Welcome to the fifth round of Stakeholders’ Advisory Working Group meetings.
This session will focus on how we can make the I-81 Viaduct Project not only a sustainable project but also a model of sustainability. Syracuse has been in the forefront with sustainably, with initiatives such as the Connective Corridor, Save the Rain, and the West Side Initiative, and institutions such as the SUNY College of Science and Forestry (ESF), Syracuse University (SU), and the Center of Excellence. With this project, NYSDOT has an opportunity to raise the bar for sustainability.

Today, we will provide our first thoughts as we explore numerous ways for the project to provide sustainable strategies and then we will talk about existing plans that may interface with, complement, or be consistent with how we approach this project. There are multiple opportunities for real synergies in which existing initiatives could enhance this project and vice versa.

The presentation will not focus on any one alternative in particular: no matter which alternative is ultimately selected as the preferred alternative, we will strive to provide a sustainable solution that works with the existing plans and moves us into a sustainable future.

This is just a beginning—a brainstorming session on initial ideas representing how we can focus the sustainability discussion of the project. We are looking to hear for your ideas. We have note-takers who will record your ideas, thoughts, things you like and don’t like, things you wish to add for us to consider. We don’t know that we’ll be able to do everything that is suggested; for example, we are going to show you solar street lights—which may or may not be feasible. But we will consider and investigate the potential and feasibility of each concept.
When the Sustainability SAWG first convened in April, NYSDOT proposed a broad definition of a sustainable I-81 Viaduct Project. A sustainable transportation corridor comprises economic, social, and environmental components. We are going to focus today on the environmental, mobility, and social aspects. We will briefly touch upon economic sustainability, but we are working on a detailed economic sustainability approach, which will be the focus of a future SAWG meeting.
The Environmental Impact Statement (EIS) will fully analyze the potential impacts of the alternatives under consideration. This slide shows just a few of the chapters of the EIS that are closely related to sustainability. The SAWG will look at what the project can achieve beyond the analysis that is provided in the EIS to more specifically and practically make this project a model of sustainability. We will investigate how sustainability can be optimized for each of the alternatives that moves forward as part of the EIS.
To get us started, we’ve put together this preliminary outline of potential sustainability areas of focus that could be addressed by the I-81 Project. This list can change—we can add and subtract from it depending on your input and how the project progresses. Today’s presentation explores how each of these categories can contribute to a more sustainable I-81 Viaduct Project.

We’ve identified 10 potential areas of focus for a sustainability initiative for I-81. They are:

- Walkability
- Bicycle Mobility
- Access to Transit
- Street Trees/Native Plants
- Greenspace
- Urban Vitality
- Connected Communities
- Rain as a Resource
- Energy Conservation/Renewable Energy
- Construction

These potential sustainability measures would be applied in the best possible way to each alternative.
The first focus area we are discussing today is walkability. The great urban planner William H. Whyte said, “The street is the river of life of the city, the place where we come together, the pathway to the center.” People who walk in their city are out exploring, discovering, socializing, and participating in the economic vitality of the city—and as a result, the city becomes a sustainable place. We are committed to designing a project that strongly promotes walkability.
What are the components of walkability? How does one create a walkable city? First, people need a reason to walk, and this translates to a mix of uses. A combination of residential, retail, and dining facilities encourages high levels of walking.

The walk should be safe. Sidewalks should have ample width, crosswalks should be clearly delineated, there should be proper pedestrian crossing signals, and pedestrians should be buffered from the roadway. Provision of on-street parking is one effective way to buffer pedestrians from the street and make them feel safe from adjacent traffic.

The walk should be comfortable. A sense of “spatial definition” is preferred over a wide open space where the pedestrian feels exposed. Spatial definition is provided by buildings on one side of the sidewalk and street trees on the other. This is the ideal environment to encourage walking.

And finally, an interesting walk will provide signs of humanity—that is why building entrances and windows face the street. Blank walls are unappealing, lack humanity, and discourage walking.

Walkability can be encouraged through the design of the sidewalk and adjacent street, but for this project to be truly successful, it should encourage high quality urban design of existing adjacent surface parking lots to create a street that is truly walkable. The goal is to design the I-81 Viaduct Project in a manner that will support redevelopment that will lead to walkability.
The extent of bicycling in a city is a direct result of the amount of bicycle infrastructure that is in place. Millennials often cite the presence of biking infrastructure as a factor in deciding where to move. From a safety perspective, it is best to have cyclists consolidated; this makes them more visible and predictable to motorists.

The Connective Corridor is an example of a well-designed complete street with bicycle infrastructure. This project has been recognized nationally, by the American Public Works Association NYS Chapter as the 2013 Transportation Project of the year, and by the American Society of Landscape Architects (ASLA). The project also includes a unified streetscape design that creates a visual identity for the corridor, façade improvements to support the businesses, and green infrastructure including rain gardens.
As part of the I-81 Viaduct Project, we will analyze bicycle connectivity from an origin/destination and network point of view. The diagram on the right side of this slide is a distillation of bicycle infrastructure in the city, illustrating what currently exists and our understanding of what is planned in the short term. This is a first-cut effort that needs to be verified and analyzed further. Currently, the Erie Canalway Trail and the Connective Corridor are the primary east-west bicycle facilities in the city. Recognizing that demand is largely in the east-west direction, should there be another east-west bicycle corridor somewhere farther to the south? Which would be the best corridor for a north-south connector, if that is to be developed? We are planning to have a working meeting with members of the City/County planning staff to understand their vision for bicycle infrastructure in the city, and we also expect to work closely with you and other members of the public to identify where bicycle infrastructure should be concentrated.
Bicycle infrastructure should include ample routes and well-located bike parking, including parking at bus stops to facilitate movement between modes. On the left side of the slide is an example of a covered bicycle storage structure with a thin green roof. On the right is an example of a bike parking facility located at a subway and bus station to encourage multimodal connections.
Route 9A, also known as West Street or the West Side Highway, is located on the western shore of Manhattan. This NYSDOT project, completed in 1994, was on the forefront of the complete streets movement. The project successfully supports high volumes of multiple modes of transportation, with dedicated facilities to accommodate motorists, bicyclists, and pedestrians. The pedestrian and bike paths connect to the larger Hudson River Valley Greenway, which extends all the way to the northern tip of Manhattan.

The cohesive design gives the street a distinctive visual quality, and the densely planted buffers separate bicyclists and pedestrians from the large volumes of vehicular traffic. The project provided pedestrians and bikers with an extensive green corridor through the west side of the city.
Multimodal connectivity and support for transit is an important design consideration as well. The sketch on this slide shows a bus stop encompassing a covered shelter with seating, bike racks, and local maps and informational signage. Bus shelters could be innovative design opportunities that communicate the commitment to green infrastructure. The bottom part of this slide shows a bus shelter with a green roof on the left, a bus shelter with solar power in the center, and a shelter constructed of recycled materials on the right.
Street trees have a powerful impact on walkability and visual quality and provide many other benefits, including an increase in property values and retail viability. One study showed that a drive on a treeless street is perceived to be significantly longer than an equal-length drive on a tree-lined street.
The dense urban core of Syracuse through which the project largely passes contains some of the most heavily paved areas of the region and lacks consistent street tree cover.
Streets with tree canopies are documented to be from 5 to 15 degrees cooler than those without a tree canopy. This can make a big difference when the temperature really heats up. The cooling impact of a healthy single tree is equivalent to ten room-size air conditioners operating 24 hours a day.

When it rains, a tree’s leaves directly absorb the first 30 percent of the precipitation, which never even touches the ground. Once the leaves are saturated, up to 30 percent more of the rain seeps into the soil; the roots then absorb the water back up into the tree. Through this process, a mature tree absorbs about half an inch of water from every rainfall. As you may already know, planting of street trees is part of the solution to overtaxed combined sewer outflows (CSOs).

Street trees close to traffic are ten times more effective than more distant vegetation at capturing car exhaust and absorbing carbon dioxide.

- Studies also show increased property values where there are mature trees and increased income to businesses located on tree-lined streets.
Native species of street trees have additional benefits. Native plant species are well adapted to local climatic conditions and have co-evolved with native animal and insect species. To illustrate one example of the benefits of native plants, native oak trees provide food for 534 caterpillar species, while the gingko, a popular non-native street tree, supports just one. These caterpillar species are important food sources for birds and other animals. Planting native species creates habitat for wildlife.
Shrub and ground layer plantings also could be native and could be selected for wildlife benefits. Streets with a diversity of native plantings can function as green habitat corridors in the city. This project could be a model of native urban habitat planting.
An infrastructure project of this magnitude should be considered within the broader context of the City’s parks and open spaces and overall greenspace. Could the I-81 Viaduct Project contribute to an interconnected system of parks and greenspaces? Greenspace opportunities in the I-81 Viaduct Project area could include potential improvements to the public realm through the creation of new public spaces as well as green “corridors” that link existing green spaces, parks, and linear trail elements.
This map shows an initial inventory of existing parks, plazas, and trails in the vicinity of the I-81 Viaduct Project area. It is not complete and is just a first cut, but it demonstrates that there is a framework of rich public spaces surrounding the project area including parks, squares, active street corridors, and even private spaces that serve a public function. Overlaid are the existing linear connective elements, which are adjacent to I-81 and I-690. The I-81 Viaduct Project area overlaps several existing linear routes: the Connective Corridor, the Erie Canalway Trail, Onondaga CreekWalk, NYS Bike Route 11 (State Street), and other streets identified on the City’s bicycle plan as potential future bike facilities.

- This project could be an opportunity to consider these spaces as a network and to look for opportunities to create a more interconnected greenspace system.

- Given its central location near downtown and the intersections with several existing recreation corridors, there are opportunities embedded within the I-81 Viaduct project to build connections between existing and new greenspace to move toward a more connected open space system within the city.
Although they are not greenspaces, the areas below viaducts can offer potential programming opportunities to the community through which they pass. Other cities have sought to make use of these spaces as recreational or cultural areas. These uses can improve underutilized spaces of the city and provide amenities to complement conventional parks and greenspaces. Dynamic, active, well-lit, and aesthetic public spaces below structures can be used to provide a link from one neighborhood to another. The I-81 Viaduct Project will seek to explore these potential opportunities under the Viaduct Alternatives.
The new I-81 Viaduct Project will seek to build and reinforce community connections to the greatest extent possible. Many people—for example, residents of Pioneer Homes—have expressed a desire for improved connectivity across Almond Street and for east-west connections throughout the corridor. Pedestrian linkages at intersections, and other locations where appropriate, will be carefully examined to ensure connectivity is optimized.

Signage, seating, landscaping, and other site enhancements could serve to reinforce community identity and pride. We will look for opportunities for these types of improvements and incorporate green infrastructure where possible.
The Buffalo Outer Harbor Parkway Project is a NYSDOT highway infrastructure project that resulted in improved community connections. Community members participated in the development of the design and content of what is referred to as the Industrial Heritage Trail, a multi-use interpretive trail that parallels the street corridor. The armatures for the interpretive signage recall Buffalo’s grain elevators, and railings recall important industries where people in the area earned their living. These elements provide distinctive local meaning and context for this community. Similarly, the I-81 Viaduct Project hopes to incorporate elements that are distinctive and meaningful to the Syracuse community.

• The construction of the Parkway includes numerous sustainability initiatives – for example, recycled materials were used where possible. During construction, the original cobblestone roadbed was uncovered and the design was altered to incorporate the cobblestone (seen in upper left photo). Limestone from the recently demolished auditorium in downtown Buffalo was reclaimed and repurposed as seating for picnic tables, and for pavement (engraved here with the names of the former grain elevators that previously existed on the site). The wood benches are constructed of recycled wood.

• The project was awarded the EverGreen Award from the NYSDOTs GreenLITES program – it is a self certification program established to address sustainability and environmental concerns.
There is widespread agreement that everyone wants Syracuse to be more vital, and NYSDOT’s goals for the I-81 Viaduct Project state that it should be supportive of a revitalized community. Obviously, the creation of a vital downtown will be the responsibility of many persons and groups. This redevelopment would occur outside the NYSDOT right-of-way (ROW) and outside of NYSDOT’s control. While we can’t control the redevelopment, we certainly want to coordinate with those responsible for shaping the City’s future.

NYSDOT’s concern lies in the creation of the physical environment within the ROW and how it relates to urban vitality. We are concerned with creating an environment that sets the stage for the type of development the City and County envision for the corridor. Part of promoting vitality includes urban infill and good urban design. Urban infill increases density, which can reduce energy consumption by encouraging walking, biking, and use of transit.
This diagram illustrates the existing surface parking lots adjacent to the existing I-81 viaduct corridor on Almond Street. These areas represent “missing teeth” in the street frontage. Over time, the hope is that these missing teeth would be filled in with high quality buildings that address Almond Street, with front entrances and windows that face the street, and contribute vitality to the character of the street.

Again, NYSDOT can work only within its own boundaries. Urban infill would require investment on private property and real estate beyond the ROW. This will be an ongoing conversation with the SAWGs and other stakeholders to work in a parallel tract to consider what the redevelopment potential could be under each alternative, how each alternative can help shape redevelopment in a positive way, and what measures need to be put in place in the community to facilitate that development. Working with the community to understand what type of future development is desired, and how the I-81 Viaduct Project can support it, will be an important step.
Armory Square, a vibrant and successful City neighborhood, is a brilliant example of urban vitality and urban infill. The neighborhood comprises a variety of functions—from retail to restaurants and bars, as well as offices and residences. This mélange of uses contributes to a 24-hour-a-day street life. Armory Square also mingle harmoniously with its historic context. For example, the development’s architectural massing and materiality, as well as rhythm of doorways and window transparency, respond to the historic context. It also accommodates structured parking in a way that’s sensitive to the neighborhood.
Syracuse residents and members of this group well understand the importance of recycling rain water, as opposed to putting it in pipes underground. With the success of the Onondaga Lake clean up, fish species are coming back to the lake, recreational boating is expanding, and new parks and public waterfront access points are being created. In the case of the Syracuse Inner Harbor development, improved water quality is one of the aspects that has sparked economic development in the region.

The I-81 Viaduct Project is an opportunity to expand further the potential for stormwater recycling. Stormwater could be captured and used as an amenity in new greenspaces. For example, a boulevard or other linear greenspace could sponsor a “stream” of recycled stormwater that is filtered and treated as it moves through the space. The picture on the lower-left side of the slide depicts a fountain in Toronto, created by an artist, that celebrates the recycling of water in a central public space. Many potential opportunities exist to infuse art into the recycling of stormwater.
Locally, Save the Rain has demonstrated success in a variety of ways. Administered through the County, Save the Rain has secured and spent millions of dollars of funding for design and implementation of initiatives. These include residential rain barrel programs, bioswales (or rain gardens), heavy construction including permeable pavements and urban rain garden installations, combined sewer separations, and a sewage interceptor facility at the old Trolley Lot just west of downtown. Shown here are a few Save the Rain projects already interfacing with the project area, downspout disconnections from the elevated highway to rain gardens rather than storm sewers.

• As a result of their good work, and a number of other organizations, individuals, institutions and municipalities, Syracuse has emerged as a national leader in the implementation of green and gray infrastructure.
On the left of this slide is another example of green infrastructure. This beautiful linear bioswale is located along a residential street. Could a linear bioswale element be a good fit for a future Almond Street, or perhaps the interstitial spaces created between connective ramps in the Viaduct Alternatives? On the right of the slide are examples of stormwater parks. These greenspaces, which provide stormwater quality and quantity functions, also offer amenities for public access as park land or trail space. Layering stormwater function with other community needs is a strategy that offers potential for the I-81 Viaduct Project under any alternative.
Although efforts have been made to reduce the number of Combined Sewer Overflow (CSO) events, more work is still to be done. This map from 2011 illustrates the City’s sewer sheds and active CSO locations on Onondaga Creek. Active CSOs within and adjacent to the I-81 Viaduct Project area currently contribute to CSO events. Perhaps there could be an opportunity to partner to develop solutions to both address existing active CSO outfalls and stormwater quality and quantity of the I-81 Viaduct Project.
Reducing non-renewable energy consumption can be done several ways. A few that are potentially meaningful for the I-81 Viaduct Project are:

- Investing in successful walkable communities by implementing a complete streets approach and by infill development
- Strengthening the existing bike network and expanding it where possible to induce additional bike use
- Encouraging the use of park and ride offered by Centro could decrease single occupancy vehicle use
- Roadway signal timing and roundabouts can both positively impact the efficiency of traffic flow; fewer delays mean less fuel wasted

There also are opportunities for expanding the use of renewable energy sources or other innovative technologies for the I-81 Viaduct Project. A few are:

- Implementing solar power streetlights
- Implementing solar power lighting under new viaduct structures
- Using solar-powered compacting trash receptacles in a system of streetscape furnishings
These creative solar-powered light fixtures and urban wind turbines also function as sculptural elements that make a statement about a community’s commitment to green infrastructure.
The existing viaduct currently requires a robust maintenance and repair regimen to keep it functioning as safely and smoothly as possible. The constant upkeep and repairs of the structure requires a great deal of energy expenditure, often with considerable disruption to the community. By simply removing the existing viaduct—whether it is replaced with a new viaduct or otherwise—the I-81 Viaduct Project would reduce future long-term maintenance and energy use. All infrastructure has life cycle and maintenance energy requirements. The I-81 Viaduct Project would seek to reduce these requirements.

A well-designed and constructed new transportation facility employs strategies to maximize the life cycle of the new facility and will reduce future energy and maintenance expenditures. Using innovative and recycled materials in construction can save considerable energy as well.

- An inspection program assists in strategically planning for repair needs. Facilitating routine access to infrastructure by inspectors, and employing monitoring sensors in new construction can both assist in maintenance planning to maximize efficiency, and minimize energy expended when repairs are needed.

- Winter maintenance is another facet. NYSDOT and other highway departments are always advancing and improving in their approach to de-icing and plowing. One technology that can potentially assist in targeting the application of de-icing salts is pavement sensors. These elements monitor changes in weather, and temperature of the pavement itself to accurately target the application of de-icing materials on the roadway to minimize salt use and energy use at the same time.
The implementation of smart growth principles and green building standards together can reduce the amount of energy consumed and greenhouse gas emissions resulting from the housing and transportation sectors. By encouraging density and mobility in the project vicinity and improving community connectivity, the I-81 Viaduct Project would support the reduction of energy consumed.

Use of state-of-the-art highway technology where practical, such as solar lighting and pavement sensors, would further support the reduction of non-renewable energy uses and support the use of renewable energy sources.
Beyond the sustainability priorities put forth by the City, County, and region, one topic particularly relevant for the I-81 Viaduct Project is deconstruction- and construction-phase sustainability measures. All of the Build Alternatives propose the removal of the existing viaduct and considerable new infrastructure of some kind replacing it. This complex topic warrants careful consideration.
Materials from the existing structure that could potentially be recycled include asphalt, concrete, and steel, potentially diverting an immense amount of material from landfills. Recent examples of recycling on a large transportation project include the Tappan Zee Bridge Project, where the existing structural steel components will be recycled. NYSDOT’s Kosciuszko Bridge project, in Brooklyn and Queens, generated 600 tons of recycled steel and 2,000 cubic yards of recycled concrete from the removal of 70,000 square feet of bridge deck.

For this project, some material recycling could potentially be executed onsite, particularly for crushed aggregate material, saving additional energy by eliminating hauling. A potentially creative solution for diverting demolition debris from landfills is through “upcycling.” Upcycling is the conversion of waste material to a higher or better use. The image on the right-side of the slide shows a house located outside of Boston, whose structure comprises 600,000 pounds of steel frame and concrete deck components salvaged from the former I-93 Viaduct in Boston, which was removed during the Big Dig.
There are a number of opportunities for using recycled materials in new transportation construction. Common construction techniques include use of structural steel manufactured from a high percentage of post consumer steel, and use of crushed concrete as aggregate for new concrete pours or as a compacted structural road base course.

An interesting innovation in sustainable roadway construction is the use of warm mix asphalt (or WMA) in lieu of hot mix asphalt. The WMA technology reduces energy consumption and emissions during production and transport to the site. WMA was used on a portion of I-87 near Albany in 2011.

Requiring the use of ultra-low sulfur diesel vehicles where possible minimizes emissions during construction.

As the project advances, other green construction practices will likely be identified and integrated into the project.
In the past, NYSDOT has developed Environmental Performance Commitments, or EPCs. These are commitments to the community regarding construction phase strategies and techniques. For this project we would look at state-of-the-art construction techniques that achieve a high level of environmental performance.
Many of you participating in the SAWG today have been looking at this topic for years and have been intimately involved in articulating community-wide sustainability aspirations. The City of Syracuse Sustainability Plan, the Onondaga County Sustainable Development Plan, and the Vision CNY Regional Sustainability Plan all outline sustainability goals.

We’ve reviewed these existing plans to identify how each of the I-81 Viaduct Project’s sustainability initiatives could support community sustainability initiatives in line with these plans.
The City of Syracuse Sustainability Plan from 2012 is a part of the City’s Comprehensive Plan. We’ve compiled and paraphrased points from this plan with particular relevance to the I-81 Viaduct Project:

• Energy Goals
  Promote alternative transportation, improve walkability, use complete streets concepts, increase density of the urban core

• Natural Environment Goals
  Connect Syracuse’s parks and other public spaces with neighborhood greenways, improve Onondaga Creek, increase tree canopy coverage, decrease urban heat island effect, use green infrastructure for stormwater management
We also reviewed the Onondaga County Sustainable Development Plan. A few of the more relevant points for the I-81 Viaduct Project are:

- **Transportation and Land Use**
  
  Promote importance of Syracuse as the economic and cultural center; foster density downtown with mix of uses and prioritize urban infill; institute a sustainable streets policy combining concepts of complete streets, multimodal transportation, and green infrastructure; prioritize gateways and streetscapes; invest in public transportation, walkable communities, and bicycle corridors

- **Protect the Environment**
  
  Restore Onondaga Lake as a premier recreational and cultural resource; complete and connect trail systems including the Erie Canalway Trail to form major ped and bike spines in the region; minimize impervious surface areas; expand Save the Rain program to address stormwater issues
A few points from the VisionCNY Regional Sustainable Development Plan with potential to overlap with the I-81 Viaduct Project are:

- **Infrastructure Goals:**
  Decrease the number of deficient or poor bridges and roads; expand park and ride facilities; develop and implement complete streets to encourage walking and biking.

- **Land Use Goals:**
  Create new cycle tracks along major commuting corridors; implement an urban infill program; implement a regional pedestrian and bicycle trail access program.

- **Environment Goals:**
  Reduce the number of CSOs; reduce the impervious pavement areas in the urbanized area; promote a regional green infrastructure program.
Questions/discussion/any additional insight and thoughts? Are there other sustainability themes that ought to be explored in greater detail moving forward?