Appendix B

Site Selection Technical Memorandum

Date:

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Monmouth County

Authored by: Stantec Consulting Services, Inc.

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Introduction and Methodology

Monmouth County hosts a variety of special events and is home to many tourist attractions, such as miles of white sandy beaches, parks, horse racing, music and theatre venues, and agritourism attractions like flower farms and orchards. County roadways are also used to access Six Flags Great Adventure theme park located in Ocean County, adjacent to Monmouth County Route 537 in Millstone Township. This wide variety of attractions draw millions of visitors annually, significantly benefitting the local and regional economies. However, high visitation also results in high traffic congestion which can disrupt the travel experiences of both visitors and residents, as well as cause negative impacts on the environment and local economy.

The purpose of the Monmouth Within Reach study is to develop strategies and best practices to regulate travel demand more effectively and reduce the frustrations of travel for both residents and visitors. One of the most critical steps to the study is the selection of event and tourism destinations to advance for further analysis and the development of specific travel demand management (TDM) plans. These plans will produce a set of actionable proposals for peak tourism periods and events to reduce traffic congestion and minimize disruption to County residents and visitors. Recommendations may include but are not limited to strategies such as coordination and scheduling for reduced conflicts, shuttle services and improved integrated transit, technological solutions for fast and easy notifications, among others. The intent is to develop TDM actions for the five locations with the ability to adapt them for other types of events and or tourist attractions within the County.

This memorandum documents the process by which event and tourism sites were chosen and then evaluated, through a multi-phase process to develop a list of sites that will advance into the next phase of the study to develop TDM mitigation plans.

Summary of Methodology

Due to the relatively large number of event and tourism destinations in the County, the evaluation process was conducted in two phases. This dual-phased approach was necessary to reduce the number of destinations that were entered into the detailed screening evaluation that utilized quantitative measures. The quantitative evaluation screening utilized data sources such as the US Census, Airsage, and StreetLight; therefore, it would not have been feasible to evaluate all destinations in the County in this manner. The methodology for the selection of the event and tourism destinations is summarized in Figure 1.

In Phase I, the Project Team developed a long a long list of event and tourism destinations throughout the County. These sites were categorized by type of destination (i.e., beaches, downtowns, parks, concert venues, etc.) as well as location (i.e., the shore, western Monmouth, Bayshore). The Project Team then shared this list with County staff to obtain input related to known mobility issues, including congestion levels. The County staff input was used to develop a preliminary ranking of destinations, and the top locations from each category were selected, resulting in a total of twelve locations that were advanced to Phase II.

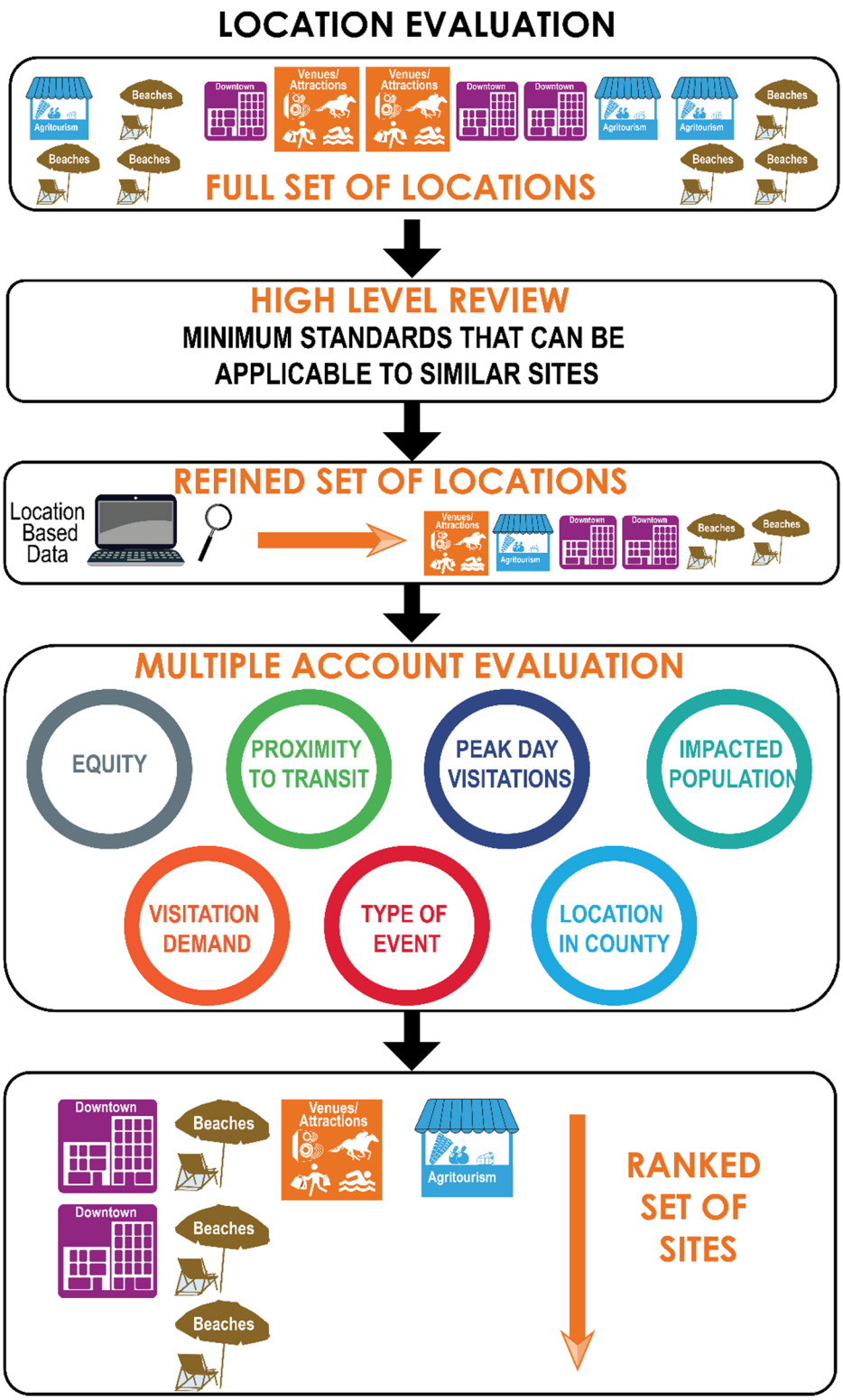

Figure 1: Site Selection Process

The twelve locations identified in Phase I were then advanced to a quantitative evaluation process in Phase II. US Census data and location-based data sources, Airsage and StreetLight, were utilized to evaluate and rank the twelve sites based on weighted screening criteria that were developed in coordination with the Advisory Committee (AC). The AC consists of representatives from the regional transportation agencies, including the New Jersey Transportation Planning Authority, New Jersey Department of Transportation, New Jersey Turnpike Authority, New Jersey Transit, and several divisions within Monmouth County. The Project Team and AC reviewed the evaluation results and selected five of the highest-ranked locations that were representative of the various type of event and tourism locations throughout the County.

A detailed description of each Phase is discussed in the body of this memorandum.

Long List of Candidate Sites (Phase I)

In Phase I, a list of 24 candidate sites were developed by the Project Team, in consultation with Monmouth County staff. These sites represent a diverse selection of destinations throughout the County. Candidate sites were placed into four categories exemplifying the variety of visitor and tourist-based options within Monmouth County.

Agritourism – Agriculture-based tourism in the spring and fall bring people from around Monmouth County and beyond to take advantage of the rural settings and products that are available, along with events and festivals that occur on the sites. These sites tend to produce high volumes of traffic but only for specific periods or days of the year.

Beach Towns – Monmouth County's beaches, the northernmost beaches of the Jersey Shore, are a major component of the County's tourism economy, as well as a significant source of seasonal congestion. The congestion is related to volume exceeding capacity of the roadways at peak times, and also the sometimes-frustrating search for parking in some beach communities.

Downtowns – Downtown areas typically provide the commercial, dining, and entertainment portion of a visitor's trip that brackets a visit to a venue, a beach, or other attraction. There are a number of possible sites to be considered around the County. These sites can attract people by all modes at all times of the day.

Venues and Attractions – Each venue or attraction creates a different draw in terms of visitors and the modes they use to arrive. Within this category are major attractions, shopping centers, racetracks, concert venues and water parks that have significant volumes of attendees, typically focused more on weekends than weekdays.

The full list of sites under consideration is informed by local experience on the level of demand, the resulting congestion, and the mobility impacts to surrounding communities. Figure 2 and Table 1 identifies the list of sites.

Table 1 - Long List of Candidate Sites

Agritourism	Beaches	Downtowns	Venues & Attractions
Holland Ridge Farms	Asbury Park	Red Bank	Six Flags
Battleview Orchards	Sandy Hook	Asbury Park	East Freehold Showgrounds
Easmont Orchards	Sea Bright	Allentown	Monmouth Park
Happy Day Farm	Belmar	Freehold	PNC Bank Arts Center
Casola Farms	Long Branch	Union Beach	Freehold Raceway Mall
	Manasquan		Keansburg Water Park
	Avon		Freehold Raceway

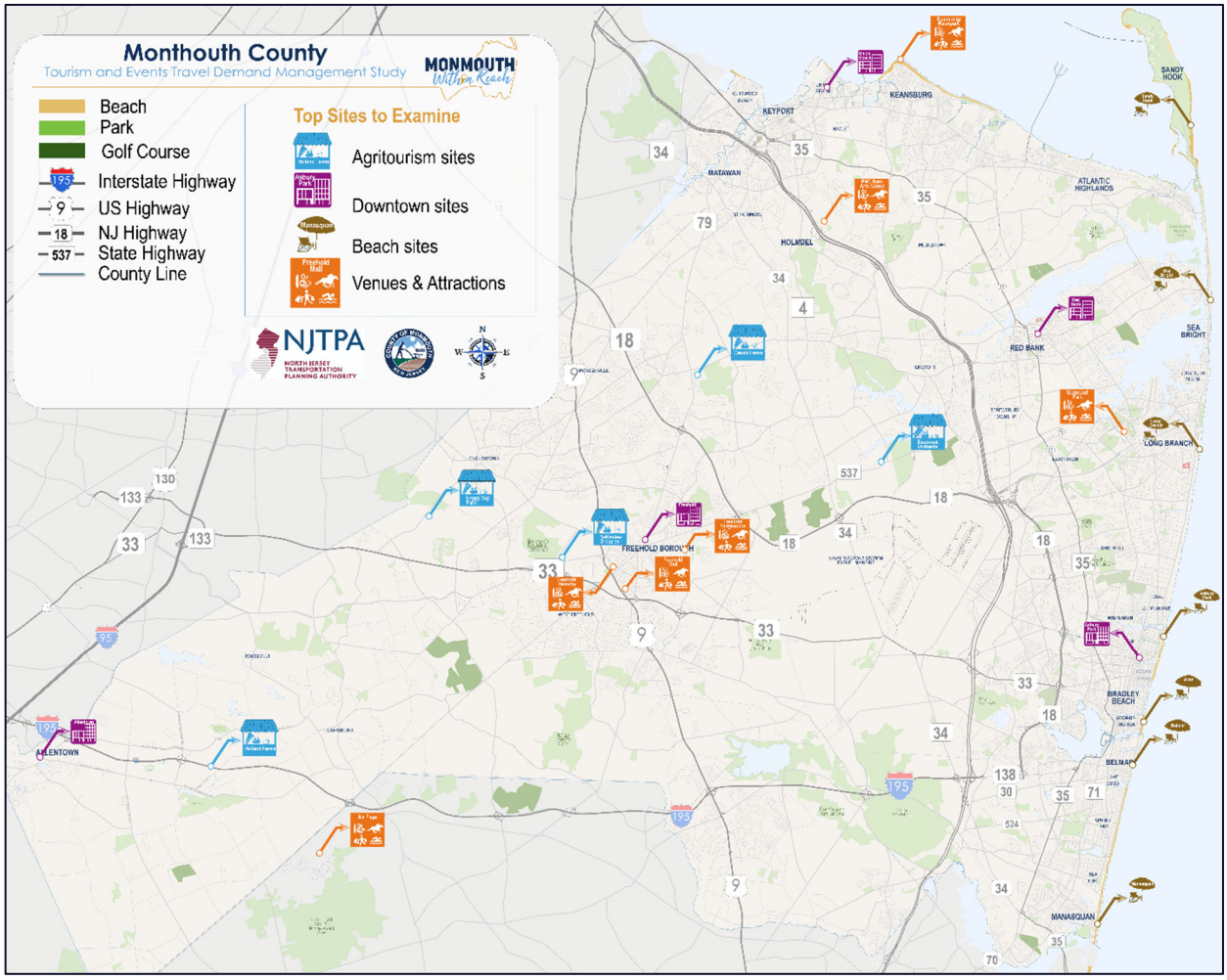

Figure 2 - Long List of Sites

High Level Analysis / Prioritization for Short List

The first step in the analysis process was to reduce the initial list of projects to a more manageable one that could then be evaluated utilizing a set of quantitative and qualitative evaluation criteria. The initial list was reviewed by County staff with the goal of identifying representative locations around the County that could benefit from congestion relief. Solutions for these sites would then be analyzed for applicability to other locations. For example, the strategies recommended for one beach destination can be adapted by other beach communities, and those selected for downtowns, similarly can serve as a template for other downtowns.

With these criteria in mind, County staff provided their input on locations that should advance to Phase II of the evaluation. The twelve selected sites are shown in Figure 3 and Table 2. The list retains candidate sites regionally throughout Monmouth County with several sites that can act in two different categories as showcase sites. The goal is to produce a final set of sites that can best

exemplify the category with respect to the challenges from congestion and the potential solutions that might be used by others in the same category.

Table 2 – Short List of Candidate Sites

Agritourism	Beaches	Downtowns	Venues & Attractions
Holland Ridge Farms	Asbury Park	Red Bank	Six Flags
	Sandy Hook	Asbury Park	East Freehold Showgrounds
	Sea Bright	Allentown	Monmouth Park
	Belmar	Freehold	PNC Bank Arts Center

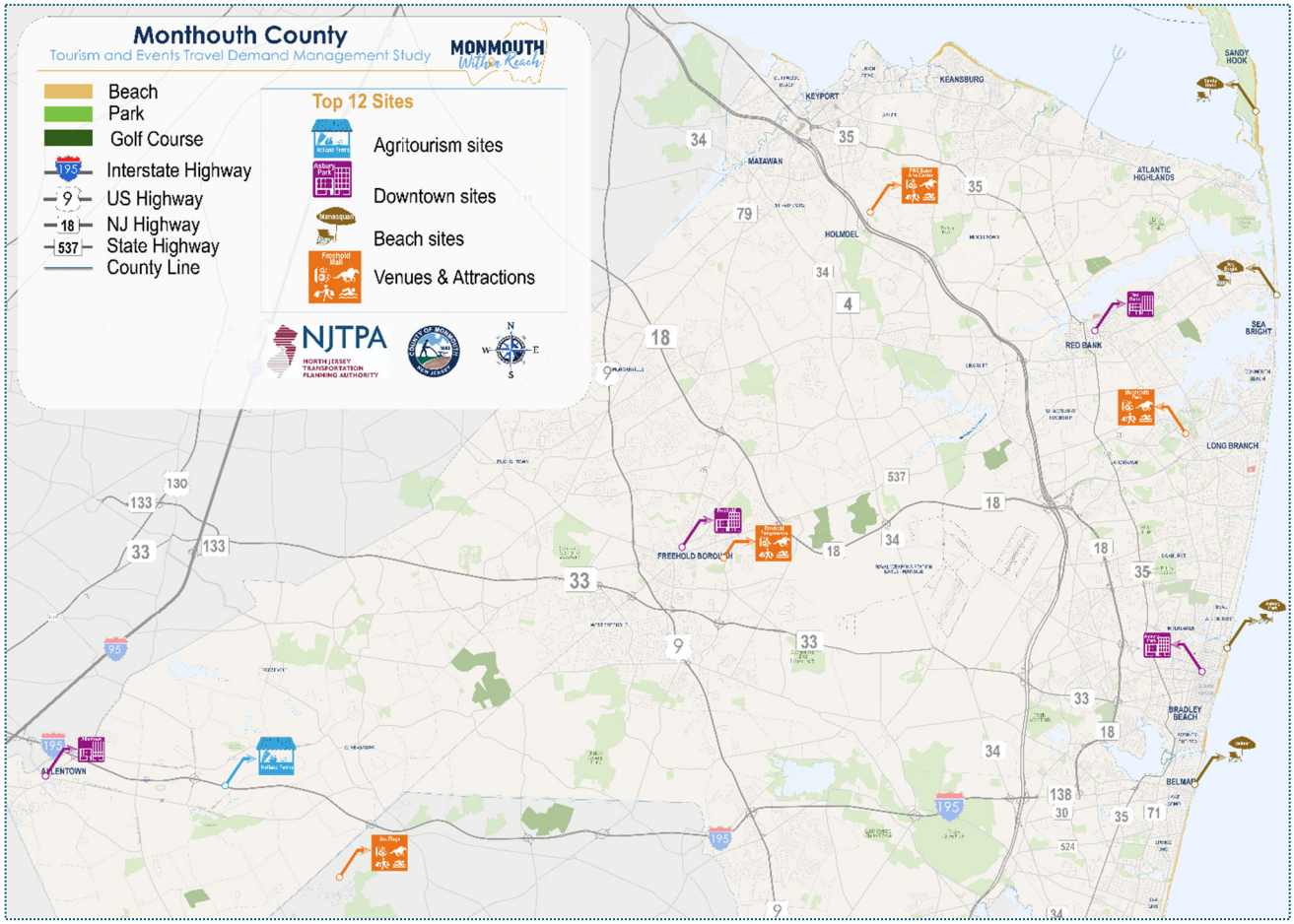

Figure 3 - Short List of Sites

Phase II Evaluation

Data Sources for Evaluation

Each of the twelve sites advanced to Phase II was evaluated using data from multiple sources. The primary data sources are aggregated smart device-based data for mobility patterns and user profiles, and demographic data from the US Census. Normally, field data collection and observations may play a significant role in this type of analysis; however, with the effects of the COVID-19 pandemic, visitation to many of the destinations is well below normal levels. For this reason, the ability to "recreate" historical traffic data using smart device-based location records was essential to understanding guest travel patterns.

Airsage

Airsage is an anonymized data vendor that provides origin and destination data for population movements as well as GPS data points on these locations aggregated by hourly interval for each day. The Project Team obtained data for the time period from Saturday June 29 through July 28, 2019 for movement activities countywide. These dates were selected specifically to identify visitation to the annual Monmouth County Fair, Fourth of July festivities, PNC Bank Arts Center concerts, summer music events, wine and beer festivals, and other summer beach activities. With GPS point data aggregated at hourly increments, the Project Team created computer simulations that illustrate the time periods and roadways accessing the designated sites as well as train stations and local communities. An example of the animations is shown in Figure 4. The Airsage data proved invaluable to guide specific analysis using StreetLight data.

StreetLight

StreetLight is another data vendor that aggregates user data to provide measures of mobility, as well as a user profile. They work with their partners to aggregate location data from millions of travelers across the US. This can be used to generate metrics such as travel speed, travel demand, origin-destination patterns, and arrival and departure routes. This information is available at the hourly level for all of calendar year 2019, so the Project Team was able to identify, for example, total demand, peak daily demand, and peak hour demand for each site.

Streetlight also has the ability to identify home and work locations of travelers at the census block level, on an aggregated basis. For example, StreetLight can identify where visitors to a destination live, even if they are outside the local region. This in turn can be used to develop demographic profiles for travelers, including information on age, income levels, family size, and race and ethnicity.

Figure 4: Screenshot of Animation of PNC Bank Arts Center

US Census

US Census data from the American Community Survey 2019 informed our team on the social demographic characteristics of the communities potentially impacted by the major destinations. Specifically, the Project Team mapped the households that were reported with incomes below the poverty level, median household incomes, households where English is not the first language spoken, minority populations, persons over 65 years of age, and occupied housing units that identify as a zero-car household. This information provides a measure of the impacts of event and tourism-related congestion, as well as the benefit of proposed improvements to the local community, including low-income and minority groups.

Phase II Evaluation

The Phase II Evaluation started with quantitative evaluation utilizing 11 objective criteria which were determined through coordination with the AC. Each destination was ranked on 11 objective criteria, and these rankings were combined to create a weighted overall score for each destination. This provided an objective measure of the relative congestion and potential relief for each site. The destinations were then ranked and categorized by destination type, and further assessed qualitatively by the AC to develop a short-list of sites for advancement to Phase III.

The evaluation criteria are as follows:

Peak Day Visitation Volumes

The first metric is the peak day visitation, which is a measure of the total demand at each site (Figure 5). Sites with high peak day demand are likely to be good candidates for mitigation strategies. This was evaluated by examining total daily demand (entry and exit activity) at each location. As an example, Figure 5 shows the peak day at PNC Bank Arts Center was September 7, 2019, which correlated with a Luke Bryan Concert.

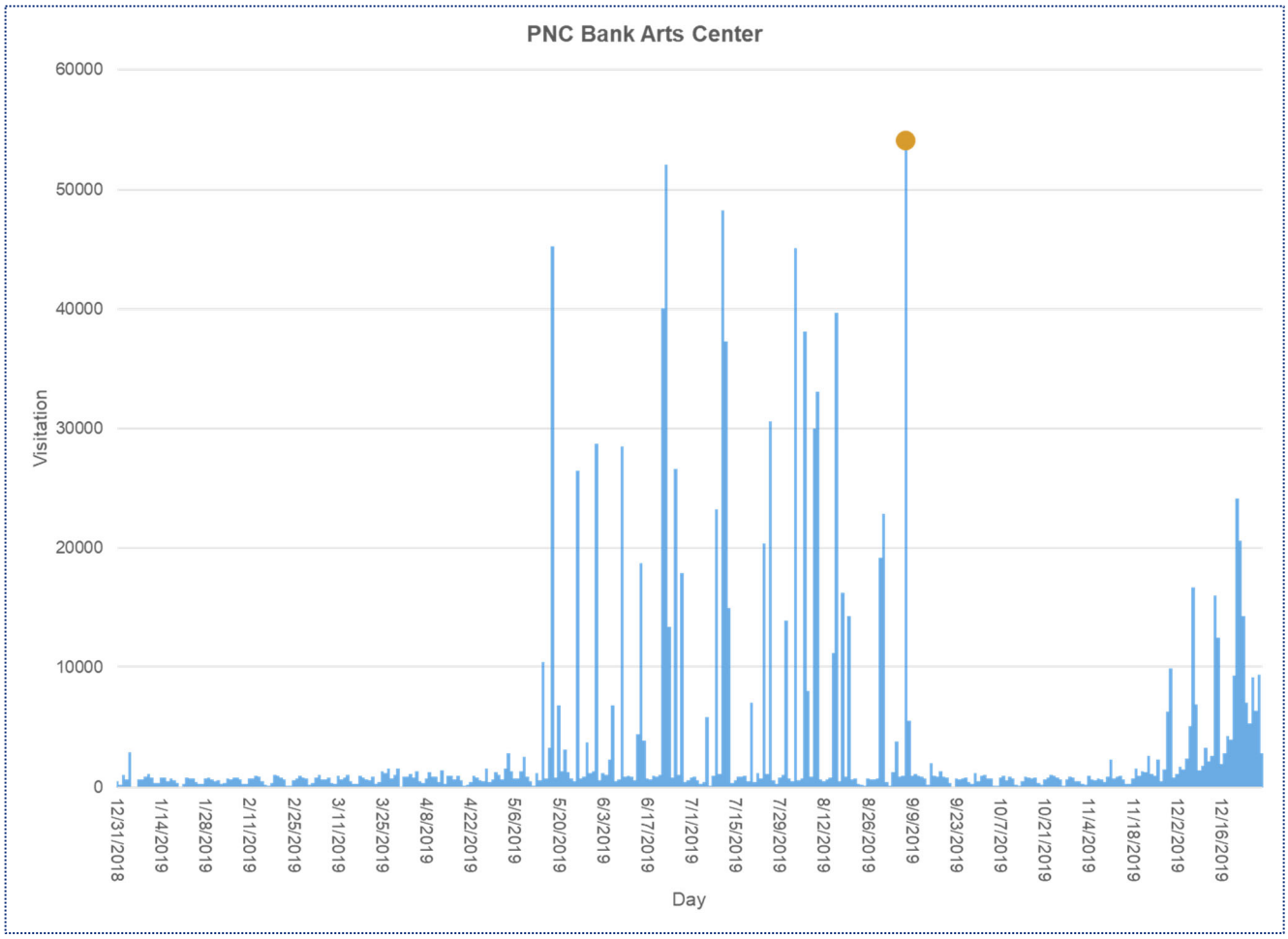

Figure 5 - Peak Day Demand Example

For each quantitative metric, sites were ranked from highest to lowest. The plot was then inspected to find natural break points, and destinations were assigned a score of 1 through 5 for the criteria based on where they ranked. For example, the highest peak day visitation volumes were observed at Six Flags and Asbury Park, so these destinations received a score of 5 for these criteria, while sites with low peak day visitation – in this case, Holland Ridge Farms, a score of 2 (Figure 6).

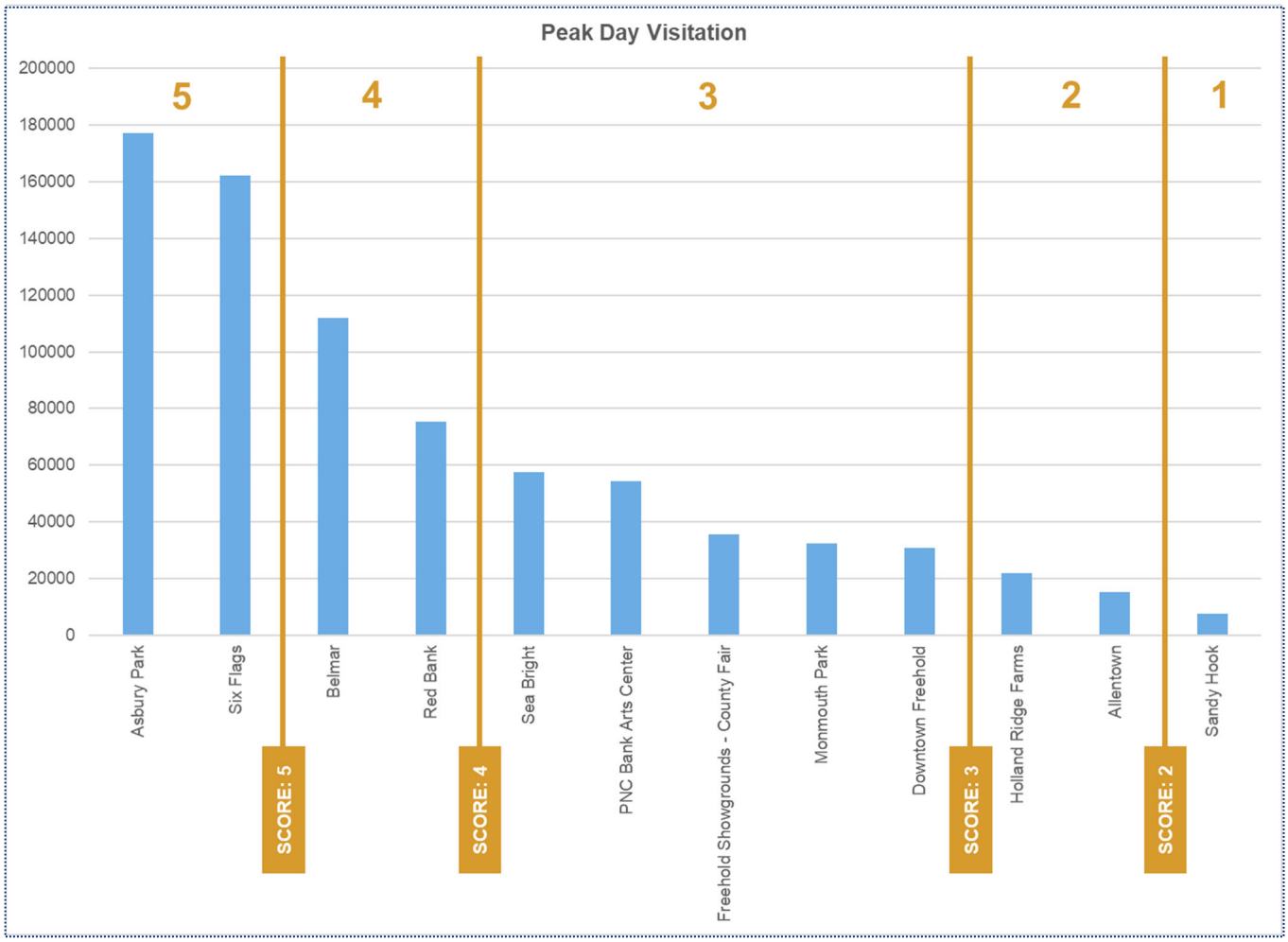

Figure 6 - Peak Day Visitation by Site

Ingress and Egress Visitation Demand

Ingress and egress visitation demand examines the highest two-way (entering and exiting) traffic flow time periods at each destination (Figure 7). The example below illustrates this metric for an event at PNC Bank Arts Center. The highest numbers of visitor arrivals were observed in the 6:00 PM hour whereas the highest departures at the 11:00 PM hour. This is one indication of the peak level of activity at a site. A spike in peak hour travel demand suggests that strategies to disperse demand by time (earlier or later arrivals) or by location (off-site parking) could be effective in reducing congestion during these critical time periods.

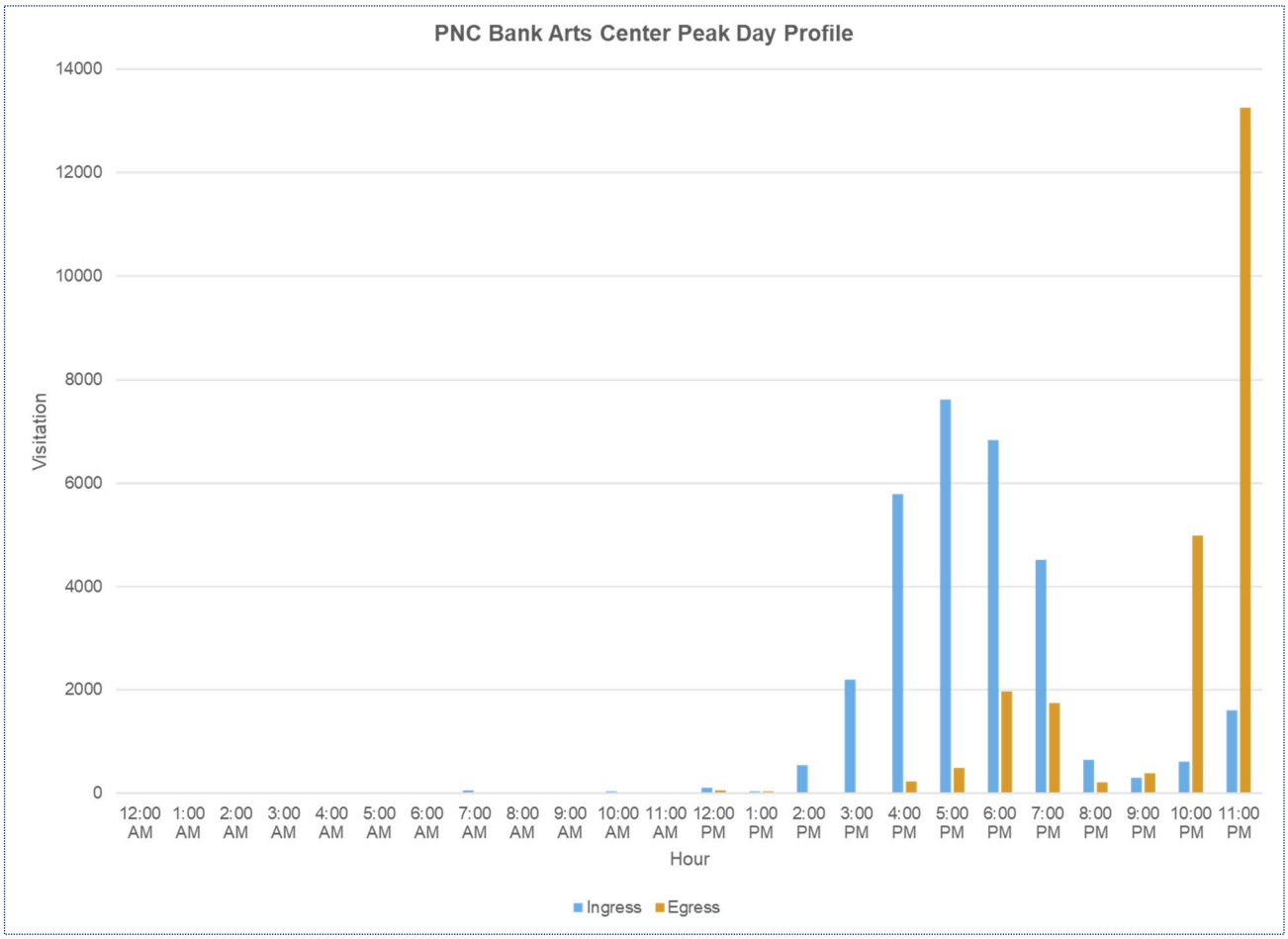

Figure 7 - Peak Day Profile Example

Density of Visitors

The density of visitors provides a measure of the demand at each destination, relative to the land area of the destination (Figure 8). This was suggested as one way to normalize for the differences between small and large sites. However, this is most important when evaluating the space per pedestrian on a site, whereas this study is primarily focused on ingress and egress modes and travel routes. Asbury Park, Monmouth Park, and Red Bank ranked at the top on the list for this qualitative metric, while Sandy Hook, with over 27,000 acres, ranks at the bottom in terms of visitors per acre of land area.

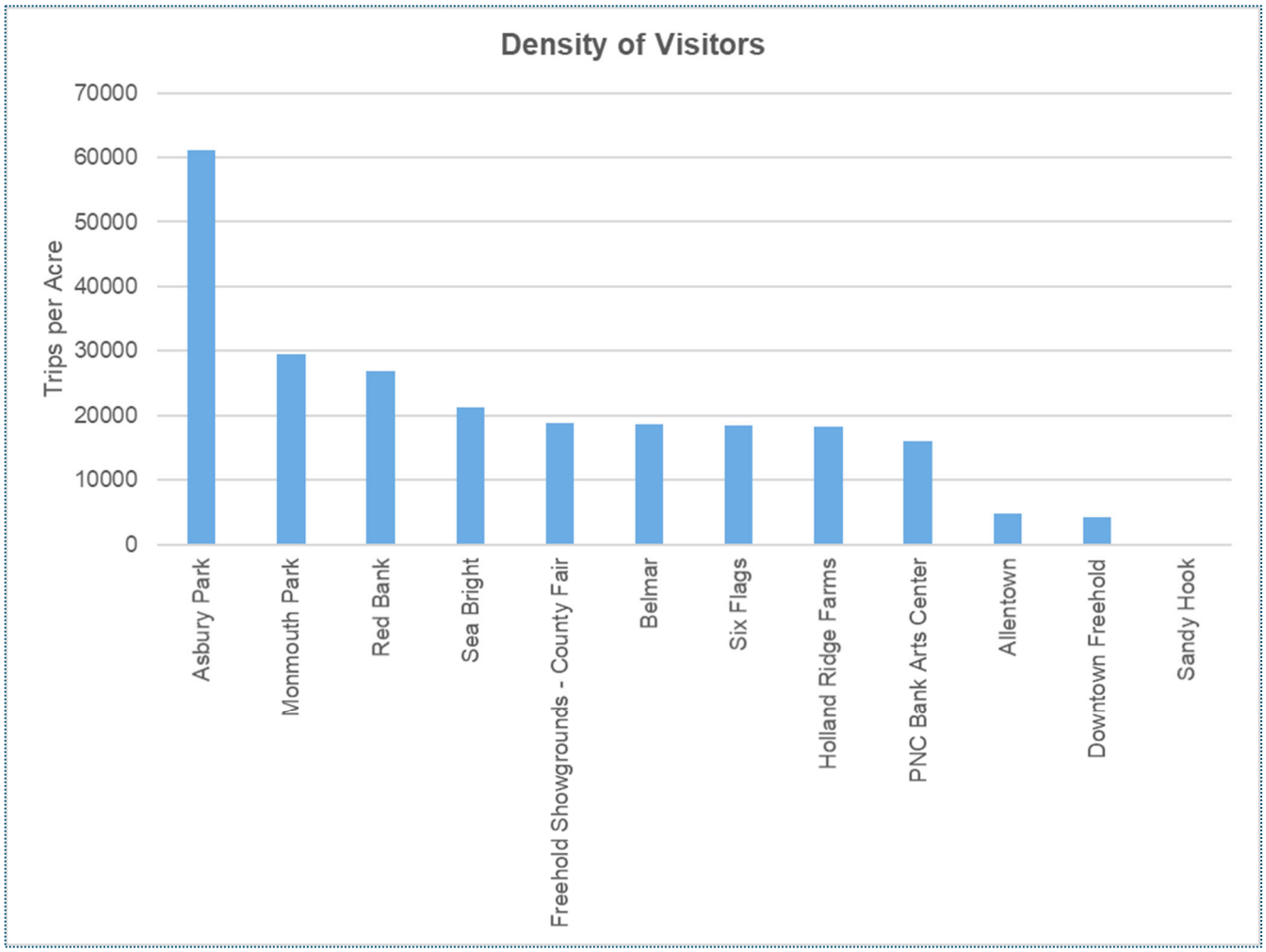

Figure 8 - Density of Visitors

Proximity to Transit

Proximity to transit was evaluated based on the distance from the destination to the closest train station (Figure 9). This criterion is important because train stations can be used to provide an alternative mode of travel to a destination, particularly for visitors coming from areas along the NJ TRANSIT rail systems. Even at locations where guests may not currently take transit to a destination, the presence of a train station indicates the infrastructure required to encourage and facilitate alternate modes of travel is in place. Asbury Park, Red Bank, and Belmar received the highest score since each destination offers a nearby train station. Other destinations are proximate to a train station, such as PNC Bank Arts Center. However, a distance of two miles from the closest facility, suggests implementing a shuttle service on event days could facilitate higher usage by seamlessly connecting visitors to this destination without the need of a personal vehicle.

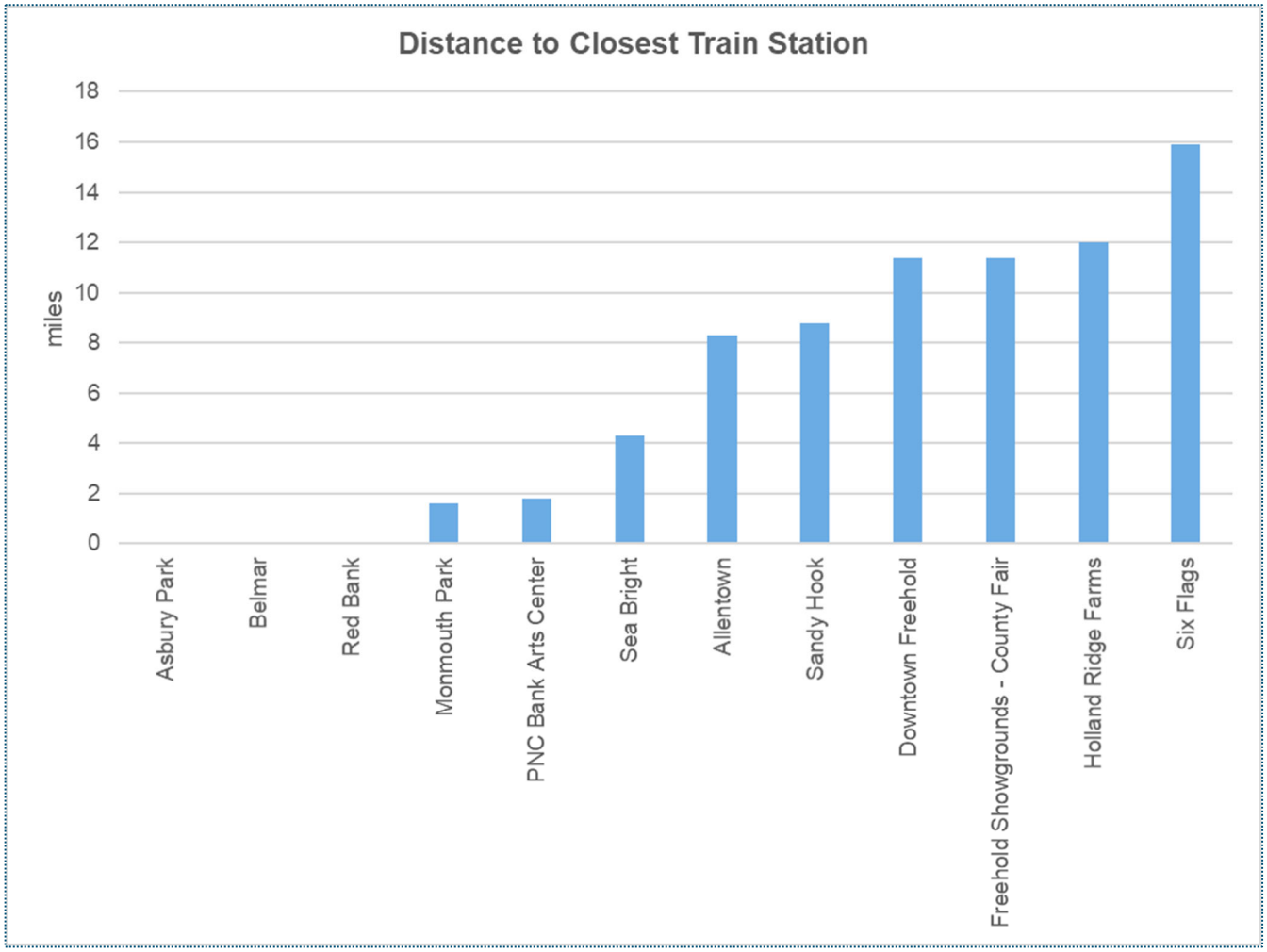

Figure 9 - Distance to Train Stations

Residential Population

The residential population near each destination is a basic measure of the number of people in the community that may be impacted by event and tourism-related traffic congestion. For purposes of this comparison, the Project Team identified the number of people reported living in the US Census Block Groups within a one-mile radius of the primary entry point to each destination. The block groups included in the analysis are illustrated below in Figure 10 and the populations are shown in Figure 11. It should be noted that in the case where a small proportion of a very large block group was located within the one-mile buffer radius, it was excluded from the analysis so as not to incorrectly skew the resident count. Destinations with high residential populations nearby, such as Red Bank, Asbury Park, and Belmar are weighted more heavily than those with fewer nearby residents as part of the site selection criteria.

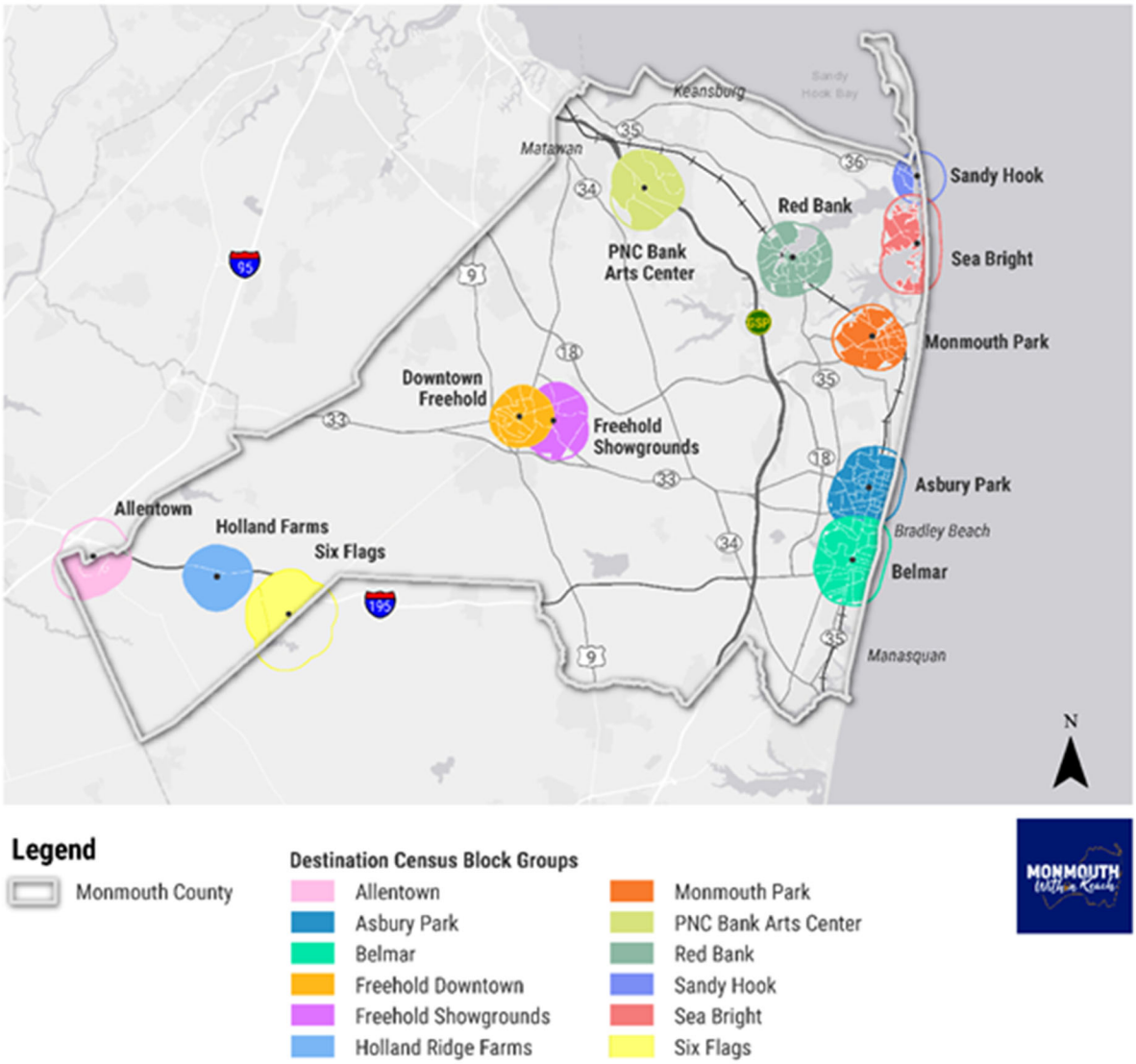

Figure 10 – Resident Population Within a One Mile Buffer of Each Destination

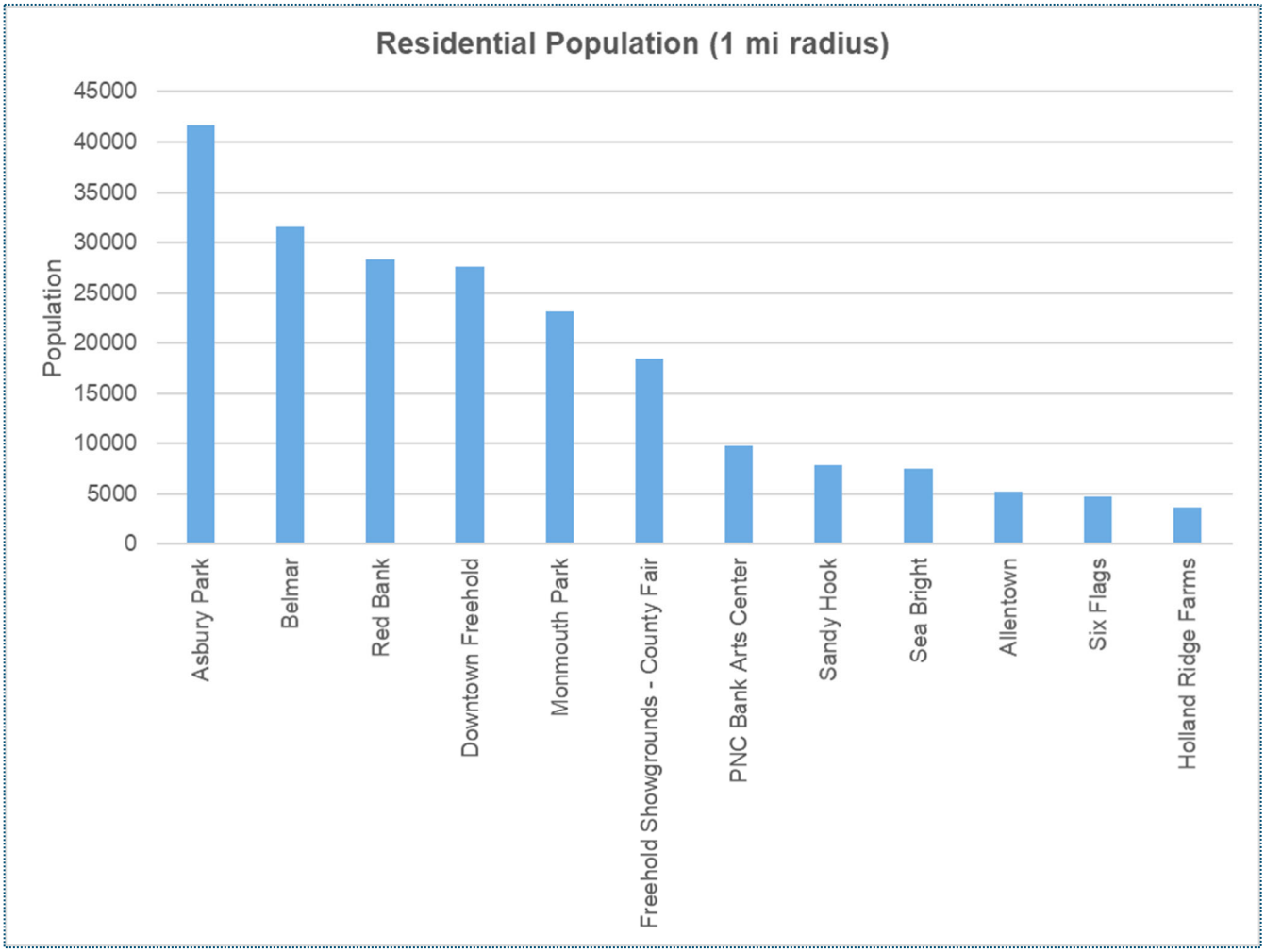

Figure 11 - Residential Population Estimates, 2019

Resident Transit Mode Share

Another measure of accessibility to a destination is the residential commuter transit mode share. This was identified using US Census ACS 2019 data for travel mode to work. This provides a different measure of transit connectivity than the presence of a train station. A high transit commuter mode share demonstrates residents' willingness to use alternatives to a personal vehicle (should they have one) to travel to work. High transit mode share near the selected destinations also confirms proximity and accessibility which was not measured by the distance to the train station metric above. The communities around Sea Bright and Sandy Hook were observed to have the highest residential transit mode shares among the destinations under review (Figure 12).

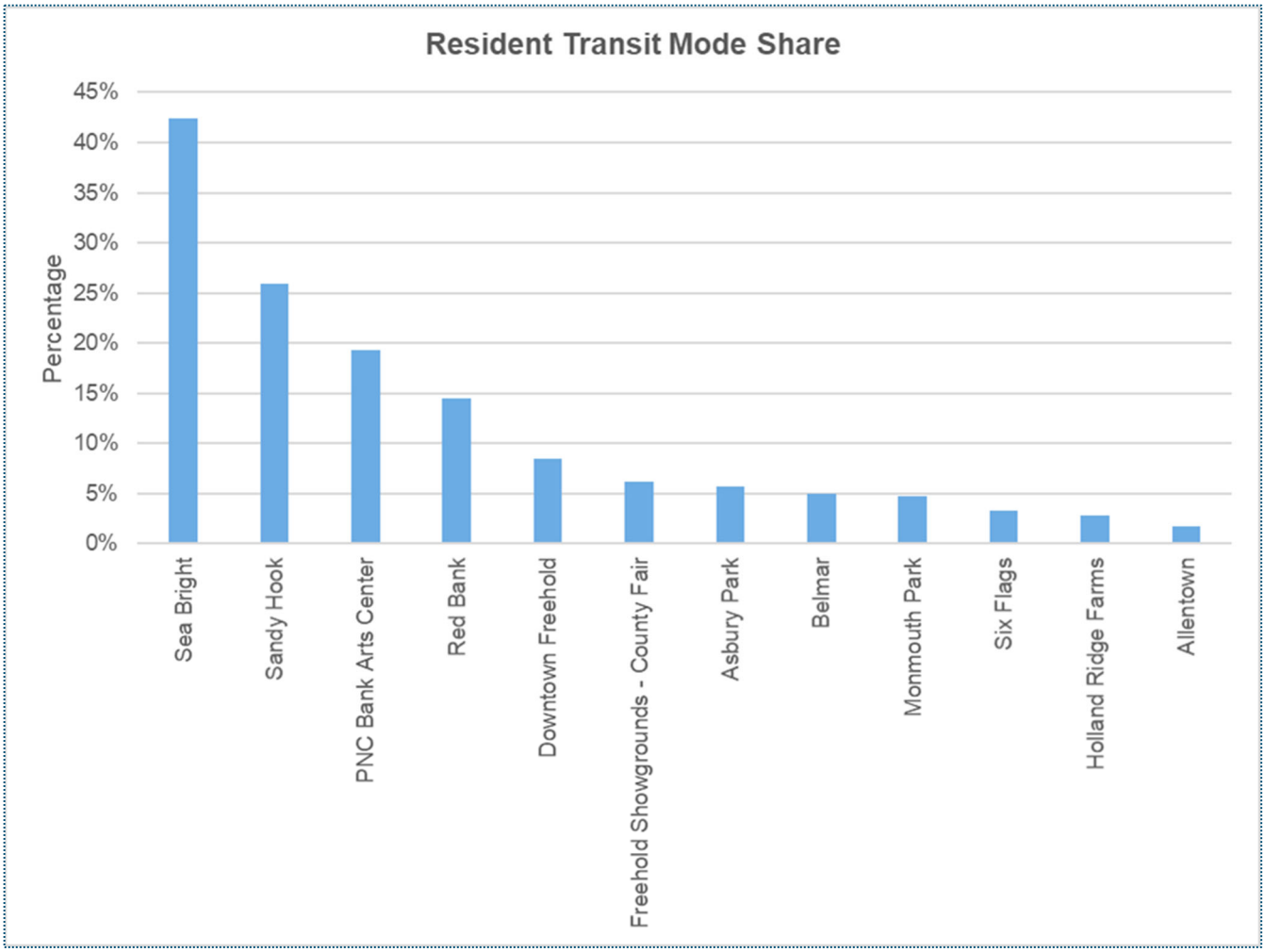

Figure 12 - Resident Transit Mode Share

Equity Analyses

The next two metrics examined the proportion of low-income and minority populations in the communities surrounding each destination (Figures 13 and 14). These metrics are important because they help identify whether these groups may be more likely to be impacted by peak event and tourism related traffic congestion, and whether the solutions would benefit these groups in the surrounding communities. The communities around Asbury Park and Monmouth Park were identified as those with the highest percentage of low-income and minority residents.

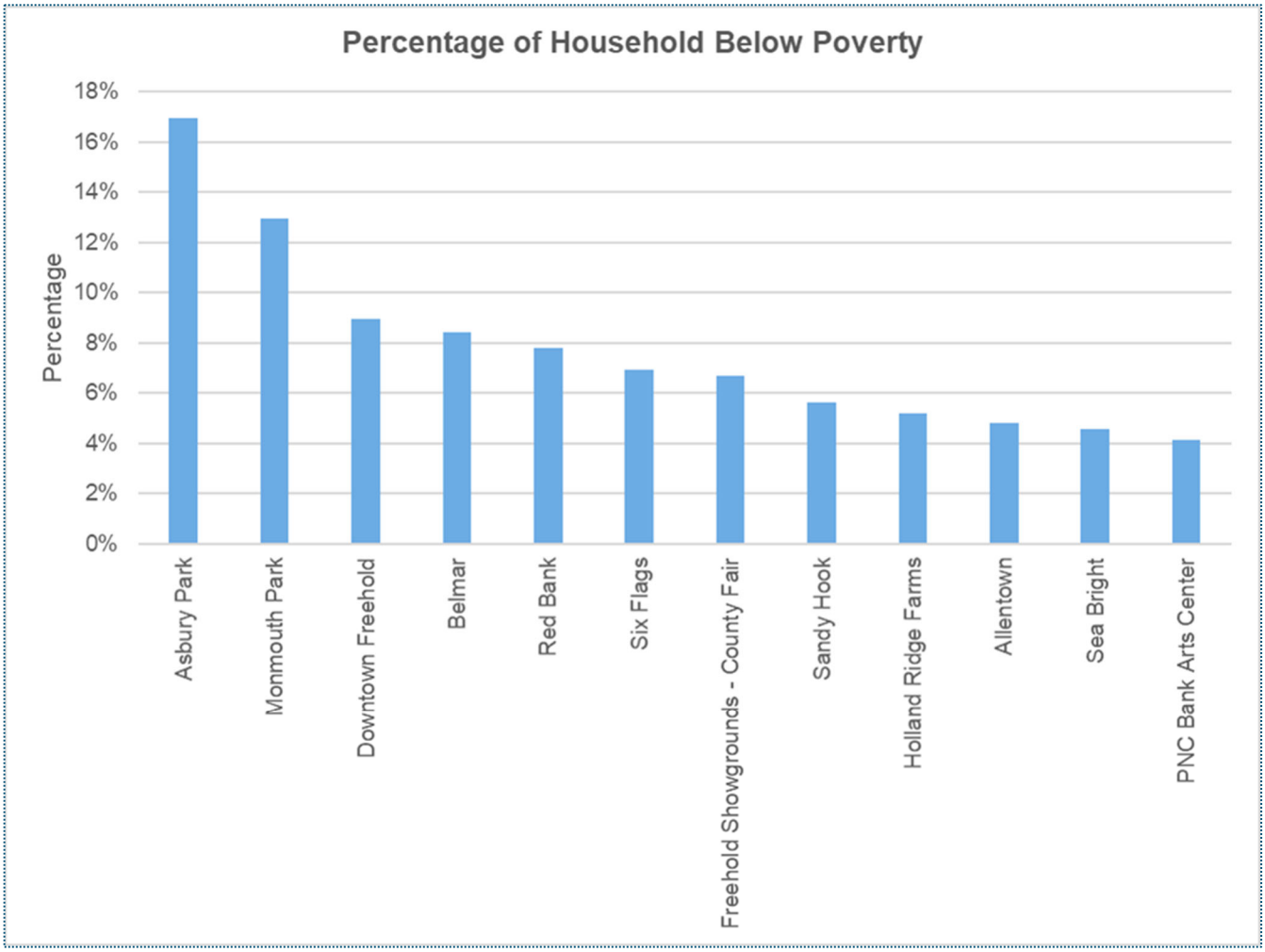

Figure 13 - Percentage of Households with Incomes Below the Poverty Line

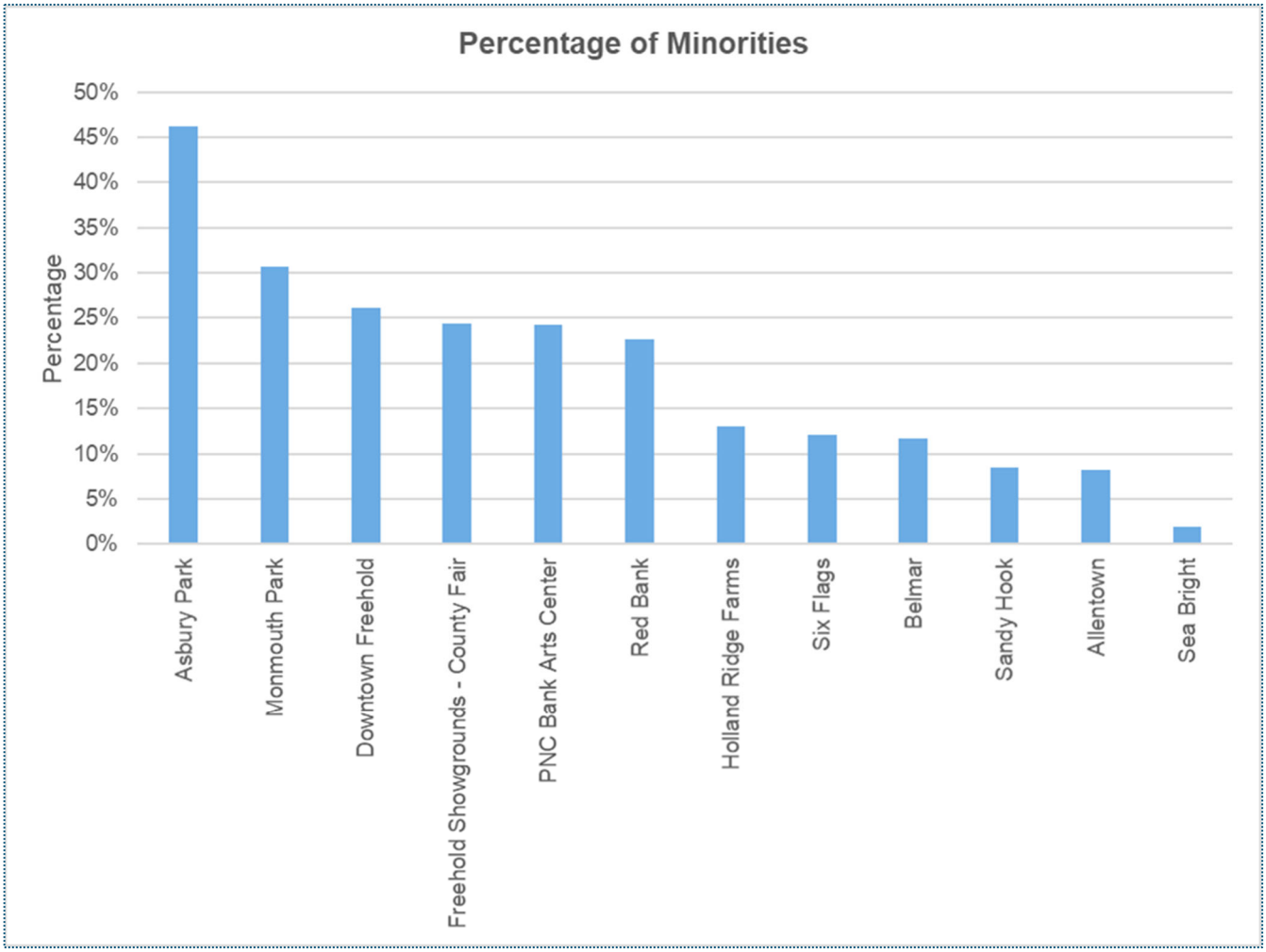

Figure 14 – Percentage of Minority Populations

Duration of Peak

The peak day and peak hour traffic volume criteria discussed above provide an indication of the concentration of traffic during those peak periods. This measure, the duration of the peak, provides an assessment of how long the peak lasts on those peak days. A site with a sustained peak, for example, of several hours, may impact the surrounding communities more than an event center like PNC Bank Arts Center, where the peak lasts for 1-4 hours before traffic returns to normal (see Figure 15 as an example). The peak day hourly demand profiles were used to evaluate the duration of the peak.

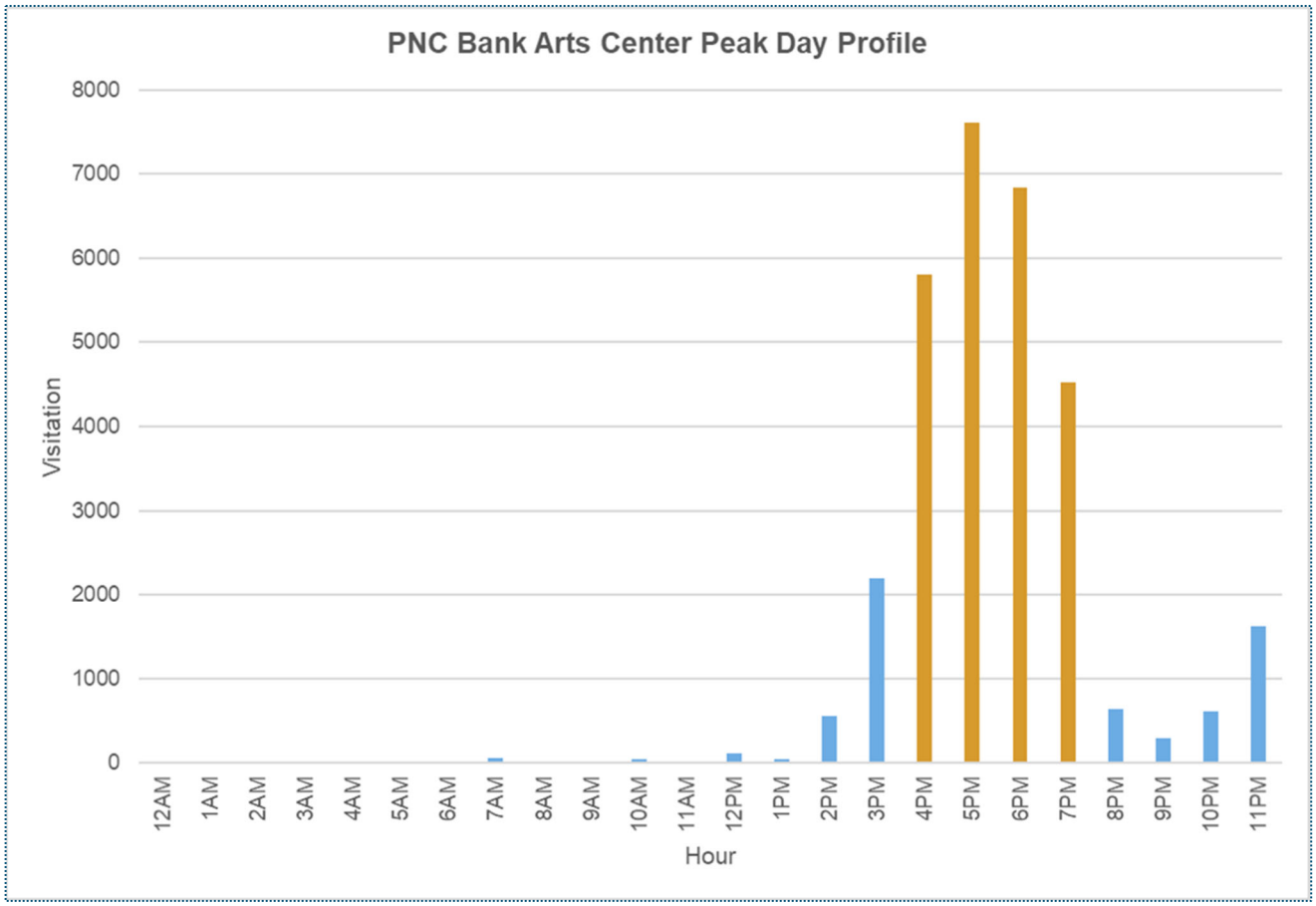

Figure 15 - Peak Hour Demand at PNC Bank Arts Center

Major Ingress and Egress Roadways

A final objective measure of the impact of peak traffic on a community was the count of local roadways that carried up to 5% of all the traffic to a destination. Streetlight's Top Routes functionality allows for an understanding of the relative demand on ingress and egress routes to a destination. For the purposes of this analysis, the intent was to identify local roads that experienced demand from a destination, so limited-access roadways like the Garden State Parkway, NJ Turnpike, I-195, and NJ 18 were excluded from the analysis. Sea Bright and Asbury Park were observed to have the greatest number of local roads impacted, while PNC Bank Arts Center and Six Flags Great Adventure had the least number of local roadways impacted (Figure 16). This can be attributed to having most of their visitor traffic using nearby limited access roadways such as I-195 and the Garden State Parkway.

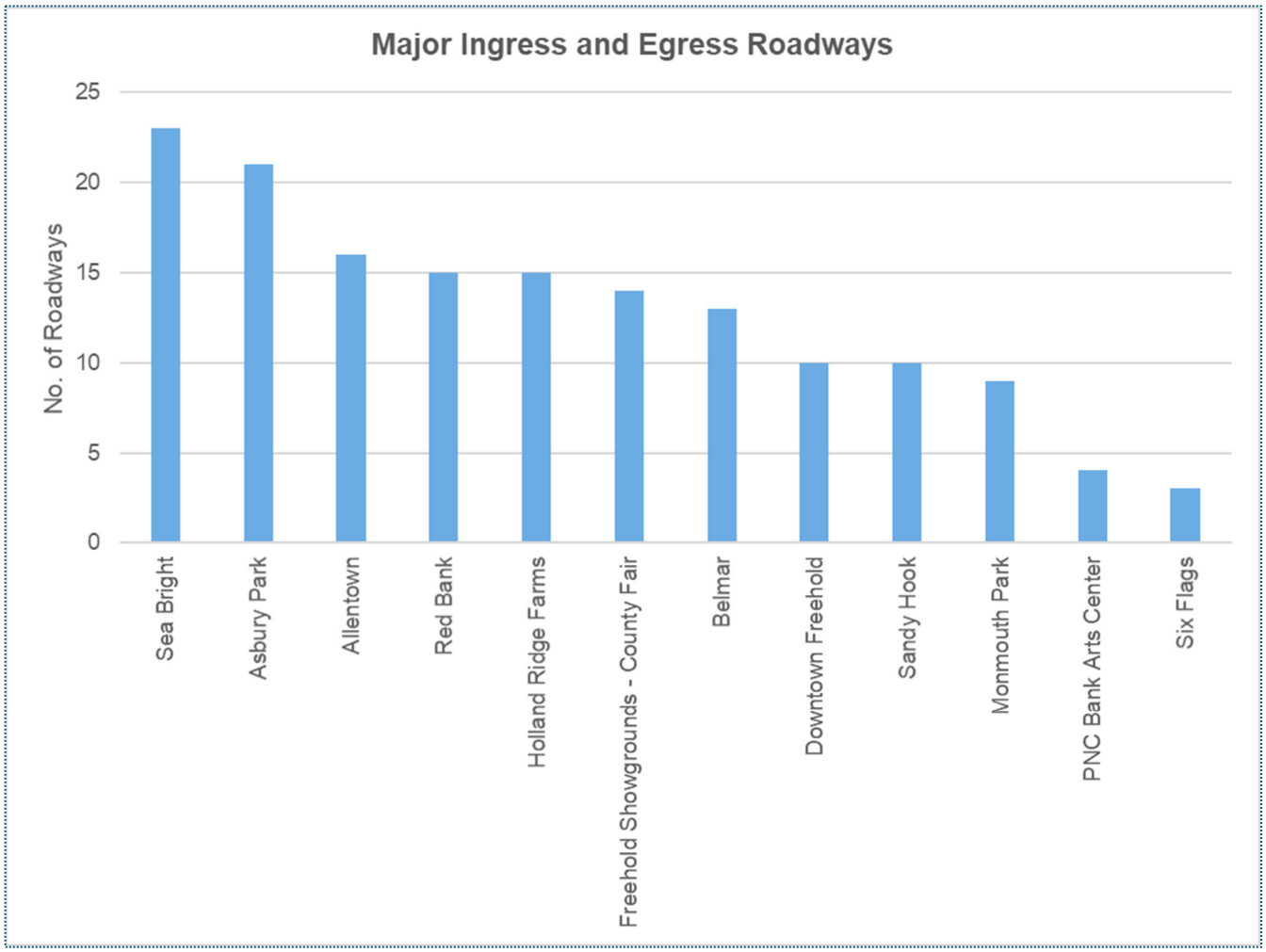

Figure 16 - Major Ingress and Egress Roadways

Potential for Satellite Parking

An off-site park-and-ride operation can be one of the most effective travel demand management strategies. This type of solution relieves parking demand at the destination and disperses some of the ingress and egress traffic to other locations, thereby reduces the severity of congestion. However, an effective satellite parking operation typically involves intercepting travelers on their way to a destination. For this metric, the Project Team evaluated how many remote commuter park-and-ride facilities were located along the routes that are more heavily utilized by visitors to each specific destination. Figure 16 reveals in the Downtown Freehold location, several satellite parking locations are available for travelers to access. Destinations further west (Allentown, Holland Ridge Farms, Six Flags Great Adventure) and east of State Route 35 (Sandy Hook, Sea Bright, Monmouth Park, Asbury Park, Belmar) lack direct and convenient access to park-and-ride facilities. As of now, the majority of park-and-ride Locations are along the US 9 and Garden State Parkway corridors.

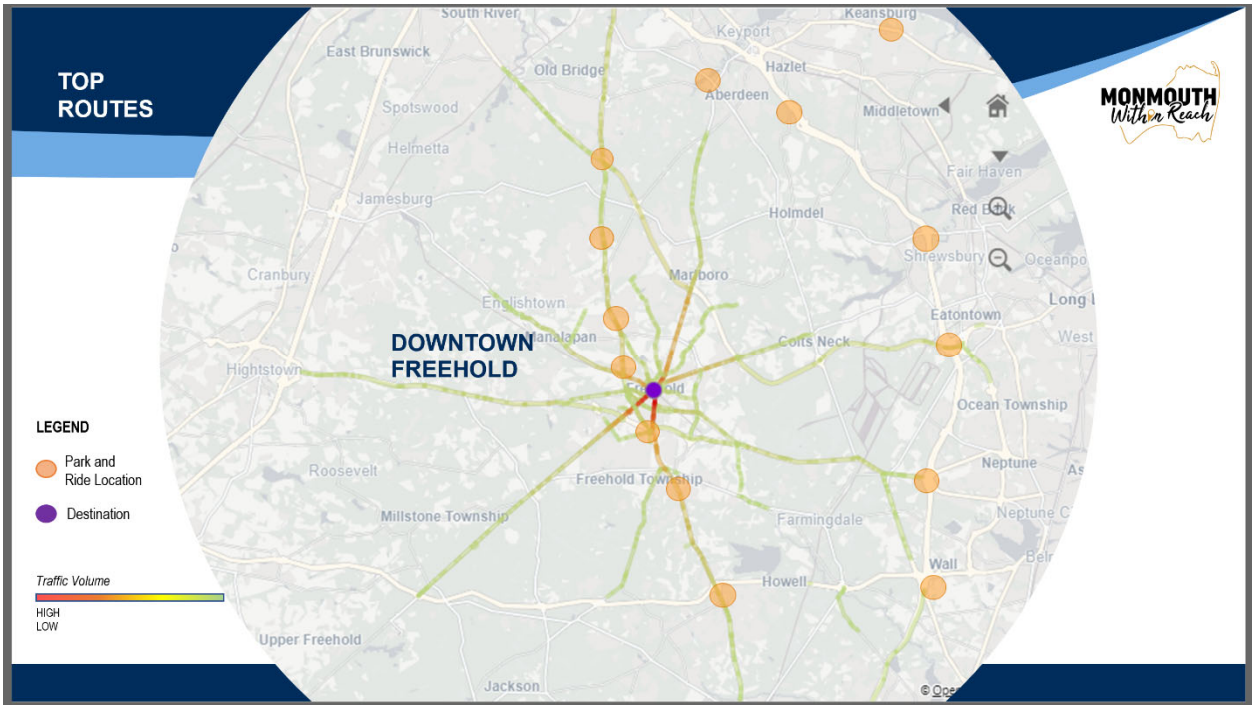

Figure 17 - Example of Top Routes Output

Phase II Rankings

Each destination was rated on a 1 to 5 scale using the evaluation metrics identified above. Each metric was assigned a weight to describe its relative importance. Peak day visitation, for example, was assigned a weight of 5, while the density of visitors at a destination was assigned a score of 2.5. This provided a weighted objective ranking for each destination.

The destinations were then categorized based on the type of site (either Downtowns, Beach Communities, Large Attractions, or Rural Attractions). The goal was to select representative sample(s) in each of these categories. A single destination may fit into multiple categories, for example, Asbury Park, which ranked highest in the overall weighting scores, is both a Downtown and a Beach Community.

See Tables 3 and 4 on the following pages.

Table 3: Site Selection Criteria Matrix

Criteria	Weight	Six Flags	Monmouth Park	Belmar	Asbury Park	Sea Bright	Red Bank	East Freehold Showgrounds / County Fair	Allentown	Downtown Freehold	PNC Bank Arts Center	Holland Ridge Farms	Sandy Hook
Peak Day Visitation Volumes	5	5	3	4	5	3	4	3	2	3	3	2	1
Ingress and Egress Visitation Demand	5	4	3	3	5	2	3	1	2	3	5	1	2
Density of Visitors Based on POI (Trips Per Acre)	2.5	3	4	3	5	3	4	3	2	2	3	3	1
Proximity to Transit	3	1	4	5	5	3	5	2	3	2	4	2	3
Potential for Satellite Parking	5	5	3	2	3	2	2	5	1	5	2	4	2
Resident Transit Mode Share for Work, Recreational, and Shopping Trips	2	1	2	2	3	5	4	3	1	3	4	1	5
Residential Population (1 mi radius)	3	1	3	4	5	2	4	3	1	4	2	1	2
Equity – Income (Residents)	3	3	4	3	5	1	3	3	1	3	1	2	2
Equity – Minority Population (Residents)	3	3	4	3	5	1	4	4	2	4	4	3	2
Duration of Peak (Hrs)	3	3	4	5	4	4	3	3	3	3	3	4	5
Major Arrival and Departure Roadways	5	2	3	4	5	5	4	4	4	3	2	4	3
	Weighted Scores	**123**	**131**	**137**	**181**	**111**	**140**	**124**	**82**	**129**	**118**	**101**	**95**
	Ranks	7	4	3	1	9	2	6	12	5	8	10	11

Table 4 - Site Rankings and Categorization

Site	Score	Downtown	Large Attraction	Beach Community	Rural
Asbury Park	181	X		X	
Red Bank	140	X			
Belmar	137			X	
Monmouth Park	131		X		
Downtown Freehold	129	X			
East Freehold Showgrounds/ County Fair	124		X		
Six Flags Great Adventure	123		X		X
PNC Bank Arts Center	118		X		
Sea Bright	111			X	
Holland Ridge Farms	101		X		X
Sandy Hook	95		X	X	
Allentown	82	X			X

Recommendations for Further Study

This section describes the Project Team's recommendation for further evaluation to develop TDM mitigation plans. As discussed above, the goal is to examine a diverse mix of sites, so that the strategies identified at one location may be adapted to another. For example, even though all beach communities performed well in the objective ranking criteria, it would not be advisable to study each beach community. Additionally, interest from the site owners and operators is critical to performing further detailed analysis, and was necessary for determining the final list of site for further study.

The selected sites are as follows and are depicted in Figure 18:

- **Sandy Hook / Sea Bright** – The proximity of these two destinations allows for a joint review of both, since they share common arrival and departure routes, and traffic to one destination may also lead to congestion on the approaches to the other. This combination represents a beach community and a major attraction. Sandy Hook is considered a "unit" of the Gateway National Recreation Area and one of four national parks operated in New Jersey and includes the areas of Staten Island and Brooklyn/Queens. Data provided from park staff indicates recreation visits in 2017 totaled 1.9M with steady annual increases in visitation from 2013 onward. Visitors on foot or bicycles soared between 2013 and 2017 with a nearly fourfold increase over the five-

year time span. In 2013, an estimated 3,275 visitors arrived as a pedestrian or cyclist and over 12,500 did so in 2017. The National Park Service reported recreational visits to Gateway National Recreation Area topping 9.4 million[1]. With its single point of vehicular access from State Route 36, congestion issues and parking limitations are well known. When parking is full or congestion into Sandy Hook is high, visitors sometimes drive south into Sea Bright which also has limited roadway transportation and parking infrastructure.

- **East Freehold Showgrounds / County Fair** – The Monmouth County Fair is by far the largest event held at the East Freehold Showgrounds every year. Access to and interest from the Monmouth County Parks System staff that manage this well-run event was a crucial consideration leading to its selection as a Large Attraction for further study.

- **Red Bank** – The borough of Red Bank features many different event types. It is a multi-activity Downtown with significant theater activity, nightlife, 5k runs, and festivals.

- **Asbury Park** – This community represents a beach community, downtown, and it also has many other attractions. The destination features nightlife, parades, large and medium concerts, festivals, and is supported by an active transportation planning and management staff.

- **Agritourism** – Holland Ridge Farms is a successful agritourism attraction that draws significant crowds for its flower festivals, however access to the site and operating staff was limited. The Project Team determined that the best course of action was to study Agritourism as a topic by collecting location based data on travel patterns to Holland Ridge Farms, and reaching out to other locations to gain insight into Agritourism operations.

[1] *Nps.gov/aboutus/visitation-numbers.html*

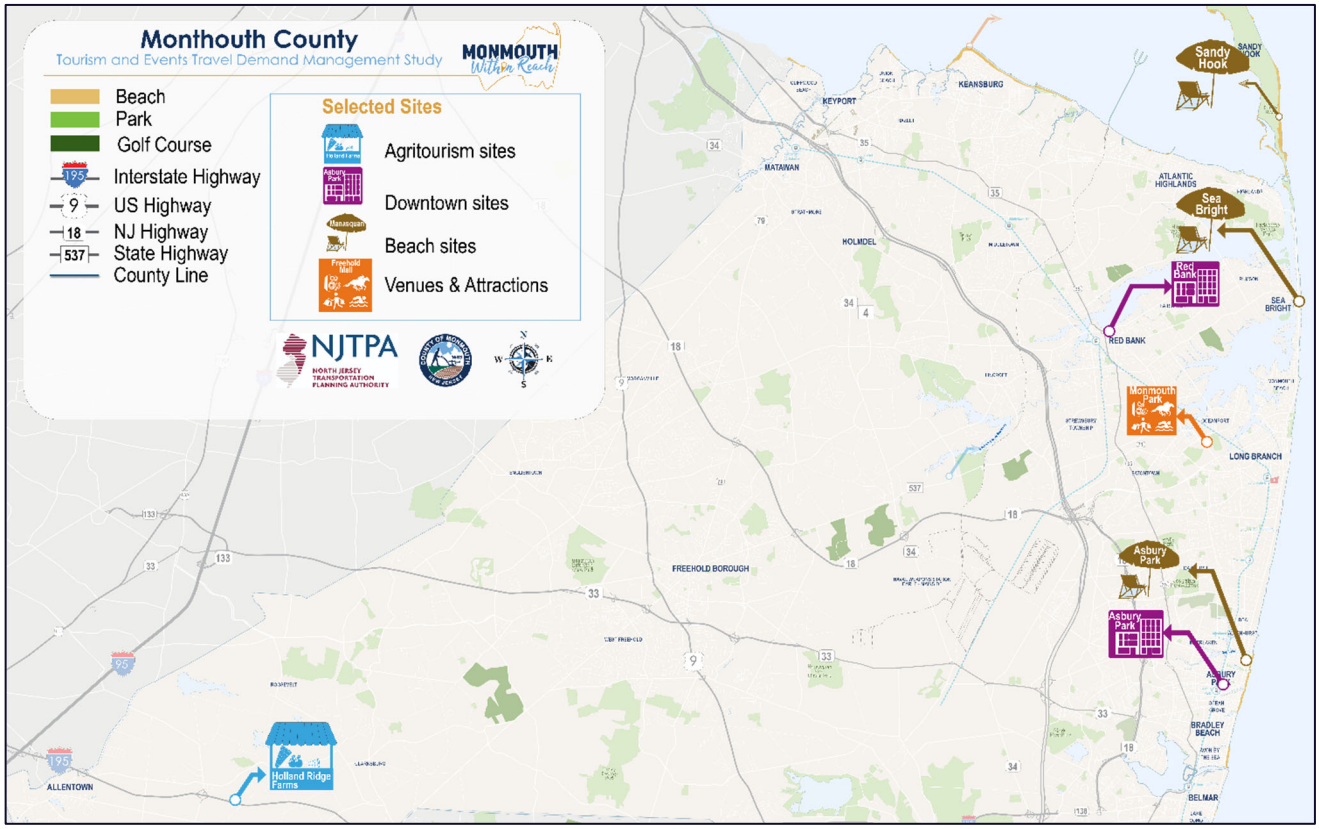

Figure 18 - Selected Sites

Next Steps

The project objective is to develop a TDM mitigation plan for each of the selected destinations identified above. The specific steps leading up to each are as follows:

1) Conduct a detailed examination of travel patterns near each selected site.

2) Meet with stakeholders to understand their concerns, goals and objectives related to peak season operations, as well as their available resources and existing traffic management strategies they currently employ.

3) Identify travel demand management strategies for each type of destination, based on the “toolkit” of travel demand management strategies.

Figure 19 – Travel Demand Management Strategies

The TDM deck is a summary of the main modal, transportation network and communication options that have been utilized over the past decade in resort and venue-based areas to encourage and force changes in travel to reduce the impact of the trip on the tourist-based experience. We have identified a deck of strategies that can be divided into five suits:

Travel Behavior - This can include on-street operational changes, new forms of information, using traffic apps to change the way people use the road network, creating priority infrastructure for transit and cycling or diverting background traffic (regional and local through traffic not related to tourist trips) onto new paths.

Communications - This can be pre-travel communications, information received enroute, wayfinding approaching tourist areas or venues and proper signage.

Improve Existing Services - This may include making shared rental programs more widely available, adding service to existing public and private transportation services during busy weekends, key changes to problematic intersections to improve flow, managing pedestrians at key crossings, or temporarily altering traffic signal operations to reflect changes in peak travel demand. These strategies have been previously used or implemented in other tourist-based locations. The goal is to make travelers more aware of these amenities and customize existing facilities and services to benefit the major event day or seasonal peak experiences.

New Options for Modality - Create or encourage new modal options that do not currently exist for events, venues, or other attractions. These can include new connectivity to the County or improved travel within the County.

Parking - Parking is identified as a special area of interest in the travel demand management deck. Even with alternate mode strategies, most visitors will choose to drive to their destination. In beach communities, for example, vehicles circulating for a parking space is a significant source of congestion. In a previous study in the Sarasota-Manatee Barrier Islands, the Project Team determined that drivers spent up to 30 minutes circulating for the elusive parking space. Visitors that are “location-agnostic” (they just want to visit a beach, not necessarily a specific beach) are more likely to circulate and re-circulate over longer distances to find parking spaces.

The “Toolkit”

A comprehensive event management plan includes a multi-phased approach to managing congestion. It should be noted that a 1-mile queue on a 1-lane road includes approximately 200 vehicles. This understanding is essential to the underlying themes of the travel demand management “deck” described above. A 3-mile queue represents a significant amount of congestion; however, it includes just 600 vehicles. If six hundred vehicles exemplify significant congestion, the annual average daily visitation according to the StreetLight data to destinations such Sandy Hook (2,159), Red Bank (39,095), and Asbury Park (39,013) results in massive impacts throughout the surrounding communities.

For a destination that features thousands or tens of thousands of vehicle arrivals per hour, this presents a tremendous opportunity. If the proposed strategies can be implemented singularly, or in combination, this can encourage some guests to change their travel modes or plans. If as few as ten percent of all guests arrive early, change to transit, park off-site, use a shared ride service, or park in a satellite lot, the resultant cumulative reduction in congestion would result in a better experience for everyone going to an event and living in the area.