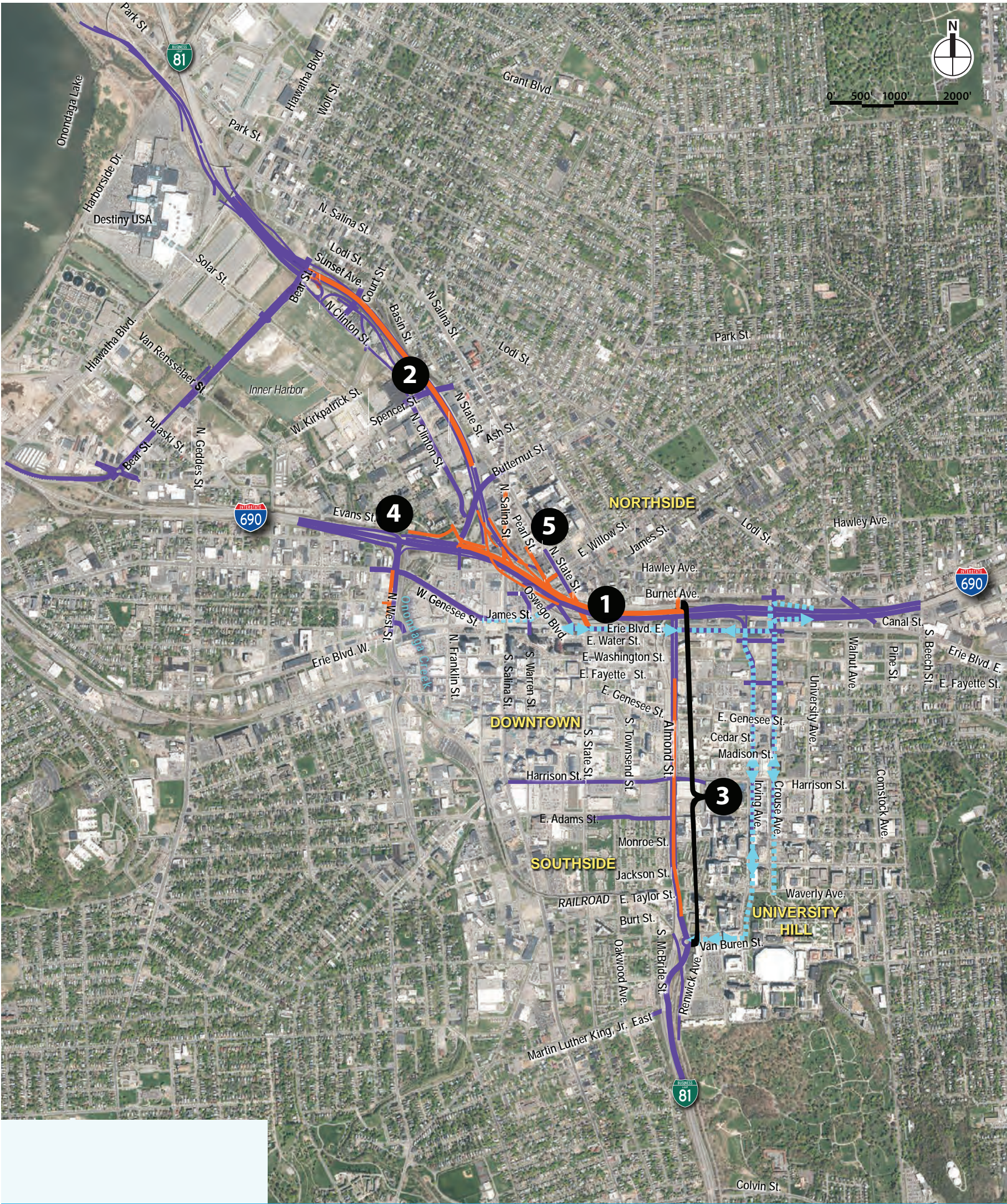
Location	Temporary Improvements for Maintaining Traffic
Crouse Avenue and westbound on-ramp to I-690	Construct temporary westbound on-ramp from Crouse Avenue. Provide two receiving lanes at Crouse Avenue, for a minimum of 500 feet, before tapering to one lane on the ramp
Walnut Street, East Fayette Street to Erie Boulevard.	Temporarily remove on street parking and stripe for three lanes (one southbound lane and two northbound lanes). At the Erie Boulevard intersection, provide an exclusive left turn lane and a shared left/through/right lane in the northbound direction
West Street Interchange	Construct a temporary westbound bypass, construct temporary widening of the eastbound off-ramp, and construct a temporary westbound connection between West Genesee Street and the existing westbound on-ramp, along Wallace Street and Herald Place
Temporary signal re-timing	A number of existing signals, especially along the Phase 2A detour route, would be re-timed to support the detour
Note: ¹ Refer to Chapter 5, Transportation and Engineering Considerations , for discussion of temporary traffic impacts and temporary parking impacts during construction and Chapter 6, Social, Economic, and Environmental Considerations , for discussion of temporary environmental impacts during construction.	

The primary eastbound I-690 detour route, which is shown on **Figures 4-10 and 4-11**, would follow West Street to West Genesee Street, to James Street, to Oswego Boulevard, to Erie Boulevard, and to Crouse Avenue, at which point traffic would re-enter eastbound I-690. The detour route also would support eastbound traffic headed into Downtown and Downtown traffic headed to the west via the westbound I-690 on-ramp at West Street.

A truck diversion analysis was performed to determine the maximum potential for truck traffic to be diverted from existing I-81 and I-690 to other roadway facilities paralleling existing I-81 and I-690 during Phase 2A, which was identified as the worst-case scenario during construction. As described below, during Phase 2A, westbound I-690 traffic would be shifted onto the new eastbound section of I-690 between Leavenworth Avenue and Crouse Avenue; the portion of BL 81 between the NYS&W Railway bridge and the existing I-81/I-690 connector ramps would be demolished toward the end of construction Phase 1. determined. Depending on the trip origins and destinations (O-D), all existing I-81 and some of the existing I-690 truck traffic would be diverted to other freeways or local roads, and some truck traffic between specific O-D pairs might not involve route diversion during construction. Refer to the detailed analysis in **Chapter 5, Transportation and Engineering Considerations**, which identifies the temporary improvements and mitigation measures needed to maintain truck traffic during construction.

Local Street Improvements

In addition to the temporary and permanent local street improvements needed for the Phase 2A detour route, **Table 4-4** lists other local streets that would be improved during Phase 1 to facilitate maintenance of traffic in later phases. The temporary improvements include reconfigured travel lanes, additional turn bays, temporary traffic signals, signal re-timing, and ramp improvements. Permanent improvement to local streets also would be initiated or completed during this phase, including improvements to Crouse and Irving Avenues, as noted above, and to portions of West Genesee Street, Erie Boulevard, and Van Buren Street, among others. Short-term lane shifts and local traffic detours would be used to accommodate traffic while local street improvements are made.



PHASE 2B Work Elements and Schedule		Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7	
1	Reconstruct Westbound I-690, Leavenworth Ave. to Forman Ave.														
	Construct new WB I-690 to NB I-81 ramp														
Northern Segment															
2	Complete mainline reconstruction, including Oswego Blvd. and Pearl St. ramps														
BL 81/Almond Street															
3	Complete reconstruction of Almond St., Burt St. to Burnet Ave.														
Local Streets															
4	Reconstruct Evans St. and Websters Landing														
5	Complete reconstruction of James, Willow, Warren, and Pearl Streets														

Phase 2A—Eastbound I-690 Closure and Reconstruction

Phase 2A, which would take approximately 18 months to complete, consists of the reconstruction and realignment of eastbound I-690, improvements to interchange ramps, and various other improvements to eastbound I-690 along the approximately 1.3 miles between Leavenworth Avenue and Forman Avenue. To construct these improvements, eastbound I-690 between West Street and Crouse Avenue would be closed to traffic during this entire phase. All I-690 traffic from the west would exit at West Street and then use the previously described detour route along city streets. Westbound I-690 would remain open throughout this phase. The West Street interchange, partially reconfigured during the early stages of Phase 2A, would provide I-690 access to and from the west, and the new Crouse Avenue ramps would provide I-690 access to and from the east.

As previously described, the entire city grid network, in addition to the primary detour route, was analyzed for its ability to accommodate the temporary traffic increases anticipated to occur as a result of closing eastbound I-690. The locations identified as needing temporary improvements are listed in **Table 4-4**. All other local streets were determined to have enough capacity to accommodate the projected increases in traffic demand during construction. Specific improvements and WZTC elements that would be put in place during Phase 2A are described below and shown in **Figure 4-10**. For additional detail, refer to the Conceptual Construction Phasing and Maintenance and Protection of Traffic Plans in **Appendix A-1**.

Eastbound I-690

Reconstruction of the eastbound I-690 mainline and associated ramps would be performed during this phase, with completion of the eastbound mainline anticipated by the end of the phase. Shifting of traffic lanes along eastbound I-690 would be required at both ends of the detour zone to direct traffic to the local streets. Eastbound traffic would exit before or at the West Street interchange. Traffic destined for Downtown or University Hill would continue south on West Street or travel eastward along West Genesee Street and Erie Boulevard. Traffic headed north of I-690 would take either the Bear Street/Geddes Street interchange or the West Street interchange to Genesee Street and turn north on Salina Street. Motorists who wish to re-enter eastbound I-690 to travel toward East Syracuse would use the new Crouse Avenue on-ramp or continue along Erie Boulevard to the Teall Avenue interchange. This detour would be in effect throughout Subphase 2A.

I-690 Interchange 11/12 (West Street/West Genesee Street)

Before eastbound I-690 could be closed, preparation activities at the existing I-690/West Street interchange would be required during the early stages of Phase 2A. West Street would remain open to traffic at all times during this construction. The temporary improvements described below would be constructed early in Phase 2A, and together with the other improvements listed in **Table 4-4** and constructed in Phase 1, would maintain traffic and interstate connections during subsequent phases:

- A temporary, two-lane westbound I-690 bypass on the north side of Interchange 11/12 (West Street/West Genesee Street) would be constructed to accommodate westbound I-690 traffic during subsequent phases. To construct this bypass, the existing two-lane northbound West Street to westbound I-690 on-ramp would be partially demolished and reduced to one lane. In addition, temporary lane shifting and shoulder closures would be needed on westbound I-690 where the

bypass would connect to the existing westbound mainline, but otherwise, the existing lanes on westbound I-690 would remain open throughout this phase.

- **Temporary widening of the eastbound I-690 off-ramp to Genesee Street:** The existing off-ramp to West Genesee Street (Exit 12) would be temporarily widened from one lane to two lanes in preparation for the next phase of construction. Construction of this ramp would require temporary shoulder closures, but otherwise the existing eastbound I-690 travel lanes, the existing Exit 11 (West Street) off-ramp, and the existing Exit 12 (West Genesee Street) off-ramp would remain open at all times. A short section of Belden Avenue would be temporarily narrowed to a single lane where it is near the ramp, but since traffic volumes are very low, two-way traffic would be maintained using a temporary signal.

In addition to eastbound I-690, Phase 2A would include the reconstruction of westbound I-690 between Plum Street and North Franklin Street (the section adjacent to the temporary bypass constructed during Phase 1). Phase 2A would also include construction of the eastbound I-690 ramps to and from West Street/Genesee Street and the westbound I-690 on-ramp from West Street/Genesee Street in their entirety, partial construction of the proposed westbound I-690 exit-ramp to West Street/Genesee Street, and construction of the West Street/Genesee Street at-grade intersection in its entirety except for the future parking area on the west side. West Street and access to and from the west would be maintained throughout this phase. Work in this area would be done in several subphases using traffic lane shifting to maintain traffic. Traffic on westbound I-690 between Clinton Street and Leavenworth Avenue would be shifted to the two-lane temporary westbound I-690 bypass through Subphases 2A1 and 2A2, then shifted to the newly completed eastbound structure in Subphase 2A3 in this area. Other ramps would be closed or modified, including the following:

- **West Street On-Ramp to Eastbound I-690:** This ramp, together with the spur to Herald Place, would be closed starting early in Phase 2A. Motorists generally would use the Phase 2A detour route described above.
- **Westbound I-690 Off-Ramp to West Street:** This ramp would be closed as soon as westbound I-690 traffic is moved to the temporary bypass and would not reopen until the end of Phase 2B. Vehicles traveling from the east would use either the new off-ramp to Crouse Avenue or the existing off-ramp to Geddes Street and then travel on local streets to various Downtown destinations.
- **Eastbound I-690 Off-Ramp to West Street:** This ramp, which would serve as the last access point for Downtown traffic during the eastbound I-690 closure, would remain open throughout Phases 2A and 2B. Two lanes of traffic would be maintained with modified configuration and phased construction until the opening of the new ramp during Phase 2B.
- **West Street On-Ramp to Westbound I-690:** This ramp, which would serve as the primary interstate access point for motorists traveling west from Downtown and University Hill during the eastbound I-690 closure, would remain open throughout Phase 2A. Traffic shifts and subphases would be necessary as construction progresses. Once the new eastbound I-690 off-ramp to West Street is constructed in Subphase 2A1, it would be used as a temporary westbound on-ramp in Subphases 2A2 and 2A3, which would then allow demolition of the existing

westbound on-ramp and completion of the new westbound on-ramp, as well as completion of the westbound I-690 bridges over West Street, in Subphase 2A3.

- **West Street:** West Street would remain open in both directions during this phase, with subphases to facilitate construction. Traffic lane modifications and shifting would occur, first to the existing northbound lanes, followed by the southbound lanes, to remove the existing bridges and embankments.

Removal of Existing I-81 Viaduct Continues

Demolition of the existing northbound I-81 viaduct section between Burt Street and the I-690 interchange would begin early in Phase 2A. During demolition of the viaduct, two lanes in each direction would be maintained between Burt Street and Erie Boulevard through the use of temporary widening and lane shifting. Once the northbound viaduct is demolished, southbound traffic would be shifted to the east, in the space previously occupied by the northbound viaduct, allowing for a minimum of four lanes of traffic to be maintained during demolition of the southbound section of the viaduct. Sideroad connections would be maintained during demolition activities except for short-term closures of the intersection during non-peak periods for removal of the existing overhead superstructure.

By the end of the first year of Phase 2A, the remaining viaduct between Burt Street and the existing I-81/I-690 ramps would be demolished.

Almond Street, between Burt Street and Burnet Avenue

Reconstruction of Almond Street between Fayette Street and Erie Boulevard would begin early in Phase 2A, with major sections completed early in the phase. The Catherine Street section between Erie Boulevard and Burnet Avenue would be completed in conjunction with the reconstruction of I-690 during Phase 2B. Reconstruction of Almond Street between Burt Street and Fayette Street would be progressed in subphases as the overhead viaduct is being removed and space allows. Traffic maintenance along Almond Street through this phase is described in the above section “Removal of Existing I-81 Viaduct.” Although all or most of Almond Street would continue to be operational to traffic during this phase, temporary lane shifts and lane closures would be necessary. Construction activity along Almond Street would continue into future phases.

New Pearl Street On-Ramp

Construction of the new northbound Pearl Street on-ramp to existing I-81 would start early in this phase, and the existing Pearl Street ramp would remain open until the new ramp is complete. Construction would need to be staged, with lane shifting as necessary. The existing Pearl Street ramp would continue to operate at a two-lane capacity at all times until it is replaced by the new ramp. The existing Butternut Street/State Street on-ramp to existing northbound I-81 also would remain in place until the new Pearl Street on-ramp is fully opened to traffic.

New Oswego Boulevard Off-Ramp

Early in this phase, construction would be started on the new southbound off-ramp from existing I-81 to Oswego Boulevard in areas available for construction. Traffic from southbound existing I-81

would continue to use the existing off-ramps with the following modifications: a temporarily realigned Salina Street off-ramp, temporary detour of the existing Franklin/Butternut Street off-ramp to Genant Drive, and a new Clinton Street off-ramp to existing Clinton Street.

Existing I-81 Northern Segment between Clinton Street/Salina Street (Interchange 19) and Westbound Route 370 to Liverpool (Interchange 24)

The reconstruction and realignment of the existing I-81 northern segment mainline would begin in this phase. The existing I-81 mainline and connector ramp capacity would be maintained. Existing Butternut Street and the existing Butternut Street bridge would be reconstructed after the combined sewer in this vicinity is relocated. Reconstruction of the mainline would be phased by shifting traffic onto reconstructed/widened sections constructed in Phase 1. Ramp entrance and exit areas would remain open, except for short-term closures, and lanes would be shifted as needed. A minimum of three through lanes of traffic in each direction would be maintained in this area throughout construction. The existing access ramp from Butternut Street to existing northbound I-81, and existing southbound I-81 to Spencer Street, would be open to traffic with temporary modifications until the end of construction. In addition, the existing southbound I-81 off-ramp to Butternut Street would be temporarily relocated to connect to Genant Drive/North Franklin Street to make room for reconstruction of Butternut Street and the Butternut Street bridge. Traffic along North Clinton and Salina Streets would be maintained throughout the construction period.

Phase 2B—Westbound I-690 Reconstruction

Phase 2B, which would take approximately 18 months to complete, consists of the reconstruction and realignment of westbound I-690, improvements to interchange ramps, and various other improvements to westbound I-690 along the approximately two miles between Leavenworth Avenue and Beech Street. Upon completion of Phase 2A, newly completed eastbound I-690 would be opened to two-way traffic (two eastbound and two westbound lanes). Once westbound I-690 traffic is detoured onto the newly completed eastbound I-690 section, the remaining sections of westbound I-690 would be demolished and completely rebuilt. At the conclusion of Phase 2B, westbound I-690 traffic would be moved onto the newly constructed section of westbound I-690, and eastbound I-690 would assume its final configuration. Specific improvements and WZTC elements that would be put in place during Phase 2B are described below and shown in **Figure 4-11**. For additional detail, refer to the Conceptual Construction Phasing and Maintenance and Protection of Traffic Plans in **Appendix A-1**.

Westbound I-690

Reconstruction of the westbound I-690 mainline and associated ramps would be performed during this phase, with completion of I-690 achieved by the end of the phase. Upon completion of Subphase 2A, westbound I-690 traffic would be detoured onto the newly completed eastbound I-690 section while the remaining sections of westbound I-690 would be demolished and completely rebuilt. In addition, once the westbound I-690 traffic is shifted onto the newly constructed eastbound highway, the existing westbound I-690 to northbound BL 81 ramp would be closed and reconstructed. Traffic from westbound I-690 would need to exit at Crouse Avenue and use Erie Boulevard and State Street or Burnet Avenue and State Street to reach the northbound BL 81 on-ramp at Pearl Street or Butternut Street. To accommodate these detoured vehicles as well as other traffic detours, the existing

Butternut/State Streets on-ramp would remain open, and the Pearl Street on-ramp would continue to operate with two-lane capacity. The temporary improvements at the Pearl Street ramp also would address existing merging problems associated with the existing on-ramp. At the conclusion of Subphase 2B, westbound I-690 traffic would be moved onto the newly constructed section of westbound I-690, and eastbound I-690 would assume its final configuration.

I-690 Interchange 11/12 (West Street/West Genesee Street)

The new I-690 interchange at West Street and the new at-grade intersection between West Street and West Genesee Street would be substantially complete by the end of Subphase 2A. During Phase 2B, the temporary eastbound I-690 off-ramp would be removed and Evans Street, including the Evans Street bridge over Onondaga Creek, would be constructed. Construction of westbound I-690 east of the West Street interchange would be reconstructed during this phase, therefore, the westbound off-ramp to West Street would remain closed. All other ramps at this interchange would remain open throughout this phase.

New Pearl Street On-Ramp

Early in this phase, as soon as existing westbound I-690 is shifted onto the eastbound I-690 section and the westbound I-690 to northbound BL 81 ramp is closed to traffic, the remaining portion of the new Pearl Street ramp, with local street extension to Erie Boulevard, would be constructed. During construction, the existing Pearl Street ramp would remain open with two-lane capacity at all times until it is replaced by the new ramp. The existing Butternut Street/State Street on-ramp to northbound BL 81 also would remain in place until the new Pearl Street on-ramp is completed and opened to traffic.

New Oswego Boulevard Off-Ramp

Once existing westbound I-690 is demolished, the remaining portions of the new southbound BL 81 to the Oswego Boulevard off-ramp (i.e., those portions over Salina Street and between westbound I-690 and Erie Boulevard) would be constructed. During construction of the new Oswego Boulevard off-ramp in this phase, traffic from southbound BL 81 would continue to use the existing off-ramps with modifications: the Salina Street off-ramp would be temporarily realigned, traffic on the existing southbound off-ramp to Butternut Street/North Franklin Street would be detoured to Genant Drive/North Franklin Street, and a portion of the new Clinton Street off-ramp would be utilized. The temporary ramp to Salina Street would remain open until the opening of the new Oswego Boulevard off-ramp. Construction of the remaining portions of the new Clinton Street off-ramp would then proceed and, once complete, the temporary southbound BL 81 off-ramp to Genant Drive/North Franklin Street would be removed.

Complete BL 81 Northern Segment between Clinton Street/Salina Street (Existing Interchange 19) and Westbound Route 370 to Liverpool (Existing Interchange 24)

The remaining reconstruction of the median area along the northern segment of BL 81 would be completed during this phase. A minimum of three travel lanes in each direction would be maintained throughout construction using shoulder closures and lane shifting. Once the new southbound BL 81

ramp to Oswego Boulevard is opened, the temporary southbound off-ramp to Genant Drive/North Franklin Street can be removed.

Complete Almond Street Construction

Construction along Almond Street would be completed during this phase. Traffic along Almond Street would be maintained in phases and lanes would be shifted as necessary. Traffic also would be accommodated on adjacent local streets, including those streets improved during previous phases.

4.4.2 CONSTRUCTION MEANS AND METHODS

This section describes the primary means and methods to construct the Community Grid Alternative. As explained in **Section 4-1**, the development of specific construction means and methods would be proposed by the Contractor. Therefore, the construction means and methods discussed below identify some of the factors that the Contractor may consider.

Most of the construction means and methods related to the Community Grid Alternative are identical or similar to those presented for the Viaduct Alternative. Therefore, the various means and methods discussions presented below primarily refer to the Viaduct Alternative discussion, although any differences are specifically identified.

Construction Staging Areas

The discussion of construction staging areas presented for the Viaduct Alternative is also applicable to the Community Grid Alternative.

Office/Administrative and Support Space

The discussion of office/administrative support space presented for the Viaduct Alternative is also applicable to the Community Grid Alternative.

Disposal and Borrow Sites

The discussion of disposal and borrow sites presented for the Viaduct Alternative is also applicable to the Community Grid Alternative.

Concrete Batch Plant

The discussion of concrete batch plant presented for the Viaduct Alternative is also applicable to the Community Grid Alternative.

Bridge and Buildings Demolition

The discussion of bridge and buildings demolition related to the existing I-81 viaduct and the I-690 mainline and associated interchange ramps presented for the Viaduct Alternative is also generally applicable to the Community Grid Alternative, with two differences. The first difference is the construction sequencing related to demolition of the existing I-81 viaduct south of Erie Boulevard, which would be more simplified for the Community Grid Alternative since a replacement viaduct would not need to be constructed. This would provide more flexibility in terms of the siting of staging areas and the phasing of construction.

The second difference is that fewer existing buildings would be required for right-of-way acquisition and demolition for the Community Grid Alternative than would be for the Viaduct Alternative. At present, it is anticipated that four buildings would be acquired and demolished for the Community Grid Alternative. As with the Viaduct Alternative, it is anticipated that all the building demolitions would occur in Phase 1 and that the associated right-of-way would provide space for interim staging and laydown areas during the early phases of construction and, ultimately, space needed for the Project.

New Bridge Substructure Construction

The discussion of new bridge substructure construction presented for the Viaduct Alternative is also generally applicable to the Community Grid Alternative. However, the discussion of new bridge substructure construction for this alternative is applicable to the I-690 and the I-481 portion of the Project, but not the existing I-81 viaduct portion of the Project, since this alternative would not require reconstruction of the existing I-81 viaduct once it has been demolished. In contrast, the Viaduct Alternative would require new bridge substructure construction for the reconstruction of the I-81 viaduct and of I-690 and its associated ramps but would not require substructure construction along the I-481 corridor.

New Bridge Superstructure Construction

The discussion of new bridge superstructure construction presented for the Viaduct Alternative also is generally applicable to the Community Grid Alternative. In particular, the discussion of new bridge superstructure construction for this alternative is applicable to the I-690 portion of the Project, as well as to the portion north of I-690 (where, for example, the Bear, Court, Spencer, and Butternut Street bridges would be reconstructed). However, it is not applicable to the existing I-81 viaduct portion of the Project, since the Community Grid Alternative would not require reconstruction of the existing I-81 viaduct once it has been demolished. The Community Grid Alternative would require superstructure construction along I-481 (including at the south and north interchanges with BL 81) and the relocation of the bridge carrying the New York, Susquehanna and Western service near Renwick Avenue (see **Chapter 3, Alternatives**, for more information).

4.4.3 CONSTRUCTION EQUIPMENT AND EMPLOYMENT

Table 4-5 provides a breakdown of the major types of equipment that could be used on site to construct the Community Grid Alternative. The equipment primarily would be used to perform to the heavy civil and structural activities associated with the Project (e.g., demolition, superstructure construction, and earthworks) and could have the greatest effect in terms of air emissions, particulates, and/or noise generation.

Table 4-5 lists engine type (diesel, gasoline, or electric), engine size (horsepower), the number of each equipment type to be employed, the percentage of time during a typical eight-hour workday that each equipment type would likely be in use, and the percentage of time that each equipment type would likely be in use during the duration of each task.

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Table 4-5
Community Grid Alternative: Potential Construction Equipment

Work Task	Start Date	End Date	Equipment Type	Engine type	Size (hp)	Qty	Daily Use*	Average Use**
Demolition	Month 1	Month 72	Hydraulic Excavator, 1 CY	Diesel	150	2	85%	30%
Demolition	Month 1	Month 72	Backhoe Loader, 48 hp	Diesel	48	2	85%	30%
Demolition	Month 1	Month 72	Backhoe Loader, 80 hp	Diesel	80	6	85%	35%
Demolition	Month 1	Month 72	Vibrating Plate, Gas, 21"	Gasoline	5	1	50%	10%
Demolition	Month 1	Month 72	Lead, 90' high	N/A	-	1	85%	30%
Demolition	Month 1	Month 72	Conc. Hammer Attach.	N/A	-	4	85%	35%
Demolition	Month 1	Month 72	Dump Truck, 12 CY, 400 hp	Diesel	400	1	85%	30%
Demolition	Month 1	Month 72	Cutting Torch	N/A	-	4	80%	25%
Demolition	Month 1	Month 72	Welder, Gas Engine, 300 amp	Gasoline	300A	1	85%	30%
Demolition	Month 1	Month 72	Lattice Boom Crane, 150 Ton	Diesel	300	1	85%	30%
Demolition	Month 1	Month 72	Acetylene Torches, 5", 1/2" weld size	N/A	-	2	20%	20%
Superstructure	Month 1	Month 72	Concrete Bucket, 1 CY	N/A	-	2	85%	35%
Superstructure	Month 1	Month 72	Concrete Pump (Small)	Diesel	400	2	100%	40%
Superstructure	Month 1	Month 72	Concrete Vibrator	Electric	20A	4	70%	45%
Superstructure	Month 1	Month 72	Lead, 90' high	N/A	-	5	85%	45%
Superstructure	Month 1	Month 72	Hammer, Diesel, 41k ft-lb	Diesel	220	2	90%	55%
Superstructure	Month 1	Month 72	Cutting Torch	N/A	-	7	90%	55%
Superstructure	Month 1	Month 72	Pickup Truck, 3/4 Ton	Diesel	300	12	100%	50%
Superstructure	Month 1	Month 72	Welder, Gas Engine, 300 amp	Gasoline	300A	7	90%	50%
Superstructure	Month 1	Month 72	Crawler Crane, 75 Ton	Diesel	250	4	100%	5%
Superstructure	Month 1	Month 72	Lattice Boom Crane, 150 Ton	Diesel	300	4	85%	35%
Superstructure	Month 1	Month 72	Hydraulic Crane, 25 Ton	Diesel	250	2	85%	30%
Superstructure	Month 1	Month 72	Hydraulic Crane, 55 Ton	Diesel	300	2	85%	30%
Superstructure	Month 1	Month 72	S.P. Crane, 4x4, 12 Ton	Diesel	200	1	40%	40%
Superstructure	Month 1	Month 72	Hand Tools	Electric	20A	30	85%	50%
Superstructure	Month 1	Month 72	Acetylene Torches, 5", 1/2" weld size	N/A	-	5	40%	40%
Earthworks	Month 1	Month 72	Hydraulic Excavator, 1 CY	Diesel	150	5	85%	35%
Earthworks	Month 1	Month 72	Hydraulic Excavator, 3.5 CY	Diesel	200	4	85%	35%
Earthworks	Month 37	Month 42	Backhoe Loader, 48 hp	Diesel	48	1	85%	45%
Earthworks	Month 1	Month 72	Vibrating Plate, Gas, 21"	Gasoline	5	1	50%	30%
Earthworks	Month 1	Month 72	Dozer, 300 hp	Diesel	300	1	85%	40%
Earthworks	Month 1	Month 72	Loader, Skid Steer, 30 hp	Diesel	30	1	90%	60%
Earthworks	Month 1	Month 72	Dump Truck, 12 CY, 400 hp	Diesel	400	20	90%	65%
Earthworks	Month 1	Month 72	Light Truck, 1.5 Ton	Diesel	450	1	100%	60%
Notes: * Daily Usage Percentage = Percentage of time that the equipment is in use during a typical 8-hour workday. Example: 75% daily use equals 75% of an 8-hour workday or 6 hours. ** Average Use Percentage = Percentage of time that the equipment is in use during the duration of the task. Example: For a task that lasts 4 quarters, 50% average use means that the equipment is in use half the time during the 4-quarter construction period, or 2 quarters. CY=cubic yard; hp=horsepower; S.P.=self-propelled								

As shown in **Table 4-5**, essentially all demolition, superstructure construction, and earthwork activities associated with the Community Grid Alternative would begin early in the construction period and continue throughout. Due to winter conditions in the Syracuse region, winter construction, including earthworks, would require special provisions, which are material and weather dependent. The only exception to this is the use of a backhoe loader during earthworks, which would occur for a seven-month period during Subphase 2A.

One of the factors used to estimate the on-site construction equipment and their durations of use is the number of on-site staff hours by category of worker involved in the construction of the heavy civil and structural elements of the Project. Estimates were developed based on the expertise and

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experience of construction estimators and various factors typically used by such estimators. Estimates were primarily used to develop the number of hours of heavy vehicle usage and of construction activities that would have the greatest effect on air quality and noise.

Table 4-6 shows estimates of construction employment. The estimates are of the number of on-site construction workers directly involved in the actual demolition and/or construction of the Project. Staff hours associated with ancillary functions, such as office/administrative work, material deliveries, construction inspection, construction management, landscaping, design engineering, safety oversight, and various vendor activities, are not included in this estimate. In addition, the indirect and induced employment associated with manufacture of materials to be used on-site, shipping of materials, and local services to accommodate the construction workers have not been estimated.

Table 4-6
Community Grid Alternative: Construction Staff Hours and Staff Years Generated

Description	Construction Staff Hours				Demolition Staff Hours				Total
	1	2A	2B	Total	1	2A	2B	Total	
Carpenters	111,333	481,743	474,482	1,067,558	90,860	68,145	68,145	227,150	1,294,708
Concrete Finishers/Masons	19,823	84,926	81,234	185,983	-	-	-	-	185,983
Common Building Laborers	84,715	307,715	285,045	677,475	553,342	415,014	415,014	1,383,370	2,060,845
Equipment Operators, Crane or Shovel	27,682	70,334	69,112	167,128	32,981	24,737	24,737	82,455	249,583
Equipment Operators, Light Equipment	4,545	13,933	8,597	27,075	-	-	-	-	27,075
Equipment Operators, Medium Equipment	8,457	39,162	31,585	79,204	259,939	194,949	194,949	649,837	729,041
Equipment Operators, Oilers	8,439	36,507	35,787	80,733	12,897	9,678	9,678	32,253	112,986
Helpers Average (5 trades)	12,675	24,034	24,034	60,743	51,601	38,705	38,705	129,011	189,754
Pile Drivers	17,749	107,078	107,078	231,905	-	-	-	-	231,905
Rodmen (Reinforcing), Foreman	14,031	78,781	78,781	171,593	-	-	-	-	171,593
Rodmen (Reinforcing)	50,837	268,298	268,298	587,433	-	-	-	-	587,433
Rodmen (Reinforcing), Apprentice	14,031	78,781	78,781	171,593	-	-	-	-	171,593
Skilled Workers Average (35 trades)	290	6,752	9,089	16,131	251,533	188,647	188,647	628,827	644,958
Structural Steel Workers	7,524	36,050	47,540	91,114	77,410	58,053	58,054	193,517	284,631
Welders, Structural Steel	158	748	994	1,900	1,617	1,204	1,204	4,025	5,925
Truck Drivers, Heavy	357,066	188,164	65,684	610,914	63,625	47,724	47,724	159,073	769,987
Total Staff Hours	739,355	1,823,006	1,666,121	4,228,482	1,395,805	1,046,856	1,046,857	3,489,518	7,718,000
Total Staff Years	356	876	801	2033	671	503	503	1678	3711

Table 4-6 also shows staff hours anticipated for on-site demolition and construction activities during each construction phase. As shown in the table, 7,718,000 staff hours spread across the three construction phases and six years of total construction are estimated for this alternative. Of this total, 3,489,518 staff hours would be involved in demolition activities while 4,228,482 staff hours would be involved in new construction activities.

Assuming a standard work year of 2,080 hours (40 hours per week for 52 weeks per year), the overall total number of staff hours for the entire Project would be equivalent to more than 3,711 staff years of employment.

4.5 MEASURES TO MINIMIZE AND MITIGATE ADVERSE CONSTRUCTION EFFECTS

4.5.1 CONSTRUCTION COMMITMENTS

To help avoid, minimize, and otherwise mitigate the adverse effects of construction activities on the community, NYSDOT would require its contractors to comply with measures listed in **Table 4-7**. The list includes measures to address traffic diversions, dust and debris, increases in emissions and noise, access to businesses and residences, and community engagement. Cumulatively, these measures would help address adverse effects during the construction period. In addition to these measures to minimize or otherwise mitigate adverse construction effects, **Table 4-7** also lists commitments to promote job training for and hiring of local residents for construction of the I-81 Viaduct Project.

4.5.2 PUBLIC OUTREACH

NYSDOT would require that the Contractor prepare a communication and public outreach plan for its approval. The plan would be implemented throughout the construction period. As it would be the Contractor's responsibility to develop and implement this plan, the specifics cannot be stated at this time. NYSDOT would assume the hands-on responsibility for administering the plan and ensuring its implementation. NYSDOT would coordinate with FHWA to implement public outreach efforts. At a minimum, the plan would include:

- Establishment of a centrally located, on-site project office that would accommodate drop-in visitors with any questions, comments, or concerns that they may have about ongoing and upcoming construction activities. The office would be staffed by at least one full-time person and open during standard work hours (i.e., 9:00 am to 5:00 pm) or as needed. The office would be accessible to the public via transit. Access to the office would be PROWAG compliant and the office itself would be ADAAG compliant.
- Establishment of a telephone number that would be used to call and ask any questions about ongoing and upcoming construction activities, to submit input, or discuss a concern. This number would be operated as a full-time, staffed telephone line; a part-time staffed telephone line; and/or an answering machine where callers can leave a message and knowledgeable staff would return their calls.
- Development and maintenance of a website to advise stakeholders and the general public of upcoming and current street closures, detours, nighttime construction activities, and locations and times of particularly noisy construction activities; identification of specific locations where construction is currently being implemented or will be implemented; notification of any changes to the project schedule; identification of temporary staging locations; and identification of on-site mitigation measures that are currently being or will be employed.
- Development of a specific communication schedule and procedures for providing construction status updates and other construction-related information to the general public. Procedures that may be used include distribution of flyers at facilities that are regularly frequented by members of the local communities (e.g., houses of worship, entranceways to apartments/community homes, certain local businesses), public notices in local papers, and notification of meetings on public buses. The flyers and public notices would be printed in both English and Spanish, as appropriate.

- Development of a specific communication schedule and procedures for providing construction status updates and planned coordination meetings with public and private entities including, but not necessarily limited to, city/municipal engineering, city/municipal planning, city/municipal clerk, city/municipal mayor, other city/municipal offices as appropriate, police stations, fire departments, ambulance services, hospitals, universities, schools, libraries, houses of worship, large employers, transit providers, and trucking and freight services.
- Development of a specific communication schedule and procedures for coordinating with media (e.g., local radio stations, local television stations, local newspapers) to disseminate construction-related information, such as upcoming and current street closures, detours, and nighttime construction activities to the general public. These procedures should also include opportunities for implementing social media alerts via Facebook, Twitter, or other appropriate social networking services. These various media outlets would include both English- and Spanish-speaking audiences, as appropriate.

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Table 4-7

Measures and Commitments to Minimize Construction Effects

Technical Area	Commitments
Transportation	Develop a Traffic Management Plan, which would identify traffic management strategies, such as: -- Implementing expanded and improved Intelligent Transportation Systems; -- Implementing local street improvements early in the Project; -- Retiming signals within the Project limits; -- Designating truck routes or truck detour; and -- Providing planned and unplanned Traffic Incident Management. Identify in the plan transit or High Occupancy Vehicle (HOV) measures, such as: -- Adding bus routes and/or adding buses to existing routes; -- Providing park-and-ride facilities; -- Implementing a rideshare action plan; -- Coordinating employee shuttles with local employers; and -- Implementing Transportation Demand Management measures (e.g., guaranteed ride home, car sharing, and carpool matching).
	Establish aggressive completion and/or milestone dates to minimize construction durations.
	Refine the construction staging plan to reduce the need for highway/street closures and detours.
	Implement capacity and safety enhancements early in construction phase to reduce the impacts of later phases of the Project.
	Direct Contractor to shuttle construction workers from remote parking sites to construction areas, when reasonable.
	Direct Contractor to maintain safe pedestrian traffic and to maintain public access to intersecting roads, residences, business establishments, adjacent property, bus stops, and transportation facilities for vehicles, pedestrians, and bicyclists. Where sidewalks, walkways, or shoulders must be temporarily closed to facilitate construction, safe pedestrian passage shall always be maintained on one side of the roadway, unless other temporary pedestrian accommodations are provided in the contract documents. Construction zone pedestrian access would be maintained in accordance with the Accessibility Guidelines for Pedestrian Facilities in the Public Right of Way.
Community Character and Social Considerations	Provide incentive and disincentive clauses to the construction contract to minimize construction durations.
	Direct Contractor to manage all surplus materials and waste generated in the performance of the contract in accordance with applicable federal, state, and local laws and regulations.
	Require Contractor to maintain safe storage of construction materials; remove construction waste and debris generated from the work site and dispose of waste containers at regular intervals; and utilize construction barriers that are uniform and well maintained.
	Require that temporary construction lighting shall be designed, installed, and operated to avoid glare that affects traffic on the roadway or that causes annoyance or discomfort for residences adjoining the roadway, when reasonable.
	Coordinate with emergency service providers as well as hospitals near the construction zone to minimize the impact of construction activities on their operations.
	Require that there are no short-term temporary lane and/or shoulder closures during major holidays and major events. Long-term lane and/or shoulder closures would be retained as necessary. The NYSDOT will reserve the right to cancel any work operations that would create traffic delays by unforeseen events.

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Table 4-7 (cont'd)
Measures and Commitments to Minimize Construction Effects

Technical Area	Commitments
Community Character and Social Considerations	Continue to coordinate with the Syracuse City School District during construction regarding potential effects on schools near the construction zone. During final design, NYSDOT would consider implementing additional construction restrictions within the construction zone near Dr. King Elementary School, such as time and/or seasonal restrictions where appropriate.
	Under the Community Grid Alternative, construct a wall adjacent to BL 81 and the Loretto facility. The wall would serve as a health and safety barrier protecting the integrity of the specialized care and treatment provided at the Loretto facility.
Economic Considerations	Inform the public regarding construction zones, traffic delays, road closures, and detours in a timely manner.
	Direct Contractor to maintain access to businesses for vehicles, pedestrians, and bicyclists. If access cannot be maintained, require the Contractor to notify the business and provide alternative access. If alternative access cannot be provided, the Contractor must conduct work when the business is not operational and must restore access during business hours.
	Permanent property acquisitions and displacements would be conducted in accordance with the NYS Eminent Domain Procedure Law and the Uniform Relocation Assistance and Real Property Acquisition Policies Act.
	Establish agreements with property owners for any temporary easements that are required for construction prior to the start of work.
	Direct Contractor to install temporary business signs to identify entrances and direct customers to businesses that would be affected by detours.
	Promote job training for and hiring of local residents for construction of the I-81 Viaduct Project.
	<ul style="list-style-type: none"> — In coordination with FHWA, establish a local hiring preference for the I-81 Viaduct Project and expand NYSDOT's On-the-Job Training program for the Project to increase access for individuals to seek careers in heavy highway construction. — Continue the Workforce Forward: Syracuse program, which is connecting workers to training opportunities and infrastructure jobs in and around Syracuse, including individuals to work on ancillary jobs that would be created by the I-81 Viaduct Project. — Create a video program to introduce and encourage high school students to pursue careers in highway construction; coordinate with the Syracuse City School District and its P-Tech program to solicit interest and use employment opportunities for the I-81 Viaduct Project to encourage participation. — Advertise training programs and construction employment opportunities at public meetings and the Project's outreach center. — Monitor the local hiring metrics throughout the Project and conduct regular meetings with the WorkSmart NY Syracuse Build Collaborative to discuss progress and any steps to modify the initiatives.
Cultural and Historic Resources	Implement all stipulations specified in the Project's Section 106 Programmatic Agreement.
	Continued consultation and coordination among the State Historic Preservation Office, Federal Highway Administration, the Advisory Council on Historic Preservation, the Onondaga and Tuscarora Nations, and NYSDOT regarding the Project's effects on historic and cultural resources as stipulated in the Project's Section 106 Programmatic Agreement (see Appendix E-6).

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Table 4-7 (cont'd)
Measures and Commitments to Minimize Construction Effects

Technical Area	Commitments
Parklands and Recreational Resources	<p>Establish a 20-foot (0.12-acre) safety buffer between Wilson Park and the construction zone. To mitigate the temporary loss of parkland at Wilson Park:</p> <ul style="list-style-type: none"> — Prior to construction, construct a basketball court west of the bleachers in the location of the former tennis court; — After construction, add a third hoop and backboard to the new court, benches, new shade trees, a new water fountain in the basketball court area, a new splash pad, new pavement for access from Jackson Street, and other fence, pedestrian gates, and parking improvements; and — Once construction is complete, reconstruct the existing eastern basketball court and regrade and reseed the adjacent lawn area. — Install signage to inform the public that the safety buffer is closed to the public.
Air Quality	<p>Use Ultra Low Sulfur Diesel fuel to operate all diesel engines.</p> <p>Use construction equipment that meets Tier 4 emissions standards, where appropriate and to the extent practicable.</p> <p>Direct Contractor to schedule and conduct activities and to employ appropriate protection techniques to minimize impacts to air quality and to prevent hazardous or objectionable air quality conditions, particularly for drillings, cutting, grinding, abrasive blasting, or similar activities.</p> <p>Restrict the burning of any materials on the construction site</p> <p>Require the Contractor to develop and implement a Dust Control Plan that includes pro-active measures to prevent discharge of dust into the atmosphere. In areas not subject to traffic, apply products and materials including vegetative cover, mulch, and spray adhesives on soil surfaces to prevent airborne migration of soil particles. In areas subject to traffic, apply products and materials including water sprinkling, polymer additives, barriers, windbreaks, and wheel washing.</p> <p>Direct Contractor to protect sensitive receptors including hospitals, schools, daycare facilities, building fresh air or ventilation intakes, elderly housing, and convalescent facilities from impacts of diesel exhaust fumes. The Contractor shall:</p> <ul style="list-style-type: none"> — Ensure that diesel powered engines are located away from building air conditioners and windows; — Minimize exposure of sensitive receptors in proximity (50') to diesel exhaust, in terms of both concentration and time; and — Limit idling time for diesel powered equipment to three consecutive minutes for delivery and dump trucks and all other diesel powered equipment with limited exceptions. <p>Implement an outdoor ambient air quality monitoring program during construction that will be overseen by NYSDOT. The program would identify the locations, including a location near the Dr. King Elementary School, and durations of air quality monitoring and protocols to address any exceedances of National Ambient Air Quality Standards, should they be observed, during final design.</p> <p>Direct Contractor to use solar powered digital signs, including arrow panels and portable variable message signs when reasonable.</p>
Noise and Vibration	<p>Implement a noise and vibration monitoring program during construction.</p> <p>Coordinate work operation to coincide with time periods that would least affect neighboring residences and businesses. Normal work hours would be scheduled between 6:00 a.m. and 9:00 p.m. Nighttime, Saturday morning, and Sunday construction activities would be limited to 70dBA Lmax at 50' in Noise Sensitive Areas when reasonable (schools, places of worship, medical facilities, residential areas).</p>

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7 4-7 (cont'd)

Measures and Commitments to Minimize Construction Effects

Technical Area	Commitments
Noise and Vibration	Implement abatement measures that would include shrouds or other noise curtains, acoustic fabric, soundproof housings, physical barriers, and/or enclosures to reduce noise from pile drivers, compressors, generators, pumps, and other loud equipment when reasonable.
	Restrict the use of impact and drilling equipment including pile drivers, jackhammers, hoe rams, core drills, direct push soil probes (e.g., Geoprobe), pavement breakers, pneumatic tools, and rock drills when reasonable.
	Require motorized construction equipment to be equipped with an appropriate well-maintained muffler and require silencers to be installed on both air intakes and air exhaust when reasonable.
	Require all construction devices with internal combustion engines to be operated with engine doors closed and with noise-insulating material mounted on the engine housing that does not interfere with the manufacture guidelines.
	Direct Contractor to transport construction equipment and vehicles carrying rock, concrete, or other materials along designated routes that would cause the least disturbance to noise sensitive receptors when reasonable.
	Require self-adjusting or manual audible back up alarms for vehicles and equipment used in areas adjacent to sensitive noise receptors.
	Direct Contractor to use pre-auguring equipment to reduce the duration of impact or vibratory pile driving when reasonable.
	Provide as much notice of construction activities to the hospitals and medical facilities as possible and would coordinate with them to resolve schedule conflicts if construction activities would impact critical surgeries or procedures.
	For the construction zone between MLK, Jr. East and Harrison Street: -- Direct Contractor to use saw cutting methods and prohibit impact hammers during the demolition of existing structures when reasonable; and -- Direct Contractor to use drilled foundations on all bridge piers and other support structures and prohibit pile driving methods.
Water Quality, Surface Waters, and Wetlands	Direct Contractor to protect all water resources within the contract limits and adjacent lands and take measures to maintain water quality of receiving water bodies in accordance with Federal and State regulations.
	Prepare a Stormwater Pollution Prevention Plan (SWPPP) to meet the requirements of the State Pollutant Discharge Elimination System General Permit for Stormwater Discharges from Construction Activity. Contractor will be directed to install erosion and sediment controls in accordance with the New York Standards and Specifications for Erosion and Sediment Control and the requirements of the NYSDOT Highway Design Manual, Chapter 8 Highway Drainage.
	Minimize temporary impacts to surface waters and wetlands to the extent practicable. Best management measures such as turbidity curtains, cofferdams, and temporary piping or diversion of Onondaga Creek, Mud Creek, and the North Branch Ley Creek tributary would be implemented for any in-water construction activities, as necessary, to maintain stream flow and minimize increases in suspended sediment. Disturbed streambanks will be stabilized in accordance with the SWPPP and the requirements of the NYSDOT Highway Design Manual, Chapter 8 Highway Drainage, using native riparian plant species where possible. Disturbed wetland areas will be restored using soil restoration techniques and planting of native plants where possible, as per the landscape restoration plan that would be developed for this alternative.

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Table 4-7 (cont'd)

Measures and Commitments to Minimize Construction Effects

Technical Area	Commitments
General Ecology	Direct Contractor to conduct tree clearing during the winter hibernation period for Indiana bat and northern long-eared bat. Bridge bat surveys will be conducted during the roosting season and prior to construction to determine if there is any evidence of bats actively using bridges identified for removal.
	Require that new culverts intended to convey surface water have a minimum width of 1.25 x bankfull and would be embedded or three sided (open bottom) to allow for passage of aquatic organisms and small terrestrial species. Provisions for wildlife passage will be incorporated in the culvert design where practicable.
	Direct Contractor to revegetate disturbed areas in accordance with a Landscape Restoration Plan to include native plant species.
Contaminated Materials	Require Contractor to prepare a project-specific Safety and Health Plan.
	Remove and transport all contaminated materials in accordance with Federal and State regulations.
	Require Contractor to dispose of soil contaminated with petroleum or other non-hazardous materials as non-hazardous industrial waste at a permitted solid waste management facility or use it in applications that have received generic or case-specific beneficial use determinations from the New York State Department of Environmental Conservation.
Lead Based Paint	Implement a lead-based paint public education program, in coordination with the Onondaga County Health Department, prior to the demolition of the existing I-81 viaduct and adjacent structures. Potential activities could include the development of educational materials on household protocols to prevent the spread of contaminated dust into homes and holding a community session/meeting focused on demolition and ways to protect residents from lead dust during construction.
	Require Contractor prepare a Lead Exposure Control Plan that includes practices and measures that will be implemented to ensure the safety and health of employees who may be exposed to lead during construction work. By extension this plan will be developed to protect the general public. The LECP is consistent with the OSHA Lead Standard (29 CFR 1926.62) and will address all the requirements of that standard.
Public Engagement	Provide early and continual public involvement opportunities throughout the transportation planning process, including providing information on the Project's website, making public announcements, and providing numerous opportunities for input.
	Provide timely information about transportation issues and processes to the general public, affected public agencies, freight shippers, private providers of transportation, and others affected by transportation plans, programs, and projects.
	Use Variable Message Signs to provide real-time motorist information concerning construction dates, traffic changes, delays, and other pertinent work zone traffic related information.
	Develop a construction communication program to guide community engagement throughout construction.
	Establish a project outreach center to disseminate construction information and to obtain input from the public.
	Conduct community open houses periodically throughout the construction period to proactively disseminate construction information and to receive comments regarding construction from the community.
	Establish a phone and email hotline to accept comments regarding construction operations.
	Develop an app and/or social media platform to communicate construction status, detours, closures, and other relevant construction information.
	Coordinate with local media to communicate construction information.
	Establish a protocol to accept and address community complaints.