provide a separate bike lane, a shared bike lane with a minimum width of 14 feet should be provided that accommodates bikes and vehicles, where appropriate.

As stated, it was not practical to develop a typical section for every possible right-of-way width in Jersey City. Therefore, in deciding how to treat a right-of-way width not specifically listed, the closest right-of-way typical section should be used. Any additional width should be added to the sidewalk, if 5 foot bike lanes and adequate lane widths and parking widths are already provided as recommended above. If not, then the bike lanes, through lanes, and parking lanes should be brought up to recommended standards. For high volume roads, additional travel lanes should be provided in lieu of lanes wider than standards. Wider lanes tend to encourage higher speeds. Further discussions of traffic calming measures can be found in the Traffic Calming Plan of this report.

The Typical Roadway Sections can be found in Figures 4.6-1 through 4.6-28. It should be noted that, although not depicted on the sections, some streets will require special considerations for buses as indicated on the Functional Class mapping. These roads are Congress Street, Franklin Street, and Ravine Avenue.

4.6.2 Street Amenities

Street amenities create inviting, attractive, usable public spaces. Therefore, the plan includes typical sidewalk layouts that accommodate bike racks, benches, planters, street trees, trash receptacles, and lighting. Sample layouts for street amenities can be found on the typical sections.

4.7 Traffic Calming Plan

4.7.1 Introduction

According to the Institute of Transportation Engineers (ITE) “traffic calming is the combination of mainly physical measures to reduce the negative effects of motor vehicle use, alter driver behavior and improve condition for non-motorized street users.” (*I.M. Lockwood, “ITE Traffic Calming Definition,” ITE Journal, Vol. 67, July 1997, page 22-24.)* Traffic calming measures are used to reduce the speed and volume of vehicles to acceptable levels for the functional street classification, thereby making roadways safer, more pedestrian-friendly, and improving aesthetics.

Traffic calming has been used in Europe for many years and has been successfully used throughout the United States in more recent years. Traffic calming measures cannot solve all traffic problems and careful consideration should be taken to overall regional impact.

Traffic calming measures are not regulatory measures that require enforcement, but are intended to be self-enforcing measures. It should be noted that NJDOT would not consider traffic calming features along segments of roads with posted speed limits of 40 MPH or above. However, all roads in local streets in Jersey City have posted speed limits of 25 mph, with the exception of portions of Garfield Avenue and Caven Point Road.

4.7.2 Traffic Calming Measures

The following are some examples of traffic calming measures:

4.7.2.1 Speed Humps and Speed Tables

Speed humps and speed tables are a raised surface within the traveled way designed to effectively reduce speeds. Typically, they are used within a residential setting to create a gentle rocking motion that discourages drivers from driving quickly. Speed humps are designed for speeds of approximately 15 MPH at the hump and between 20 MPH to 25 MPH between properly spaced speed humps.

As shown in Figure 4.7-1, speed humps and tables are typically 3 to 4 inches in height and vary between 12 and 22 feet in length and can be constructed of either hot mix asphalt or concrete. Additionally stamped concrete or decorative pavement is sometimes used with speed humps to improve the aesthetics. Additionally, rubber speed humps are widely available and can be used on a temporary or trial basis.

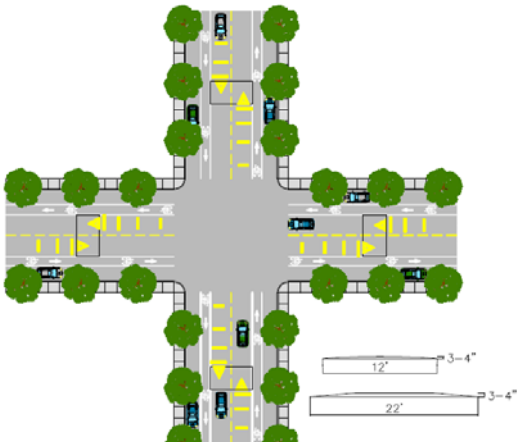


Figure 4.7-1 Speed Humps

There are two typical designs for speed humps and speed tables. The first is the Watts speed hump that was designed by the Transport and Road Research Laboratory in Great Britain and endorsed by the ITE in its publication “Guidelines for the Design and Application of Speed Humps”, dated June 1997. The cross section of these speed humps are a parabolic shape and are 12 feet in width and are only permitted on local streets with volumes of less than 3,000 ADT (average daily traffic) and with a posted speed limit of 30 MPH or less (New Jersey Title 39, C.39:4-8.10). Speed humps may be constructed on a totally self-contained two-lane-residential street and on totally self-contained one-way residential streets under municipal jurisdiction that have no direct connection with any street in any other municipality and on one-way streets connecting to County Roads. This design is primarily used at mid-block locations. The use of the parabolic speed humps should be limited to streets that are classified as “local”, with no more than two travel lanes or 40-feet of pavement width. The horizontal curvature of the road should be a 300-foot radius or greater, with adequate stopping sight distance. Speed humps should not be used on streets with grades greater than 8%. There should be no more than 5% long-wheelbase vehicles and the street should not be a primary emergency response route or bus route. It is also important that a majority of the residents support the use of speed humps on their local street.

The second design was developed in Seminole County Florida and is more commonly referred to as a speed table. The speed table is 22 feet in length and has a 10-foot flat top with a 6-foot ramp on each end. This design is less abrupt than the parabolic speed hump and, therefore, has less impact on emergency service routes. This design can be used at mid-block locations or can be used at intersections as raised pedestrian crosswalks. They can also be used in the main access aisles of large shopping centers.

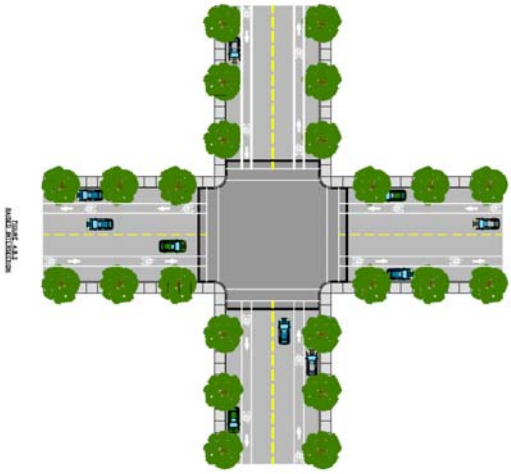
Speed humps and speed tables are typically spaced between 400 and 550 feet apart. Speed humps should be located at least 200 feet away from intersection or sharp horizontal or vertical curves that limit sight distance. Speed humps/tables must also be located so that there is sufficient room on either side of the hump so that bicycles do not conflict with parked cars. Finally, provisions must be made in the design of speed humps so that it does not block gutter flow or other drainage patterns. The design and location of speed humps or speed tables should consider bicycle access, as well as drainage impacts.

Proper signing and striping of speed humps is important to provide advance warning to motorists as well as bicyclists and pedestrians. The Manual on Uniform Traffic Control Devices has proposed the adoption of standard Speed Hump Warning Signs and pavement markings. It is recommended that these markings be used with speed hump designs. Delineator posts should be provided during the winter months to alert snowplow operators.

Since speed humps and speed tables are primarily designed to reduce speeds, limited use of speed humps and speed tables can be anticipated within Jersey City.

4.7.2.2 Raised Intersections

Figure 4.7-2 – Raised Intersection



Raised intersections are similar to speed tables; however, unlike speed tables the entire intersection, including the crosswalks, is raised 6 inches above the street level to be flush with the sidewalk and curb (see Figure 4.7-2). Long ramps are provided on all approaches. Raised intersections are commonly used in redevelopment areas, commercial areas, business districts, and other high pedestrian activity areas with an ADT of 10,000 or less. Although they are appropriate on both local streets and collector roadways, they are generally not recommended for use on arterial roadways.

Raised intersections reduce vehicle speeds on all approaches and reduce conflict between vehicles and pedestrians by elevating pedestrians above street level and demarcating the intersection and crossing areas. Decorative textured pavement is commonly used in raised intersections. Advanced warning signage and striping must be provided.

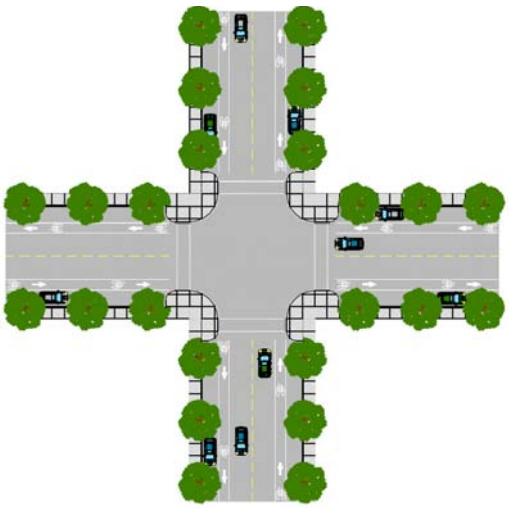
Similar considerations should be given to the location and placement of raised intersections as speed humps/tables. The implementation of raised intersections should also consider bicycle access in the design and location. Special considerations must be taken into account during the design of raised intersection to provide adequate warning to visually-impaired pedestrians. The use of decorative pavement should be considered, but should be done in

conjunction with the implementation of a road opening permit ordinance (as noted in Section 4.7.2.8) that requires a contractor restore the road surface using a matching decorative pavement.

4.7.2.3 Bump Outs (also known as Neckdowns)

This traffic calming measure involves the extension of the curb line to narrow the street width and shorten the length of the crosswalk, as noted in Figure 4.7-3. Neckdowns reduce the curb to curb roadway width, making the intersection more pedestrian-friendly, by shortening the crossing distance and improving visibility of the crosswalk and the intersection via raised peninsulas. Neckdowns can also tighten curb radii, which reduces the speed of turning vehicles.

Figure 4.7-3 – Bump Outs and Neckdowns



This traffic calming measure is appropriate for all types of street classification including local, collector and arterials. It can be used on streets with traffic volumes of up to 15,000 ADT and with posted speed limits of 40 MPH or less. Generally, the curb is extended 8 feet from the existing curb line, thereby creating a protected area for parked vehicles. This measure also provides greater visibility at the intersection, since vehicles travel away from the curb line, closer to the centerline of the traveled way. Bump outs or neckdowns reduce the length of the crosswalk for pedestrians, while creating a narrowing effect to the motorist traveling through the neckdown.

Neckdowns and bump outs can also be used at mid-block locations to provide areas for benches and plantings, which improve the aesthetics of the neighborhood. Vertical elements, such as light poles, trashcans, benches and trees, can also be used to draw attention to the constriction of the road and provide a visual cue to the motorist.

The main disadvantage of this traffic calming measure is the potential impact to roadway drainage. Consideration must be given to roadway drainage and snow/ice removal when designing bump outs. Bump outs at the intersections should not have an effect on parking, since the bump out should be located within the no parking area at intersections. Curb bump outs at intersections benefit pedestrians more than they help to reduce vehicular travel speeds. Turning templates must be used when designing bump outs. Consideration must be given to bicycle access when locating and designing curb bump outs at intersections.

4.7.2.4 Chicanes

Chicanes (Figure 4.7-4) are a series of mid-block curb extensions approximately 50 to 100 feet apart staggered on alternating sides of the street that force

vehicles to negotiate a serpentine alignment. This measure is appropriate on local streets that have traffic volumes of less than 3,500 ADT and can be used on both one-way and two-way streets. Chicanes are not appropriate on roadways with high truck volumes, bus routes, primary emergency response routes or in areas where the roadway grade exceeds 8%.

Chicanes can be constructed from a variety of devices including curb extensions, planters, trees, barrels, fences or barricades; however, care must be taken so that these devices do not create a safety hazard.

A chicane-like effect can be created by alternating on-street parking from one side to the next when parking is normally provided only on one side of the street. On streets where parking is permitted on both sides of the street, actual chicanes would result in the loss of on-street parking. Chicanes should be designed to accommodate bicyclists in a designated bike lane.

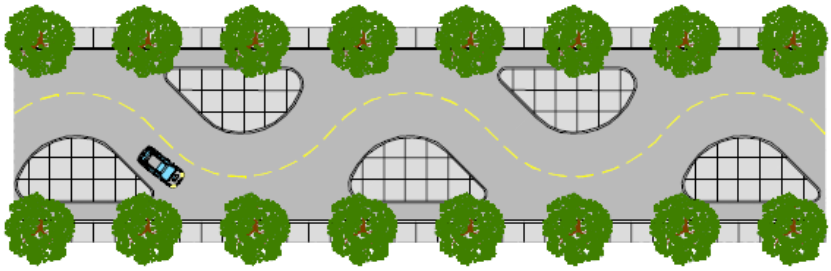
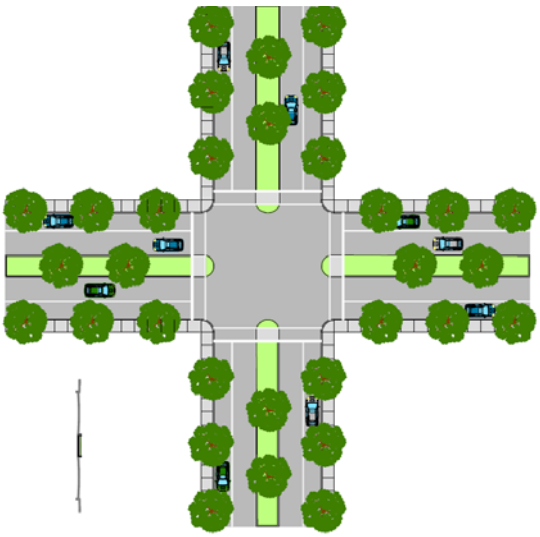


Figure 4.7-4 – Chicanes

4.7.2.5 Raised Medians and Pedestrian Refuges

A raised median includes the installation of a curbed island within the center of a street. This island narrows the travel lanes at that location and provides a pedestrian refuge area in the center of the street. This reduces the crossing distance for pedestrians by allowing them to cross half of the street at one time, as shown in Figure 4.7-5. They can be provided at approaches to intersections or along an entire block.

Figure 4.7-5 – Raised Median



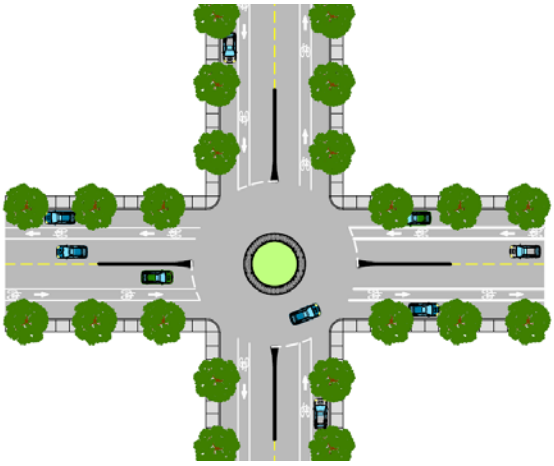
Care should also be taken to provide adequate pedestrian safety. Wide sections of depressed curbs, for barrier-free access at street corners, can serve as unimpeded ramps for vehicles onto sidewalks. In addition, large depressed curbs at corners provide short-cuts for corner cutting vehicles. In conjunction with the implementation of traffic calming measures, City ordinances should be amended to require barrier-free depressed curb ramps to be setback from the street corner so as to provide two distinct sets of ramps with a full face curb between them.

Median islands are appropriate for local, collector and arterial streets and may be used on high-volume roads with posted speed limits up to 40 MPH. Median islands should be 6 to 8 feet wide and should be at least 12 to 20 feet in length. Access across the raised median should be provided in the design to accommodate pedestrians and bicyclists. Raised medians will restrict access to driveways to/from one direction of travel.

4.7.2.6 Traffic Circles

Traffic circles are raised circular islands located in the center of an un-signalized intersection. Traffic circles are generally landscaped and are typically controlled by yield signs on all approaches. The traffic circle restricts drivers from speeding through intersections by impeding the straight through movement, which forces motorists to slow down, approximately 4 to 6 MPH in the vicinity of the traffic circle.

Figure 4.7-6 – Traffic Circle

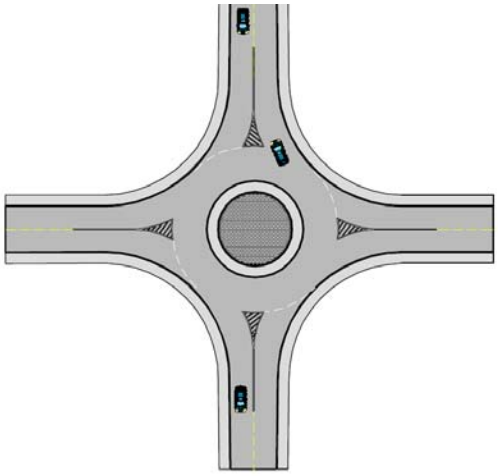


Traffic circles can be used at intersection of local streets, with average daily traffic volumes of less than 3,500. Primarily, traffic circles should be used at intersections that have low pedestrian and left turning volumes.

As shown in Figure 4.7-6, the major disadvantage of traffic circles is the inability of large vehicles such as trucks and busses to maneuver around tight radii. If there is a truck volume issue, mountable curb and truck aprons may be required within the traffic circle.

The horizontal deflection of traffic circles forces cars, trucks and buses into the pedestrian crosswalks or into the bicycle lanes, thereby impacting bicycle access.

Figure 4.7-7 - Roundabout



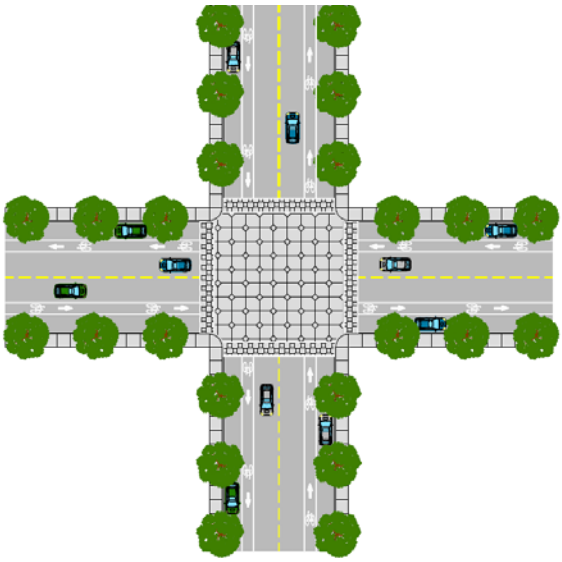
4.7.2.7 Roundabouts

Roundabouts are similar to the traffic circle in that they require vehicles to circulate around a center island in a counter clockwise direction (see Figure 4.7-7). However, they are generally much larger than traffic circles and are used mainly on arterial and collector streets, where traffic circles are used on local roadways. A single lane roundabout has a capacity of 2,500 vehicles per hour.

Roundabouts require the rights-of-way, similar to a traditional intersection. Parking is prohibited on the approaches and around a roundabout. Pedestrian and bicycle crossings are generally not permitted within the roundabout. Therefore, this traffic calming measure should not be used on streets with high pedestrian and bicycle volumes.

4.7.2.8 Textured Pavement and Crosswalks

Figure 4.7-8 – Textured Pavement



Concrete pavers, stamped concrete and/or decorative pavement is placed at intersections to warn motorists they are approaching a pedestrian crossing (see Figure 4.7-8). Because there is no change in the roadway geometry, textured pavement and crosswalks are suitable for all classification of roadways and may be used on streets with speed limits up to 45 MPH.

This traffic calming measure by itself has minimal effect on reducing traffic speeds or volume. However, it is particularly effective when used in combination with other traffic calming measures. Textured pavement and crosswalks may present traction problems for bicyclists and wheelchairs if a heavily textured surface is utilized. Care should be taken to design an appropriate pavement texture that meets the Americans with Disabilities Act. Consideration should be given to bicyclists when developing a textured pavement treatment.

Another major issue with this traffic calming strategy is associated with maintenance, particularly as it relates to utility work and road opening permits. When a road opening is required in areas having textured or decorative pavement, the utility contractor will typically only patch the roadway with hot mix asphalt. Therefore, the implementation of this traffic calming strategy must be done in conjunction with a Road Opening Permit Ordinance that requires a contractor to restore the road surface using a matching decorative pavement.

4.7.2.9 Road Closures, Traffic Diverters

Another category of traffic calming measures is full or partial road closures, including directional diverters, semi-diverters, median barriers, forced turn islands, pork chops, right turn islands, etc. These traffic-calming measures are designed to control traffic volumes on residential roadways and should only be used on local streets with traffic volumes of less than 3,500 vehicles per day.

Full street closures are barriers placed across a street to completely close off a street to through traffic; leaving only the sidewalk and bicycle paths open, as shown in Figure 4.7-9. Half street closures are similar to the full street closure, except that they only block travel in one direction.

Directional diverters are barriers placed diagonally across intersection to block through movements, forcing traffic to turn to the right only. Median barriers are raised islands located along the centerline of a street and through an intersection to block traffic at a through street. Forced turn islands, pork chops and right turn islands are raised islands that only block certain turning movements at intersections.

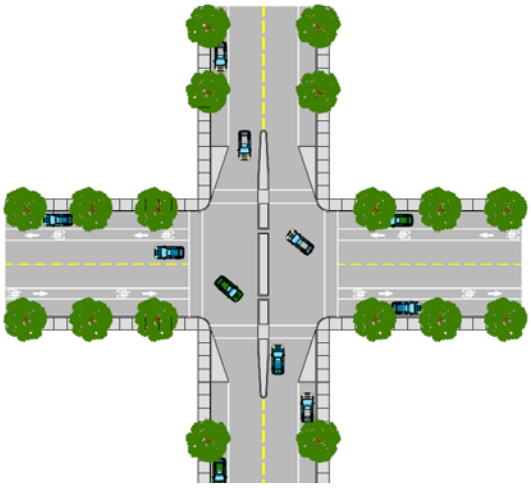


Figure 4.7-9 – Diversion

With road closures, barriers such as landscaped islands, walls, gates, bollards, or other obstructions can be used to leave an opening smaller than the width of a passenger car but large enough for pedestrians and bicyclists to maintain access. These methods are most often used to alleviate cut through traffic by making travel less direct through neighborhoods with a street grid layout. The use of these measures does not address speed control. In addition, since they prohibit traffic in certain directions, road closures or diversions tend to move a traffic problem to an adjacent street. Because of road closures, the circuitous route may impact emergency response times. The use of road closures and diversions should be coordinated with fire, police and other emergency services, as well as snow removal, garbage collection and school bus routes.

Although this strategy is more difficult to implement in existing established neighborhoods, it should be considered in the design of street networks in new redevelopment areas. This measure is also recommended in areas with high pedestrian traffic, where portions of roadways can be closed off for pedestrian traffic only.

4.7.2.10 Multi-Way Stop Controlled Intersections

A multi-way stop controlled intersection is where all (three or four) roadway approaches are stop controlled. Multi-way stop control is used where the volume of intersecting traffic is approximately equal. The primary purpose of multi-way stop controlled intersections is not traffic calming. Some studies indicate that installation of multi-way stop control does not significantly affect travel speeds at a significant distance away from the intersection. Some studies showed that a slight increase in speeds after the installation of multi-way stop control. Multi-way stop control is used on neighborhood roadways where the traffic volumes on intersecting streets are approximately equal. Multi-way stops must be installed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). The decision to install multi-way stop control should be based on an engineering study and must be approved by either the Municipal or County Engineer. Criteria that should be considered when assessing an intersection for a multi-way stop include the following:

- Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop
- The total traffic volume entering the intersection from the major street approaches should be at least 300 vehicles per hour for any 8-hour period of an average day, and minor street vehicular
- Pedestrian and bicycle volumes entering from the minor street averages at least 200 units per hour for the same 8 hour period

4.7.2.11 Reduced Speed Limits

Studies report that reduced posted speed limits on local streets show little or no effect. The primary reason drivers travel at a speed is roadway geometry, other traffic and the immediate environment, rather than reacting to a specific speed limit sign. Reduced speed limits are a function of enforcement. Posting of unreasonably low speed limits can reduce the credibility of other traffic control devices.

Streets in Jersey City generally have posted speed limits of 25 mph, except portions of Garfield Avenue and Caven Point Road. As such, limited use of reduced speed limits can be anticipated in Jersey City.

4.7.2.12 Traffic Signs, Striping and Pavement Markings

Some of the measures involving signs include posted speed limits, turn prohibitions, commercial vehicle/weight prohibitions, pedestrian crossing ahead, and “yield to pedestrian in crosswalk” in road, flexible signposts. Examples of striping are upgrades to thermoplastic retro-reflective crosswalks and shoulder lines. Pavement markings include school crossing, pedestrian crossing, speed limits, warning signs installed with thermoplastic retro-reflective tape. Several studies have found that adding shoulder lines or bike lanes to give the perception that the lanes are narrower have resulted in reduced travel speeds of 3 to 4 MPH. Striping is a low cost traffic calming technique. Additionally, the implementation of Jersey City’s typical roadway cross sections will reduce travel lane widths and add bike lanes on Jersey City streets.

Signage and pavement markings can be a low-cost, high-impact, start to traffic calming. Signing, striping and pavement markings have a minimal impact on emergency response routes. However, they have limited effectiveness on volume and speed reduction. As with all signing, striping and pavement markings, they must also be installed in accordance with the MUTCD. The establishment of an enforcement program in conjunction with traffic signage and pavement parking is important to improve the effectiveness of the program. This method has no impact on bicycle access.

4.7.2.13 Speed Detector Signs

Speed detector and display signs can also be used as a form of traffic calming measure. These signs display the speed of approaching vehicles to alert motorists when they are driving at unsafe speeds. They have been proven to slow down traffic and are ideal for use on local roads or in school zones.

Speed detector signs can be a lower cost traffic calming measure that can either permanently be installed or used in temporary locations by the Police Department. The establishment of an enforcement program in conjunction with this measure is important to improve the effectiveness of this program.

4.7.2.14 Red Light Running

On January 13, 2008 Governor Corzine signed into law Assembly Bill 4314, which requires the establishment of a five-year pilot program to determine the effectiveness of a traffic control signal monitoring system in New Jersey. This program involves using a camera system and vehicle sensors, which produce images of vehicles crossing the intersection during the red phase of the traffic signal. Three municipalities have already been selected to participate in this program and the NJDOT has made provisions for up to 12 municipalities to be approved in the first year.

In order to be selected to participate in this program, a municipality must demonstrate that an intersection has a history of red light running and that no efforts including engineering, enforcement and education, have been effective in decreasing the number of violations.

4.7.3 Traffic Calming Measure Consideration Matrix

The Traffic Calming Selection Matrix provides guidance on selecting a traffic calming measure for a particular street. The traffic calming measure is listed along the left side of the matrix. The criteria to consider when choosing a traffic calming measure are shown across the top of the matrix. In general, addressing traffic calming issues involves neighborhood participation, developing a toolbox of applicable measures, and establishing a process for study and implementation. This matrix should be used to establish the appropriate traffic calming measures in response to neighborhood inquiries.

Table 4.7.1 Traffic Calming Selection Matrix

Traffic Calming Measure	Functional Classification	Cartway Width	Traffic Volume	Maximum Posted Speed Limit	Percent Heavy Vehicles	Roadway Grade	Comments and Recommendations
Speed Humps	Local residential and local park	40-feet or less	Less than 3,000 ADT	25 MPH	Less than 5%	Less than 8%	Emergency services and transit should be consulted
Speed Tables/ Raised Crosswalks	Local residential and local park	40-feet or less	Less than 3,000 ADT	25 MPH	Less than 5%	Less than 8%	Emergency services and transit should be consulted
Raised Intersections	Minor collector, local residential and local park	40 feet or less	Less than 10,000 ADT	35 MPH	Less than 5%	Less than 8%	Emergency services and transit should be consulted
Bumpouts/ Neckdowns	All	48 feet or less	Up to 15,000 ADT	40 MPH	Less than 5%	Less than 8%	Emergency services and transit should be consulted
Chicanes	Local residential and local park	40 feet or less	Less than 3,500 ADT	35 MPH	Less than 5%	Less than 8%	Emergency services and transit should be consulted
Raised Medians/ Pedestrian Refuges	All	Up to 6 lanes	Up to 15,000 ADT	40 MPH	Less than 5%	Less than 8%	Emergency services and transit should be consulted
Traffic Circles	Minor collector, local residential and local park	One and two lane approaches	Less than 3,500 VPH	45 MPH	No limit	No limit	Aprons should be included to accommodate large, heavy vehicles
Roundabouts	Minor collector, local residential and local park	One and two lane approaches	Up to 2,500 VPH for a single lane	45 MPH	No limit	No limit	Aprons should be included to accommodate large, heavy vehicles
Textured Pavement/ Crosswalks	Minor collector, local residential and local park	Up to 4 lane cross sections	Up to 10,000 ADT	45 MPH	No limit	No limit	Road Opening Permit Ordinance must be revised to include restoration
Road Closures	Local residential and local park	Two lane roads	Less than 3,500 ADT	35 MPH	No limit	No limit	This strategy should be considered in redevelopment areas or in new subdivisions
Traffic Signage & Markings	All	No limit	No limit	No limit	No limit	No limit	Low cost measures
Multi-way Stops	Minor collector, local residential and local park	Single lane approaches	500 VPH for an 8 hour period	40 MPH	No limit	No limit	Traffic calming is not the primary purpose
Speed Detector Signs	All	No limit	No limit	No limit	No limit	No limit	Must be implemented in conjunction with an enforcement program

4.7.4 Implementation Strategies

Prior to the installation of any traffic calming measure, the City must first establish the need for the traffic calming. Priority areas for traffic calming would include areas in the vicinity of schools, parks, local residential neighborhoods, train stations, bus station and bus stops. In addition, a pilot program should be considered at the requests a specific neighborhood(s).

The Police Department in cooperation with the City's Division of Engineering and the City's Division of City Planning should evaluate the existing traffic conditions in order to properly document the existing traffic patterns, volumes and speeds. This should include documentation of traffic counts, speed studies, signing, striping and roadway geometry. After the need for traffic calming has been established, a public meeting should be held with the residents in the affected neighborhood to explain the program and to solicit public input. After the meeting, the neighborhood should be polled for further input. Additionally, meetings should be held with emergency service providers to solicit their input.

When the need for the traffic calming has been defined, the City should implement a pilot program using low cost treatment, such as temporary speed humps, barrels/cones, barricades, etc. After the temporary traffic calming measures have been installed for a period of time (generally 6 months to one year), the Police Department in cooperation with the City's Division of Engineering and the City's Division of City Planning should reevaluate the effectiveness of the traffic calming device. A second meeting should be held with the resident to solicit post construction public input. A post-construction survey could be an effective way to solicit input and should be considered. If the City staff, the residents and the governing body determine that the traffic calming measures are effective, then the temporary treatments can be replaced with permanent measures.

Several important factors should be taken into consideration during the evaluation of a pilot program. The City should consider the adjacent neighborhoods. In some cases, it is recommended that the adjacent areas should be studied both pre and post installation of traffic calming measures, since often the installation of traffic calming measures only shift the problem to an adjacent street. Traffic calming measures often impact emergency response time; therefore, prior to considering any traffic calming measures, the City should meet with emergency service personnel to review the neighborhood concerns, the various traffic calming measures and the associated impacts of each measure. Finally, the installation of any traffic calming measure must be accompanied with a corresponding education and enforcement element, in order for these measures to be affective.

4.7.5 Funding Sources

The cost of traffic calming varies greatly depending on the traffic calming measure and the specific road characteristics. Traffic calming measures can be implemented as part of the City's annual capital improvement programs. Alternatively, traffic calming measures can be privately funded by developers when required in conjunction with site plan or subdivision approval. Finally, grants are available from the NJDOT under programs such as the Safe Routes to Schools and Local Aid to implement traffic calming measures.

4.8 Sidewalk Maintenance Plan

Sidewalks are an integral aspect of the circulation system. Sidewalks must be maintained and adequate provisions must be made in construction zones to accommodate pedestrians. Jersey City aims to preserve all sidewalks, in order to keep them safe and inviting. An adequate, well-maintained pedestrian network will provide access and enhance the transportation network for residents and visitors alike, thereby reducing vehicular congestion, increasing public transit ridership, and improving the quality of life. In addition, a well-maintained network of pedestrian sidewalks will increase connectivity throughout the City by offering users a number of different routes by which to reach their destination. These spaces should not be impeded nor closed for construction. Instead, they should be modified to fit the needs of all users.

Jersey City's Sidewalk Maintenance Plan was designed to follow current Americans with Disabilities Act (ADA) , ADA Guidelines for Buildings and Facilities (ADAAG), the U.S. Access Board issued Draft Public Rights-of-Way Accessibility Guidelines (PROWAG) dated November 23, 2005, and recommendations cited in Chapter 41 of New Jersey Department of Transportation (NJDOT) Pedestrian Design Guidelines. These sidewalk maintenance guidelines are superseded by any future revisions to ADA, ADAAG, and PROWAG guidelines that are more restrictive.

4.8.1 Pedestrian Facility Maintenance

For the safety of pedestrians and to preserve the quality of life, it is important to keep pedestrian facilities around the City well-maintained. The maintenance of pedestrian facilities, including sidewalk repairs, the removal of snow, ice, and water, and inspection, should be undertaken with regularity so that pedestrian paths can be accessed by all types of pedestrians, free of potential hazards, and adequately handle typical pedestrian volumes.

4.8.2 Sidewalk Repairs

Sidewalks should be kept in a state of good repair for the safety and accessibility of all of its users. Additionally, the City aims to maintain sidewalks in a structurally sound, aesthetically pleasing form. Therefore, the following guidelines should be applied to the City's sidewalks:

a) Sidewalks with breaks in vertical elevation of less than ¼ inch should be reviewed on a case by case basis. However, these sidewalks typically would not require replacement if this differential was the only sidewalk deficiency and the sidewalk was not recently installed. These areas should be monitored.

b) Tripping hazards with changes in vertical elevation of more than ¼ inch, should be repaired. All slabs should be replaced from joint to joint where feasible. Saw-cutting may be acceptable in some locations subject to the approval of the City Engineer's office.

c) Sidewalks with cross slopes greater than 2% should be replaced or reset.

d) Sidewalks with running slopes greater than 5% where the pedestrian access route exceeds the general grade of the roadway, should be replaced with the installation of a curb ramp that meets the required federal guidelines, or be reset to less than 5% running slope or to follow the general grade of the roadway.

e) Spalling sidewalk should be reviewed on a case-by-case basis, but typically would not require replacement. However, spalling sidewalk should be monitored for ponding water, which could be the cause of the spalling.

f) If ponding runoff is noted on the sidewalk, then the sidewalk should be repaired or reset to eliminate ponding. Ponding water can result in unsafe icing conditions and is an obstruction to pedestrians, which reduces sidewalk capacity and causes an unnecessary nuisance to its users.

g) Sidewalks with hairline cracks typically would not require replacement if this deficiency is the only sidewalk deficiency and the sidewalk was not recently installed. These areas should be monitored.

h) Sidewalks with cracks greater than ¼ inch should be repaired. All slabs should be replaced from joint to joint where feasible. Saw-cutting may be acceptable in some locations subject to the approval of the City Engineer's office.

i) Broken and chipped sidewalk should be reviewed on a case-by-case basis. If these deficiencies cause an unlevel traveling surface, tripping hazard or potential for ponding, then the sidewalk should be replaced from joint to joint where feasible. Saw-cutting may be acceptable in some locations subject to the approval of the City Engineer's office.

j) All sidewalk replacement should be in accordance with Ordinance requirements and should be in accordance with the City's Typical Concrete Sidewalk details.

4.8.3 Winter Season Maintenance Requirements

It is important that snow and ice are removed from pedestrian paths in a timely manner and stored in areas that will not impede pedestrian movement throughout the City. The following guidelines shall be followed when removing snow and ice from roadways and sidewalks:

a) Snow and ice that has been removed from streets, driveways, parking lots and sidewalks shall not block sidewalks or other pedestrian routes.

b) All intersections and access to pedestrian crosswalks shall be kept clear of snow and ice, which tend to accumulate in snow banks at the corners of intersections.

c) Ponding and icing should be prevented on sidewalks and intersections. Inlet grates and gutters should be kept clear of snow and ice to allow for adequate drainage of melting snow and ice. Pursuant to §296-1.1, Jersey City Code of Ordinances, all property owners, occupants or other person having charge of a residential building or vacant lot are required to clear snow and ice from the sidewalks and gutters to one foot outside the curb within eight hours after snow has fallen.

d) Where sidewalks pass through publicly-owned properties, the agency that owns the property is responsible for snow and ice removal.

4.8.4 Inspection

The inspection of pedestrian paths should be undertaken by the City periodically to check that all sidewalks are in a state of good repair. The frequency of these inspections shall be at the City's discretion. The City should develop a schedule to perform routine safety and ADA inspections of sidewalks. Additionally, for projects undertaken by private developers, sidewalks should be inspected prior to Certificates of Occupancy (CO) being issued and prior to performance bond release. Additionally, Temporary Certificates of Occupancy (TCO) should not be issued prior to a sidewalk deficiency being rectified. Lastly, for maintenance bond inspections, sidewalks should be inspected by the City or City's representative, and all sidewalk deficiencies corrected prior to maintenance bond release. The City should abide by a system of tracking all maintenance bond inspections, so that maintenance bonds do not expire prior to inspections being performed.

4.8.5 Pedestrian Facilities in Work Zones

The safety of sidewalks abutting and within work zones is an important aspect of sidewalk maintenance in Jersey City. When a modification in pedestrian facilities is necessary as a result of construction activities, the following guidelines should be followed to provide safe and adequate pedestrian access around the project site.

4.8.5.1 Informational Needs

When a modified pedestrian route is necessary as a result of construction, it is important to provide pedestrians with adequate information to ensure that they are able to follow modified pedestrian routes safely and with little difficulty. Specifically, the following information should be provided in the event that a pedestrian path will be modified:

a) Advance information for detours, bypasses, and sidewalk/path blockages.

b) If blockages are necessary due to construction activities, information regarding the provision of alternate routes should be provided.

c) Signage should be as specific as possible with regard to directing pedestrians along alternate routes.

d) Mechanisms should be provided to alert and adequately notify groups with special limitations (e.g., blind, deaf, disabled) of a change in pedestrian paths.

4.8.5.2 Channelization

In the event that a pedestrian path will require modification due to ongoing construction a proper transition to the modified path should be provided that is channeled using proper barriers such as cones, marking tape, barricades, ropes or chains, or wood railings, and meets the ADA, ADAAG, and PROWAG widths and maximum grade requirements. The duration of the project and potential use by groups with special limitations should be considered to determine that the proper barriers are being used. Lastly, in the case of a bypass or detour, adequate signage should be provided to direct pedestrians back to the original path, and adequate barriers should be provided.

4.8.5.3 Modified Path Design Considerations

Modified pedestrian paths should provide adequate safety, accessibility, and capacity for all users. Therefore, the following shall be followed:

a) Changes in pedestrian facilities should take into account the origins, destinations, and routes of its users. Where feasible, pedestrian paths should be modified to have a minimal impact on the most heavily used pedestrian paths.

b) Pedestrians will take the shortest route wherever possible. For pedestrian safety, the modification of pedestrian facilities should make it difficult or impossible to walk outside of the designated alternative pedestrian paths by utilizing physical barriers such as barricades, providing a safe, direct and convenient alternative access route to minimize the possibility of a pedestrian deviating from the route, and providing adequate signage to inform pedestrians of alternate access routes.

c) Night time use of the modified facilities should be considered with respect to pedestrian safety and security. Adequate lighting should be provided.

d) Storage of construction materials, construction equipment, and waste should be pre-designated outside of the pedestrian route.

e) If it appears no modified pedestrian route can be provided during construction, undertaking construction in stages should be considered in order to provide a pedestrian route. For an example, a detour can be provided to divert pedestrian traffic to the other side of the street where an alternate sidewalk or pedestrian path is available. Alternatively, pedestrian traffic can be diverted to a planting strip, where available, or onto the curb lane, as long as an adequate barrier is provided to protect pedestrians from vehicular traffic.

f) An adequate barrier should be provided which blocks access to the original pedestrian path, to make sure that pedestrians use the modified pedestrian path.

g) The pedestrian route should have clearly defined boundaries and be able to adequately handle current pedestrian volumes and meet ADA, ADAAG, and PROWAG requirements;

h) The walkway surface should be constructed of a rigid, stabilized material that is even, free of wide cracks, holes, and other potential obstructions. The material should be a non-slip surface.

i) There should be periodic inspection of the construction site to determine that changes in construction have not blocked the modified path;

j) Slopes, widths, and vertical clearances should meet all applicable regulations.

k) Adequate drainage should be provided so that ponding does not occur on the modified pedestrian path, and adequate space for snow and ice removal and

storage should be provided if construction is to take place during the winter months.

l) Proper channeling from modified pedestrian paths to the crosswalk should be provided. If it is necessary to alter the crosswalk as part of construction, the new crosswalk shall be clearly delineated, and old crosswalk markings should be completely invisible. In some instances, Pedestrian crossing signs, may be necessary, to alert motorists to unexpected pedestrian crossing and altered traffic signal timing, if necessary, to provide pedestrians an adequate amount of time to safely cross an intersection.

4.8.6 Funding and Responsible Entities

Funding to implement necessary changes in pedestrian paths as a result of ongoing construction shall be provided by the contractor, developer, or property owner of the construction project requiring the alteration of the pedestrian path in question. When an excavation undertaken by a property owner or utility company causes the necessity for sidewalk repairs, the cost of the sidewalk repairs and shall be the responsibility of the property owner or utility company. The costs for routine sidewalk repairs are the responsibility of the abutting property owner, except in the case of a capital project where the project design results in the sidewalk being removed and replaced, in which case the funding for the project would be the responsibility of Jersey City.

In many cases, escrow accounts for specific private projects will be available for inspection of sidewalks. In the case of a capital project, the sidewalk inspection would be included in the capital budget for the project. The routine sidewalk inspections that are not relative to a construction project, should be planned for by the City of Jersey City in their annual budget.

Sidewalk maintenance is paramount for the safety of Jersey City's sidewalk users, and Jersey City is committed to maintaining and preserving this critical aspect of their circulation system.

5. CONCLUSIONS

The Circulation Plan Element helps Jersey City address current needs and prepares Jersey City for growth through 2050. The Plan gathered feedback from all of its stakeholders through the 2050 Mobility Survey, Focus Group, Visioning Session, and Public Meetings, and the City incorporated that feedback into all aspects of its Plan. The City created a Technical Advisory Committee (TAC) consisting of various State, County, and local agencies which play a role in Jersey City's transportation infrastructure, and the TAC vetted all aspects of the Plan. The result is an action-oriented Circulation Plan Element for the short, medium, and long terms that addresses the needs of the multi-modal system and facilitates the movement of people and goods safely and efficiently. The Plan develops a Vision for a transformed world-class center served by a multi-modal transportation system that is attractive, clean, safe, efficient, reliable, inclusive, affordable, accessible, and user-friendly. This Vision focuses on travel to, from, and within Jersey City, for bikes, pedestrians, vehicles, buses, ferries, rails, and all mass transit carriers. The Plan addresses the needs of all of its users, and emphasizes alternatives to the automobile.

Goals, Objectives, Strategies, and Actions were established based on feedback from the public and the TAC, and from recommendations cited in various studies performed in Jersey City and throughout the region. The Action plan identifies timeframes for the Actions, as well as potential lead implementation agencies, ranges of costs, and possible funding sources. Indicators and Targets are provided for the City to measure its success in attaining the Goals, Objectives, and Strategies, as well as Baselines to use for comparison purposes. The Plan recognizes how the City will grow, and addresses how the Circulation system will address this growth. The Plan identifies potential right-of-way needs to accommodate anticipated redevelopment. A Jersey City Functional Classification System is established which enables the City to apply Typical Roadway sections which maximize the use of existing and future streets for all of its users. The Plan also provides guidelines for Traffic Calming measures, and provisions for sidewalk maintenance.

The Circulation Plan Element relates directly to the land use plan and corresponding development and redevelopment objectives and strategies of the City. It is the purpose of this Plan to address current mobility needs and to prepare the City's transportation system for growth through 2050, and to enable Jersey City to achieve its vision.

5.1 How Circulation Element Will Address Growth and Circulation Issues

The Circulation Element will address growth by identifying rights-of-way that need to be secured and recommending improvements to the transportation infrastructure for all aspects of the multi-modal system. Circulation will also be addressed by revising the existing and future roadway layouts to accommodate all users in order to provide connectivity for all modes of travel. Ultimately, this Circulation Element will address the sustainability of mass transit, roads and highways, and bicycle and pedestrian modes of transportation.

5.1.1 Mass Transit

In Jersey City, mass transit is made up of buses, passenger rail, HBLR, ferries, and other private carriers such as taxis and jitneys. The plan recommends multiple actions to improve mass transit circulation both within Jersey City to improve neighborhood connectivity, and throughout the region, for all of its users. There are multiple Actions that include new studies, actions from previous studies of the Jersey City and the Region, upgrades to existing stations, accessibility issues, easier transfers, efficiency of service, hours of operation, number of stations, neighborhood and regional connectivity, provisions for bikes at stations and on mass transit

vehicles, and expansion of mass transit service. The plan identifies rights-of-way to be preserved to facilitate many of these actions.

5.1.2 Roadways

The Circulation Element identifies rights-of-way needed for new street grids, roadway extensions, and transportation infrastructure improvements. These new streets and projects will serve development and redevelopment projects, provide relief to congestion on local streets, and provide better connectivity within Jersey City and to and from the region. The Circulation Element recommends multiple actions to enable the existing and future roadway and highway system to accommodate all of its users, relieve congestion, and facilitate the movement of goods and services. The Circulation Element also addresses maintenance of transportation infrastructure, changes to the roadway system including major interchange improvements, sophisticated traffic signal systems, bus preemption and bus priority on roadways. The Circulation Element establishes a Jersey City Functional Classification System, that can be used in conjunction with Typical Roadway Sections to maximize the use of the existing and future roadways to accommodate all users, including pedestrians, bicycles, and vehicles. The Circulation Element has provisions for traffic calming, and addresses sidewalk maintenance.

5.1.3 Freight

Much of the freight improvements in the plan are Actions to implement regional projects, and recommendations from other studies of Jersey City and the region. These recommendations include but are not limited to, the diversion of through trucks from a multi-use urban boulevard along the Route 440 and Route 1&9 T corridor between the Bayonne border and Route 7, the completion of the Portway projects, and the support of efforts by PANYNJ, NJDOT, NJTPA and other entities to advance capacity expansion within existing port lands, as well as port improvement efforts. These port improvement efforts include but are not limited to increasing the vertical clearances of the two rail tunnels that connect New Jersey to the North American rail system, and channel dredging.

5.1.4 Bicycle and Pedestrian Circulation

The plan identifies multiple improvements for bicycle and pedestrian circulation. The plan creates Typical Roadway Sections which include bike lanes and wide sidewalks with street amenities. The Traffic Calming Plan provides a framework for the installation of traffic calming devices, where applicable, citywide. The Plan recommends multiple Goals, Objectives, Strategies, and Actions, that advance bike and pedestrian circulation. These Actions include but are not limited to: accommodations for bikes at mass transit stations and on mass transit vehicles, bike incentive programs, accessibility upgrades throughout the circulation system, pedestrian walkways for access to mass transit, completion of the waterfront walkways, construction of the 6th Street embankment linear path and Jersey Avenue extension with bike and pedestrian accommodations, and completion of the East Coast Greenway Route. The plan also addresses sidewalk maintenance and traffic calming that make the City streets a safer place for bikes and pedestrians.

5.2 Plan Implementation

The Circulation Plan Element should provide guidance for all new projects in Jersey City. The Typical Roadway Sections should be incorporated into capital improvement projects. The Land Development Ordinance should be updated to adopt the applicable recommendations of the Circulation Plan Element so that future development and redevelopment design

roadway layouts in accordance with the Typical Sections. Site plan and subdivision applications should be reviewed for consistency with this plan.

A committee comprised of representatives from appropriate Jersey City departments, divisions, and agencies should be formed to advance the actions described in the Circulation Element. This committee should prioritize the actions in the Circulation Element, identify and secure funding for transportation projects, develop transportation-related policy, and monitor the attainment of the goals of Circulation Element using the Indicators described in the Circulation Element.

Funding should be secured to advance projects, policies, and studies for which Jersey City is identified as the Lead Implementation Agency. Jersey City should work with all agencies identified in the Action Plan to advance other projects, policies, and studies. Jersey City should monitor its progress in the attainment of its Goals, by tracking the Indicators and Targets.

By implementing the Circulation Plan Element, the multi-modal system will be prepared for growth as Jersey City becomes a bustling, world-class center, and Jersey City will be served by a multi-modal transportation system that is attractive, clean, safe, efficient, reliable, inclusive, affordable, accessible, and user-friendly.

Photo Source: Jersey City Division of City Planning

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Zoning Map, dated January 28, 2009, and all Redevelopment Plans identified in the legend of the Zoning Map were reviewed.