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## **APPENDIX E      Assembly Square Access Analysis**

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The following memorandum was completed at the request of the Office for Commonwealth Development. It investigated the interim year impacts of the proposed redevelopment plan at that time.

**MEMORANDUM**

**TO: Anne Tate**  
**Office for Commonwealth Development**

**May 19, 2004**

**FROM: Mark S. Abbott, P.E.**

**RE: Interim-Year Analysis for Assembly Square Development**

At your request, we have reviewed the Assembly Square Transportation Plan<sup>1</sup> in order to analyze interim-year and 2025 traffic conditions without transportation improvements (that is, no new interchange or intersection improvements). The Assembly Square Transportation Plan does not provide interim-year analyses or no-build (no-roadway-improvements) analyses. The interim-year and 2025 no-build traffic conditions estimated as part of the present short study were meant to provide a preliminary understanding of the effects of incremental development in Assembly Square. The analyses in this memorandum were based solely on the above-mentioned report.

**Background**

The Assembly Square Transportation Plan was prepared by Rizzo Associates for the City of Somerville's Office of Housing and Community Development. It proposes an improvement program to enhance connectivity between all transportation modes and creates a transportation network that will support the future land use vision and serve the needs of the district's employers, employees, and visitors. The report

- identifies the transportation challenges facing Assembly Square;
- evaluates potential improvements in public transportation, pedestrian and bicycle access, and motor vehicle access; and
- recommends a multimodal transportation improvement plan that is designed to help Assembly Square achieve the vision of a vibrant urban village.

The development build out and trip generation outlined in the report are shown in Table 1. The build out information includes the development's proposed land uses and square footage. Trip generation is provided by mode in person trips and vehicle trips.

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<sup>1</sup> Rizzo Associates, for the City of Somerville Office of Housing and Community Development, *Assembly Square Transportation Plan: Final Report*, May 13, 2003.

**Table 1 Development Phases and Trip Generation**

|                                         | <b>EXISTING<br/>(2002)</b> | <b>PHASE I<br/>(2007)</b> | <b>PHASE II:<br/>Full Development<br/>(2025)</b> |
|-----------------------------------------|----------------------------|---------------------------|--------------------------------------------------|
| <b><u>Development Build Out</u></b>     |                            |                           |                                                  |
| <b>Land Use</b>                         | <b>Square Feet</b>         | <b>Square Feet</b>        | <b>Square Feet</b>                               |
| Residential                             | -                          | 1,604,300                 | 1,774,800                                        |
| Office/R&D                              | 240,000                    | 1,803,800                 | 4,468,000                                        |
| Retail                                  | 668,284                    | 1,077,616                 | 1,142,616                                        |
| Hotel                                   | 86,000                     | 86,000                    | 180,000                                          |
| Industrial                              | 80,000                     | 42,000                    | 12,000                                           |
| Institutional                           | 32,000                     | 32,000                    | 32,000                                           |
| <b>Total</b>                            | <b>1,106,284</b>           | <b>4,645,716</b>          | <b>7,609,416</b>                                 |
| <b><u>Trip Generation</u></b>           |                            |                           |                                                  |
| <b>Daily Trip<br/>Generation</b>        | <b>Person (Vehicle)</b>    | <b>Person (Vehicle)</b>   | <b>Person (Vehicle)</b>                          |
| Transit                                 | 650 (n/a)                  | 1,700 (n/a)               | 34,900 (n/a)                                     |
| Auto                                    | 32,650 (20,950)            | 87,250 (56,700)           | 93,550 (61,450)                                  |
| Walk/Bike/Other                         | 1,200 (n/a)                | 1,650 (n/a)               | 3,500 (n/a)                                      |
| <b>Total</b>                            | <b>34,500 (20,950)</b>     | <b>90,600 (56,700)</b>    | <b>132,600 (61,450)</b>                          |
| <b>AM Peak Hour<br/>Trip Generation</b> | <b>Person (Vehicle)</b>    | <b>Person (Vehicle)</b>   | <b>Person (Vehicle)</b>                          |
| Transit                                 | 20 (n/a)                   | 65 (n/a)                  | 1,875 (n/a)                                      |
| Auto                                    | 1,875 (1,205)              | 5,360 (3,480)             | 7,760 (5,095)                                    |
| Walk/Bike/Other                         | 40 (n/a)                   | 75 (n/a)                  | 165 (n/a)                                        |
| <b>Total</b>                            | <b>1,935 (1,205)</b>       | <b>5,500 (3,480)</b>      | <b>9,800 (5,095)</b>                             |
| <b>PM Peak Hour<br/>Trip Generation</b> | <b>Person (Vehicle)</b>    | <b>Person (Vehicle)</b>   | <b>Person (Vehicle)</b>                          |
| Transit                                 | 70 (n/a)                   | 150 (n/a)                 | 3,630 (n/a)                                      |
| Auto                                    | 3,030 (1,950)              | 8,065 (5,240)             | 11,430 (7,475)                                   |
| Walk/Bike/Other                         | 100 (n/a)                  | 135 (n/a)                 | 325 (n/a)                                        |
| <b>Total</b>                            | <b>3,200 (1,950)</b>       | <b>8,350 (5,240)</b>      | <b>16,100 (7,475)</b>                            |

Source: Rizzo Associates, for the City of Somerville Office of Housing and Community Development, *Assembly Square Transportation Plan: Final Report*, May 13, 2003.

Table 2 presents level-of-service data from the Transportation Plan report for four key intersections. These four locations were chosen for evaluation in this memorandum because they process the highest amount of traffic entering/exiting Assembly Square. The table shows the existing operations and the future operations under the proposed full development preferred

alternative. As shown in the table, the only intersection which is failing during both future peak hours with full development is the Route 28/Middlesex Avenue intersection.

**Table 2 Level of Service for 2002 and 2025 at Selected Intersections**

Source: Rizzo Associates, *Assembly Square Transportation Plan: Final Report*, May 13, 2003.

| Intersection                    | Condition                              | LOS | AM Peak Hour |       | LOS | PM Peak Hour |       |
|---------------------------------|----------------------------------------|-----|--------------|-------|-----|--------------|-------|
|                                 |                                        |     | V/C          | Delay |     | V/C          | Delay |
| Route 28 at<br>Assembly Sq Dr   | 2002 Existing                          | A   | 0.72         | 3.4   | A   | 0.74         | 4.7   |
|                                 | 2025 Full Development<br>Preferred Alt | A   | 0.84         | 3.9   | C   | 1.09         | 31.3  |
| Route 28 at<br>Middlesex Ave    | 2002 Existing                          | D   | 0.80         | 40.1  | B   | 0.49         | 12.2  |
|                                 | 2025 Full Development<br>Preferred Alt | F   | 1.26         | 107.0 | F   | 1.23         | 96.3  |
| Route 28 SB at<br>Mystic Ave NB | 2002 Existing                          | D   | 0.58         | 35.2  | B   | 0.34         | 17.7  |
|                                 | 2025 Full Development<br>Preferred Alt | D   | 0.87         | 49.8  | C   | 0.66         | 20.7  |
| Route 28 at<br>Mystic Ave SB    | 2002 Existing                          | D   | 1.01         | 38.0  | B   | 0.63         | 10.1  |
|                                 | 2025 Full Development<br>Preferred Alt | E   | 1.04         | 71.4  | B   | 0.66         | 18.0  |

## Analysis

The analysis performed for this memorandum was based upon traffic volumes and signal-operations data provided in the Transportation Plan report.

For the purposes of this analysis, interim-year PM peak hour traffic volumes were developed for 2010, 2015, and 2020. These are shown in Table 3, in addition to traffic volumes for 2002 and 2025 from the Transportation Plan report. The PM peak hour was chosen because the vehicle trips associated with Assembly Square are higher in the afternoon than in the AM peak hour. For each of the interim years it was assumed that 25% of the total proposed development would occur. So, in 2010, 25% of the development would occur; in year 2015 there would be 50% of the development; and so on until full build is achieved in 2025. Also, for intersection traffic volumes a background growth rate was applied based on the growth that was assumed in the Transportation Plan report.

In general, the traffic volumes that were developed show growth from 2002 to 2025, although at the Route 28/Mystic Avenue southbound intersection there is a decrease. This decrease is most likely due to the Central Artery project improvements but cannot be exactly determined without access to the planning model that was used for the Transportation Plan report, developed by Rizzo Associates.

The intersection analysis was performed using Synchro, which was also used for the Transportation Plan report. Analysis conditions and settings for 2002 (existing conditions) from the report were used for the interim-year no-build analyses. No-build refers here to the absence

of roadway improvements; that is, future no-build geometric and signal conditions are the same as exist today.

As Table 4 shows, the level of service (LOS) at the two key Route 28 intersections which are used for direct access to Assembly Square, Assembly Square Drive and Middlesex Avenue, begins to deteriorate to failure in 2010, with only 25% of the development occurring. The LOS at Middlesex Avenue is already F in 2010, and both intersections are well above capacity by 2025, when full development occurs.

**Table 3 PM Peak Hour Intersection Volumes**

| Intersection                            | Approach       | Movement     | 2002*<br>(Existing) | 2010<br>(25%) | 2015<br>(50%) | 2020<br>(75%) | 2025*<br>(Full Development) |
|-----------------------------------------|----------------|--------------|---------------------|---------------|---------------|---------------|-----------------------------|
| Route 28 at<br>Assembly<br>Square<br>Dr | Route 28 SB    | Left         | 130                 | 223           | 315           | 408           | 500                         |
|                                         |                | Through      | 1,690               | 1,781         | 1,850         | 1,919         | 1,990                       |
|                                         | Route 28 NB    | Through      | 1,910               | 2,430         | 2,845         | 3,329         | 3,895                       |
|                                         |                | Right        | 15                  | 74            | 133           | 191           | 250                         |
|                                         | Assembly Sq Dr | Right        | 195                 | 318           | 440           | 563           | 685                         |
| Route 28 at<br>Middlesex Ave            | Route 28 SB    | Through      | 150                 | 178           | 205           | 233           | 260                         |
|                                         |                | Right        | 1,555               | 1,614         | 1,652         | 1,690         | 1,730                       |
|                                         | Route 28 NB    | Left         | 1,525               | 2,060         | 2,490         | 2,989         | 3,570                       |
|                                         |                | Through      | 180                 | 628           | 1,075         | 1,523         | 1,970                       |
|                                         | Middlesex Ave  | Left         | 85                  | 518           | 950           | 1,383         | 1,815                       |
|                                         |                | Right        | 400                 | 444           | 488           | 531           | 575                         |
| Route 28 SB at<br>Mystic Ave NB         | Route 28 SB    | Left         | 555                 | 759           | 957           | 1,155         | 1,354                       |
|                                         |                | Through      | 845                 | 1,158         | 1,462         | 1,766         | 2,071                       |
|                                         |                | Right        | 240                 | 175           | 150           | 132           | 120                         |
|                                         | Mystic Ave NB  | Through/Left | 585                 | 761           | 945           | 1,130         | 1,320                       |
| Route 28 at<br>Mystic Ave SB            | Route 28 SB    | Left/Through | 895                 | 1,185         | 1,479         | 1,745         | 2,071                       |
|                                         | Mystic Ave SB  | Through      | 300                 | 382           | 444           | 516           | 600                         |
|                                         |                | Right        | 625                 | 596           | 578           | 561           | 545                         |
|                                         | Mystic Ave NB  | Through      | 1,000               | 982           | 971           | 961           | 950                         |

Source: Rizzo Associates, *Assembly Square Transportation Plan: Final Report*, May 13, 2003.

**Table 4 Level-of-Service Analysis for Interim Years at Selected Intersections: PM Peak Hour**

| Intersection                       | Movement       | <u>2002 (Existing)*</u> |             |             | <u>2010 (25%)</u> |             |             | <u>2015 (50%)</u> |             |              | <u>2020 (75%)</u> |             |              | <u>2025 (Full Development)*</u> |             |              |       |
|------------------------------------|----------------|-------------------------|-------------|-------------|-------------------|-------------|-------------|-------------------|-------------|--------------|-------------------|-------------|--------------|---------------------------------|-------------|--------------|-------|
|                                    |                | LOS                     | V/C         | Delay       | LOS               | V/C         | Delay       | LOS               | V/C         | Delay        | LOS               | V/C         | Delay        | LOS                             | V/C         | Delay        |       |
| Route 28 at<br>Assembly Sq<br>Dr   | Route 28 NB    | Through                 | A           | 0.69        | 6.0               | B           | 0.87        | 11.8              | C           | 1.02         | 33.7              | F           | 1.19         | 104.3                           | F           | 1.40         | 195.0 |
|                                    |                | Right                   | A           | 0.01        | 0.0               | A           | 0.05        | 0.1               | A           | 0.09         | 0.1               | A           | 0.12         | 0.2                             | A           | 0.16         | 0.2   |
|                                    | Route 28 SB    | Left                    | D           | 0.82        | 50.8              | F           | 1.38        | 232.3             | F           | 1.94         | 472.3             | F           | 2.51         | 722.8                           | F           | 3.06         | 969.9 |
|                                    |                | Through                 | A           | 0.34        | 0.0               | A           | 0.36        | 0.0               | A           | 0.38         | 0.0               | A           | 0.39         | 0.0                             | A           | 0.40         | 0.1   |
| Assembly Sq<br>Dr                  | Right          | A                       | 0.12        | 0.2         | A                 | 0.20        | 0.3         | A                 | 0.28        | 0.4          | A                 | 0.36        | 0.6          | A                               | 0.44        | 0.9          |       |
|                                    | <b>Overall</b> | <b>A</b>                | <b>0.74</b> | <b>4.7</b>  | <b>B</b>          | <b>1.06</b> | <b>16.9</b> | <b>D</b>          | <b>1.37</b> | <b>44.1</b>  | <b>F</b>          | <b>1.69</b> | <b>100.5</b> | <b>F</b>                        | <b>2.02</b> | <b>170.2</b> |       |
| Route 28 at<br>Middlesex<br>Ave    | Route 28 NB    | Through                 | B           | 0.58        | 12.9              | B           | 0.79        | 16.8              | C           | 0.95         | 26.3              | F           | 1.14         | 87.9                            | F           | 1.37         | 185.5 |
|                                    |                | Right                   | A           | 0.12        | 0.2               | A           | 0.41        | 0.8               | A           | 0.70         | 2.6               | C           | 0.99         | 20.8                            | F           | 1.28         | 174.8 |
|                                    | Route 28 SB    | Left                    | C           | 0.24        | 29.5              | C           | 0.28        | 29.8              | C           | 0.33         | 30.1              | C           | 0.37         | 30.5                            | C           | 0.41         | 30.8  |
|                                    |                | Through                 | B           | 0.59        | 12.9              | B           | 0.62        | 13.3              | B           | 0.63         | 13.6              | B           | 0.65         | 13.8                            | B           | 0.66         | 14.0  |
| Middlesex Ave                      | Left           | D                       | 0.47        | 37.6        | F                 | 2.86        | 887.6       | F                 | 5.24        | 1,955.0      | F                 | 7.63        | 3,030.3      | F                               | 10.00       | 4,101.0      |       |
|                                    | Right          | A                       | 0.26        | 0.4         | A                 | 0.29        | 0.5         | A                 | 0.32        | 0.5          | A                 | 0.35        | 0.6          | A                               | 0.37        | 0.7          |       |
|                                    | <b>Overall</b> | <b>B</b>                | <b>0.49</b> | <b>12.2</b> | <b>F</b>          | <b>0.93</b> | <b>92.5</b> | <b>F</b>          | <b>1.39</b> | <b>274.9</b> | <b>F</b>          | <b>1.86</b> | <b>523.9</b> | <b>F</b>                        | <b>2.25</b> | <b>830.4</b> |       |
| Route 28 SB at<br>Mystic Ave<br>NB | Route 28 SB    | Left                    | B           | 0.39        | 18.2              | B           | 0.54        | 19.8              | C           | 0.68         | 22.4              | C           | 0.82         | 26.9                            | D           | 0.96         | 41.0  |
|                                    |                | Through                 | B           | 0.42        | 18.4              | C           | 0.57        | 20.2              | C           | 0.72         | 22.8              | C           | 0.88         | 28.0                            | D           | 1.03         | 52.1  |
|                                    | Mystic Ave NB  | Right                   | B           | 0.40        | 18.5              | B           | 0.29        | 17.4              | B           | 0.25         | 17.0              | B           | 0.22         | 16.7                            | B           | 0.20         | 16.5  |
|                                    |                | Through                 | B           | 0.26        | 15.2              | B           | 0.34        | 15.9              | B           | 0.43         | 16.7              | B           | 0.51         | 17.7                            | B           | 0.59         | 18.9  |
|                                    | <b>Overall</b> | <b>B</b>                | <b>0.34</b> | <b>17.5</b> | <b>B</b>          | <b>0.45</b> | <b>18.8</b> | <b>C</b>          | <b>0.57</b> | <b>20.8</b>  | <b>C</b>          | <b>0.68</b> | <b>24.5</b>  | <b>D</b>                        | <b>0.79</b> | <b>39.1</b>  |       |
| Route 28 at<br>Mystic Ave<br>SB    | Route 28 SB    | Left/Through            | A           | 0.42        | 6.0               | A           | 0.56        | 6.8               | A           | 0.70         | 7.6               | B           | 0.84         | 11.2                            | B           | 0.98         | 18.7  |
|                                    |                | Through                 | B           | 0.18        | 13.1              | B           | 0.22        | 13.5              | B           | 0.26         | 13.8              | B           | 0.30         | 14.2                            | B           | 0.35         | 14.7  |
|                                    | Mystic Ave SB  | Right                   | C           | 0.82        | 28.8              | C           | 0.78        | 26.5              | C           | 0.75         | 25.8              | C           | 0.73         | 24.4                            | C           | 0.71         | 23.5  |
|                                    |                | Through                 | A           | 0.58        | 1.2               | A           | 0.57        | 1.1               | A           | 0.70         | 7.6               | A           | 0.56         | 1.1                             | A           | 0.55         | 1.1   |
|                                    | <b>Overall</b> | <b>B</b>                | <b>0.63</b> | <b>10.1</b> | <b>A</b>          | <b>0.68</b> | <b>9.6</b>  | <b>A</b>          | <b>0.73</b> | <b>9.5</b>   | <b>B</b>          | <b>0.78</b> | <b>11.0</b>  | <b>B</b>                        | <b>0.83</b> | <b>14.7</b>  |       |

\*Source: Rizzo Associates, *Assembly Square Transportation Plan: Final Report*, May 13, 2003.

## Summary

The analysis conducted for this memorandum indicates that without major roadway improvements and alternative access points to Assembly Square, development of Assembly Square could possibly be constrained by the capacities of the existing roadway system. For development to occur as envisioned by the Assembly Square Planning Study<sup>1</sup> and the Assembly Square Transportation Plan, improvements to the I-93 interchange like ones described in the reports would be needed. It is likely that with minor geometric and signal-equipment improvements to the intersections, an increased amount of development can occur, but not the full build development that is proposed.

It should be noted that the CTPS analysis documented in this memorandum was based on work by others, and its results should only be used as an approximation of the traffic operations in the area under interim-year no-build conditions with the proposed development.

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<sup>1</sup> The Cecil Group, et al., for the City of Somerville Office of Housing and Community Development, *Assembly Square Planning Study: The Vision and Implementation Plan for the Future*, October 2000.

