I-81 Viaduct Project
Onondaga County, New York

COMMUNITY GRID ALTERNATIVE
EVALUATION OF FULL AND PARTIAL BL 81/I-690 INTERCHANGE OPTIONS
(Draft)

Prepared by:

PARSONS

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INTRODUCTION

The New York State Department of Transportation (NYSDOT), in cooperation with the Federal Highway Administration (FHWA), is preparing a Draft Design Report/Draft Environmental Impact Statement (DDR/DEIS) for the Interstate 81 (I-81) Viaduct Project (the Project) in the City of Syracuse, Onondaga County, New York. The purpose of the Project is to address structural deficiencies and non-standard highway features while creating an improved corridor through the City of Syracuse that meets the transportation needs and provides the transportation infrastructure to support long-range planning efforts.

The Project alternatives consist of the No Build Alternative, the Viaduct Alternative, and the Community Grid Alternative. The No Build Alternative, required by NEPA as the baseline to which the build alternatives are compared, would involve continual maintenance and repairs to the highway, which would be retained in its existing configuration. The Viaduct Alternative would involve the reconstruction of I-81 between approximately Colvin Street and Hiawatha Boulevard, including the replacement of the existing viaduct with a new viaduct, and the reconstruction of I-690 between Leavenworth Avenue and Lodi Street, including a full I-81/I-690 interchange. The Community Grid Alternative would remove the I-81 viaduct between the New York, Susquehanna and Western Railway (NYS&W) bridge near Renwick Avenue and the I-81/I-690 interchange and replace it with an urban arterial at grade. The section of I-81 between the southern I-81/I-481 interchange (Interchange 16A) and the I-81/I-481 northern interchange (Interchange 29) in Cicero would be de-designated as an interstate and the existing segment of I-481 between these two interchanges would be re-designated as the new I-81. As shown in Figure 1, the portion of existing I-81 between its northern and southern interchanges with I-481 would be re-designated as a business loop of I-81 (BL 81). The Community Grid Alternative also would involve the full reconstruction of I-690 from Leavenworth Avenue to Beech Street. Options with and without a fully directional interchange between BL 81 and I-690 were considered as part of this alternative.

The Project Area consists of portions of I-81, I-690, and I-481 where project elements may be implemented. It includes the southern and northern interchanges of existing I-81 with I-481 (Exits 16A and 29, respectively); the portion of existing I-81 between Colvin Street and Hiawatha Boulevard, including the existing I-81 viaduct and the existing I-81/I-690 interchange in Downtown Syracuse (I-81 Viaduct Area); I-690 between Leavenworth Avenue and Beech Street; existing I-481 between I-690 and the New York State Thruway (I-90); and

1 According to AASHTO, a business route is “a route principally within the corporate limits of a city which provides the traveling public an opportunity to travel through that city, passing through the business part of the city, while the regular number is used to obviate passing through the congested part of the city.” A “business loop” is a route that leads into a downtown business district and returns to the freeway at the other end. The designation of BL 81 would be subject to review and approval by AASHTO. In addition, interstate changes are subject to approval by FHWA.
Community Grid Alternative: Business Loop 81

Figure 1
selected local roads in Downtown Syracuse. In addition, I-690 joins with I-90 west of Onondaga Lake, just beyond the Project Area.

Per FHWA’s Policy on Access to the Interstate System (May 22, 2017), this white paper includes a comparison of the design, operational, safety, and other considerations of providing a partial interchange or a full interchange between I-690 and BL 81 for the Community Grid Alternative. The limits evaluated for this comparison include an evaluation of a small and specific portion of the overall project, generally bounded by Hiawatha Boulevard to the west and north, Almond Street to the east, and I-690 to the south, with the addition of other localized areas affected by the design options (see Figure 2). Additionally, this white paper identifies mitigation measures proposed to compensate for the missing movements under the partial interchange option, including wayfinding signage, impacts on local intersections, and mitigation of driver expectation leading to wrong-way movements on ramps.

**EXISTING CONDITIONS**

Under the existing condition, the I-81/I-690 interchange is a partial interchange, with six of the eight possible connections provided. The interchange does not provide either the eastbound I-690 to northbound I-81 movement or the southbound I-81 to westbound I-690 movement. Currently, motorists use Bear Street and Hiawatha Boulevard to travel between these directions (see Figure 2). While Bear Street is the signed route for these movements, local motorists familiar with the area also use Hiawatha Boulevard.

All intersections along both Bear Street and Hiawatha Boulevard currently operate at LOS D or better during peak hours. Along the Bear Street designated route, several Priority Investigation Locations (PILs) were identified by NYSDOT. At these locations, NYSDOT recently implemented safety improvements and has programmed others for the near future to address conditions at these PILs.
I-81 Viaduct Project

Figure 2

Existing I-81/I-690 Interchange

Existing WB I-690 to NB I-81
Existing SB I-81 to EB I-690

Existing EB I-690 to NB I-81
Existing SB I-81 to WB I-690

Alternate connection route
SB I-81 to WB I-690 and
EB I-690 to NB I-81

Existing NB I-81 to EB I-690
Existing SB I-81 to WB I-690 connection

Existing EB I-690 to NB I-81 connection
Existing SB I-81 to EB I-690

Existing EB I-690 to SB I-81
Existing NB I-81 to WB I-690

Existing WB I-690 to NB I-81

Figure 2
COMPARISON OF FULL AND PARTIAL BL 81/I-690 INTERCHANGE OPTIONS

As stated earlier, NYSDOT evaluated two options for the proposed BL 81/I-690 interchange under the Community Grid Alternative: a full interchange and a partial interchange.

Earlier in the design process, the Community Grid Alternative retained an interstate designation along the current alignment of I-81 from I-690 to the existing northern I-81/I-481 interchange (Interchange 29). The full interchange option, which would provide a full interchange making all connections between BL 81 and I-690, was considered in accordance with AASHTO’s “A Policy on Design Standards – Interstate System” (May 2016), which states, “Interchanges shall be provided between all intersecting interstate routes, between other selected access-controlled highways, and at other selected public highways to facilitate the distribution of traffic. Each interstate shall provide for all traffic movements.” To reduce the property and displacement impacts of this full interchange concept and improve wayfinding by maintaining the 81 designation through the City of Syracuse, the business loop concept was introduced into the design of the Community Grid Alternative. While the northern segment of the business loop would not be an interstate, it would remain a freeway. Therefore, NYSDOT evaluated both a full interchange option and a partial interchange option to determine their advantages and disadvantages.

Under the full interchange option, the four possible connections between BL 81 and I-690 would be provided. These four connections consist of the two new ramps that would be built to provide the direct connections that are unavailable today (between eastbound I-690 and northbound BL 81 and between southbound BL 81 and westbound I-690) and the two existing ramps between the two freeways (northbound I-81 [future BL 81] to eastbound I-690 and westbound I-690 to northbound I-81 [future BL 81]), as shown on Figure 3. With the removal of the viaduct, the other four existing ramps, which connect to and from the southern segment of existing I-81, would no longer be needed and would be removed. Instead, connections would be made from I-690 to the local streets (e.g., Crouse and Irving Avenues).

Under the partial interchange option (see Figure 4), two of the possible four ramps between BL 81 and I-690 (southbound BL 81 to eastbound I-690 and westbound I-690 to northbound BL 81) would be reconstructed to accommodate the same movements that are available today. As noted above, the other two movements are missing from the existing I-81/I-690 interchange, as well as from the proposed partial interchange. Therefore, motorists would continue to use Bear Street and Hiawatha Boulevard to travel between eastbound I-690 and northbound BL 81 and between southbound BL 81 and westbound I-690 (see conceptual signing plans in Attachment 2).

NYSDOT analyzed the operations and capacity of Bear Street and Hiawatha Boulevard and determined that with minor improvements, such as signing, striping, and signal upgrades, these routes would continue to function safely and efficiently in the future under the partial interchange option without providing the additional direct connections between BL 81 and I-690.
Southbound BL 81 would contain four travel lanes.

W. Division St. would become a dead end.

Genant Dr. would be severed between W. Division St. and N. Clinton St.

Southbound BL 81 to westbound I-690 ramp

Southbound BL 81 to eastbound I-690 ramp

Eastbound I-690 to northbound BL 81 ramp

Westbound I-690 to northbound BL 81 ramp

FIGURE 3

Community Grid Alternative
Full BL 81/I-690 Interchange Option
Southbound BL 81 would contain three travel lanes.

Genant Dr. between W. Division St. and N. Clinton St. would remain open.

Southbound BL 81 to eastbound I-690 ramp.

Reconstructed Butternut St. bridge.

Westbound I-690 to northbound BL 81 ramp.

215 Genant Dr.

Community Grid Alternative
Partial BL 81/I-690 Interchange Option

Figure 4
Under both the full and partial interchange options, all new and reconstructed ramps would include longer acceleration and deceleration lanes that meet the recommended design standard and stopping sight distance standards. However, the full interchange option would result in one additional nonstandard feature, six additional non-conforming features, and additional building impacts (refer to DESIGN CONSIDERATIONS, below, for a more detailed discussion). Table 1 provides a summary of the evaluation of the two interchange options, and specific evaluation criteria are discussed in greater detail below.
Table 1: Comparison of Full and Partial BL 81/I-690 Interchange Options

<table>
<thead>
<tr>
<th>Description</th>
<th>Full Interchange</th>
<th>Partial Interchange</th>
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<tbody>
<tr>
<td><strong>Business loop with all four possible interchange connections between BL 81 and I-690 (Full Interchange)</strong></td>
<td>• To meet vertical clearance requirements, Butternut Street bridge would be relocated farther north</td>
<td>• Butternut Street bridge would be reconstructed in similar location as the existing one</td>
</tr>
<tr>
<td><strong>Business loop with two interchange connections (Partial Interchange)</strong></td>
<td>• Would introduce at least one, and possibly several other, nonstandard feature to avoid building acquisitions</td>
<td>• Would not introduce any additional nonstandard or non-conforming features - all ramp spacings would meet recommended design standards</td>
</tr>
<tr>
<td><strong>Would introduce three additional non-conforming ramp spacing conditions and three non-conforming LOS locations</strong></td>
<td>• Would create larger mass of transportation infrastructure in Downtown/Northside areas due to ramps, associated widening of I-690, and additional lane on BL 81</td>
<td>• Would minimize building acquisitions</td>
</tr>
<tr>
<td><strong>Would result in acquisition of up to seven additional buildings - five of these could be avoided by introducing additional non-standard features, but two are unavoidable</strong></td>
<td>• Would result in acquisition of up to seven additional buildings - five of these could be avoided by introducing additional non-standard features, but two are unavoidable</td>
<td>• Would result in a smaller transportation footprint than the existing condition</td>
</tr>
<tr>
<td><strong>Would create larger mass of transportation infrastructure in Downtown/Northside areas due to ramps, associated widening of I-690, and additional lane on BL 81</strong></td>
<td>• Bear Street and Hiawatha Boulevard operations would be improved with the reduction in traffic</td>
<td>• Bear Street and Hiawatha Boulevard would continue to operate well with a minor intersection improvement</td>
</tr>
<tr>
<td><strong>Lower level of service (LOS) at BL 81 and I-690 due to increased traffic and merging/diverging maneuvers (3 locations at LOS E/F)</strong></td>
<td>• Lower VMT. Trip lengths would be 0.8 to 1.7 miles (or 24 to 50 percent) shorter than under the full interchange option</td>
<td>• Higher LOS at BL 81 and I-690 (LOS D or better)</td>
</tr>
<tr>
<td><strong>Would attract more traffic to Geddes Street and lower the LOS (7 intersections at LOS E/F)</strong></td>
<td>• Lower travel time</td>
<td>• Higher LOS on Geddes Street (LOS D or better)</td>
</tr>
<tr>
<td><strong>Lower travel time</strong></td>
<td>• Higher vehicle miles traveled (VMT)². Trip lengths would increase by 0.8 to 1.7 miles (or 30 to 100 percent) compared to trips currently using Bear Street and Hiawatha Boulevard</td>
<td>• Higher travel time</td>
</tr>
<tr>
<td><strong>Four new ramp junctions on freeways</strong></td>
<td>• Four new ramp junctions on freeways</td>
<td>• NYSDOT recently implemented safety improvements along Bear Street and Hiawatha Boulevard and has programmed others for the near future to ensure the safe operation of these routes</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td>• $1.99 billion ($90 million higher than the partial interchange)</td>
<td>• $1.90 billion</td>
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² Vehicle miles traveled (VMT) measures the amount of travel for all vehicles in a geographic region over a given period of time.
### I-81 Viaduct Project
#### Evaluation of Full and Partial BL 81/ I-690 Interchange Options

<table>
<thead>
<tr>
<th></th>
<th>Full Interchange</th>
<th>Partial Interchange</th>
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<tbody>
<tr>
<td><strong>Property and Socioeconomic Impacts</strong></td>
<td>• Would require acquisition of 6 to 11 buildings</td>
<td>• Would require acquisition of 4 buildings</td>
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<td></td>
<td>• Displacement of up to 197 employees</td>
<td>• Displacement of 35 employees</td>
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<tr>
<td><strong>Cultural Resources (Architectural)</strong></td>
<td>• Veteran’s Fastener Supply, eligible for listing on the National Register of Historic Places (NRHP), would be demolished</td>
<td>• No direct impacts</td>
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<td></td>
<td>• Learbury Centre, eligible for listing on the NRHP and a contributing resource to the North Salina Street Historic District, would be demolished</td>
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<tr>
<td></td>
<td>• North Salina Street Historic District would be affected by the demolition of the Learbury Center, a contributing resource</td>
<td></td>
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<tr>
<td><strong>Visual</strong></td>
<td>• New flyover connector ramps would be as high as approximately 66 feet above existing grade – about 25 feet higher than all other infrastructure in the area</td>
<td>• No new connector ramps</td>
</tr>
<tr>
<td></td>
<td>• The scale, mass, and height of the new connector ramps would result in adverse visual impacts, particularly in the Franklin Square area</td>
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### DESIGN CONSIDERATIONS

As previously described, the full interchange option includes all four of the possible connections between I-690 and BL 81 (see Figure 5), and the partial interchange option would provide two of the possible four ramp connections (see Figure 6). Construction of the full interchange option instead of the partial interchange option would introduce several design implications, including:

**Butternut Street Alignment** – The reconstruction of the Butternut Street bridge would be required under both options, but under the partial interchange option, the new bridge location would be very similar to the existing one. As a result, Butternut Street would follow its existing route and connect to North Franklin Street at the same location as it does today. Under the full interchange option, the Butternut Street bridge would need to be relocated farther north to provide adequate vertical clearance over the eastbound I-690 to northbound BL 81 ramp. The realignment of Butternut Street farther north would result in other impacts, which include:

- Butternut Street would connect with North Franklin Street where Genant Drive currently connects. Currently, Butternut Street is aligned with North Franklin Street just north of I-690 and forms a fairly straight route between the Northside neighborhood and the Armory Square area. The relocation of Butternut Street would introduce a left turn onto North Franklin Street and route traffic through a portion of the residential Franklin Square neighborhood.
Southbound BL 81 would contain four travel lanes.

W. Division St. Butternut St. Salina St. West St.

DOWNTOWN

Franklin Square

NORTHSIDE

Genant Dr. would be severed between W. Division St. and N. Clinton St.

215 Genant Dr.

N. Clinton St. extension

117 Butternut St.

Relocated Butternut St. bridge

Eastbound I-690 to northbound BL 81 ramp

329 N. Salina St.

Westbound I-690 to northbound BL 81 ramp

Southbound BL 81 to westbound I-690 ramp

215 Genant Dr.

Southbound BL 81 to eastbound I-690 ramp

329 N. Salina St.

Community Grid Alternative Full BL 81/I-690 Interchange Option

Enlargement

Figure 5
Genant Dr. between W. Division St. and N. Clinton St. would remain open

Reconstructed Butternut St. bridge

Westbound I-690 to northbound BL 81 ramp

Southbound BL 81 to eastbound I-690 ramp

Butternut St

Salina St

Genant Dr

West St

N. Clinton St

Franklin Square

NORTHSIDE

DOWNTOWN

Community Grid Alternative Partial BL 81/I-690 Interchange Option Enlargement

Figure 6
- Genant Drive would be severed from North Clinton Street and North Franklin Street.

**Lanes Required on Southbound BL 81** – The addition of the southbound BL 81 to westbound I-690 ramp would cause an increase in southbound traffic between Hiawatha Boulevard and I-690, necessitating the widening of southbound BL 81 from three to four lanes in this segment. The widening would cause additional right-of-way (ROW) impacts, as well as increased impacts to Genant Drive. Under the partial interchange option, the existing smokestack associated with the building at 706-16 North Clinton Street would not be acquired and Genant Drive between West Division Street and North Clinton Street would remain a one-way southbound city street. Under the full interchange option, the additional southbound lane would require the removal of the aforementioned smokestack and segment of Genant Drive. In addition, the offset from the corner of the building at 311 Genant Drive to the edge of the southbound BL 81 shoulder would be reduced. Under the partial interchange option, the corner of the existing building would be 25 feet from the edge of the southbound BL 81 shoulder. Under the full interchange option, the corner of the existing building would be 15 feet from the edge of the southbound BL 81 shoulder.

**Additional Non-Standard Features** – Construction of the full interchange option instead of the partial interchange option would result in one additional non-standard feature, as follows:

- Grade – The 7.2 percent grade of the eastbound I-690 to northbound I-81 ramp would be non-standard (6 percent is standard). This steeper grade would be required for the ramp to pass beneath the Butternut Street bridge and meet vertical clearance criteria.

**Additional Non-Conforming Features** – Under the partial interchange option, all ramp spacings would meet the recommended standards and all freeway segments would operate at LOS D or better. The full interchange option, however, would result in three non-conforming ramp spacing features and three non-conforming LOS locations:

- Ramp spacing between the eastbound I-690 off-ramp to West Street and the next eastbound I-690 ramp - Under the partial interchange option, the proposed design spacing between the eastbound I-690 off-ramp to West Street and the subsequent ramp (eastbound I-690 on-ramp from West Street) would be approximately 2,225 feet, which would meet recommended design standards. The addition of the eastbound I-690 to northbound BL 81 ramp under the full interchange option would place an additional ramp within this segment and create a non-conforming ramp spacing of 450 feet (1,000 feet is recommended) between the eastbound I-690 off-ramp to West Street and the eastbound I-690 off-ramp to northbound BL 81.

- Ramp spacing between the point where the Pearl Street and westbound I-690 onrams merge into northbound BL 81 and the subsequent ramp (eastbound I-690 to northbound BL 81 ramp) - Under the partial interchange option, the proposed ramp design spacing between the point where the Pearl Street and westbound I-690 onrams merge into BL 81 and the subsequent ramp (northbound BL 81 off-ramp to Court Street) is approximately 2,725 feet, which would meet recommended design standards. Under the full interchange option, the eastbound I-690 to northbound BL 81 ramp would place an additional ramp within this segment and create a non-conforming ramp spacing of 1,675 feet (2,000 feet is recommended) between the point where the eastbound I-690 to northbound BL 81 ramp merges into BL 81 and
the off-ramp to Court Street begins. In addition, as a result of this spacing, the on-ramp from eastbound I-690 would be extended to the off-ramp to Court Street as an auxiliary lane, creating a weaving, rather than a merge/diverge, condition.

- Ramp spacing between the southbound BL 81 split to eastbound I-690/Clinton Street and the next southbound ramp - Under the partial interchange option, the spacing between two split ramps along southbound BL 81 (the two-lane ramp to I-690 and the two-lane ramp to Clinton Street/Oswego Boulevard) would meet recommended design standards. Under the full interchange option, the southbound BL 81 to westbound I-690 ramp would place an additional ramp split within this segment and create a non-conforming ramp spacing of 325 feet (800 feet is recommended) between the split of the ramps to eastbound and westbound I-690 and the split of the ramps between the two-lane ramp to I-690 and the two-lane ramp to Clinton Street/Oswego Boulevard.

- LOS merge – eastbound I-690 at the Interchange 10 (N. Geddes Street) on-ramp (2050 AM peak hour). See Level of Service discussion below for additional detail.

- LOS merge – westbound I-690 at the Interchange 9 (Bear Street) on-ramp (2050 PM peak hour). See Level of Service discussion below for additional detail.

- LOS weave – Westbound I-690 between the Interchange 11 (West Street) on-ramp and Exit 10 (North Geddes Street) off-ramp (2050 PM peak hour). See Level of Service discussion below for additional detail.

Additional Building Acquisitions – The full interchange option would require six more building acquisitions than the partial interchange option and result in an indirect impact to one building. As described below, it may be feasible to avoid the direct impacts to some, but not all, of the buildings by introducing additional non-standard features.

- 329 North Salina Street – This building (the Learbury Centre) would not be impacted under the partial interchange option. Under the full interchange option, the geometric requirements for the eastbound I-690 to northbound BL 81 ramp and the physical constraints of the area would require the building to be fully acquired and removed. Furthermore, there is no practical alignment variation that would avoid this impact without causing impacts to other buildings in the area, resulting in different and possibly greater adverse effects.

- 117 Butternut Street – This building (Veteran’s Fastener Supply Corp.) and property would not be impacted by the partial interchange option. As noted above, under the full interchange option, the Butternut Street bridge would be relocated north of its current location to provide adequate vertical clearance over the eastbound I-690 to northbound BL 81 ramp. The geometric requirements for the eastbound I-690 to northbound BL 81 ramp and the physical constraints of the area would require the building to be fully acquired and removed. Furthermore, there is no practical alignment variation that would avoid this impact without causing impacts to other buildings in the area, resulting in different and possibly greater adverse effects.

- 901 North State Street – Under the partial interchange option, the face of this building (Avalon Document Services) would be approximately 11 feet from the back of the BL 81 roadside barrier, therefore, the building would not be impacted by the partial
interchange option. Under the full interchange option, the addition of the eastbound I-690 to northbound BL 81 ramp would push the roadside barrier approximately two feet into the building, requiring its full acquisition. However, it may be feasible to avoid the direct building impact by reducing the standard ten-foot right-side shoulder to three feet, which would place the back of the roadside barrier approximately five feet from the existing face of building.

- 909 North State Street – This storage building would not be directly impacted by the full interchange option, but its offset from the highway would be reduced. The building is physically attached to buildings on both sides of the structure and may or may not be able to remain if the other buildings require removal. Under the partial interchange option, the face of the existing building would be approximately 18 feet from the back of the BL 81 roadside barrier and therefore the building would not be impacted by the partial interchange option. Under the full interchange option, the addition of the eastbound I-690 to northbound BL 81 ramp would push the roadside barrier closer to the building, so that it would be approximately seven feet from the existing face of building. However, as noted above, if the standard ten-foot right-side shoulder is reduced to three feet to avoid the impact to the adjacent building, the offset to this building would be increased to approximately 14 feet.

- 915 North State Street – This storage building would be acquired under the full interchange option. Under the partial interchange option, the face of the existing building would be approximately five feet from the back of the BL 81 roadside barrier and therefore the building would not be impacted by the partial interchange option. Under the full interchange option, the addition of the eastbound I-690 to northbound BL 81 ramp would push the roadside barrier approximately five feet into the building, which would require the building's full acquisition. However, it may be feasible to avoid the direct building impact by reducing the standard ten-foot right-side shoulder to three feet. This would place the back of the roadside barrier approximately two feet from the existing face of building.

- 1001 North State Street – Under the partial interchange option, the acquisition of this building (County Wide Appliance) was avoided in part by using a non-standard right-side shoulder width of seven feet. The face of the existing building would be approximately six feet from the back of the BL 81 roadside barrier. Under the full interchange option, the addition of the eastbound I-690 to northbound BL 81 ramp would push the roadside barrier approximately nine feet into the building, assuming a standard ten-foot-wide right-side shoulder. This would result in the acquisition of the building. Simply reducing the width of the right-side shoulder to seven feet, or to three feet, would not avoid this impact. However, it may be feasible to reduce both the southbound and northbound BL 81 median side shoulders to a non-standard width of four feet (versus the 10-foot standard) and to reduce the northbound right-side shoulder to a non-standard width. These reductions may make it possible to avoid the full acquisition. Avoidance of this impact would also require realignment of the BL 81 mainline, and therefore additional analysis would be needed to determine exact resultant widths.
1025 North State Street – Under the partial interchange option, this building (Adirondack Furniture) would not be acquired. The acquisition would be avoided in part by using a nonstandard right-side shoulder width of seven feet, resulting in the placement of the roadside concrete barrier on the face of the existing retaining wall. Under the full interchange option, the addition of the eastbound I-690 to northbound BL 81 ramp would push the roadside barrier approximately 14 feet into the building, which would require the building to be fully acquired. Simply reducing the width of the right-side shoulder to seven feet, or to three feet, would not avoid this impact. However, it may be feasible to reduce both the southbound and northbound BL 81 median side shoulders to a non-standard width of four feet (versus the 10-foot standard) and to reduce the northbound right-side shoulder to a non-standard width. These reductions may make it possible to avoid the full acquisition. Avoidance of this impact would also require realignment of the BL 81 mainline, and therefore additional analysis would be needed to determine exact resultant widths.

TRAFFIC OPERATIONAL AND SAFETY CONSIDERATIONS

Traffic Volumes
The Syracuse Metropolitan Transportation Council (SMTC) Regional Travel Demand Model was used to forecast future traffic volumes for the Project. The traffic volumes forecasted to use the new ramps under the full interchange option are shown in vehicles per hour (vph) in Table 2.

Table 2: Traffic Volumes (vph)

<table>
<thead>
<tr>
<th>Movement</th>
<th>Year</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
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<tbody>
<tr>
<td>Eastbound I-690 to Northbound BL 81</td>
<td>2020</td>
<td>1,000</td>
<td>1,330</td>
</tr>
<tr>
<td></td>
<td>2050</td>
<td>1,100</td>
<td>1,440</td>
</tr>
<tr>
<td>Southbound BL 81 to Westbound I-690</td>
<td>2020</td>
<td>680</td>
<td>970</td>
</tr>
<tr>
<td></td>
<td>2050</td>
<td>760</td>
<td>1,050</td>
</tr>
</tbody>
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The new ramps would attract some traffic currently using Bear Street and Hiawatha Boulevard, as well as some traffic currently using I-90 to connect to I-690 west of Onondaga Lake.

Level of Service
The full interchange option would attract additional traffic onto BL 81 and I-690 between the BL 81/I-690 interchange and Hiawatha Boulevard because of the travel time benefit. As a result, level of service (LOS) on these sections of BL 81 and I-690 would be lower under the full interchange option due to higher density, as well as the additional merging/diverging maneuvers with non-conforming ramp spacing. In the 2050 analysis year, all freeway
segments would operate at LOS D or better on these freeway sections under the partial interchange option, but three freeway segments would operate at LOS E or F under the full interchange option (see Figure 7):

- Eastbound I-690 at the Interchange 10 (N. Geddes Street) on-ramp merge is projected to operate at LOS F (2050 AM peak hour).
- Westbound I-690 at the Interchange 9 (Bear Street) on-ramp merge is projected to operate at LOS E (2050 PM peak hour).
- Westbound I-690 weaving section between the Interchange 11 (West Street) on-ramp and Exit 10 (North Geddes Street) off-ramp is projected to operate at LOS E (2050 PM peak hour).

In addition, the full interchange option would attract additional traffic onto Geddes Street. This would occur because trips to and from the Westside neighborhood within the City of Syracuse would benefit from using the eastbound I-690 to northbound I-81 and southbound I-81 to westbound I-690 connectors to connect with BL 81 via the Geddes Street interchange on I-690. As a result, intersection LOS on Geddes Street would deteriorate under the full interchange option. Under the partial interchange option, all Geddes Street intersections would operate at LOS D or better in the 2050 analysis year, but several intersections would operate at LOS E or F under the full interchange option. In 2011, the City of Syracuse implemented a road-diet project for Geddes Street from West Fayette Street to Spencer Street which reduced capacity along this route. Additionally, the City has a planned project to perform a road diet on the abutting section of Geddes Street. These capacity reductions would make traffic increases on Geddes Street impractical.

Travel Time
Currently, motorists use Bear Street and Hiawatha Boulevard to travel between eastbound I-690 and northbound I-81 and between southbound I-81 and westbound I-690. Bear Street is the existing signed route, and Hiawatha Boulevard is a parallel alternate route (see Figure 2). Based on analyses, Hiawatha Boulevard is a quicker route than Bear Street during certain periods. Using information from the Project’s traffic models, travel times were calculated on roadway segments from eastbound I-690 (just west of the Hiawatha Boulevard exit ramp) to northbound BL 81 (just north of the Hiawatha Boulevard entrance ramp) and from southbound BL 81 (just north of the Hiawatha Boulevard/Destiny USA exit ramp) to westbound I-690 (west of the entrance ramp from State Fair/Hiawatha Boulevard). Table 3 provides a comparison of the travel times along optimal routes (those that minimize travel time) under the full and partial interchange options. Table 4 compares the travel times along the proposed signed routes between BL 81 and I-690 under each option.

Travel times were evaluated along the signed route and the shortest path. The signed route would be different for each option. For the partial interchange, Bear Street would be maintained as the signed route, and for the full interchange, the new connector ramps would be the signed route. The shortest path is defined as the route resulting in the shortest travel time. Under the partial interchange option, travel times on the signed route (Bear Street)
Locations with Level of Service E or F Under Community Grid Full Interchange Option

I-81 Viaduct Project Figure 7
would be longer than those on the shortest path (Hiawatha Boulevard) because in most cases, Hiawatha Boulevard is a quicker route than Bear Street. Under the full interchange option, the shortest path and the signed path would be the same (the new connector ramps).

Comparing the shortest paths, the peak-hour travel time would be between 0.1 and 1.6 minutes less under the full interchange option than under the partial interchange option.

Based on a comparison of the signed routes, the full interchange option would reduce peak-hour travel time by between 0.6 and 1.8 minutes compared with the partial interchange option, depending on the scenario.

**Table 3: Travel Time Along Shortest Path (minutes)**

<table>
<thead>
<tr>
<th>Movement</th>
<th>Year</th>
<th>Peak</th>
<th>CG with Partial Interchange</th>
<th>CG with Full Interchange</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastbound I-690 to Northbound BL 81</td>
<td>2020</td>
<td>AM</td>
<td>5.4</td>
<td>4.6</td>
<td>-0.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM</td>
<td>6.0</td>
<td>4.6</td>
<td>-1.4</td>
</tr>
<tr>
<td></td>
<td>2050</td>
<td>AM</td>
<td>5.4</td>
<td>5.0</td>
<td>-0.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM</td>
<td>6.3</td>
<td>4.7</td>
<td>-1.6</td>
</tr>
<tr>
<td>Southbound BL 81 to Westbound I-690</td>
<td>2020</td>
<td>AM</td>
<td>5.1</td>
<td>4.5</td>
<td>-0.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM</td>
<td>5.3</td>
<td>4.6</td>
<td>-0.7</td>
</tr>
<tr>
<td></td>
<td>2050</td>
<td>AM</td>
<td>4.8</td>
<td>4.7</td>
<td>-0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM</td>
<td>5.5</td>
<td>5.4</td>
<td>-0.1</td>
</tr>
</tbody>
</table>

**Table 4: Travel Time Along the Signed Route (minutes)**

<table>
<thead>
<tr>
<th>Movement</th>
<th>Year</th>
<th>Peak</th>
<th>CG with Partial Interchange</th>
<th>CG with Full Interchange</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastbound I-690 to Northbound BL 81</td>
<td>2020</td>
<td>AM</td>
<td>6.4</td>
<td>4.6</td>
<td>-1.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM</td>
<td>6.2</td>
<td>4.6</td>
<td>-1.6</td>
</tr>
<tr>
<td></td>
<td>2050</td>
<td>AM</td>
<td>6.6</td>
<td>5.0</td>
<td>-1.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM</td>
<td>6.3</td>
<td>4.7</td>
<td>-1.6</td>
</tr>
<tr>
<td>Southbound BL 81 to Westbound I-690</td>
<td>2020</td>
<td>AM</td>
<td>5.2</td>
<td>4.5</td>
<td>-0.7</td>
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<tr>
<td></td>
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<td>5.6</td>
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<td>5.3</td>
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<td>-0.6</td>
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<tr>
<td></td>
<td></td>
<td>PM</td>
<td>6.4</td>
<td>5.4</td>
<td>-1.0</td>
</tr>
</tbody>
</table>

**Safety**
The full interchange option would redistribute some traffic from the local street system to the freeway system by providing additional direct connections between BL 81 and I-690. Crash rates on freeways are lower than at local street intersections, so some safety benefit would be expected. However, the full interchange option would introduce four new ramp junctions into the freeway system in the Downtown area, which would result in non-conforming ramp spacing. In addition, travel demand forecasts indicate that additional traffic (including trucks) currently using I-90 would travel through the Downtown area to utilize these ramps. Therefore, some of the safety benefit of shifting traffic from the local streets to the freeway system would be offset by additional merging and diverging maneuvers, compounded by non-conforming ramp spacing and increased traffic density.

NYSDOT has analyzed Bear Street and Hiawatha Boulevard and determined that without building the new ramps, these roadways would operate safety in the future with minor signal, striping, and signing improvements. Many of these measures have already been implemented by NYSDOT in the past few years or are currently programmed, including traffic signal upgrades and optimization, back plate installations, new/improved pedestrian crosswalks, upgraded sidewalks, repaving, and signing upgrades at multiple locations along Bear Street and Hiawatha Boulevard.

**Cost**
The total estimated cost of the full interchange option is $90 million higher than the partial interchange option (including contingencies and ROW). As noted earlier, the southbound BL 81 to eastbound I-690 ramp would require a fourth southbound lane, which would start about 800 feet north of Bear Street. Therefore, this ramp would add more than 1.5 lane miles of additional roadway, of which approximately 1,400 feet would be on structure. Similarly, the eastbound I-690 to northbound BL 81 ramp would add about 0.9 lane miles, of which 2,100 feet would be on structure.

**Property and Socioeconomic Impacts**
As shown in Table 1, the Community Grid Alternative would require the full acquisition of up to 11 commercial buildings under the full interchange option and four commercial buildings under the partial interchange option. Table 5 lists the affected buildings’ tax map numbers, address and square footage, occupants, and estimated value under each interchange option.

<table>
<thead>
<tr>
<th>Option</th>
<th>Tax Map #</th>
<th>Address/ Square Footage</th>
<th>Commercial Occupant</th>
<th>Number of Employees</th>
<th>Estimated Value based on Public Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full/ Partial</td>
<td>030.-04-20</td>
<td>101 Lodi Street/10,910 sf</td>
<td>Tobin’s Real Wood Furniture (tenant)</td>
<td>7</td>
<td>$300,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lawrence Automotive (tenant)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full/ Partial</td>
<td>050.-10-01</td>
<td>500 Renwick Ave./13,332 sf</td>
<td>Syracuse Housing Authority Garage (owner)</td>
<td>13</td>
<td>$325,000</td>
</tr>
</tbody>
</table>
The partial interchange option would displace 35 employees housed in three buildings (one of the buildings, 215 Genant Drive, is vacant). The full interchange option would displace up to 197 employees, or up to an additional 162 employees as shown in Table 5.

### Cultural Resources

As shown in Table 1, the full interchange option would require the acquisition and demolition of two historic buildings that are also Section 4(f) properties: the Veteran’s Fastener Supply Corp. building at 117 Butternut Street and the Learbury Centre at 329 North Salina Street. In addition, the Learbury Centre is a contributing resource to the North Salina Street Historic District Expansion, therefore, its demolition would affect the district.

### Visual Resources

The BL 81/I-690 interchange has the greatest potential for substantial changes in visual character and quality resulting from the Project alternatives. The new BL 81/I-690 interchange under the partial interchange option would generally be at about the same elevation as the existing interchange. However, the eastbound I-690 to northbound BL 81 ramp proposed under the full interchange option would be the tallest piece of infrastructure of the Project, reaching approximately 66 feet above existing grade at its highest point, or about 25 above I-690. Each of the two additional ramps between BL 81 and I-690, which are proposed under the full interchange option, would be approximately 35 feet wide. The new ramps would create adverse visual effects in the Franklin Square area of the Lakefront.
neighborhood. Avoidance of adverse visual impacts, such as in the Franklin Square area, resulting from construction of the connector ramps between BL 81 and I-690, would require the identification of alternative routes or means of connection, which would result in other direct and indirect impacts to other areas.

**RECOMMENDATION**

NYSDOT has analyzed both full and partial BL 81/I-690 interchange options under the Community Grid Alternative to identify the advantages and disadvantages of providing a fully directional interchange.

The full interchange option would introduce additional non-conforming features (ramp spacing) and conflict points (merge/diverge areas). Moreover, NYSDOT analyzed the operations and capacity of Bear Street and Hiawatha Boulevard and found that these roadways would operate safely and efficiently with minor improvements. These improvements, such as signing, striping, and signal upgrades, would address issues in high crash locations and ensure that these routes would continue to function safely and efficiently in the future without providing additional direct connections between BL 81 and I-690. While the full interchange option would provide some minor benefits to traffic flow, these are not warranted by its additional cost. In addition, the full interchange option would require the full acquisition and demolition of up to seven more buildings than the partial interchange option, resulting in additional employee displacement, and introduce visual impacts. Two of these buildings are historic buildings and Section 4(f) properties. Finally, future provision of a full interchange would not be precluded by the proposed partial interchange design.

For these reasons and others cited above, and in consideration of public input, NYSDOT recommends the dismissal of the full interchange option and the incorporation of the partial interchange option for the Community Grid Alternative.