

Appendix A

A Basis for Evaluation of Architectural Design Quality

Introduction

Purpose

Design quality is an overarching consideration—encompassing physical, cultural, historical, and aesthetic considerations—and can be an elusive topic to address. The purpose of this document is to articulate principles to be used as a basis for evaluating architectural design quality and, more specifically, to serve as a framework for the design evaluation of the Category 1 Casino applications.

Overview

The evaluation of design is both objective and subjective. Some aspects are evaluated in respect to established standards yielding a clear determination, such as whether or not a building's form—e.g., height and setbacks—is consistent with zoning or planning guidelines. Others—such as the choice of materials—are more qualitative, taking into consideration industry standards, local environment and construction practices, and the goals and expectations for the project. Lastly, the evaluation of some considerations—particularly aesthetics—is subjective and will be influenced by personal and professional preferences, expertise, and experience.

Key Considerations

Drawing on historical architectural design standards and federal, state, and local guidelines, key considerations for design quality

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have been identified and are discussed in greater detail below. In general terms, a well-designed site and building will:

- Be of consistently high quality
- Reflect the qualities of the region
- Provide public space and amenities
- Serve and improve its immediate environment
- Be compatible with planning visions
- Strengthen connections with existing and future networks
- Capture and extend the essential qualities of the building type

These principles have formed the basis for the consideration and evaluation of the building and site designs proposed in the Category 1 casino applications and may provide guidance in dealing with site planning and architectural design issues as these projects are developed through subsequent stages of design and construction.

Background

Design Evaluation

Evaluating design is a complex process that takes into account multiple considerations such as form, program or use,

functionality, materials, context (physical, economic, and social), and aesthetics. Since design is specific to the problem at hand—to its function, to its site and place, and to its physical and cultural context—the evaluation of an architectural design solution needs to consider not only the external appearance but also the project in relation to its program, site, and context.

The evaluation process itself—and the decisions rendered as a result of the process—can vary depending on the goals and criteria for the project, the purpose of the evaluation, and the stage at which the project is evaluated.

Reference Materials

In evaluating planning and design there are certain general principles that have a degree of universal acceptance. The Roman architect, Vitruvius, wrote that “Well building hath three conditions; firmness, commodity, and delight.” This statement has been generally accepted as a definition of good architectural design since the Roman era. A contemporary translation of the original Latin (*firmitas, utilitas, et venustas*) might be “durability, usefulness, and attractiveness.” The last word in the sentence, “attractive” refers to the experiential qualities and appeal of an architectural environment as well as an external image as perceived from a distant viewpoint.

In contemporary times, the federal government’s General Services Administration (GSA) Design Excellence Program attempts to describe some of the qualities of good design for federal buildings in its guiding principles, including:

“...incorporating into such designs qualities which reflect the regional architectural traditions of that part of the nation in which buildings are located.”

“...special attention should be paid to the general ensemble of streets and public spaces of which Federal buildings will form a part.”

Similarly, motivated principles (among others) were outlined in the white paper provided by the Massachusetts Chapter of the AIA (American Institute of Architects) entitled “Casino Design: Sustainability and Community Linkages: Requiring Excellence for Massachusetts Casinos” (March 2013).

In addition, local guidance was gleaned from the Artery Business Committee’s (now known as A Better City) principles for design and programming in the Wharf District of downtown Boston and from the architectural design review documents utilized by five cities located in New England: New London, CT; New Haven, CT; Northampton, MA; Lowell, MA; and Concord, NH. These cities were chosen because of their relative proximity and similar size to Springfield, Everett, Revere and Brockton. An overriding premise common to all these design review documents is that well designed buildings are good neighbors, and an important part of being a good neighbor is reflecting and responding to the planning and design characteristics of the surrounding built environment.

Approach to Review

In reviewing and evaluating a design, the clarity and completeness of the materials is important. For a concept design such as the Category 1 Casino applications, there is an expectation that the

representation of a design proposal be consistent, complete, and clear. As an example, the representation of the size, location, and configuration of a specific component—such as a parking structure or hotel—should be consistently depicted in the various plan, elevation, section, and perspective drawings in order to be clearly understood. A proposal should also represent all sides of a project, not just those that provide the most attractive views, and drawings should not utilize drawing techniques, such as the placement of entourage in renderings (people, vehicles, animals, plants, etc.) in order to blur or conceal building elements that could be deemed unattractive or problematic.

The Category 1 design review is grounded in the RFA-2 application materials, where approximately one-third of the application questions concern Building and Site Design and provide broad-reaching and detailed information on the manifold aspects of design.

Supplementing the information submitted by the applicants, the review benefits from site visits to understand context; public meetings and input along with host and surrounding community agreements to hear from the community; existing facility visits to assess the quality and approach to development and operations; and MEPA documents including the ENF for MG&E's proposal. Finally, Requests for Clarifications addressed apparent contradictions or inconsistencies.

Framework for Evaluation

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Using the historical definition of good architectural design and drawing on federal, state, and local guidelines, certain elements of design quality emerge. As a basis for the evaluation of architectural design, a well-designed site and building will:

- **Be of consistently high quality** in its design, construction, and materials. High quality design extends through all scales from the broadest site planning and building organization to finish materials, details, planting, lighting, and signage. Quality materials and details also contribute to the life-span of the building.
- **Reflect and project the aspirations of the community, the region, and the Commonwealth** through its design even as it solves problems related to its immediate site and its program.
- **Provide public space and amenities** that benefit patrons and the community, open and accessible to all throughout the day and the seasons.
- **Serve and improve its immediate environment**, both manmade and natural.
- **Be compatible with planning visions** by being consistent with, and respectful of, the community's existing physical, historic, and cultural character and its plans and/or visions for the future.
- **Strengthen connections with existing and future networks** by integrating the site with adjoining streets and sidewalks, public transportation systems, waterways, trails, parks, and public spaces. Related to the issue of networks is that of access: an accessible site

accommodates a broad cross section of users and can be seen as welcoming to the general public.

- **Capture and extend the essential qualities of the building type** to communicate its intended purpose in a captivating way. A resort casino design should reflect the business intentions and theme of the project. If the business intention is to convey luxury, then its exterior and interior should clearly and consistently reflect that. If the business intent is fun and entertainment, then it should send that message and incorporate a program of uses and create an environment that consistently supports and communicates that theme.

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List of References

1. AIA Massachusetts White Paper: “Casino Design, Sustainability, and Community Linkages: Requiring Excellence for Massachusetts Casinos” by Julie Taylor, Esq., March 2013.
2. General Services Administration (GSA), Design Excellence Program: Guiding Principles: <http://www.gsa.gov/portal/content/136543>.
3. Design Guidelines Manual, Downtown Northampton Central Business District, Northampton, MA, April 8, 1999.
4. The Wharf District: Five Principles for Design and Programming, Waterfront/Financial District Working Group of the Artery Business Committee, August 1999.
5. City of Concord, NH Architectural Design Guidelines, City of Concord Planning Board, August 29, 1990, revised April 12, 1991.
6. City of Lowell, Acre Neighborhood District Design Review Standards, Lowell Historic Board, October 13, 1999.
7. Site and Architectural Design Guidelines, City of New Haven, CT, DRAFT May 29, 2012.

8. Design Review Guidelines, New London, CT, Planning and Zoning Commission, September 2009.
9. Scheer, Brenda Case and Preiser, Wolfgang F. E., Design Review: Challenging Urban Aesthetic Control, Chapman and Hall, 1994.
10. Langdon, Philip with Shipley, Robert G. and Welch, Polly, Urban Excellence, Van Nostrand Reinhold, 1990.

Appendix B: Design Review

MG&E/BROCKTON

Executive Summary

Using the key considerations outlined in Appendix A, the MG&E/Brockton conceptual design may be understood as follows:

- *Overall quality.* The Applicant proposes—and its supporting documentation portrays—a design approach intended to “exceed the industry standard” and uses the SugarHouse Casino property in Philadelphia as a referenced comparable. Whether the facility ultimately reaches this level of design quality will depend on the continued development of the final building design, including the choice of materials and the construction detailing.
 - *Relationship to its region.* The proposed design occupies the grounds of the former Brockton Fair Grounds and presents a masonry exterior that recalls historic industrial properties such as mill buildings even though the Applicant does not articulate a specific design connection to the region beyond “New England style.”
 - *Public space and amenities.* Landscaping and walkways are provided along the street edges. Otherwise, the public space and amenities provided are internally focused.
 - *Serve and improve its immediate environment.* Designed to maximize the site’s “park-like setting”, the proposed development provides planted buffers to east, south, and west. However, this design approach is undercut by the extent of surface parking fronting the main approach roads.
- *Compatibility with planning visions.* The proposed design is not inconsistent with the existing development along West Street and Forest Avenue and potentially could serve as an anchor for a yet to-be-studied entertainment district.
 - *Connections with existing and future networks.* The proposed design is primarily oriented to vehicular traffic. Potential connections to the adjacent Campenelli Stadium are suggested. However, a potential opportunity is lost or delayed by not incorporating the historic Brockton Fairgrounds Exhibition Hall in the gaming establishment.
 - *Qualities of the building type.* The design approach legibly articulates the gaming facility, its parking garage, and the associated hotel. The three component parts share a common masonry exterior vocabulary with the casino entrance marked by a tower element.

Discussion of the specific aspects of the concept design presented by MG&E/Brockton follows.

Site

The MG&E proposal will occupy a +/-45-acre site that is bordered to the east by a residential neighborhood and to the north, south, and west by commercial development. The site is presently occupied by the Brockton Fair Grounds, including the track, grandstand, and associated outbuildings. All the existing structures will be demolished. (See Figure 1.)

Adjacent to the site, but not incorporated in the gaming establishment itself, is the historic Brockton Fairgrounds Exhibition Hall.

The 45-acre site is large and ‘square’ in shape allowing alternative

building locations. The Applicant has chosen to align the buildings generally on a north/south axis at the east side of the site. The front of the building, on the west side, faces a large surface parking area, the two main entrances, and adjacent commercial/retail land uses. The back of the building, on the east side, has a smaller employee parking area and a 100 to 200 foot landscaped buffer adjacent to a residential neighborhood.

This is a reasonable site plan for an independent facility. It is generally positive on the neighborhood side by pulling the buildings away from the property edge to allow for a landscaped buffer and lighting that

will not spill beyond the property. However, on the commercial side, a large parking area and long distances separate it from potentially compatible uses at, for example, the Shaw’s Center, Campanelli Stadium, and possible future venues along Belmont Street, West Street, and Forest Street. It is possible that the Applicant has considered future phases of development that could better activate the edges and address compatibility with commercial surroundings, but the Application is silent on this point.

The site will be accessed by vehicles primarily via Route 24 and then along Belmont and West Streets.



Figure 1. Existing Site



Figure 2. Proposed Site Plan

Program Elements

The Gaming Establishment consists of three main elements:

- Casino floor and associated food and beverage (F&B) venues
- Multi-purpose ballroom and associated conference/meeting rooms
- Hotel and spa.

The Applicant proposes an inward-focused gaming floor including 2,990 gaming positions (2,100 slot machines, 100 live table games, and a 24-table poker area) contained within some 91,000 total sf. Non-gaming amenities include a full complement of food and beverage offerings, convenience retail, and multi-function ballroom/meeting space. The multi-function space of 12,200 sf may accommodate up to 1,000 patrons for certain programming including live entertainment.

The 250-room hotel property is directly connected to the gaming floor and offers an additional restaurant, spa and health club, pool, and multi-function ballroom/meeting space.

Organization

The building itself is composed of three distinct parts: the casino, the hotel, and the parking garage. The hotel is located to the north; the casino occupies the center; and the 1400 space, three-level garage (housing some 47% of the total 3000 spaces on site) is on the southern end of the buildings.

Each part of the building has an independent entrance and direct access to the surface parking lot. This is a reasonable site plan for an independent, stand alone facility. The Applicant's claim that buildings are set in a "park-like setting" is supported by planted

buffers to east, south, and west but undercut by the extent of surface parking fronting the main approach roads.

The interior of the casino is organized with the gaming floor (green areas in Figure 3) at its center and BOH supporting elements to the east and north. There are entrances from the parking lots to the west; the garage to the south; and the hotel to the north. Food-and-beverage offerings (blue areas) are located along the edges of the gaming floor. The multi-function ballroom/meeting space occupies a prime location between the hotel and casino floor, with access to an outdoor courtyard.

Exterior Design

As a clarification to their application, MG&E articulated the goal of complementing the style of the area in which the gaming establishment is located. Specific New England-style design elements highlighted by MG&E include: extensive use of red brick; gable and hip roof forms; clerestory windows; and iconic features such as spires.

Thus, the buildings as presented all share a common masonry vocabulary. However, each element is articulated with its own identity:

- The 6-story hotel has its own porte cochere and is capped by a hipped roof.
- The 1-story casino is anchored by a tower reminiscent of mill complexes.
- The 3-story garage caps the composition with its massing block clad in precast brick spandrel panels.

Overall, the exterior design is understated, with modest aspirations, and presents a solid image that it is not out of place in a commercial district.

Design Review

Figure 4. Exterior Renderings.



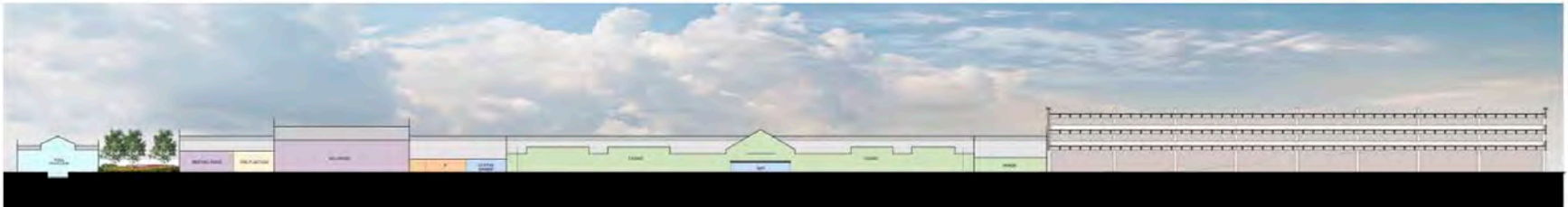
Figure 5. Proposed Elevations and Sections.



HOTEL ELEVATION



HOTEL SECTIONS



SECTION



ELEVATION

Summary

The design and documentation for MG&E/Brockton consistently portray a design approach to the proposed casino that is related to its location on the grounds of the former Brockton Fair Grounds, off West Street and Forest Avenue between a low-rise commercial strip and single-family residential neighborhoods. The logic of the proposal's configuration and material choices respond to its mixed commercial surroundings and respect its adjacent residential neighbors. In deference to those residential abutters to the east, the project's edges are pulled back significantly along that edge and help reinforce the inward focus of the development.

With the overall hotel and gaming facility set back from the street edges, the attraction of the gaming establishment may be read as more of a "destination" experience than an "integrated" experience.

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Appendix C1. Program Comparison, square feet

Category	MG&E Brockton	MGM Springfield
Hotel	209,000(1)	152,000
Gaming	91,100	126,000
Retail	1,000	15,200
Food and Beverage	32,800	34,100
Convention	28,900	43,700
Residential	0	65,000(2)
Operations	102,350	200,600
Casino Block Subtotal	466,000	636,800
Retail Block	0	122,000(3)
Total	466,000	759,000
Number of Slots	2100	3000
Number of Table Games	124	100
Gaming Positions	2990	3657
Hotel Rooms	250	250
Parking Spaces	3000	3375
Lot Size, acres	45.5	15.6
Opening Date	Q3 2018	Q4 2018

1. Includes Spa at 16,000 sq ft
2. 54 Units off site
3. Includes retail, food, bowling, cinema and operations

April 2016

Appendix C2. Cost Comparison MG&E and MGM, dollars

Category	MG&E Brockton	MGM Springfield (2)
Construction		
1. Casino	110,000,000	66,000,000
2. Hotel	72,000,000	83,000,000
3. Retail/Entertainment	14,000,000	48,000,000
4. Parking	28,000,000	93,000,000
5. A&E Services	25,000,000	22,000,000
6. Other (1)	46,000,000	95,000,000
Subtotal Construction	295,000,000	506,000,000
Construction \$/Gaming Position	99,000	138,000
Construction\$/Square Feet	633	667
FF&E	62,000,000	75,000,000
Gaming equipment	46,000,000	44,000,000
Land	23,000,000	51,000,000
License Fee	85,000,000	85,000,000
Other	167,000,000	190-210,000,000
Total	678,000,000	952-972,000,000

1. Includes site and infrastructure costs
2. Up-dated April 2016

Appendix D: Energy and Sustainable Design Review

MG&E/BROCKTON

Overview

This discussion reviews how the Applicant proposes to advance certain objectives related to energy and sustainable design in MGL c.23K, §18 (8) based on their responses to Questions 4-37 LEED Certification; 4-39 Stretch Energy Code; 4-46 On-Site Energy Generation, 4-47 Off-Site Renewable Energy, and 4-54 Sustainable Building Construction¹. The questions and responses specifically relate to three objectives listed in MGL c.23K, §18 (8):

- (i) Being certified as LEED gold or higher,
- (ii) Meeting or exceeding the stretch energy code, and
- (iii) Procuring or generating on-site 10% of its annual electricity consumption from renewable sources.

Among its sustainable development principles, the enabling legislation explicitly includes LEED Gold certifiability and Massachusetts “Stretch” Code requirements among the factors the Commission must consider. For context, Massachusetts Executive Order 484 signed in 2009 established the “Leading by Example” program, which targets a 35% reduction in overall energy consumption by state-owned buildings by Fiscal Year 2030, and a 40% reduction in greenhouse gas emissions. Additional requirements include: procuring renewably sourced electricity, incorporating bio-based fuels for oil burning applications, and reducing potable water use. Under Executive Order 484 significant projects designed for use by a public entity must meet LEED Certification, plus energy performance of 20% improvement from baseline, commissioning, and smart growth criteria established by the Commonwealth.

¹ Listed under Category 4, Criteria 4, Utilize Sustainable Development Principles in the Construction and During the Life Cycle of the Facility.

This summary addresses LEED, the Stretch Code, and renewable energy in the context of the Category 1 Casino license applications and provides background for the analysis of questions considered under Criteria 4, Utilize Sustainable Development Principles in Construction and Life Cycle of Facility.

Chapter 23K of the Massachusetts General Laws Amended through Chapter 96 of the Acts of 2012 & Chapter 194 of the Acts of 2011 - Section 18

In determining whether an applicant shall receive a gaming license, the commission shall evaluate and issue a statement of findings of how each applicant proposes to advance the following objectives:

...(8) utilizing sustainable development principles including, but not limited to: (i) being certified as gold or higher under the appropriate certification category in the Leadership in Environmental and Energy Design program created by the United States Green Building Council; (ii) meeting or exceeding the stretch energy code requirements contained in Appendix 120AA of the Massachusetts building energy code or equivalent commitment to advanced energy efficiency as determined by the secretary of energy and environmental affairs; (iii) efforts to mitigate vehicle trips; (iv) efforts to conserve water and manage storm water; (v) demonstrating that electrical and HVAC equipment and appliances will be Energy Star labeled where available; (vi) procuring or generating on-site 10 percent of its annual electricity consumption from renewable sources qualified by the department of energy resources under section 11F of chapter 25A; and (vii) developing an ongoing plan to sub-meter and monitor all major sources of energy consumption

and undertake regular efforts to maintain and improve energy efficiency of buildings in their systems...

SUMMARY

The three key objectives explained in this discussion are:

A. Being certified as LEED gold or higher.

The gaming legislation requires applicants to achieve at minimum, certifiability under the United States Green Building Council (USGBC) LEED Rating system at the Gold level of 60 points. MG&E has committed to achieve this standard, and has further committed to pursue certification of the project at Certified Gold or higher level from the USGBC.

B. Meeting or exceeding the stretch energy code.

The Massachusetts Stretch Energy code requires large commercial projects in communities that have adopted the Stretch Code to be designed to use 20% less energy than the current base code standard. The City of Brockton has not adopted the Stretch Code. MG&E has committed to meet the requirements of the current Stretch Energy Code and has acknowledged the potential impacts of an anticipated update to the Stretch Energy Code.

C. Utilizing renewable energy sources.

Applicants are required to generate on-site or procure contracts for at least 10% of their annual electric consumption. MG&E has committed to meet this goal through contracts to purchase renewable power from off-site renewable energy sources.

Each of these objectives is discussed in more detail below, with background on the standard and review of the applicants' responses.

A. LEED

USGBC Leadership in Energy and Environmental Design Rating System (LEED) has become a widely accepted baseline for measuring sustainable building performance across the US (although many advocates of sustainable building design regard it as an imperfect measure of sustainability). There are now a diverse array of specialized versions of the LEED Rating system for different building types, and different phases in a project lifecycle. The Applicant addresses several of these rating systems:

- MG&E discusses its commitment to LEED for New Construction (LEED NC), as well as indicating that the facility is intended to be LEED "EBOM ready" with metering, monitoring, and control systems should Existing Building Operating & Maintenance (EBOM) certification be considered after the building is operational.

LEED NC, as its name suggests, is applied to new construction and major renovations. The EBOM system evaluates the energy performance and building maintenance and operating practices for existing buildings regardless of their original design, and can guide decisions regarding ongoing retrofits during the life of the building. This system can be applied to buildings certified under LEED NC once they are fully operational.

Many institutions, states, and federal government agencies, including the Commonwealth of Massachusetts, have mandated achieving some level of LEED certification for new construction projects in their jurisdiction. For example, the Massachusetts Leading by Example program defined in Executive Order 484 requires all projects overseen by the Division of Capital Asset Management and Maintenance (DCAMM) and any other executive agency, or projects built for use by state agencies on state land, to meet the Massachusetts "LEED Plus" standard which includes certification by the USGBC LEED program for projects over 20,000 square feet. Also, many leading private

institutions require a LEED Gold minimum standard for new construction. So while the standard set for the gaming license goes beyond State minimum requirements for public buildings, it is in line with targets of other forward-looking projects and agencies within the Commonwealth.

LEED Certified and LEED ‘Certifiable’

Pursuing LEED Gold certification requires a commitment from the whole project team to ensure that decisions are made throughout design, bidding, and construction with both the overall goal and the specific requirements in mind. A team committed to achieving certification establishes the goals early and maintains its commitment and focus throughout the project to ensure that the project achieves integration of building design, mechanical systems, and site design with environmentally sound construction practices.

In theory, pursuing LEED Gold certifiability should entail the same process, while saving the costs and time of the registration fees and documentation submittal needed to undergo USGBC review for certification. However, the ‘certifiable’ standard lacks the enforcement mechanism provided by a third party review. A project aiming for ‘certifiable’ status under a given standard can be seen to carry less weight of commitment than a project that has committed to certification and intends to undergo scrutiny by the USGBC under the formal LEED certification reviews.

The LEED NC Rating

The LEED New Construction Rating System (LEED NC) is based on achieving up to 110 possible total credit points across seven categories. The levels of certification are: Certified (40-49 credit points), Silver (50-59), Gold (60-79), and Platinum (80 and above). See Table 1.

The USGBC provides a summary checklist of the current LEED NC

2009 rating system. The checklist has three columns for each possible credit: YES, ?, and NO.

- The YES column includes items the project team is confident the project can achieve.
- The question mark column is for those credits that may be possible depending on the details of the design development, budget, and construction process.
- The NO column is for credits that are not applicable or not likely to be achieved based on the building’s siting and design.

A LEED Checklist prepared early in design provides an approach for the project to reach the targeted level. During design development and construction the checklists can serve as a guideline for the project team for specific project attributes that need to be met for the project. Certification at a given level of LEED is achieved only after documentation for all credits is submitted to the USGBC, and attainment of each credit has been reviewed and verified by the USGBC. The number of verified credits will determine the level of certification. Some credits in the YES column from the initial checklist may be lost, and some credits in the ? column may become possible to achieve based on availability of materials, final configuration of building systems, or the way in which the construction is bid, negotiated, and carried out. It is important to identify sufficient credits above the minimum for any given certification level so that the project can achieve its goals even with some attrition.

As noted in the overview, the Commission will evaluate how each applicant proposes to advance the objective of being certified as gold or higher under the appropriate certification category of LEED. Question 4-37 asks the applicant to describe plans for becoming certifiable at the gold or higher level of LEED.

TABLE 1. LEED CHECKLIST COMPARISON TABLE FOR MGC CATEGORY 1, AREA A CASINO APPLICANTS

LEED 2009 FOR NEW CONSTRUCTION AND MAJOR RENOVATION - CERTIFICATION LEVELS:

TOTAL POSSIBLE POINTS	110 POINTS	
PLATINUM	80+ POINTS	
GOLD	60-79 POINTS	TARGETED MINIMUM LEVEL FOR APPLICANTS
SILVER	50-59 POINTS	
CERTIFIED	40-49 POINTS	

LEED 2009 for New Construction and Major Renovations: Summary by Category

<i>Category</i>	<i>Points in Category</i>	MG&E Brockton					
		Points Total by Category					
		YES	?	combined			
Sustainable Sites	26	20	2	22			
Water Efficiency	10	5	5	10			
Energy and Atmosphere	35	13	3	16			
Materials & Resources	14	7	0	7			
Indoor Environmental Quality	15	13	0	13			
Innovation & Design Process	6	2	4	6			
Regional Priority Credits	4	2	2	4			
Total	110	62.00	16.00	78.00			
		OLD MIN. +2		TINUM MIN. +18			

MG&E Brockton LEED Response

MG&E states its commitment to achieve LEED Gold certification through the USGBC certification process. This distinction is significant because the rigor of submitting documentation for USGBC review to achieve the targeted rating provides a lever that acts throughout the decision making process to shift outcomes towards attaining the targeted credit goals. A LEED checklist completed with the intent to achieve certification requires diligence in assessing the feasibility of each credit listed, as the selected credits must be achieved or replaced with additional credits to meet the targeted status.

The Applicant has provided a LEED NC 2009 checklist, which shows sixty-two credits targeted as likely, two points above the LEED Gold threshold. An additional sixteen credits are listed as possible, which brings the total to seventy-eight possible credits, or eighteen points above LEED Gold threshold. (See Table 1.)

The Applicant has explicitly stated a commitment to the certification process through the US Green Building Council. In support of this commitment, the Applicant has included a initial LEED checklist identifying the proposed 62 credit points to be pursued at this time and has assembled a team of well-qualified design professionals in this area who together with the Applicant have previously achieved LEED Gold on another casino facility.

B. MASSACHUSETTS STRETCH CODE

The Massachusetts Stretch Energy Code is an appendix to the Massachusetts State Building Code, Eighth Edition (780 CMR Appendix 115.AA), which was adopted by the Board of Building Regulations and Standards in May 2009 as an option for towns and cities interested in more energy efficient building standards than the “base” energy code. The Stretch Code amends the Massachusetts base energy code (IECC

2009) to achieve approximately a 20% improvement in building energy performance from an established baseline. For large commercial buildings over 100,000 SF, such as the proposed casinos, the current Stretch Code requires a 20% reduction in predicted energy use (calculated using accepted energy modeling software) below the baseline established by ASHRAE 90.1-2007. The method is the same as used for documenting energy credits under the USGBC’s LEED program.

Stretch Code Changes

In accordance with the statutory requirements of the Green Communities Act of 2008, Massachusetts has adopted a new baseline energy code for commercial buildings based on 2012 IECC and ASHRAE 90.1 2010, which took effect starting July 2014, and which will raise the baseline for energy performance of new buildings in the Commonwealth. A new Stretch Code has not yet been proposed or enacted, although it is anticipated that a new code will potentially require a 15% improvement in energy performance over the new base code, or about a 35% improvement from the current ASHRAE 90.1 2007 baseline.

Energy savings are generally achieved through improved design and construction of the building envelope and efficient electrical, heating, cooling, and ventilation systems.

MG&E Brockton Stretch Code Response

Even though the City of Brockton has not adopted the Massachusetts Stretch Code, the Applicant has committed to meet or exceed current Stretch Energy Code. Further, when the Stretch Code is updated, the Applicant will evaluate the proposed project in light of the new code and “will create a plan for meeting the updated requirements.” Strategies noted in support of this commitment include a focus on building envelope, HVAC equipment, appliances, lighting, and control

systems. To this end, the commitment to 3rd party commissioning for both the envelope and the HVAC system is also seen as a positive.

C. RENEWABLE ENERGY SOURCES

The Commonwealth's plan for greenhouse gas emissions (GGE) limits includes encouraging renewable sources of energy in the sectors of buildings and transportation (G.L. Chapter 21N). The Commonwealth has enacted legislation and programs to encourage both on-site generation of electricity and a market for renewable energy purchase and generation by utilities.

On-site generation of electricity from renewable sources reduces the greenhouse gas emissions of the project, and also helps reduce the need for additional power plant generation. Purchasing renewable energy from utilities or purchasing Renewable Energy Certificates (RECs) builds a stable market for renewable sources of energy generation, especially if done through long-term contracts (i.e., contracts with a duration of 10 to 20 years).

RECs are created when a certified renewable source generates electricity. One REC is issued for each megawatt-hour (MWh) of renewable electricity produced, and the certificate represents the renewable attributes of the electricity. These RECs can then be sold in a REC market transferring the renewable attributes to the purchaser, who may use them for credits against their production or use of non-renewable electricity. When the REC is created the renewable attributes are split from the electricity, and the electricity, if sold, is no longer counted as renewable.

In Massachusetts, the gaming legislation requires gaming facilities to generate or procure ten percent of annual electricity consumption from renewable sources qualified under section 11F of Chapter 25A. The qualified sources are defined as Class I or

Class II sources, based on when they began generating electric power. State law defines a broad array of qualifying sources of renewable energy. For on-site generation, the most commonly used sources are solar photovoltaic (PV), solar thermal, and wind. Ground source heat pumps, commonly referred to as geothermal, are also widely used in the region. Off-site generation includes additional options that can be utilized by larger utilities. Off-site renewable energy can be purchased through contracts for energy services, or by purchasing RECs. Per Chapter 25A, Section 11F, Class 1 renewable energy generating sources are those which began generating energy on or after January 1, 1998 from any of nine sources: (1) Solar photovoltaic or solar thermal electric energy, (2) wind energy, (3) ocean thermal, wave or tidal energy, (4) fuel cell utilizing renewable fuels, (5) landfill gas, (6) energy generated by new or increased capacity at hydro-electric facilities (with some restrictions), (7) low emission advanced biomass power conversion technologies using approved fuels, (8) marine or hydrokinetic energy, or, (9) geothermal energy. Class II sources began generating prior to January 1, 1998.

Questions 4-46, 4-47, and 4-57 relate to renewable energy generation and consumption by the proposed gaming facilities. These questions address on-site generation, purchase of off-site generated power through power contracts or purchasing renewable energy credits, and in question 4-57, directly address long-term contracts for wind, solar, or other renewables.

It is worth noting the relationship between an Applicant's renewable energy strategies, as described in its responses, and the LEED NC 2009 rating system requirements. There are two LEED credit categories related to renewable energy generation and procurement under the Energy and Atmosphere (EA) credit category:

EA Credit 2: On-Site Renewable Energy provides points for renewable energy generated on-site (1-7 points for 1% to 13% of energy costs in 2% increments).

EA Credit 6: Green Power, provides up to 2 points for purchasing certified renewable energy generated off-site, specifying minimum 2-year contracts to provide at least 35% of estimated building electricity use from renewable sources defined by Center for Resource Solutions' Green-e Energy product certification requirements.

Note that the LEED-based green power purchasing commitments for two-year contracts fall well short of the duration of the fifteen-year Category 1 gaming license, and well short of the long-term contracts of 10-20 years by state standards. Optimally, facilities would be making long-term commitments to purchase renewable energy throughout the duration of the license.

MG&E Brockton Renewable Energy Response

The Applicant does not foresee any on-site energy generation and instead commits that a total of 35% of electricity needs be achieved through the purchase of off-site renewable energy for an initial period of 2 years. Further, MG&E will investigate the purchase of an additional 35% for the first two (2) years of operation to achieve LEED credit EA6 Exemplary Performance level, and then commits to meeting the 10% threshold as a minimum after 2 years.

On-site Generation

The Applicant's response does not commit to any on-site generation beyond mention of the potential to explore a bio-mass boiler.

Accordingly, on the LEED NC 2009 checklist for the casino, the Applicant has not targeted any points as possible for LEED NC EA Credit 2, On-site Renewable Energy (which would require a minimum of 1% of electric use to be generated from renewable sources on-site).

Energy and Sustainable Design

Off-site Renewable Energy

As noted above, the Applicant commits to purchasing off-site renewable energy equal to at least 35% of its electrical power use for the first 2 years. This is consistent with the two points targeted for LEED-NC EA Credit 6, Green Power (which requires a minimum two-year contract for at least 35% of electric power use). In response to a request for clarification related to question 4-57 Energy Contracts, the Applicant has indicated that longer-term purchase agreements will be maintained to exceed the 10% stipulated by MGL c.23K, §18 (8).

Beyond this initial 2-year period, MG&E will commit to purchasing at least 10% of its energy from renewable energy sources for each successive year, "in as much as said procurement can be made at a reasonable cost and that said energy is readily available as a distinct offer on the energy market.

Mass Gaming & Entertainment LLC is evaluating options to procure the required renewable energy via Massachusetts SRECs, i.e., RPS Class 1 qualified renewable resources, or a combination of these and green-e-certified RECs.

Before the two-year commitment expires, MG&E plans to conduct a regular RFP process on a regular basis to purchase energy needs directly from manufacturers. The RFP timing will be based on the length of the previous contract, most likely every 12 to 18 months.

The Applicant has indicated an openness to considering other clean energy strategies (including collaboration with Massachusetts Clean Energy Center and potential contracts for organic food waste) but has not made any commitments.

CONCLUSION

MG&E Brockton propose strategies to build and operate an energy efficient facility that meet the intent of the energy and sustainability

goals of MGL c.23K legislation. Importantly, the Applicant emphasizes commissioning and ongoing monitoring as a means to manage the ongoing energy use of the facility. The application by MG&E and the design team proposed for the project combined with past experience achieving LEED Gold for other casinos indicates they are capable of meeting or exceeding the Commonwealth’s energy performance and sustainability requirements.

With respect to LEED certification, MG&E makes a commitment to third party oversight of their project through the USGBC certification process—which can help ensure that the project follows through on these strategies and fulfills its goals.

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April 2016*

MGC Category 1 License for Casino: Region C

Category #4 – Building & Site Design

Appendix E, Transportation

Introduction

The purpose of this memorandum is to provide background information, an overview of traffic impact studies in general, and an understanding of the key factors that determine how well the Category 1 Applicant in Region C, Mass Gaming and Entertainment (MG&E), LLC., responded to the traffic and parking related questions in the application. Some of the key factors in reviewing each Applicant's responses and traffic studies include:

- Trip generation forecasts
- Parking demand analysis
- Site access
- Adequacy of the study area
- Intersection operations
- Traffic deficiencies and proposed mitigation

Following a discussion of key general factors in the traffic and parking studies, a summary of the Applicant's overall traffic and parking response is provided.

Traffic Impact Analysis Process – General Overview

Traffic Impact & Access Studies (TIAS) have become a common part of permitting, planning and designing new projects at both the local and state level. Typically, a TIAS is used for the following:

- To determine the capacity of the existing transportation system (highways, transit, etc.).
- To identify the potential transportation demands (i.e., vehicular traffic, transit trips, parking demands, person trips) that could result from a proposed development project.
- To evaluate the effect that those new demands have on the transportation system near the proposed development project.
- To determine the development project's access requirements and identify necessary mitigation actions that should be considered to reduce or eliminate the development project's impacts.

In conducting a TIAS, there are a number of distinct steps to be followed. Guidelines are provided by a number of organizations, including the Institute of Transportation Engineers (ITE)¹ and the Massachusetts Department of Transportation (MassDOT). Local communities may also have specific study requirements.

Initially, data collection and inventories of the existing transportation systems are gathered. Inventories include collecting operating characteristics (e.g., traffic volumes, crash history) and physical data related to the transportation system (roadway width, intersection geometrics, transit route, etc.). The time periods for traffic volume data collection are determined by the proposed land use. For example, peak morning (7-9 AM) and afternoon (4-6 PM) commuting periods are studied for residential uses. Weekday afternoon peak commuting and Saturday midday peak conditions are studied for retail projects. Other special uses (e.g., a sporting arena) may require site specific time periods. In some cases, the anticipated conditions of both the commuting peak times and the facility peak time are examined. In general, the TIAS typically examines the estimated traffic conditions during the commuting peak volume time periods, as these would typically reflect the worst case conditions. If the traffic demands of the proposed development can be accommodated during the peak time periods, then it is assumed

¹ Institute of Transportation Engineers, [Transportation Impact Analyses for Site Development, An ITE Recommended Practice](#), Washington, D.C., 2010.

that traffic can be adequately accommodated during other time periods. If improvements are warranted, traffic mitigation must be designed for the peak roadway volume conditions and will improve travel conditions during the off-peak times as well.

In the case of a proposed gaming facility, the facility peak traffic typically occurs late on Saturday afternoons and evenings with an additional busy period later on Friday evenings. The Friday PM commuting period and other weekend hours are also busy periods. Traffic studies for proposed gaming facilities should, at a minimum, evaluate conditions during the Friday PM commuter period and a Saturday midday peak period. While the facility peak traffic typically occurs later in the evening, trip forecast information should also be provided for the facility peak periods, even if those periods are not analyzed in detail relative to traffic operations. Given the type of the multi-use development project being proposed with the gaming facility by the Applicant in Region C, the morning peak hour is not as critical for traffic analysis purposes.

The selection of a study area is dependent upon the proposed development use as well as its size. A larger or more intense use (e.g., a large retail center) will generate more traffic from a larger geographic area than a smaller, less intense use (e.g., a small office). The study area evaluated by the Region C Applicant is discussed later in this memorandum.

A major step in completing the TIAS is the forecasting of transportation demands in terms of vehicle trips. Urban areas with extensive transit systems and nearby high-density residential uses require that forecasts include person trips by mode of travel as well as vehicle trips. The proposed casino in Region C is located in an urban area where the Brockton Area Transit Authority (BAT) is available to facilitate non-auto access options. The regional context of the project should be taken into account and "Mode Shift" goals should be established that reflect the region, intended workforce and customer base. In some studies, forecasts may also need to include parking demand estimates. In estimating the arrival and departure patterns of the site related trips the Applicant should consider the existing traffic patterns in the vicinity of proposed development project, as well as the population and available transportation network within the expected "draw" area of the project. Again, a larger project will attract trips from further distances. Based on information provided in the research and trip distribution models used by the Applicant, the proposed casino would draw traffic from communities located within a 90-minute market area. Based on our previous research performed for the Category 2 gaming facilities and the review of the Category 1 Regions A and B casino proposals, the market area studied by the Applicant appears to be reasonable.

Analysis of the Applicant's impacts is based on accepted methods and criteria that indicate how well the existing transportation system will operate once the proposed development is built and functioning. In general, the transportation analysis methods compare the demands versus the available capacity for adjacent intersections; roadway segments; and where applicable, other components of the transportation system, such as a transit service line or parking facilities. The analysis enables a determination of the incremental impacts caused by the proposed development project. The analysis results help with determining the need for and extent of mitigation and if the proposed site access plan will adequately serve the development project. Criteria are defined for each component of the transportation system (e.g., intersections, ramp merges, roundabouts) that determines the estimated operating conditions in terms of Level of Service (LOS), which is a qualitative measure to rate the quality of traffic flow in a transportation system. The Level of Service for a particular portion of the transportation network is defined in the Highway Capacity Manual², and can vary throughout the day as the demands placed on the transportation system vary.

In reviewing the Mass Gaming and Entertainment LLC's proposal, the adequacy of the site's access, circulation and parking supply were evaluated.

² Transportation Research Board, Highway Capacity Manual (5th Edition), Washington, D.C., 2010.

Traffic and Parking Application Questions

The Applicant was required to provide information relative to potential traffic impacts, parking needs, a parking plan, site access, and proposed mitigation. As part of the Building and Site Design portion of the application, the followings are six (6) specific application questions or items that the Applicant needed to respond to. In addition to the six traffic and parking related questions, there are also three (3) traffic relevant specific Applicant questions from Category 5 – Mitigation. Those questions are listed below as well.

- 4-8 Parking;
- 4-9 Transportation Infrastructure;
- 4-23 Egress for the Gaming Establishment Site;
- 4-24 Adequacy of Existing Transportation Infrastructure;
- 4-25 Traffic Mitigation;
- 4-26 Parking Facilities;
- 5-29 Traffic Control Measures;
- 5-290 Traffic for Special Events; and
- 5-301 Snow Removal.

These items focus on providing descriptions of on and off-site transportation infrastructure, the adequacy of the current system and what, if any, mitigation actions are necessary to minimize impacts and accommodate the project's respective demands.

In addition to the information provided in the application itself, the Applicant's TIAS was included as part of their submission to the Executive Office of Energy and Environmental Affairs (EOEEA) through the State's environmental review process, the Massachusetts Environmental Policy Act (MEPA). The MEPA process is a public process, and allows for comments from state agencies, municipalities, organizations, and private citizens. The Applicant's MEPA documents provided significant additional information with respect to traffic, parking and mitigation.

For Mass Gaming and Entertainment LLC., the additional MEPA document submitted included their Environmental Notification Form (ENF) dated May 6, 2015, EEA # 15370.

The Applicant will have to complete further review coordinated through the MEPA process, in addition to this MGC review. The further review required by MEPA will include a Draft Environmental Impact Report (DEIR) and a Final Environmental Impact Report (FEIR). The MEPA process is an open and transparent process, and will allow for agency and public comments as part of the review process. As part of the DEIR, the Applicant will be required to complete a more thorough traffic study, the scope of which is defined in the ENF Certificate, dated July 10, 2015. Consequently, the Applicant will need to address outstanding issues or requests for additional information as part of the MEPA process and during the permitting/design stages following MGC license award.

Overall Review Approach

As part of our evaluation, we visited the proposed project location to become familiar with the site and its surrounding transportation network. A review of the MEPA documents provided an understanding of the existing roadway network in the vicinity of each proposed site; the anticipated daily and peak traffic volumes and arrival/departure travel patterns; the level of impact the new development project could have on traffic operations; and the extent to which mitigation of impacts may be required. The MEPA documents were reviewed in conjunction with the specific responses to the application questions. In conducting the review, accepted engineering guidelines for traffic study procedures and analysis methods published by MassDOT and ITE³ were used, as well as conducting independent research with respect to trip forecasts and analysis, where appropriate.

³ Institute of Transportation Engineers, [Trip Generation Manual \(9th Edition\)](#), Washington, D.C., 2012.

The following paragraphs summarize the key impact factors that are critical aspects in determining the adequacy of the traffic and parking responses.

Gaming Establishment Related Traffic Forecasts

While gaming establishments in general have been in existence for years, there has been a relatively limited amount of traffic and parking data collected for this type of land use that has been compiled into a usable database to forecast peak traffic levels. The ITE Trip Generation Manual has compiled the largest source of data to forecast traffic for different land uses. However, the Manual has a limited amount of information available for the gaming establishment type land use.

With a limited amount of data and forecast models available through ITE, additional research was conducted as part of our review to determine the traffic generating characteristics of gaming establishments. A number of published technical papers and technical reports submitted for other gaming establishment projects were obtained for review. However, the data found in our research produced a wide range of trip rates as it represents casino facilities that vary in terms of accessibility and use of public transportation. As a result, traffic studies submitted for other Massachusetts gaming establishment projects were obtained for review and a list of these are attached to this memorandum. Based on our research, trip forecast information for similar Massachusetts gaming establishments was identified and used as a guide to determine the reasonableness of the information submitted by the Applicant. Key findings from our research include:

- Trips are typically forecasted based on the number of gaming positions (gp).
- The peak activity for gaming establishments occur on Saturday evenings while Friday evenings (after commuter peak hour), and Sunday afternoons also experience comparable levels of activity.
- While gaming establishment activity is not high during the typical weekday morning commute peak hour, research indicates that the gaming establishments can also be active during a weekday afternoon commute peak hour, particularly the Friday afternoon commuting peak time period.
- The peak season of gaming establishment activity is typically during the July-August period.

The trip generation calculations for the proposed Brockton Casino was based on empirical traffic data from four other Casino facilities. While most trip generation estimates for proposed casinos are inclusive of all ancillary uses (e.g. hotels, retail space, or restaurants), the trips associated with the proposed hotel at the Brockton Casino were calculated separately, based on trip generation from the ITE Trip Generation Manual. This results in a higher effective trip generation per gaming position, relative to the empirical data presented by the Applicant. Table 1, below, provides a comparison of the effective trip generation rate at the proposed Brockton Casino with the trip generation rate used for other Category 1 facilities proposed in Massachusetts.

Table 1 – Summary of Vehicle Trip Generation Rates (trips per gaming position)

Day	PM Peak Hour (avg.)	Facility
Friday	0.37 / gp ^A	Proposed Brockton Casino
Saturday	0.47 / gp ^B	
Friday	0.34 / gp	MGM (Springfield)
Saturday	0.34 / gp	
Friday	0.40 / gp	Mohegan Sun Massachusetts (Revere)
Saturday	0.41 / gp	
Friday	0.40 / gp ^C	Wynn Boston Harbor (Everett)
Saturday	0.53 / gp ^C	

^A vehicle trip rate at time of roadway peak
^B vehicle trip rate at time of facility peak
^C estimated vehicle-trip rate, assuming an average vehicle-occupancy rate of 2 persons per vehicle.

Based on our findings and the comparison to other Category 1 gaming facilities proposed in Massachusetts, the trip generation rates used by the Applicant for the proposed Brockton Casino are reasonable.

To encourage the use of alternate modes of transportation, a common part of traffic studies is the development of a Transportation Demand Management (TDM) program. A comprehensive TDM program is also a typical requirement for large-scale projects going through the MEPA review process, and usually consists of actions such as designating a full time transportation coordinator, joining and supporting organizations that promote the use of alternate modes of transportation, providing information on-site about public transportation options, subsidizing employee public transportation fares, and other items. It is expected that many of these (or similar) TDM measures will be required of the Applicant.

Parking Supply Requirements

Based on information from ITE Parking Generation⁴ manual and from MGC advisors familiar with numerous gaming establishments in the northeast and Canada, it was determined that providing one (1) parking space for each gaming position serves as a reasonable baseline evaluation criteria for evaluating parking adequacy at the Category 1 casinos. Our review of the Applicant's proposed parking plans considered the amount of parking to be provided and evaluated the designation of parking for different categories of user (e.g., employees, valet, electric, etc.). We also reviewed access from adjacent roadway systems, the layout of parking areas, and the connections or path for pedestrians to travel between parking areas and building entrance.

Adequacy of Study Area

The limit of a study area is a key aspect of conducting a TIAS and in determining critical impacts and mitigation needs. A study area is typically selected based on the proposed use and the magnitude of likely trip generation, the project's access points, the anticipated arrival/departure patterns, the location of key nearby intersections, known problem locations, and known issues within reasonable proximity of the project site. The larger the project, the more the potential market area or geographic draw tends to be, which requires a larger study area. There is no one set of guidelines for determining a study area. ITE provides some guidance, but regional agencies as well as individual communities may have different requirements. For example, ITE suggests that large shopping centers (>100,000 square feet) or developments that will generate more than 500 peak hour trips should consider a study area that includes all signalized intersections and freeway ramps within two (2) miles of the property line and major unsignalized intersections within one (1) mile of the property line. However, it may be necessary to study locations beyond these limits depending on the issues and type/size of the development. Engineering judgment plays a critical role in determining the study limits.

Identifying Traffic Deficiencies and Required Mitigation

In determining the adequacy of the existing transportation infrastructure and the proposed on-site parking supply, we evaluated the project's demand versus the capacity (or supply) of adjacent roadways. For traffic flow, this is typically accomplished by completing what is referred to as a Level of Service (LOS) analysis at the study intersections and if applicable, the roadway segments and highway ramps included in the study area. LOS is a qualitative measure defined in the Highway Capacity Manual and is used by traffic engineers to rate the quality of traffic flow in the transportation system. Levels 'A' to 'F' are designated with the analysis methods taking into account the physical conditions of the roadways, the volume and characteristics of the traffic and type of traffic control (e.g., traffic signal, STOP sign, merge, etc.). The Level of Service indicates how well or how poorly intersections and roadway sections operate. LOS 'A' represents the best operating conditions and 'F' the worst. In addition to LOS, vehicular queues at intersections is another critical measure of traffic operations, particularly in urban areas where the potential exists for vehicular queues to extend from one intersection through an upstream

⁴ Institute of Transportation Engineers, [Parking Generation \(4th Edition\)](#), Washington, D.C., 2010.

adjacent intersection. The TIAS provided by the Applicant forecasts and evaluates future conditions with and without the proposed gaming establishment (Build vs. No-Build). Comparing the No-Build results with the Build conditions indicates the incremental impact of the gaming establishment related demands. Based on the findings, deficient locations (those experiencing a LOS 'E' or LOS 'F') or those locations anticipated to experience significant changes in levels of incremental impact can be identified and the need for mitigation determined.

Locations noted as deficient and possibly requiring mitigation were identified as part of the evaluation. Locations noted as being deficient without the project (i.e., No-Build condition) may need improvements, but may not be the responsibility of the Applicant. However, if the deficiency is considered by state or local authorities with jurisdictional control to be significant, it is common for the project proponents to participate in mitigating the deficiency.

In reviewing the Applicant's traffic and parking responses, the traffic studies submitted by the Applicant were reviewed and those locations noted as "deficient" were identified. Our evaluation then determined if mitigation was proposed for the noted deficient locations. A judgment was made related to the proposed mitigation in terms of being feasible, the clarity of the presentation, and if the Applicant adequately demonstrated that the deficiency would be alleviated.

Summary of the MG&E/Brockton Traffic and Parking Responses

This section provides a summary of the technical reviews of the traffic and parking responses provided by MG&E/Brockton. The figures referenced below are included as an attachment to this memorandum.

Information contained in the MG&E/Brockton's Traffic Impact and Access Study prepared by MDM Transportation Consultants, Inc. and other supporting information included in the MG&E/Brockton application were reviewed. In general, the TIAS followed procedures and methods specified in MassDOT TIA Guidelines (March 13, 2014). Additionally, comment letters and memoranda prepared by MassDOT and various municipalities on the submitted ENF were reviewed to obtain any further insights or concerns related to the proposed casino.

In terms of accessibility, the MG&E/Brockton project site is located at the existing Brockton Fairgrounds site in Brockton with frontage along Belmont Street (Route 123), West Street, and Forest Avenue. The project site is located approximately 1.5 miles east of the Route 24 / Route 123 interchange and 1.75 miles south of the Route 24 / Route 27 interchange. Route 24 is a freeway that connects I-93 in Randolph and Fall River (and continues into Rhode Island). It also has major connections to regional roadways including I-95, Route 123, I-495, Route 44, Route 140, and I-195. Within the study area, the Route 24 is a limited access highway with a median that generally provides three travel lanes in each direction with additional acceleration/deceleration lanes provided at its major interchanges. Belmont Street (Route 123) provides the most direct connection between the project site and Route 24. Regional Area and Site Locus Maps are shown in Figures 1 and 2, respectively.

The project site is located less than 2 miles west from the Brockton Area Transit Authority (BAT) Center. The BAT has three existing bus routes operating along Belmont Street with stops in close proximity to the project site (shown in Figure 3). The Applicant is evaluating the option of providing a community shuttle bus stop. They also stated they will incorporate a new bus stop on one or more existing BAT bus lines subject to BAT and City of Brockton input. The project's primary pedestrian entrance is located at the southwest corner of the project site at the primary site drive with access from Forest Avenue.

The project site is directly served by four proposed site driveways, with the potential for a fifth site driveway. The primary patron access/egress is along Forest Avenue opposite of the Brockton Registry of Motor Vehicles and includes the installation of a fully actuated traffic signal with pedestrian control equipment. This drive will provide access to the proposed resort surface parking lots on the west side of the project site and the proposed on-site parking garage. A secondary patron site access/egress is proposed via a driveway connection to West Street. This proposed driveway is limited to right-in/right-out movements only and provides access to the proposed resort surface parking lots and the proposed on-site parking garage. A potential third patron site access/egress is

proposed via a right-in/right-out driveway connection to Belmont Street. Currently this connection is only depicted as potential driveway in the site plan. It is anticipated that the connection will be clearly depicted in Draft Environmental Impact Report (DEIR). There are two additional driveways accessing/egressing the proposed employee parking lots located on the east side of the project site. These two driveways are primarily for employees' and service vehicles, though patrons may also use these driveways. The existing Brockton Fairgrounds Driveway from Belmont Street and a proposed driveway along Forest Avenue will serve as primary and secondary access/egress for employees/service vehicles respectively. The project site plan, showing all proposed driveway locations, is shown in Figure 4.

The Applicant is proposing to construct a parking garage with 1,407 parking for patrons, with 9 bus stalls located on the first level. The parking floor plans are shown in Figure 5. In addition, the applicant is proposing 1,596 at-grade parking spaces in the aforementioned surface parking lots, including an 1,184 parking space patron parking lot located on the west side of the project site, and a 412 space employee parking lot located on the east side of the project site. In all, a total of 3,003 parking spaces will be provided on the project site. The ratio of parking spaces versus gaming positions is 1.0, which is consistent with the typical industry standard of 1.0 parking space per gaming position. The Applicant generally provided a satisfactory presentation of the proposed parking lots layout, their uses, and access/egress to and from adjacent roadways. However, it is noted that there are no defined pedestrian paths between many of parking areas and entrances to the proposed casino facility, and for the parking garage, the number and location of handicapped-accessible parking spaces, preferred parking spaces for low-emitting and fuel-efficient vehicles, charging stations for electric vehicles, and carpool/vanpool/car-sharing parking spaces have not been defined. These pedestrian connections and various types of parking spaces are important aspects of the proposed site plan. It is expected that these will be further refined and clarified in future studies (i.e. the DEIR) and refinements to the site plan.

The potential traffic routes to be used for access and egress were adequately identified and described by the Applicant. The Applicant included a total of 21 intersections in the TIAS and 8 additional intersections in supplemental analysis, all located in the City of Brockton. In a second supplemental study, analysis was also performed on 11 signalized intersections located in downtown Brockton area approximately 1.5 miles east of the project site. However, only qualitative analysis was provided at these downtown locations. The original and supplemental study intersections are shown in Figure 6. It is noted that additional study intersections have already been identified and will be required to be evaluated by the Applicant in the forthcoming DEIR. These additional locations are also shown in Figure 6, and include the following intersections:

- Belmont Street / Memorial Drive
- Belmont Street / Magnolia Avenue
- Belmont Street / Warren Avenue
- Belmont Street / Belmont Avenue
- Belmont Street / Main Street
- Main Street / Pleasant Street
- Pleasant Street / Route 28
- Reynolds Memorial Highway (Route 27) / Pleasant Street / West Street
- Route 24 / Reynolds Memorial Highway (Route 27) Interchange

Of the intersections listed above, only the intersections of Belmont Street / Memorial Drive and Belmont Street / Belmont Ave were included in the 21 intersections in the original TIAS study area or the 8 intersections included in the supplemental analysis study area. The intersections of Belmont Street / Warren Avenue and Belmont Street / Main Street in downtown Brockton area were included in the supplemental analysis but were only qualitatively analyzed. It is anticipated that a complete and thorough analysis of these intersections will be included in the DEIR.

The Applicant's traffic study examined the Friday afternoon commuter peak hour and the Saturday midday peak hour, when the peak traffic flow occurs on the adjacent roadway system. The respective trip generation rates of

0.37 and 0.47 vehicle trips per gaming position for the proposed casino are based on data obtained from four similar facilities including:

- Sugarhouse Casino in Philadelphia, PA
- Casino St. Charles in Metro Saint Louis, IL
- Twin River Casino in Lincoln, RI
- Mohegan Sun Casino in Uncasville, CT

As indicated previously, the trip generation rates used by the Applicant are reasonable.

The Applicant's ENF does not include a projection of expected travel model split. Instead they assumed that all the trips to/from the casino will be vehicle trips, to provide a conservative analysis. However, at the request of MassDOT and BSC Group (the engineering consulting firm hired by the City of Brockton), it is anticipated that a more detailed analysis of public transportation facilities will be included in the DEIR. Trip Distribution Maps, representing the distribution of peak hour traffic flow, are shown in Figures 7-9.

The Applicant has proposed traffic mitigation measures at various locations. These measures include construction of a roundabout, traffic signal improvements, new traffic signals, roadway and intersection geometric improvements, pedestrian and bicycle accommodations, and a "comprehensive" Transportation Demand Management (TDM). Depending on locations, the mitigation measure may be a stand-alone improvement or combined improvements.

The most critical areas where mitigation is proposed are at the following locations:

- Forest Avenue / West Street intersection
- Route 27 / West Street / Pleasant Street intersection
- Forest Avenue
- West Street
- Forest Avenue intersections with Primary Site Driveway and Memorial Drive

Conceptual level plans of the proposed improvements at the above locations are shown in Figures 10 through 12.

The most significant mitigation that the Applicant is proposing is at the Forest Avenue / West Street intersection. The Applicant is proposing a three-legged two-lane modern roundabout. A portion of West Street between Feinberg Way and Forest Avenue will be converted to one-way (eastbound) traffic flow toward the roundabout, and the portion of Forest Avenue between West Street and Belmont Street will be converted to one-way traffic flow (northbound) away from the roundabout. The proposed roundabout will mitigate the casino related traffic at the intersection and is an improvement relative to existing conditions.

The West Street / Pleasant Street / Route 27 intersection is the #1 crash location in MassDOT's 2011-2013 statewide top 200 intersection crash list⁵. The proposed casino would potentially add 220 and 280 vehicle trips during the Friday and Saturday evening peak hours respectively. At this intersection, the Applicant is proposing full-depth widening along the Route 27 approach to lengthen the through travel lane along the curb line. The lane extension will be provided to a point approximately 600 feet west of the Westgate Drive (East). The improvement is intended to improve storage capacity and lane recognition. The Applicant also proposed to conduct a formal Road Safety Audit (RSA) at the intersection following applicable MassDOT guideline, so that key causal factors for high crash rate can be identified and potential HSIP-funded improvement actions can be taken to address safety issues. However, it is noted that this intersection was reconstructed approximately 5-6 years ago (by MassDOT), and that a major intersection realignment is likely not feasible, nor reasonable to expect of the Applicant based on the expected increases in traffic at this location.

⁵ [2013 Top Crash Locations Report](#), Massachusetts Department of Transportation (MassDOT), August 2015.

The Applicant is also proposing the widening of Forest Avenue to a four lane cross section between the proposed roundabout and Memorial Drive to improve capacity and safety. The proposed roadway improvements will follow MassDOT's complete streets design guidance and will include shoulders for bicycle accommodation and ADA-compliant sidewalks and crossings. These improvements will enhance pedestrian and bicycle safety along Forest Avenue and enhance pedestrian and bicycle connections to the project site.

Along West Street, the Applicant is proposing to widen the existing two lane cross section between Forest Avenue and approximately 300 feet north of Torrey Street to four lane cross section. Signal equipment, signal timing and signal phasing modifications will also be implemented at the West Street intersection with Torrey Street to accommodate the four lane cross section. The West Street segment between Belmont Street and Forest Avenue will be realigned to curve eastward.

The Applicant is proposing to install fully actuated traffic signals and associated pedestrian control equipment at the intersections of Forest Avenue / Primary Site Driveway and Forest Avenue / Memorial Drive. The traffic signal at the Forest Avenue / Primary Site Driveway intersection will provide capacity to accommodate existing traffic flow and additional turning traffic for the casino, and will be coordinated with the proposed traffic signal at the Forest Avenue / Memorial Drive intersection.

In addition to the Applicant proposed mitigation measures, currently MassDOT is planning to construct the following two roadway improvement projects:

MassDOT Project 608025 is intended to address traffic safety issues at 2 locations along Route 123 (Belmont Street) by performing traffic signals upgrading at the Manley Street and V.A. Hospital intersections. In addition, minor widening is planned to provide bicycle accommodation in addition to reconstruction of sidewalks along the corridor. New signage and pavement markings are also planned. The contract for this project was awarded to UEL Contractors on November 23, 2015 and it is anticipated that construction will begin in the spring of 2016.

MassDOT Project 606036 includes traffic signal and safety improvements at Route 123 (Belmont Street) / Linwood Street / Lorraine Avenue intersection and related work. Related work includes construction of a bus turn in lane at the intersection of Route 123 and Angus Beaton Drive (entrance to Brockton High School). Additionally, reconstruction of sidewalks along both sides of Belmont Street as well as new crosswalks, widening of Belmont Street shoulders to provide bicycle accommodation, and improvements to intersection geometry are proposed. This MassDOT Project currently has an advertisement date of September 3, 2016. The 100% design submission has been received; however, State Right-of-Way (ROW) and Environmental permitting are currently outstanding. The current advertisement date could potentially be delayed if the ROW and Environmental issues are not resolved.

A third MassDOT project on Belmont Street (Route 123), MassDOT project 608088, is on the "Long-Range" plan. The project limits are Angus Beaton Drive and West Street. Work on this project includes resurfacing and box cut widening along Route 123 to provide a consistent roadway cross section, bicycle accommodating shoulders and accessible sidewalks. Traffic signals will also be reconstructed to provide ADA accessible elements. This project is funded by MassDOT and is currently on the Transportation Improvement Plan (TIP) for 2018; however, no design submission has been received. It is noted that the Applicant estimates that these improvements would not be implemented until 2024.

Table 2 summarizes these proposed mitigation measures and the associated cost estimates. Figure 13 shows the location of the mitigation measures proposed by MassDOT and the recommended improvements per the Southwest Brockton Corridor Study⁶.

⁶ Old Colony Planning Council, 2014 Southwest Brockton Corridor Study, December, 2014

Table 2 – Summary of Proposed Mitigation

Proposed Mitigation	Estimated Construction Cost	Responsible Party	Estimated Completion Date
Access Improvements Construction of modern roundabout at Forest Avenue, widening of Forest Avenue and West Street with “Complete Streets” design elements, new signal at Forest Avenue, signal equipment upgrades to Belmont Street (3 locations).	\$5,300,000 ±	Applicant	2018
Forest Avenue Corridor & Signal Improvements New traffic signal at Memorial Drive, signal equipment upgrades and sidewalk reconstruction at Ash Street, Manomet Street and Warren Avenue, new traffic signal and roadway improvements at Main Street.	\$3,300,000 ±	Applicant	2018
Belmont Street Corridor and Signal Improvements – Sections 1 & 2 MassDOT has completed design and has allocated funding for roadway, traffic signal, and pedestrian/bicycle improvements along the Belmont Street corridor (MassDOT project numbers 608025 and 606036). The project limits include Belmont Street from the Route 24 interchange through Angus Beaton Drive, the signalized intersections of Belmont Street with Manley Street, VA Hospital Driveway, and Angus Beaton Drive and the unsignalized intersection of Belmont Street with Linwood Street / Lorraine Avenue.	\$6,500,000	MassDOT	2018
Belmont Street Corridor & Signal Improvements – Section 3 MassDOT has initiated preliminary design of the remaining portion of Belmont Street between Angus Beaton Drive and West Street (MassDOT project number 608088). This area represents the last section of Belmont Street in the corridor which is currently under MassDOT jurisdiction. The improvements are to include box widening and resurfacing along Belmont Street to provide a consistent cross section along the corridor to meet Complete Streets standards including shoulders for bicycle accommodation, sidewalk reconstruction and anticipated upgrades to traffic signals at West Street / Plaza Drive, Forest Avenue / Plaza Drive, and West Street / Belmont Street.	\$4,000,000	MassDOT	2024
West Street Corridor & Signal Improvements Widening of West Street, signal equipment, signal timing and signal phasing modifications at West Street / Torrey Street intersection.	\$1,000,000 ±	Applicant	2018
West Street at West Elm Street Improvements An optimal traffic signal timing plan will be implemented to enhance operations during peak traffic hours.	\$20,000 ±	Applicant	2018
Route 27 Lane Extension Full depth widening along Route 27 approach to West Street / Pleasant Street intersection to lengthen the through travel lane along the curb line.	\$600,000	Applicant	2018

Source: Appendix to the Memorandum from MDM Transportation Consultants, Inc. to Mass Gaming & Entertainment, dated September 21, 2015, and included in the Applicant’s RFA-2 application.

The proposed TDM program includes:

- A shuttle bus loop serving the local community.
- Integration of the Site as a stop on the current BAT bus routes.
- Bicycle facilities and promotion.
- Pedestrian accommodation and infrastructure.
- On-site patron and employee services.
- Posting of service and schedule information for employees and patrons.
- On-site sale of transit passes.
- Subsidizing commuter rail and local bus passes for employees.
- Designating an on-site employee transportation coordinator.
- Valet parking operations and preferential parking for carpools, vanpools, low-emission vehicles.
- Promotion of commuter assistance programs available through Executive Office of Transportation's MassRide as part of the employee orientation program.

Most of the above TDM measures are currently under evaluation, and it is expected the TDM program be refined, clarified, and expanded throughout the MEPA process.

The mitigation proposed by the Applicant, described above, is generally reasonable and adequate. However, the following are concerns relative to outstanding transportation issues related to the proposed Brockton Casino:

1. As the Applicant is required to expand their study area for future MEPA studies, mitigation measures may be required at additional intersections not yet studied. As further study is required, the mitigation package, as currently presented, may not mitigate all of the Casino-related impacts to transportation infrastructure.
2. We recommend that the Applicant evaluate additional mitigation measures at the Belmont Street / Kenelworth Ave / Fairgrounds Driveway intersection, due to the potential for a high number of left-turns from Belmont Street into the Driveway. We note that the Applicant estimates that approximately 15% of the site-generated vehicle-trips would use this driveway. To date, the Applicant has provided a figure showing that westbound through vehicles on Belmont Street have enough room to "go around" a single vehicle waiting to turn left. However, due to the number of left-turning vehicles that are anticipated, this may not be sufficient.
3. At the West Street / Pleasant Street / Route 27 intersection, the Applicant has agreed to conduct a Road Safety Audit (RSA) to identify key areas of concern, however, the Applicant has not agreed to fund any of the recommended improvements that may be identified in the RSA. The Applicant should develop safety improvements for this intersection during the MEPA process, specifically considering short and mid-term actions that are identified in the RSA.
4. The proposed alignment on West Street, in front of the Casino, creates a new, curved roadway. While this new roadway alignment may improve the geometry at the proposed roundabout (at West Street / Forest Avenue), the new alignment may be detrimental to traffic operations and safety at the Belmont Street / West Street intersection further north. The Applicant should reevaluate the proposed realignment of West Street in front of the casino with respect to the Belmont Street intersection.

Jason Sobel, P.E., PTOE

Frank Tramontozzi, P.E.

Green International Affiliates, Inc.

April 10, 2016

List of References Related to Traffic Forecast Research

1. Gaming Casino Traffic, by Paul C. Box and William Bunte, ITE Journal, March 1998
2. Trip Generation Characteristics of Small to Medium Sized Casinos, by Michael Trueblood and Tara Gude, presented at the ITE 2001 Annual Meeting & Exhibit
3. Recalibration of Trip General Model for Las Vegas Hotel/Casinos, by Curtis D. Roe, Mohamed S. Kaseko, and Kenneth W. Ackeret, ITE Journal, May 2002
4. Transportation Impact Study for 400 North Broad, Tower Entertainment, LLC, City of Philadelphia, prepared by Traffic Planning and Design, Inc., November 7, 2012
5. Transportation Impact Study for Hollywood Casino – Philadelphia, prepared by Pennoni Associates, Inc., revised February 1, 2013
6. Mega Casino Transport Analysis, prepared by Erin Toop, Jason Zhou, and Hou Ding (all University of Toronto), December 23, 2012
7. Traffic Impact Study – Baltimore Casino, prepared by Whitman, Requardt & Associates, LLP and RJM Engineering, Inc., February 2013
8. Traffic Impact and Access Study – Foxwoods Resort Casino – Milford, MA, prepared by Tetra Tech, July 9, 2013
9. Draft Environmental Impact Report, EEA# 15033 – MGM Springfield, prepared by Epsilon Associates, Inc., December 16, 2013
10. Final Environmental Impact Report, EEA# 15033 – MGM Springfield, prepared by Epsilon Associates, Inc., November 6, 2014
11. Supplemental Draft Environmental Impact Report, EEA# 15006 – Mohegan Sun Massachusetts – Revere, Massachusetts, prepared by Epsilon Associates, Inc., June 30, 2014
12. Draft Environmental Impact Report, EEA# 15060 – Wynn Everett – Everett, Massachusetts, prepared by Fort Point Associates, Inc., December 16, 2013
13. Final Environmental Impact Report, EEA# 15060 – Wynn Everett – Everett, Massachusetts, prepared by Fort Point Associates, Inc., June 30, 2014
14. Supplemental Final Environmental Impact Report, EEA# 15060 – Wynn Everett – Everett, Massachusetts, prepared by Fort Point Associates, Inc., February 17, 2015
15. Second Supplemental Final Environmental Impact Report, EEA# 15060 – Wynn Everett – Everett, Massachusetts, prepared by Fort Point Associates, Inc., July 15, 2015



The Shaws Center

Campanelli Stadium

SITE

FIGURE 1

Regional Locus Map



Site Plan Source: Klai Juba Wald Architects

FIGURE 2

Site Locus

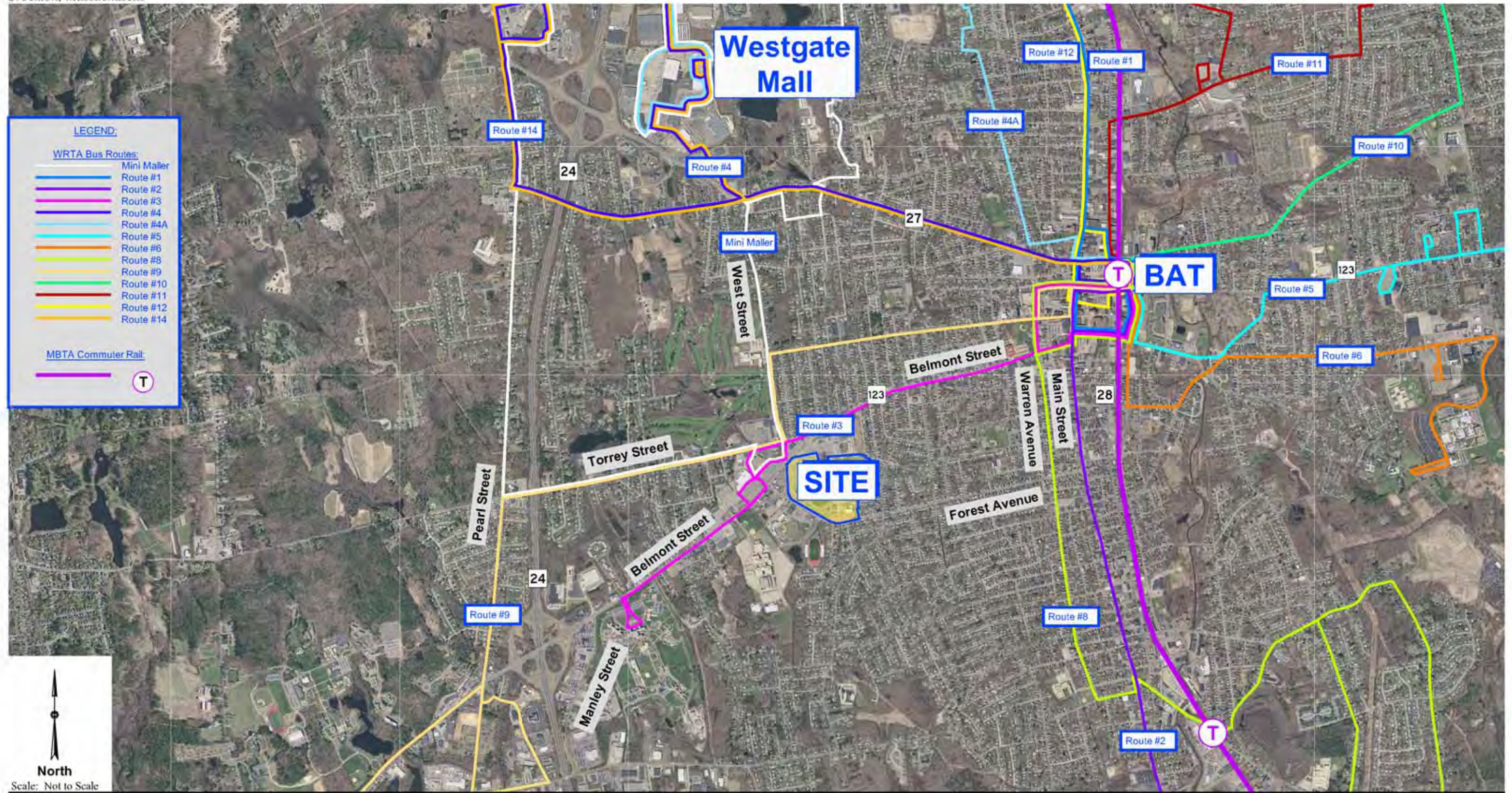


FIGURE 3





LEVEL 1 - 155 SPACES



LEVEL 2 - 395 SPACES



LEVEL 3 - 436 SPACES



LEVEL 4 - 421 SPACES

TOTAL: 1,407 SPACES

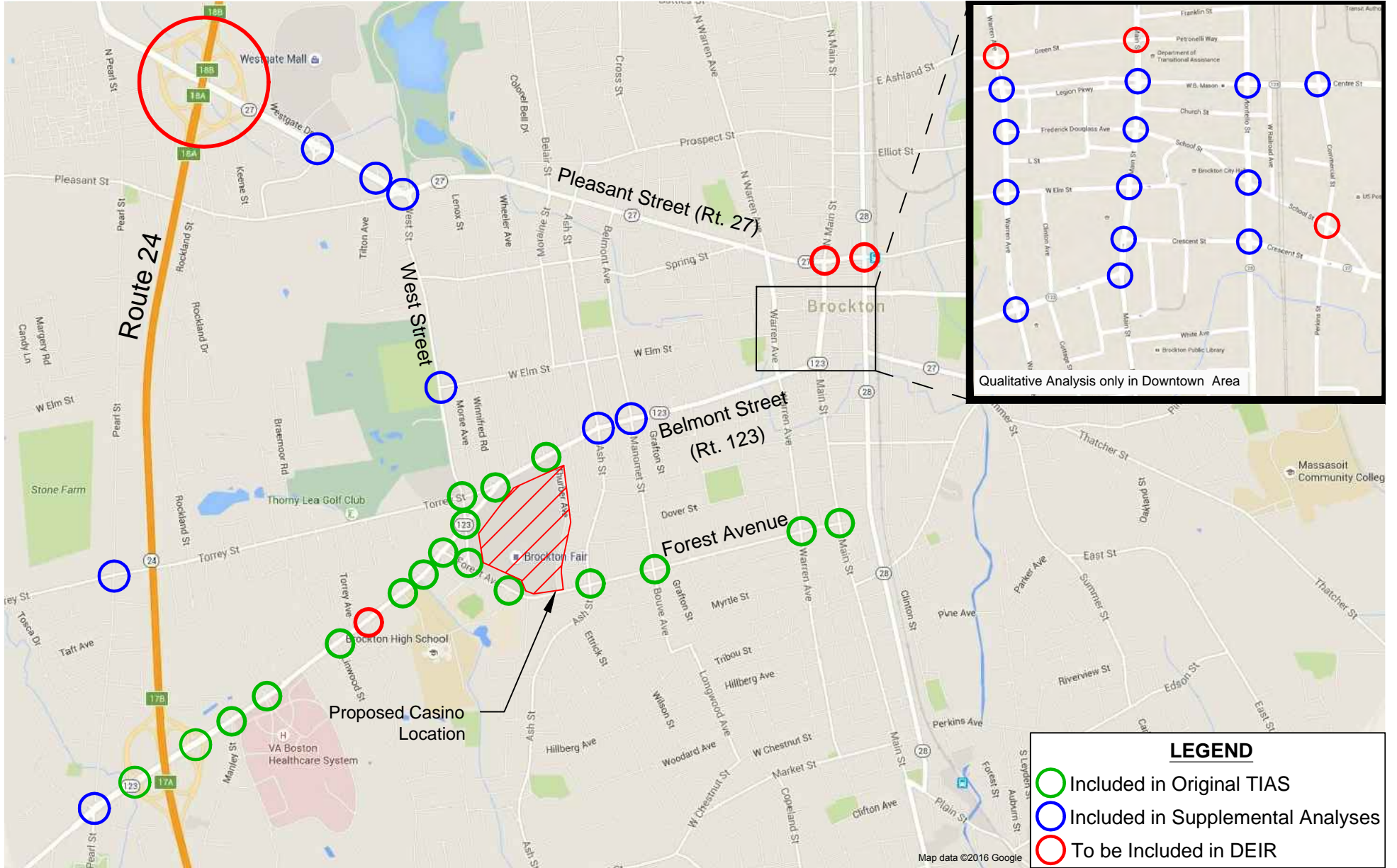


FIGURE 6

Study Intersections

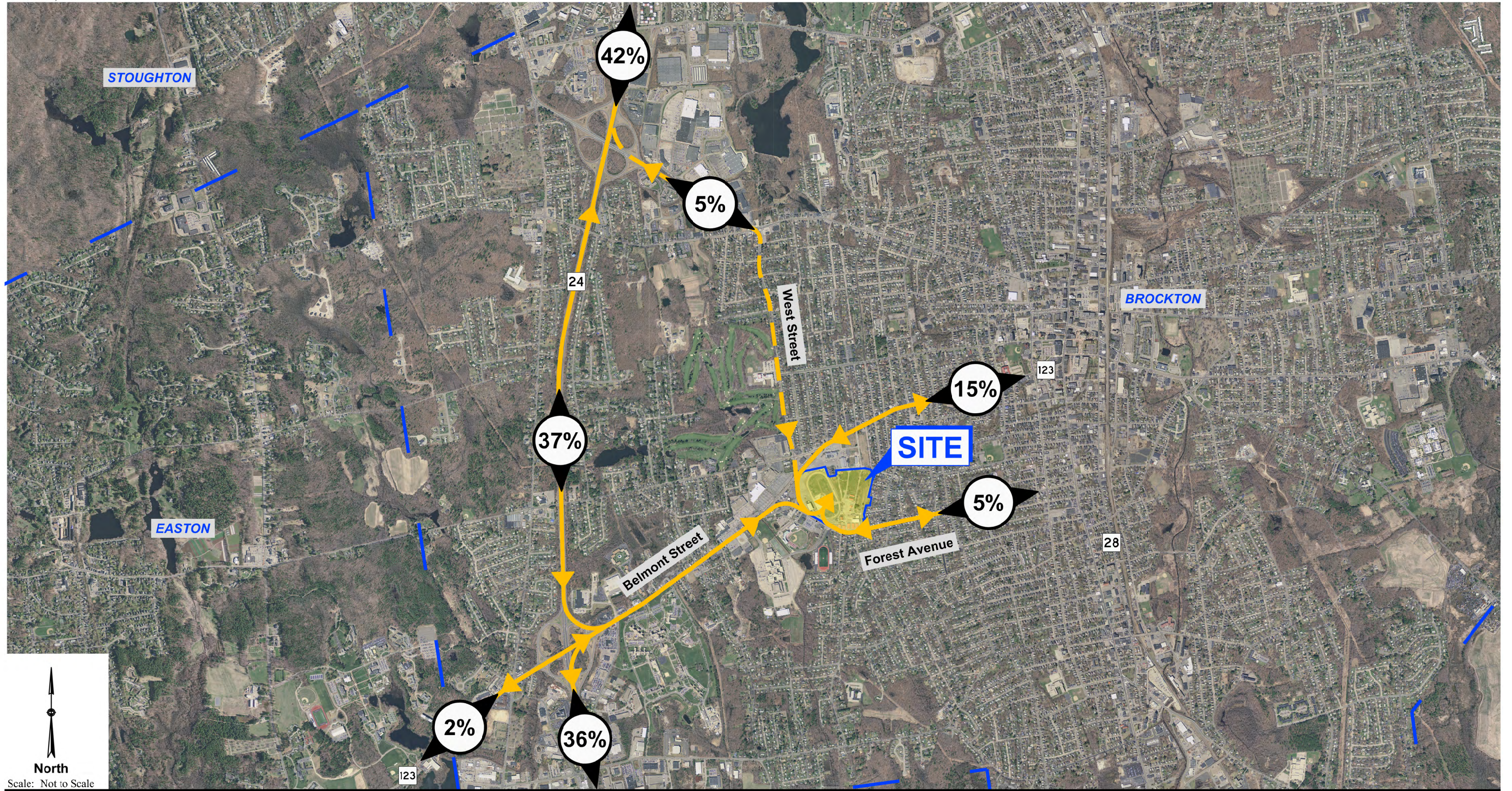


FIGURE 7

Regional Trip Distribution Patterns

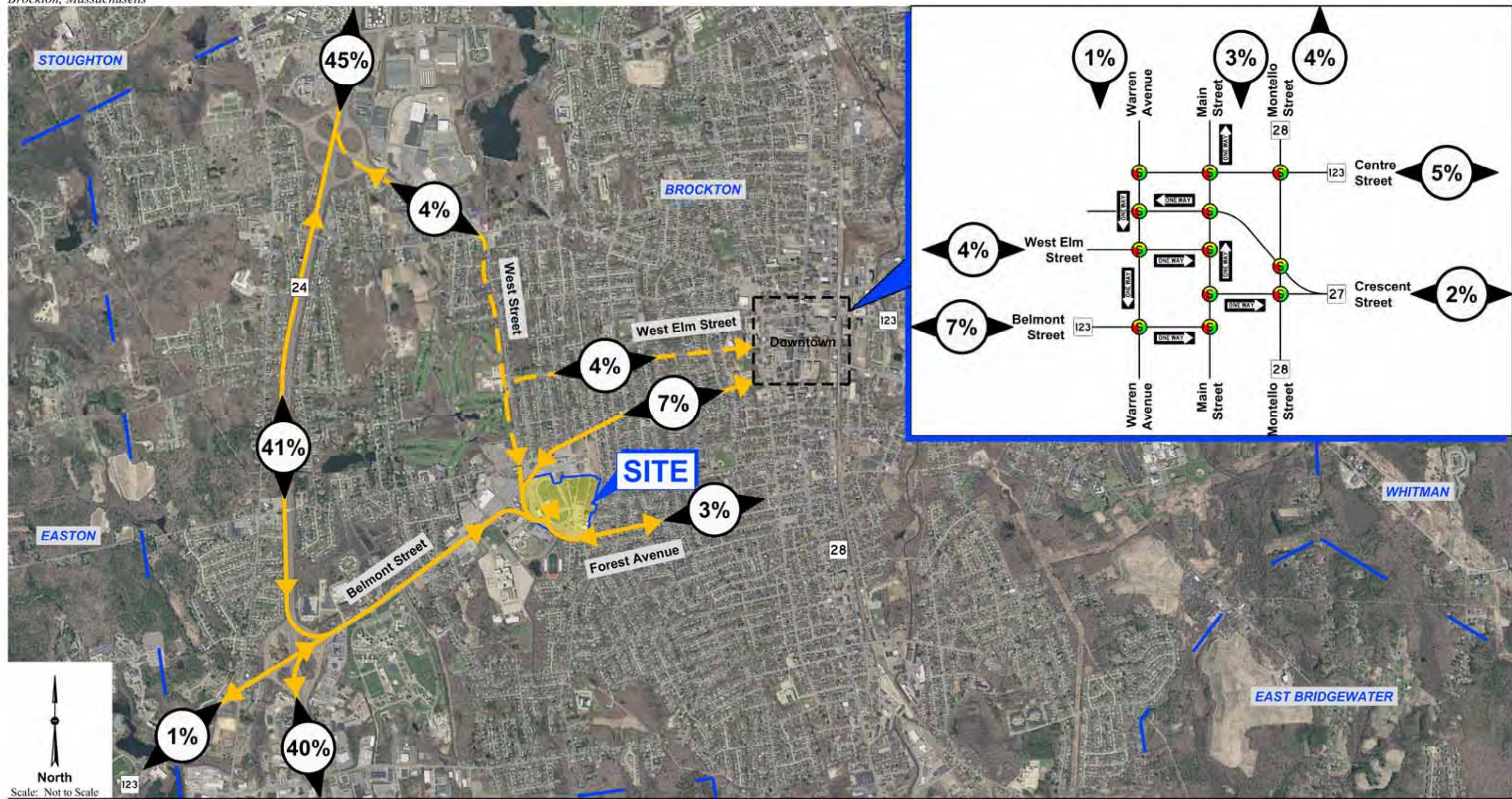


FIGURE 8

Regional Patron Trip Distribution Patterns

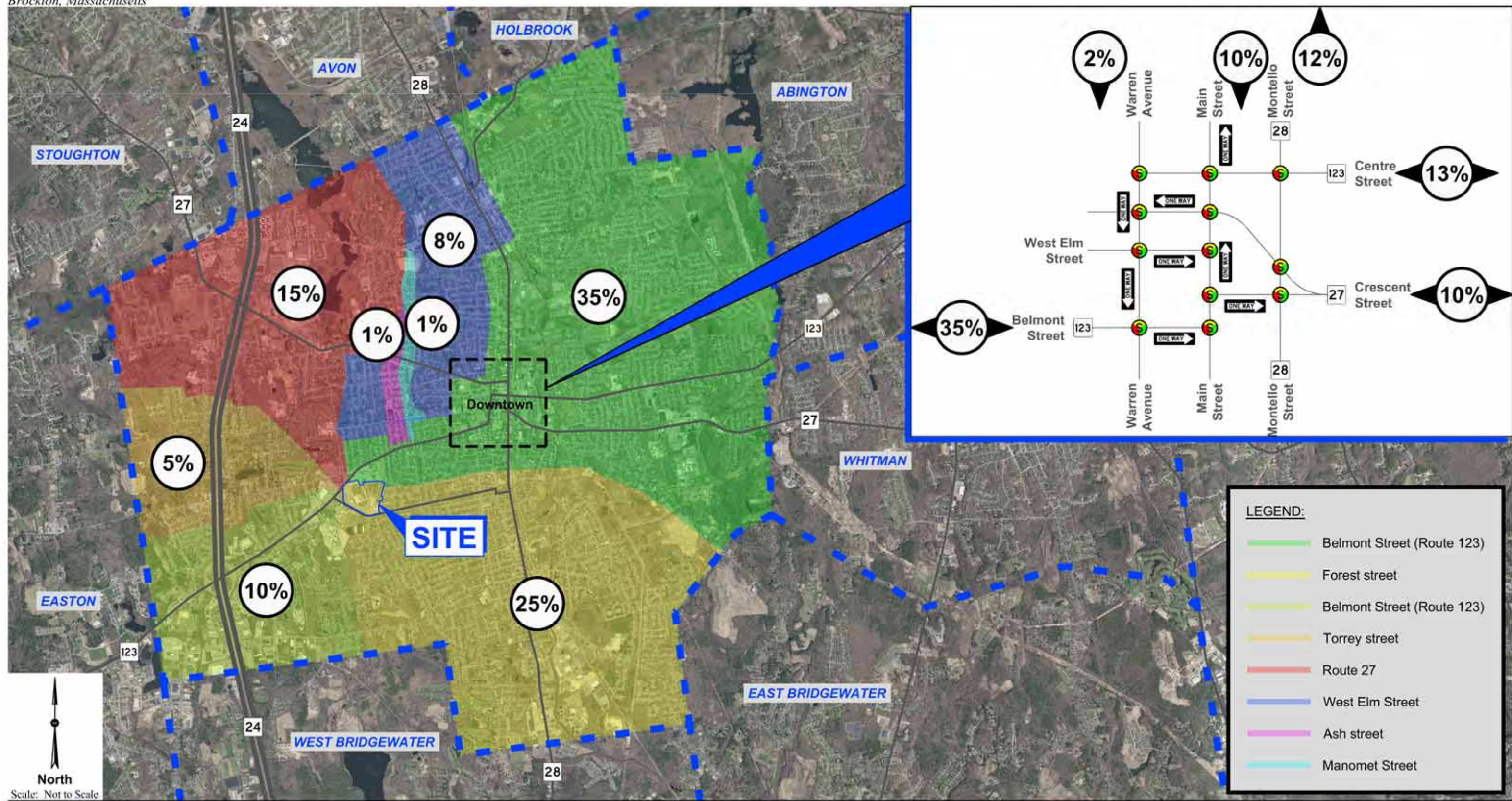
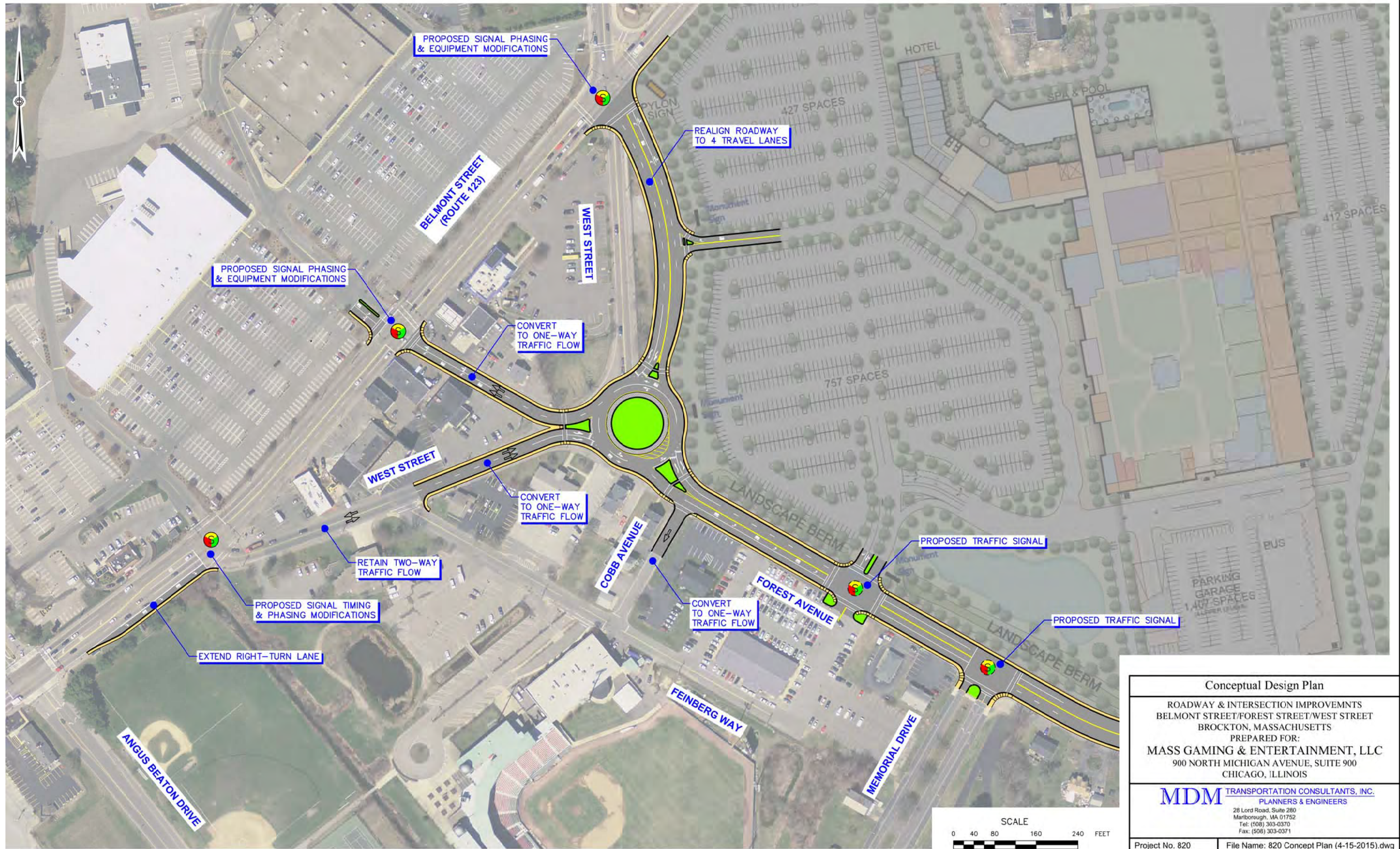


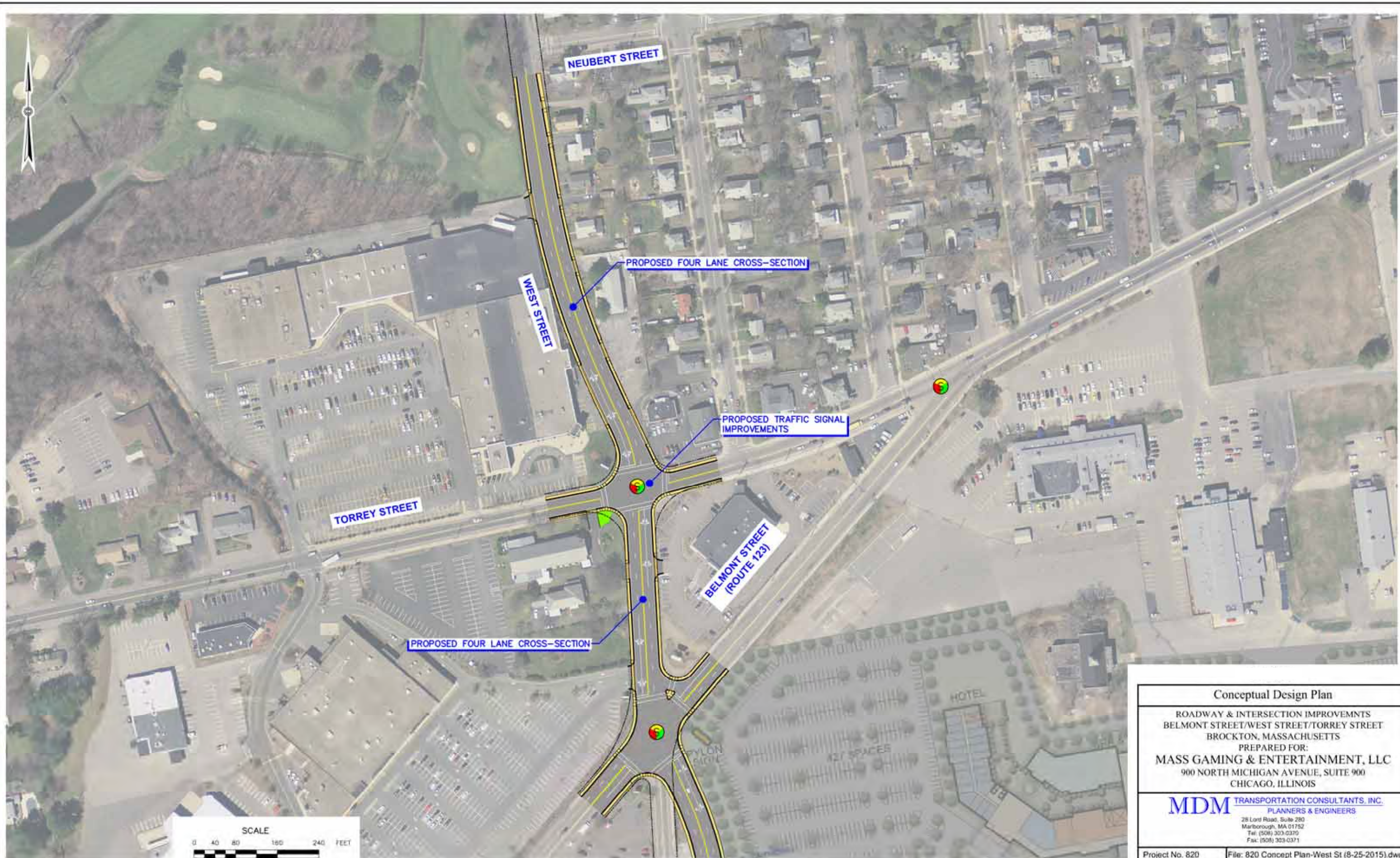
FIGURE 9

Employee Trip Distribution
Brockton and Surrounding Towns



Conceptual Design Plan		
ROADWAY & INTERSECTION IMPROVEMENTS BELMONT STREET/FORREST STREET/WEST STREET BROCKTON, MASSACHUSETTS PREPARED FOR: MASS GAMING & ENTERTAINMENT, LLC 900 NORTH MICHIGAN AVENUE, SUITE 900 CHICAGO, ILLINOIS		
MDM TRANSPORTATION CONSULTANTS, INC. PLANNERS & ENGINEERS 28 Lord Road, Suite 280 Marlborough, MA 01752 Tel: (508) 303-0370 Fax: (508) 303-0371		
Project No. 820	File Name: 820 Concept Plan (4-15-2015).dwg	
Date: April 15, 2015	Scale: As Noted	Sheet 1 of 1

FIGURE 10



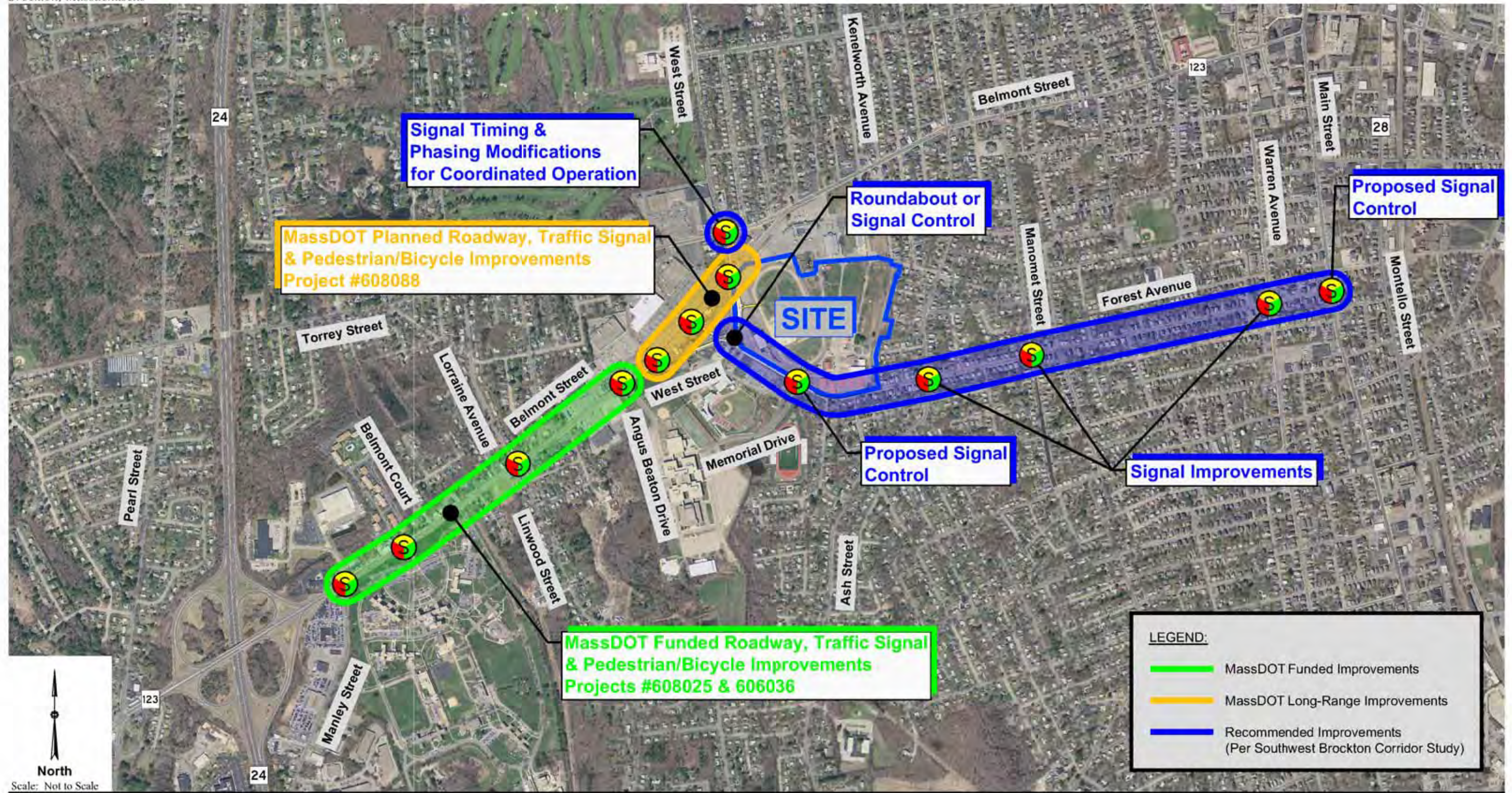
Conceptual Design Plan		
ROADWAY & INTERSECTION IMPROVEMENTS BELMONT STREET/WEST STREET/TORREY STREET BROCKTON, MASSACHUSETTS PREPARED FOR: MASS GAMING & ENTERTAINMENT, LLC 900 NORTH MICHIGAN AVENUE, SUITE 900 CHICAGO, ILLINOIS		
MDM TRANSPORTATION CONSULTANTS, INC. PLANNERS & ENGINEERS <small>28 Lord Road, Suite 200 Marlborough, MA 01752 Tel: (508) 303-0370 Fax: (508) 303-0371</small>		
Project No. 820	File: 820 Concept Plan-West St (8-25-2015).dwg	
Date: August 25, 2015	Scale: As Noted	Sheet 1 of 1

FIGURE 11



Conceptual Design Plan	
ROADWAY & INTERSECTION IMPROVEMENTS REYNOLDS MEMORIAL HIGHWAY (ROUTE 27) BROCKTON, MASSACHUSETTS PREPARED FOR: MASS GAMING & ENTERTAINMENT, LLC 900 NORTH MICHIGAN AVENUE, SUITE 900 CHICAGO, ILLINOIS	
MDM TRANSPORTATION CONSULTANTS, INC. PLANNERS & ENGINEERS <small>28 Lord Road, Suite 280 Marlborough, MA 01752 Tel: (508) 303-0370 Fax: (508) 303-0371</small>	
Project No. 820	File: 820 Concept Plan-Rt 27 (8-26-2015).dwg
Date: August 26, 2015	Scale: As Noted
Sheet 1 of 1	

FIGURE 12



North
 Scale: Not to Scale

FIGURE 13

Planned Area Improvements

