

## MEMORANDUM

**DATE:** May 23, 2019

**TO:** Ms. Jessica Bessette, AIA, LEED AP BD+C  
Arrowstreet  
10 Post Office Square, Suite 700N  
Boston MA 02109

**DRAFT**

**FROM:** Daniel J. Mills, P.E., PTOE – Principal  
Daniel A. Dumais, P.E. – Senior Project Manager

**RE:** **Proposed Lincoln-Eliot School Relocation and Expansion**  
**150 Jackson Road – Newton, MA**

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MDM Transportation Consultants, Inc. (MDM) has prepared this preliminary traffic and circulation assessment for the proposed relocation of the existing Lincoln-Eliot school (L-E) located at 191 Pearl Street to 150 Jackson Road in Newton, Massachusetts. The location of the proposed site relative to the adjacent roadway network is shown in **Figure 1**. This evaluation documents anticipated traffic generation characteristics and pick-up/drop-off operations for the proposed school relocation to 150 Jackson Road, quantifies incremental traffic increases of project on area roadways, reviews peak parking demands, and identifies recommended site access and circulation features to accommodate school traffic operations.

Key findings of the preliminary assessment are as follows:

- *Proposed Site Programming.* The L-E school proposes to expand its enrollment from 374 students to 465 students and expand from 35 staff to 80 staff. Site programming information for the existing L-E indicate the use of parent vehicles, staff vehicles and school vans. The school currently and will continue to have two critical study periods that include a typical morning drop-off peak hour (7:45 – 8:45 am) and a weekday afternoon peak hour (2:45 – 3:45 pm). Trip generation for the existing school during the critical weekday morning drop-off peak hour was 313 vehicle-trips (164 entering and 149 exiting), including 144 parent/guardian drop-off vehicles, 5 school vans and 15 staff vehicles. The actual number of concurrently vehicles parked onsite during the critical evening pick-up period was observed to be 89 vehicles broken down as follows; 5 vans, 35 staff vehicles, and 49 parent vehicles.



Figure 1

- *Projected Trip Generation.* Trip generation for the expansion and relocation of the L-E is based on empirical observations conducted at the existing L-E site (191 Pearl Street). With the proposed relocation and student/staff expansion in place, the projected peak design volumes for school pick-up/drop-off activity (i.e., trips that must be actively managed by L-E) will be 179 parent auto and 5 van trips during the weekday morning drop-off period, 94 parent auto and 5 van trips during the weekday afternoon pick-up period.
- *Site Access and Circulation.* Site access and circulation recommendations should be incorporated into the preliminary site plan to facilitate safe and efficient pedestrian and vehicle operations at the site. MDM recommends that the L-E develop a traffic management plan (TMP) aimed at enhancing school pick-up/drop-off operations, parking activity and site circulation including elements noted in this evaluation. MDM also recommends additions to the TMP plan as outlined under *Site Circulation and Parking Supply*.
- *Peak Parking Demand.* The peak parking demand for the proposed use of the Site is estimated at 142 parked vehicles (80 staff vehicles, 62 parent/guardian vehicles) during the critical evening pick-up period.

In summary, the replacement of the existing Newton Early Childhood Program (NECP) use at 150 Jackson Road with the Lincoln-Eliot school (L-E) use results in a moderate change in intersection volumes within the study area during the 7:45 to 8:45 am drop-off period and 2:45 to 3:45 pick-up period. The project will result in a reduction of trips in the area during the current NECP drop-off/pick-up periods. Peak parking demand for L-E are estimated to be 142 spaces based on observations conducted at the existing L-E facility at 191 Pearl Street with adjustment for projected student and staff increases at the 150 Jackson Road location. The preliminary parking plan utilizing the proposed on-site parking spaces is expected to accommodate the peak parking demands for L-E under typical peak pick-up/drop-off operating conditions.

## PROJECT DESCRIPTION

### Existing Conditions

The Lincoln-Eliot School (L-E) has an existing enrollment of 374± students and 40± staff at its 191 Pearl Street location. The existing operations are as follows:

- *L-E School Operations.* The general hours of operation for the L-E are 8:20 AM to 3:00 PM on Monday, Wednesday, Thursday, and Friday. On Tuesday's the school operates on half days from 8:20 AM to 1:00 PM.

- *Drop-Off Period.* The L-E drop-off period generally occurs between 7:45 AM to 8:30 AM.
- *Pick-Up Periods.* The L-E pick-up period generally occurs between 2:45 PM to 3:30 PM.
- *Staff Levels.* Staff includes approximately 35± total staff members.
- *Bus/Van Drop-Off/Pick-Up.* Approximately 5 vans service the school during the weekday morning drop-off period and afternoon pick-up periods. Traditional yellow school buses do not service the school at this time.

## **Proposed Conditions**

Under the proposed development plan, the L-E school proposes to relocate to 150 Jackson Street (Site) from 191 Pearl Street and expand its enrollment to 465 students and 80 staff. The hours of operation and bus/van usage are expected to remain consistent with its existing operation at 191 Pearl Street Jackson Street.

## **BASELINE TRAFFIC CHARACTERISTICS**

An overview of existing (Baseline) roadway conditions, traffic volume characteristics and existing school operations for the L-E school is provided below.

### **Baseline Traffic Data**

Traffic volume data was collected in January 2019 at the study area intersections during the weekday morning (7:00 AM - 9:00 AM) and weekday afternoon (2:00 PM to 4:00 PM) periods to coincide with peak traffic activity of the L-E school and the adjacent streets. Review of MassDOT permanent count station data indicates that January is a below-average traffic month (approximately 9 percent below average month conditions). An adjustment (9% increase) was made to the traffic counts to represent average conditions. The resulting Baseline weekday morning and weekday afternoon peak-hour traffic volumes for the study intersections are depicted in **Figure 2** and **Figure 3**. Turning movement counts and permanent count station data are provided in the **Attachments**.

### **Existing Trip Generation – L-E SCHOOL**

Existing site trips generated by L-E were observed during critical school activity periods including the weekday morning drop-off period and weekday afternoon pick-up period on Thursday, January 31, 2019 between 7:00 AM – 9:00 AM and 2:00 PM – 4:00 PM. A detailed trip generation summary for the site, based on the existing student enrollment of 374± students and approximately 35 staff, including a breakdown of vehicular trips by staff member, student pick-up/drop off and van service is presented in **Table 1** and described below.

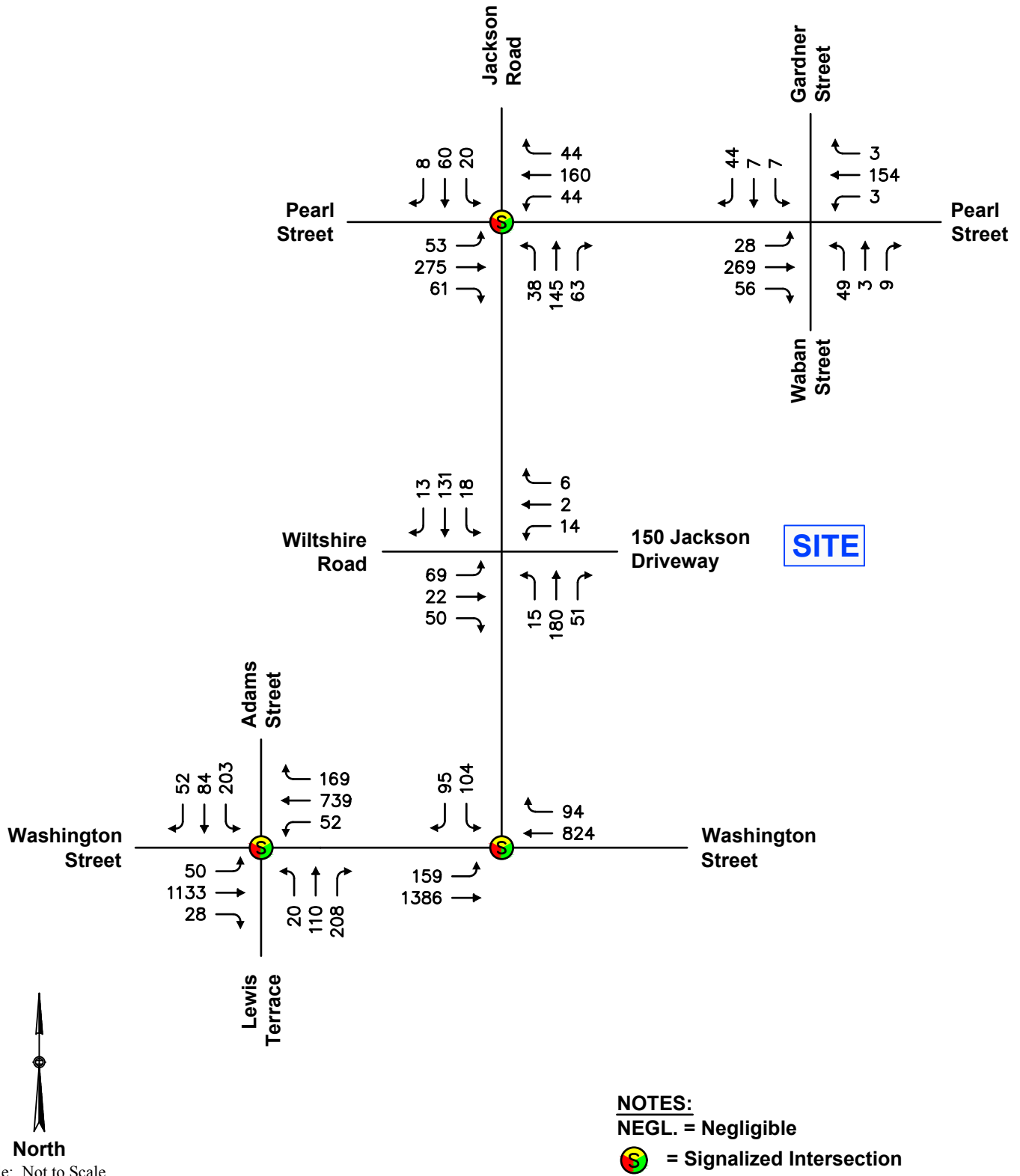
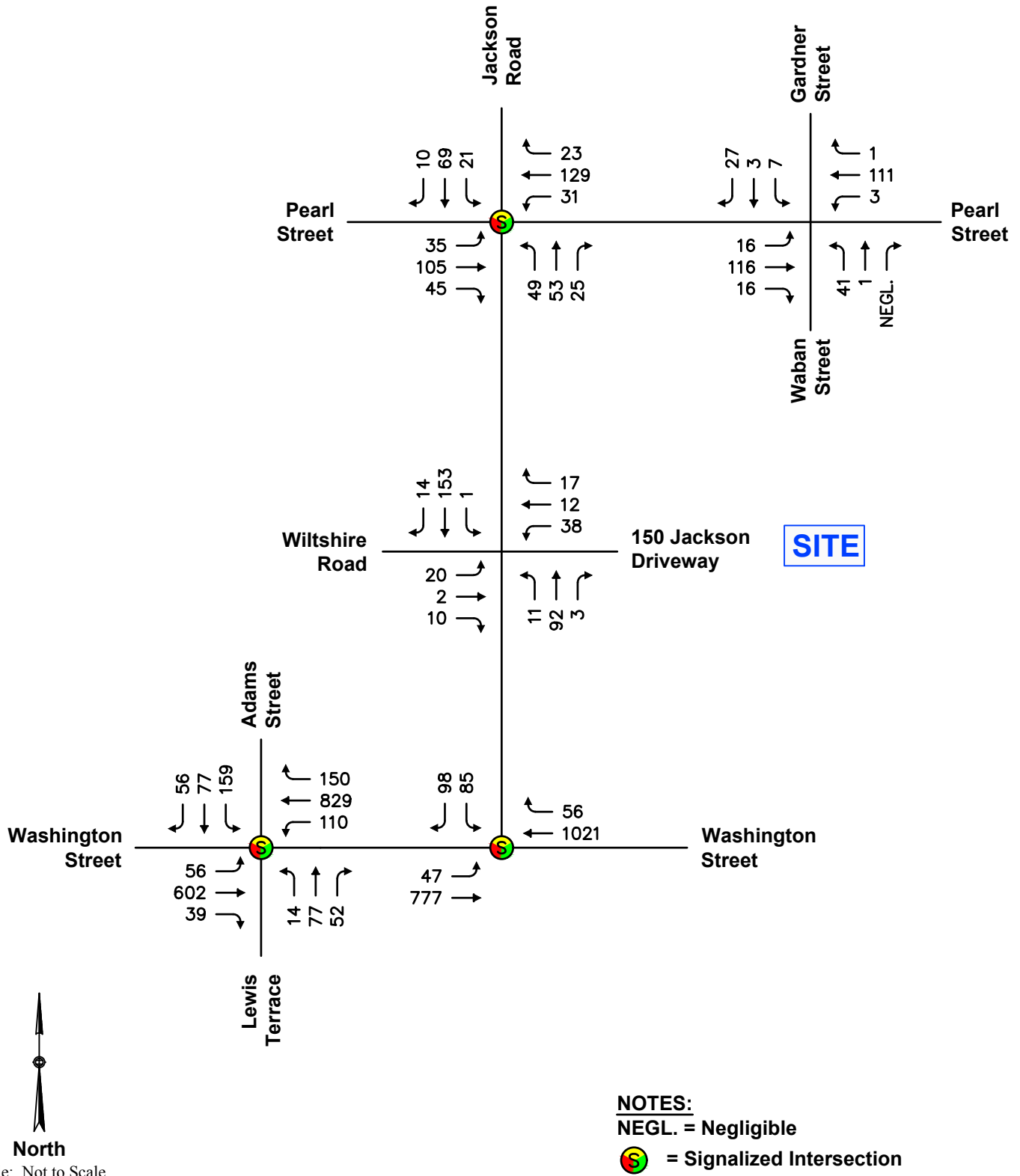


Figure 2



**Figure 3**

**2019 Baseline Conditions**

**Weekday Afternoon Peak Hour Volumes**

**150 Jackson Road**

**2:45 PM to 3:45 PM**

**TABLE 1**  
**OBSERVED L-E SCHOOL TRIP-GENERATION – (191 PEARL STREET)**

| <b>Period</b>                                           | <b>Staff<br/>Auto</b> | <b>Student<br/>Auto</b> | <b>Van</b> | <b>Total</b>      |
|---------------------------------------------------------|-----------------------|-------------------------|------------|-------------------|
| <i>Weekday Morning Drop-Off Period (7:45-8:45 AM):</i>  |                       |                         |            |                   |
| Enter                                                   | 15                    | 144                     | 5          | <b>164</b>        |
| <u>Exit</u>                                             | <u>--</u>             | <u>144</u>              | <u>5</u>   | <u><b>149</b></u> |
| Total                                                   | 15                    | 288                     | 10         | <b>313</b>        |
| <i>Weekday Afternoon Pick-Up Period (2:45-3:45 PM):</i> |                       |                         |            |                   |
| Enter                                                   | --                    | 76                      | 5          | <b>81</b>         |
| <u>Exit</u>                                             | <u>19</u>             | <u>76</u>               | <u>5</u>   | <u><b>100</b></u> |
| Total                                                   | 19                    | 152                     | 10         | <b>181</b>        |

<sup>1</sup>Peak hour trips based on empirical trip generation observed at L-E(191 Pearl Street) in January 31, 2019.

As presented in **Table 1**,

- *Weekday Morning Drop-Off Period.* Trip generation during the critical weekday morning drop-off peak hour was 313 vehicle-trips (164 entering and 149 exiting), including 144 parent/guardian drop-off vehicles, 5 school vans and 15 staff vehicles.
- *Weekday Afternoon Pick-up Period.* Trip generation during the weekday afternoon peak hour was 181 vehicle-trips (81 entering and 100 exiting), including 76 parent/guardian pick-up vehicles, 5 school vans and 19 staff vehicles.

Note that school staff also make trips to the site before, during and after the school day and therefore all staff do not necessarily arrive and depart during the peak traffic periods described above.

## DESIGN YEAR TRAFFIC VOLUMES

Design Year traffic conditions are developed by relocating the existing site trips generated by L-E at 191 Peak Street, including projected increase in staff and student enrollment, estimating likely travel patterns for these trips and adding them to the Baseline traffic networks. In addition, traffic volume for turning movements related to the existing Newton Early Childhood Program (NECP) school were reduced to account for that school's relocation to 687 Watertown Street. Given the future use of 191 Pearl Street as swing space for future school uses during renovations, no trip reduction was taken for the existing use of the 191 Pearl Street school property. Specific methodologies and assumptions used to estimate vehicle trip generation and trip distribution are discussed below.

## Projected Site Trip Generation – L-E SCHOOL

Trip generation (L-E) was projected for the critical school activity periods including the weekday morning drop-off period and weekday afternoon pick-up period. Based on L-E projections, student enrollment will increase to approximately 465 and staffing will increase to 80±. A detailed trip generation summary for the site, including a breakdown of vehicular trips by staff member, student pick-up/drop off and van service is presented in **Table 2** and is described below.

**TABLE 2**  
**PROJECTED L-E SCHOOL TRIP-GENERATION (150 JACKSON ROAD)**

| Period                                                  | Staff<br>Auto | Student<br>Auto | Van | Total |
|---------------------------------------------------------|---------------|-----------------|-----|-------|
| <i>Weekday Morning Drop-Off Period (7:45-8:45 AM):</i>  |               |                 |     |       |
| Enter                                                   | 34            | 179             | 5   | 218   |
| Exit                                                    | --            | 179             | 5   | 184   |
| Total                                                   | 34            | 358             | 10  | 402   |
| <i>Weekday Afternoon Pick-Up Period (2:45-3:45 PM):</i> |               |                 |     |       |
| Enter                                                   | --            | 94              | 5   | 99    |
| Exit                                                    | 43            | 94              | 5   | 142   |
| Total                                                   | 43            | 188             | 10  | 241   |

<sup>1</sup>Peak hour trips based on empirical trip generation observed at L-E school on January 31, 2019 with projected increases based on information provided by L-E staff.

As presented in **Table 2**,

- *Weekday Morning Drop-Off Period.* The relocated and expanded L-E school is estimated to generate 402 vehicle-trips (218 entering and 184 exiting) during the critical weekday morning drop-off peak hour.
- *Weekday Afternoon Pick-Up Period.* Trip generation during the weekday afternoon peak hour is estimated at 241 vehicle-trips (99 entering and 142 exiting).

## Trip Distribution

Trip distribution for the relocated and expanded L-E facility was derived by evaluating existing population data from the 2010 Census for the City of Newton which provides a breakdown of population centers by Census tract. The distribution also accounts for the existing roadway network and travel patterns within the area. Trip distribution for school staff are based on zip code information provided by L-E and likely travel routes. The estimated trip distribution pattern for the trips to/from the site are presented in **Figure 4**. Detailed calculations are provided in the **Attachments**.

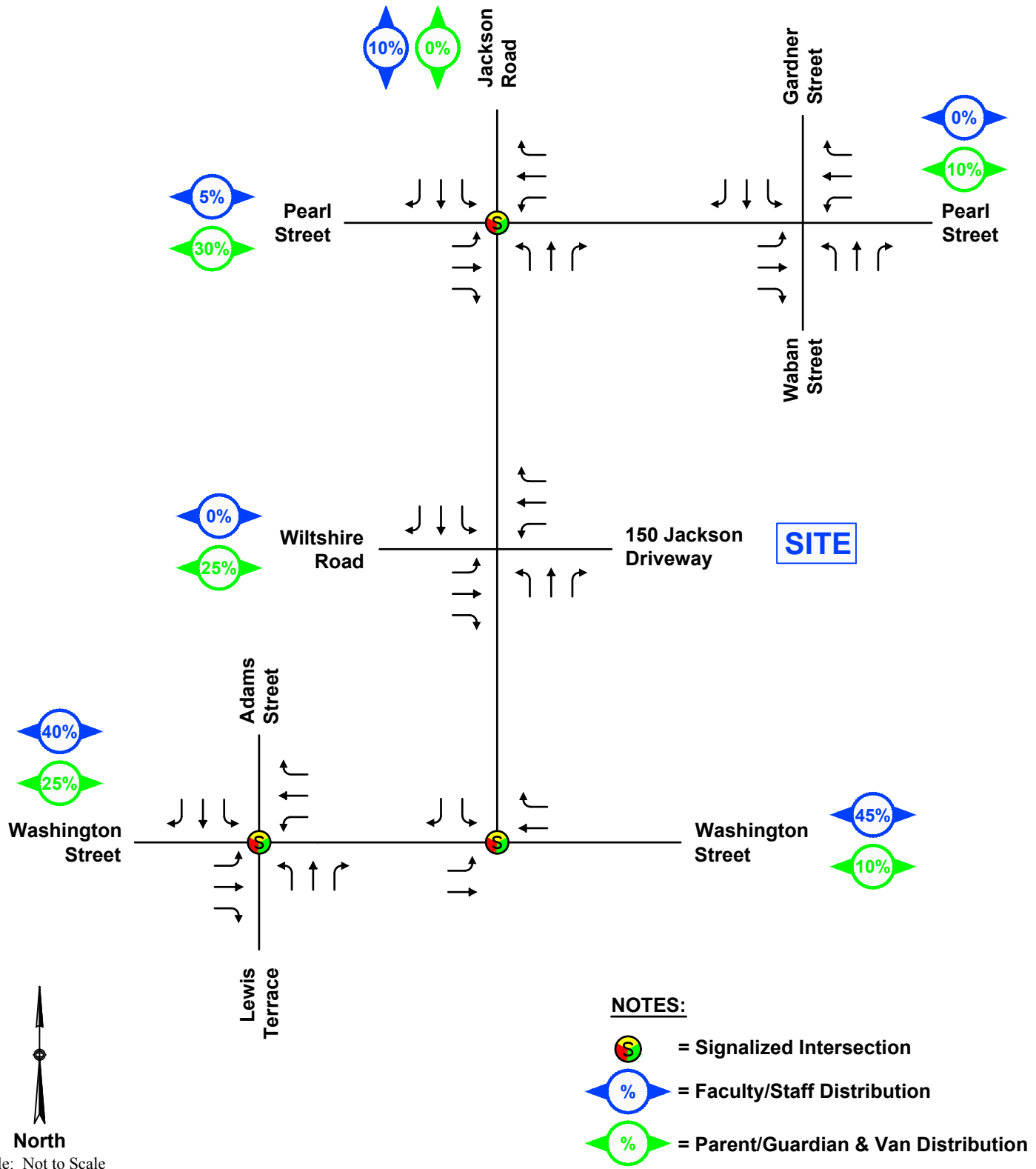


Figure 4

## Design Year Traffic Volumes

Site-Generated trips for the development were assigned to the roadway network using the trip-generation estimates shown in **Table 2** and the distribution patterns described above. The resulting site-generated traffic generation on area roadways for the weekday morning (drop-off period) and weekday afternoon (pick-up period) peak hours are presented in **Figure 5** and **Figure 6**.

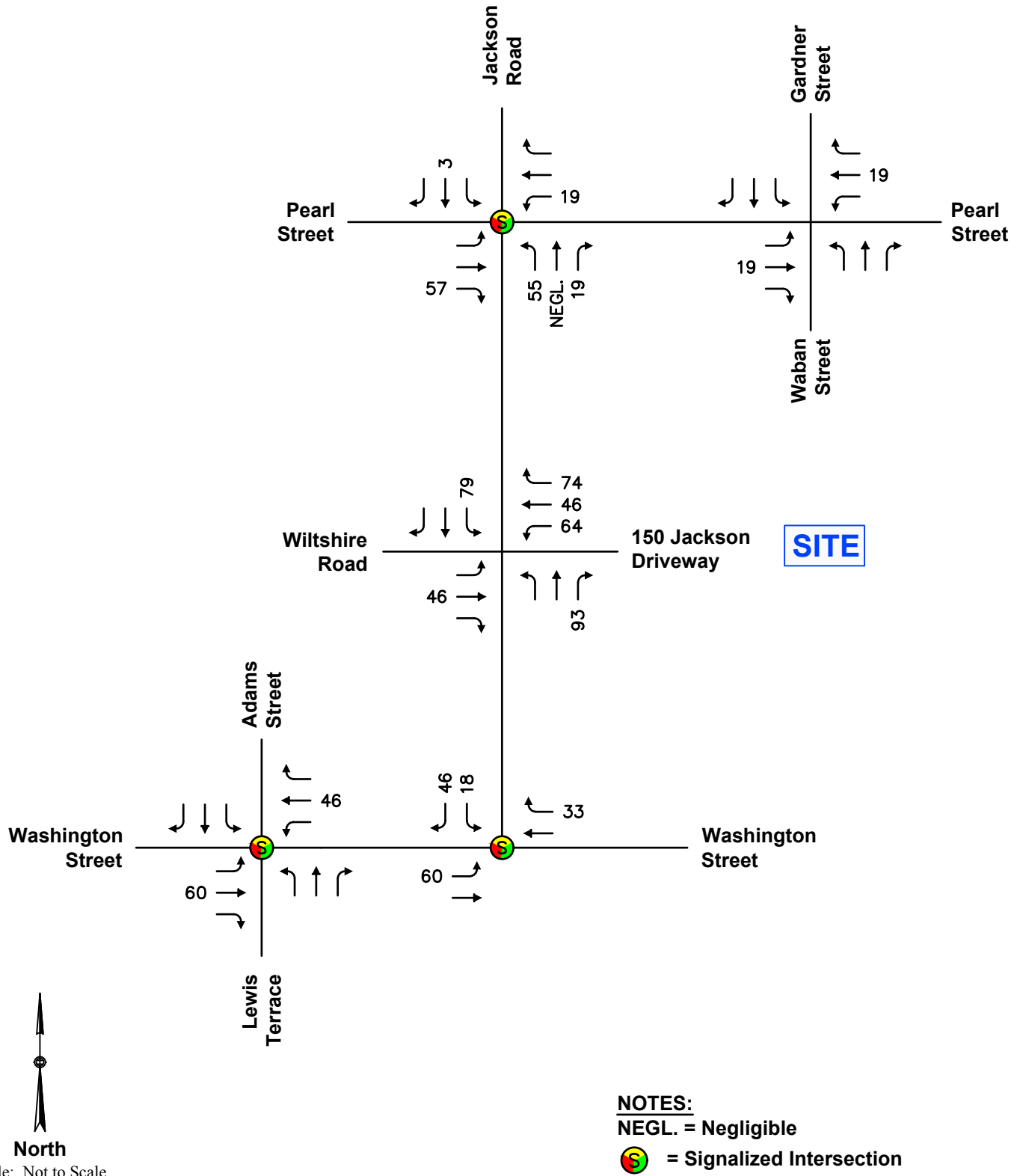
The 2019 Design Year traffic volume networks were developed by reducing traffic volume for turning movements related to the existing NECP school (see **Attachments**) and adding the LE school projected site trips to the Baseline traffic volume networks. The resulting 2019 Design Year traffic volume networks are presented in **Figure 7** and **Figure 8**. Expected increase/decrease in traffic volumes between the propose L-E use and current NECP use are also represented on **Figure 7** and **Figure 8**.

## **PARKING EVALUATION**

The following parking evaluation includes a survey of existing L-E school parking activity during the weekday (7:00 – 9:00 AM and 2:00 – 4:00 PM) and quantifies the adequacy of the parking supply to meet the projected peak parking demands of L-E school at 150 Jackson Road. L-E currently enrolls approximately 374 students with approximately 35 staff. Based on L-E projections, school will increase to approximately 465 students and 80 staff. Based on the existing site conditions, 150 Jackson Road provides 160± space on-site lot not including the 46± space Newtonville Satellite Parking Lot or parking available in the rear of the school via Walnut Park.

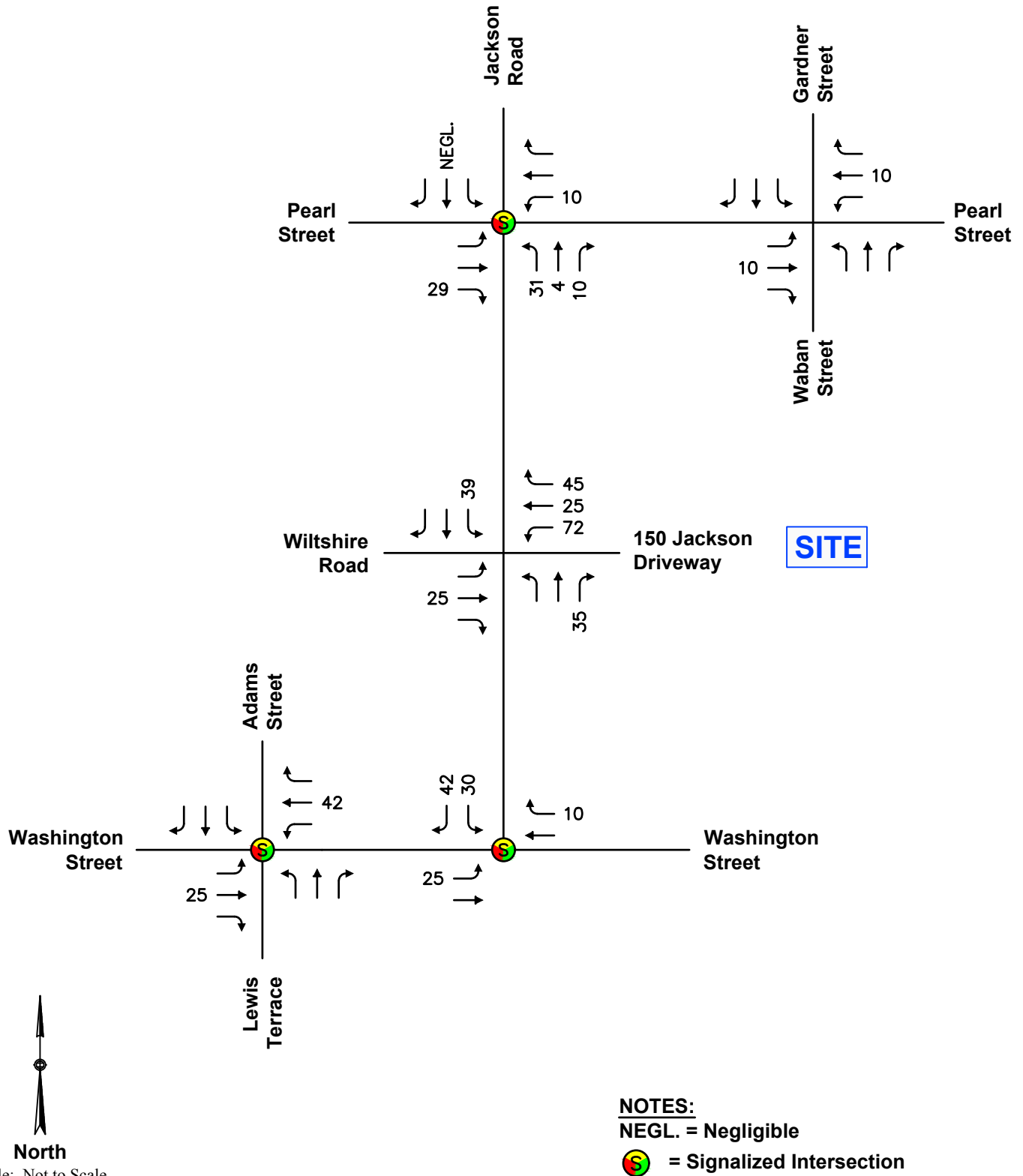
### Existing (Baseline) Parking Observations – Lincoln-Eliot School

In order to quantify current staff, parent and van parking demands for L-E, a parking accumulation survey was conducted at the existing L-E location (191 Pearl Street) on Thursday, January 31, 2019 (7:00 – 9:00 AM and 2:00 – 4:00 PM) to identify parking trends. The results of the survey are presented in **Table 3**. Detailed parking calculations are provided in the **Attachments**.



**Figure 5**

**Trip Generation**  
**Weekday Morning Peak Hour Volumes**  
**150 Jackson Road**  
**7:45 AM to 8:45 AM**



**Figure 6**

**Trip Generation**  
**Weekday Afternoon Peak Hour Volumes**  
**150 Jackson Road**  
**2:45 PM to 3:45 PM**

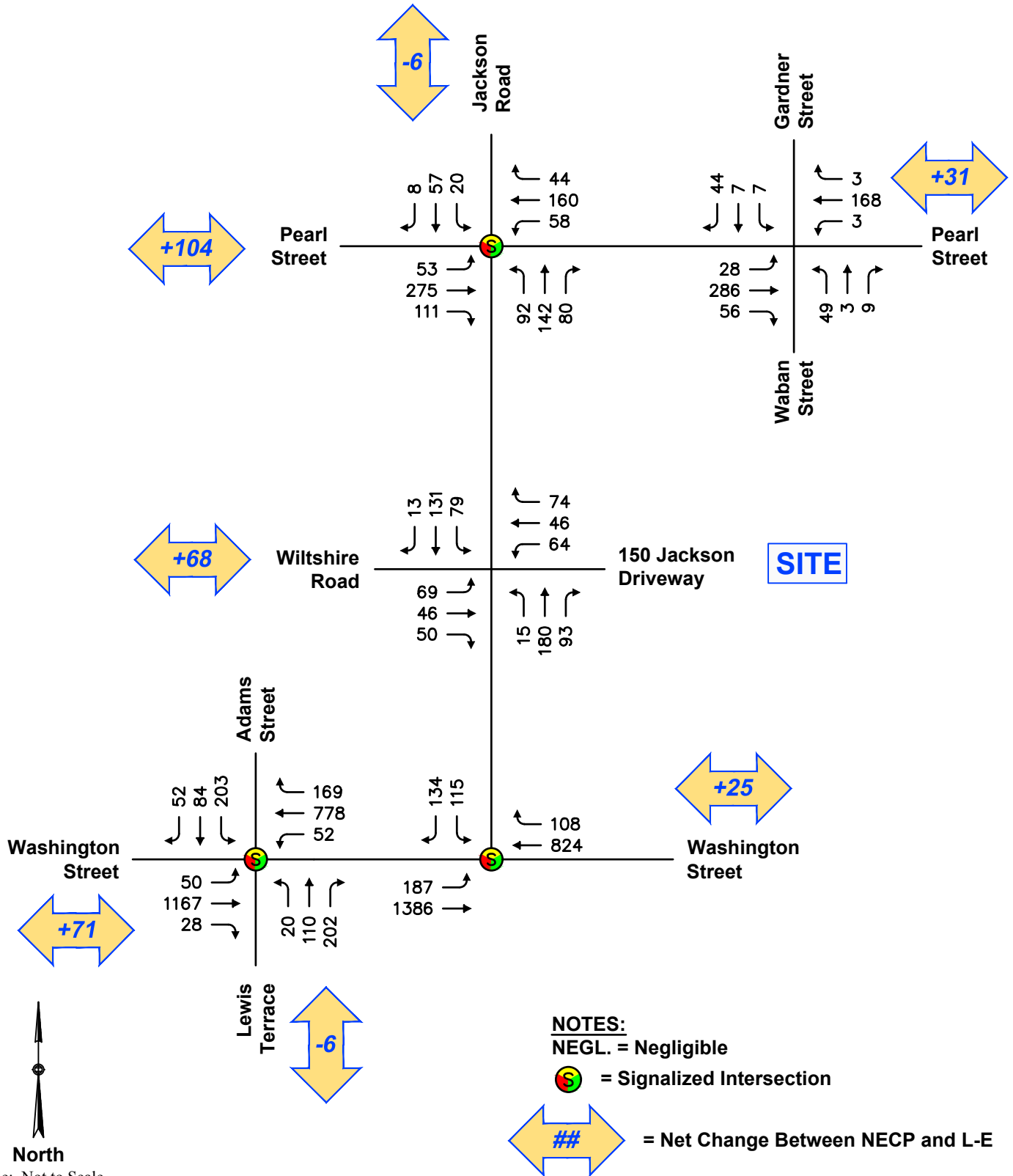


Figure 7

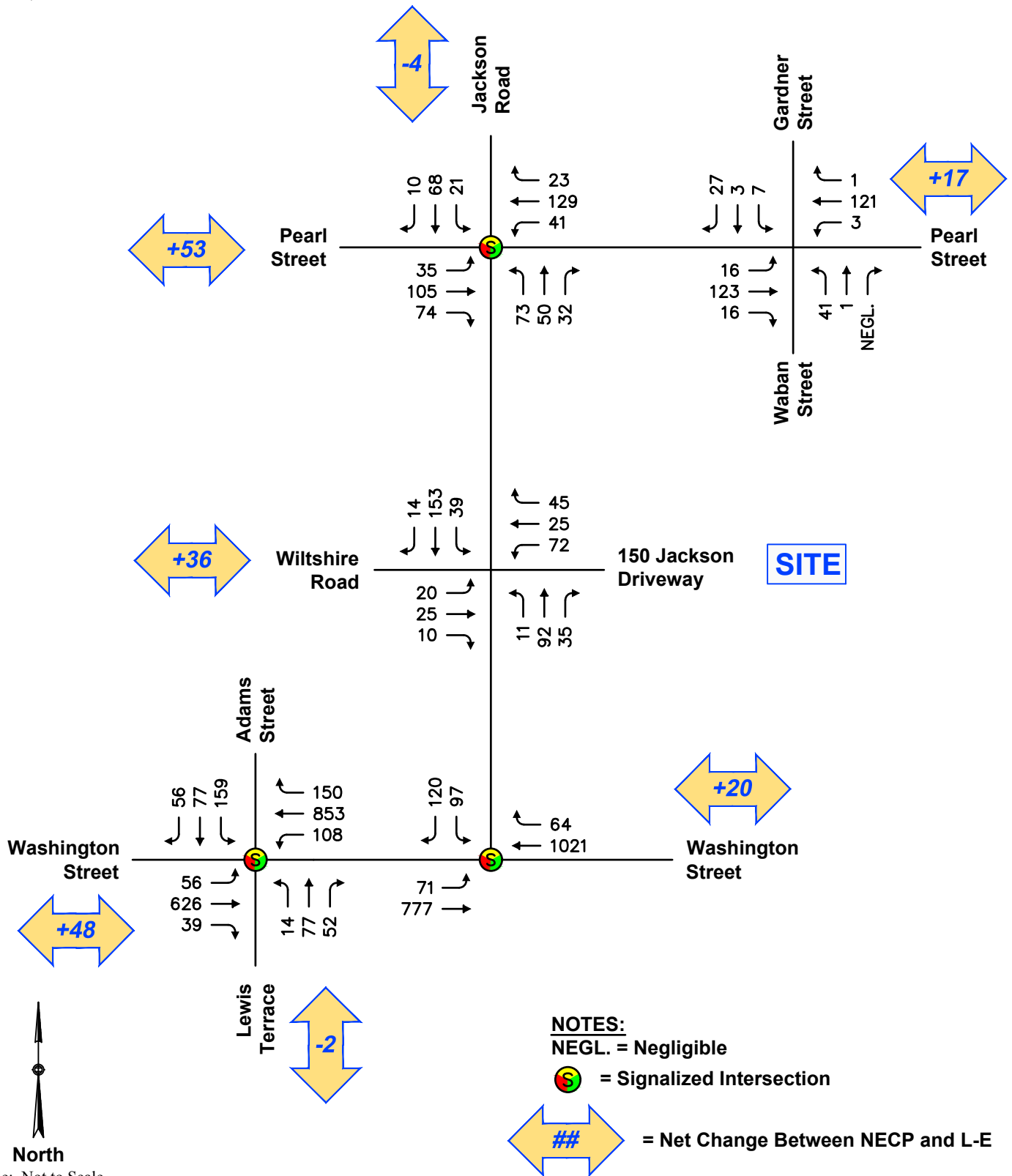


Figure 8

**TABLE 3**  
**EXISTING PEAK PARKING DEMAND SUMMARY<sup>1</sup>**

| <b>Period</b>                                                   | <b>Staff<br/>Auto</b> | <b>Student<br/>Auto</b> | <b>Van<sup>2</sup></b> | <b>Total</b> |
|-----------------------------------------------------------------|-----------------------|-------------------------|------------------------|--------------|
| <i>Weekday Morning Drop-Off Period<br/>(7:45 AM – 8:45 AM)</i>  | 35                    | 16                      | 5                      | 56           |
| <i>Weekday Afternoon Pick-Up Period<br/>(2:45 PM – 3:45 PM)</i> | 35                    | 49                      | 5                      | 89           |

<sup>1</sup>Based on field observations of the existing Newton Early Childhood Program on Thursday, January 31, 2019

<sup>2</sup>Vans are estimated based on L-E data.

As summarized in **Table 3**:

- *Critical Parking Periods.* The critical parking period occurs during the afternoon pick-up period (2:45 PM – 3:45 PM) with 89 parked vehicles (35 staff vehicles and 49 parent/guardian vehicles).
- *Morning Drop-Off Period.* During the morning drop-off period the peak parking demand is 56 parked vehicles (35 staff vehicles, 16 parent/guardian vehicles).
- *Off-Peak Parking.* The L-E school generates a parking demand of approximately 35 staff vehicles outside the critical pick-up and drop-off periods.

### **Projected Peak Parking Demand – Lincoln-Eliot School**

Projected peak parking demands for L-E school at 150 Jackson Road 687 Watertown Street was estimated based on observed L-E parking demands at 191 Pearl Street and projected parking demands associated with increased student enrollment and staffing levels. The L-E projected parking demand is presented in **Table 4**.

**TABLE 4**  
**PROJECTED PEAK PARKING DEMAND**

| <b>Period</b>                                                   | <b>Staff<br/>Auto</b> | <b>Student<br/>Auto</b> | <b>Van<sup>2</sup></b> | <b>Total</b> |
|-----------------------------------------------------------------|-----------------------|-------------------------|------------------------|--------------|
| <i>Weekday Morning Drop-Off Period<br/>(7:45 AM – 8:45 AM)</i>  | 80                    | 20                      | 5                      | 105          |
| <i>Weekday Afternoon Pick-Up Period<br/>(2:45 PM – 3:45 PM)</i> | 80                    | 62                      | 5                      | 147          |

<sup>1</sup>Based on existing L-E peak parking demand (Table 3) with projected increases provided by LE staff.

<sup>2</sup>Vans are estimated based on L-E data.

As summarized in **Table 4**:

- *Critical Parking Periods.* The critical parking period will continue to occur during the afternoon pick-up period (2:45 PM – 3:45 PM) with 142 parked vehicles (80 staff vehicles and 62 parent/guardian vehicles).
- *Morning Drop-Off Period.* Estimated peak parking demand for the morning drop-off period is 100 parked vehicles (80 staff vehicles, 20 parent/guardian vehicles).
- *School Vans.* Note that school vans are expected to queue in a designated aisle on-site and therefore do not necessarily require a marked parking space.
- *Off-Peak Parking.* The L-E school will generate a parking demand of approximately 80 staff vehicles outside the critical pick-up and drop-off periods.

### **Projected Parking Supply (150 Jackson Road)**

L-E school parking demand is expected to be accommodated within the 160± space on-site lot not including the 46± space Newtonville Satellite Parking Lot or parking available in the rear of the school via Walnut Park as described below:

- *Faculty and Staff Parking.*
  - 80± on-site parking spaces.
- *Parent/Guardian Pick-Up/Drop-Off.*
  - Morning drop-off period: 20± on-site parking spaces.
  - Afternoon pick-up period: 62± on-site parking spaces.
- *Van Loading and Unloading.*
  - Van loading/unloading will occur on-site within a designated aisle and should provide queue storage for a minimum of 5 vans.

In summary, the critical weekday afternoon pick-up period results in a total on-site parking demand of 142± parking spaces (staff and parent) which can be accommodated within the on-site 160 space main parking field.

## SITE ACCESS AND CIRCULATION

Site access and circulation recommendations should be incorporated into the preliminary site plan to facilitate safe and efficient pedestrian and vehicle operations at the site. MDM recommends that the L-E school develop a traffic management plan (TMP) aimed at enhancing school pick-up/drop off operations, parking activity and site circulation including elements noted in this evaluation. Key aspects of the Site Access and Circulation Plan and TMP should include the following:

- *Parking and Pick-Up/Drop-Off Operations*
  - The parent pick-up/drop-off area should be actively monitored by staff to direct parents to open spaces along within the designated on-site parking area and to discourage vehicles from stopping in undesignated areas on-site and along Jackson Road. It is recommended that the short term parent parking be located as close to the school as possible with the staff parking provided in the more remote parking areas.
  - Staff members should be available to direct students/parents to/from the school building entrances and the drop-off/pick-up areas as required.
  - Van pick-up/drop-off should take place within a dedicated van loading and unloading area.
  - Pedestrians crossing the Site Driveway and Jackson Street should be monitored by a crossing guard or staff during student arrival and dismissal periods. Pedestrian connections between the parking area and main entranceways should be provided. Likewise, a pedestrian connection from the main entranceway to the existing sidewalk system along Jackson Road, Waban Street, and Walnut Park should be provided.
  - Deliveries and trash removal should take place outside of school arrival and dismissal periods.
- *Designated Parking Areas*
  - Designate short-term/visitor parking spaces closest to the school within the on-site parking lot as required.

- o 80 staff parking spaces are available on-site. It is recommended that the staff parking in the on-site parking lot arrive and depart outside of the peak periods in order to minimize conflicts during the peak drop-off/pick-up periods.
- o All parking spaces should be actively managed to avoid conflicts during peak drop-off/pick-up periods.
- *Transportation Demand Management Measures*
  - o Designate a Transportation Coordinator to oversee transportation issues, to provide up-to-date transit information to faculty (if applicable), to direct staff responsible for managing student drop-off/pick-up operations and, if necessary, to adjust the school's transportation policies and procedures.
  - o Provide on-site accommodations for bicyclists (e.g., storage racks, etc.) to encourage bicycle use by staff and/or student.

## CONCLUSIONS AND RECOMMENDATIONS

MDM finds that the following access and on-site circulation related improvements will enhance traffic operations and/or travel safety for the L-E school:

### Site Access/Pedestrian Accommodations

- *Jackson Road at Site Driveways.* MUTCD compliant signs and pavement markings are recommended at the driveway approach to Jackson Road. Signs and pavement markings should including a "STOP" sign (R1-1) and STOP line pavement markings. The driveway corner radii should be designed to accommodate the largest anticipated delivery vehicle, and emergency apparatus (i.e. fire trucks).
- *Driveway Sight Lines.* Clear sight lines to/from driveways serving the site should be provided at all times. MDM recommends that any new plantings (shrubs, bushes) or physical landscape features (rock wall, etc.) to be located within the driveway sight lines, should also be maintained at a height of 2 feet or less above the adjacent existing roadway grade to ensure unobstructed lines of sight.
- *Sidewalk Connections.* Pedestrian connections between the parking area and main entranceways should be provided. Likewise, a pedestrian connection from the main entranceway to the existing sidewalk system along Jackson Road, Waban Street, and Walnut Park should be provided.

- *Sign and Pavement Markings.* Review applicability and maintenance of sign and pavement markings, including School Zones, parking restrictions, student drop-off/pick-up designations along Jackson Road, Waban Street, and Walnut Park.

## **Parking and Pick-Up/Drop-Off**

- *On-Site Parking.* Staff parking within the on-site parking lot should arrive and depart outside of the peak periods in order to minimize conflict during the peak drop-off/pick-up periods.
- *Van Loading/Unloading.* The van loading area should allow vans to be stacked on-site without on-site circulation or blockage of any pedestrian ways.

In summary, the replacement of the existing Newton Early Childhood Program (NECP) use with the Lincoln-Eliot school (L-E) use results in a moderate change in intersection volumes within the study area during the 7:45 to 8:45 am drop-off period and 2:45 to 3:45 pick-up period. The project will result in a reduction of vehicles in the area during current the NECP drop-off/pick-up periods. Peak parking demand for NECP are estimated to be 142 spaces based on observations conducted at the existing L-E facility at 191 Pearl Street with adjustment for projected student and staff increases at the 150 Jackson Road location. The preliminary parking plan utilizing the proposed on-site parking spaces is expected to accommodate the peak parking demands for L-E under typical peak pick-up/drop-off operating conditions.