

Elgin O'Hare – West Bypass: Travel Redistribution and Supporting Improvement Requirements

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Introduction

Whenever a new highway facility is added to an existing transportation system, changes occur with respect to the volume and distribution of vehicular travel. The purpose of this memorandum is to:

- Describe the effect of two new access-controlled facilities (Elgin O'Hare Extension and O'Hare West Bypass) on travel along existing major highways in the study area, including on the existing Elgin O'Hare Expressway west of I-290,
- Identify supporting improvements required to address Build Alternative traffic impacts along existing roadways.

In order to identify the effects of proposed transportation system improvements, it is important to first understand the performance of the transportation system both today and in the future. Travel performance was evaluated for the existing transportation system with current travel demand, and for the 2030 No-Action (baseline) Alternative with projected design year (2030) travel demand. The baseline system represents the expected future configuration of the transportation system without the Elgin O'Hare Extension and West Bypass facilities. The baseline system consists of major projects included in the adopted 2030 Regional Transportation Plan (RTP) (excluding the extension of the Elgin O'Hare Expressway and West O'Hare Bypass), as well as other projects in the study area as identified in agency transportation improvement programs, including:

- Roadway improvements identified in the 2030 RTP, excluding the extension of the Elgin O'Hare Expressway and West O'Hare Bypass.
- Programmed roadway capacity improvements in the study area and included in published Transportation Improvement Programs, including capacity (add lane) improvements along Thorndale Avenue, I-90, I-294, IL 53 (Rohlfing Road), and Meacham Road.
- Roadway capacity or access improvements within the study area expected to be built and funded beyond the end date of current Transportation Improvement Programs through 2030.

Programmed and anticipated roadway projects within the 2030 baseline roadway network are listed separately in the *Transportation System Performance Report – Elgin O'Hare –West Bypass Project, July 2009*. Year 2030 travel forecasts for the baseline system were developed using a travel demand model derived from the standard travel forecasting process used by the Chicago

Metropolitan Agency for Planning (CMAP). Further detail on these processes can be found in the *Travel Demand Modeling and Travel Forecasting Technical Report, Elgin O'Hare-West Bypass Project*.

New access-controlled facilities under consideration with the Elgin O'Hare – West Bypass (EOWB) study would result in changes in travel patterns on the existing highway network. An important consideration at this stage was how the proposed Build Alternatives would affect travel patterns on existing area roadways, and whether any supporting improvements may be required as a result of the travel redistribution.

Traffic impacts and required supporting improvements can be defined by comparing travel characteristics for the 2030 baseline condition with the 2030 Build Alternatives. One representative alternative (Alternative 203) was selected for this analysis. This alternative was used because it provides 12 miles of new freeways, and thus has a high potential for traffic redistribution. Where significant increases in traffic volumes were identified, screen-line comparisons were performed to define changes in travel pattern characteristics.

The remainder of this memorandum presents a summary of traffic impacts and supporting capacity improvements required to address travel redistribution associated with the Build Alternatives.

Build Alternative Traffic Impacts - Existing Expressways and Freeways

The existing freeway system in the study area includes the I-90 (Jane Addams Memorial Tollway), the I-294 (Tri-State) Tollway, I-290 (Eisenhower Expressway), the I-355 (North-South) Tollway, and the Elgin O'Hare Expressway. The existing Elgin O'Hare Expressway begins at IL 53 (Rohlwing Road) and extends to a westerly terminus near Gary Avenue and US 20 (Lake Street). The expressway cross section provides 4 basic traffic lanes (2-lanes in each direction). Interchanges are provided at Meacham Road, Roselle Road, Wright Blvd, Gary Avenue, Springinsguth Road/ IL 19 and US 20. There is also a partial cloverleaf interchange between I-290 and Thorndale Avenue. East of IL 53 and west of Gary Avenue, the existing Elgin O'Hare Expressway terminates and transitions into arterial facilities; Thorndale Avenue and Lake Street, respectively. Thorndale Avenue is a 4-lane divided (2-lanes in each direction) arterial highway extending from IL 53 (Rohlwing Road) to York Road. Lake Street is a 6-lane divided (3-lanes in each direction) arterial highway extending in a southwest/ northeast direction from the Elgin O'Hare terminus. Exhibit 1 compares existing bi-directional Average Daily Traffic (ADT) on the freeway system in the study area for existing (2007), 2030 No-Action, and 2030 Alternative 203 conditions. A comparison of existing and projected travel demand on the access controlled highway system reveals the following:

- Projected changes in ADT between the existing and 2030 No-Action conditions are derived from system-wide travel growth over the 23-year forecast period, and altered travel patterns resulting from programmed improvements to major highways such as I-90 and I-294. Travel growth on various segments of the existing freeway system ranges from approximately 13 to 81 percent. The greatest increase in projected demand occurs along the I-294 and I-90 corridors. It should be noted that widening improvements for the I-90 and I-294 corridors are included in the 2030 No-Action Alternative.
- Projected changes in ADT between the 2030 No-Action and 2030 Alternative 203 conditions are related to travel redistribution associated with implementation of the new Elgin O'Hare Extension and West Bypass corridors.

- A review of travel demand along the existing access controlled highway system in the study area, excluding the Elgin O'Hare Expressway west of Rohlwing Road, showed general consistency between the 2030 baseline condition and Alternative 203, with moderate reductions on parallel facilities and moderate increases near system connections. Therefore, required improvements to existing access-controlled highways should generally be limited to localized improvements in the vicinity of new system and service interchanges.
- Alternative 203 would result in an appreciable increase in travel demand along the Elgin O'Hare Expressway and Thorndale Avenue corridors as compared to the 2030 No-Action Alternative, resulting in the need for capacity improvements.

Whereas implementation of the Elgin O'Hare Extension and West Bypass would result in a measurable increase in travel demand along the existing Elgin O'Hare Expressway, several analytical tools were utilized to determine the basic reasons for the traffic increase.

Screen Line Comparison

Exhibit 2 shows the north-south screenline comparison of ADT along the existing Elgin O'Hare Expressway west of I-290 between Roselle Rd and Meacham Rd for existing (2007), 2030 No-Action (baseline) and Alternative 203 scenarios. Traffic volumes were developed along a north-south screen line located west of I-290. Comparison of traffic on the baseline network and Alternative 203 indicated that the bi-directional ADT traffic on the Elgin O'Hare Expressway would be 38,000 vehicles greater with Alternative 203 than with the baseline network.

Examination of traffic volumes at other crossings showed that 13,000 vehicles (or approximately 35% of the difference) would be diverted to the Elgin O'Hare Expressway from Irving Park Road, Lake Street, Wise Road and Schaumburg Road. The remainder of the diversion to the Elgin O'Hare Expressway was drawn in lesser amounts from other nearby roadways.

Exhibit 3 shows the traffic volumes along an east-west screen line located north of Nerge Road/ Elgin O'Hare Expressway for existing (2007), 2030 No-Action (baseline) and Alternative 203 scenarios. A comparison of traffic volumes for the baseline network and Alternative 203 indicates that the bidirectional ADT traffic on the O'Hare West Bypass would be 140,000 vehicles for Alternative 203. Examination of traffic volumes at other crossings showed that 73,300 vehicles (or approximately 52% of the projected demand) would be diverted to the O'Hare West Bypass from IL 83, York Road, I-90 and US 12/ US 45 (Manheim Road). The remainder of the diversion to the O'Hare West Bypass was drawn in lesser amounts from other nearby roadways.

Elgin O'Hare Expressway at IL 19 (Irving Park Road) Interchange Analysis

As illustrated in Exhibit 1, traffic projections for Alternative 203 show a sizable reduction in expressway traffic near Irving Park Road. In order to gain a better understanding of this phenomenon, a special analysis was performed of ramp volumes and turning movements in the vicinity of the Irving Park Road and Gary Avenue interchanges. Results of the analysis are shown in Table 1.

TABLE 1

Travel Forecast Comparison 2030 Baseline & Alternative 203

Elgin O'Hare Expressway @ Irving Park Rd/Gary Avenue Interchange	Average Daily Traffic		
	Baseline Network	Alternative 203	Percent Gain or (loss)
Westbound			
East of Wright Blvd	52,000	66,200	27.3%
Off to Wright Blvd and Rodenburg Road	13,800	18,700	35.5%
Off to IL 19 (Irving Park Road)	3,300	4,200	27.3%
Off to Springinsguth Road	1,600	1,200	(25.0%)
Off to Gary Avenue	13,800	15,300	10.9%
On from Springinsguth Road	4,600	3,000	(34.8%)
West of Springinsguth Road	24,100	29,800	23.7%
Eastbound			
West of Springinsguth Road	27,400	28,900	2.5%
Off to IL 19 (Irving Park Road)	5,300	5,000	(5.7%)
On from Gary Avenue	18,800	21,100	12.2%
On from IL 19 (Irving Park Road)	4,200	4,700	11.9%
On from Wright Blvd and Rodenburg Road	15,900	19,000	19.5%
East of Wright Blvd	61,000	68,700	12.6%

Analysis results indicate that the largest part of the traffic drop-off at Irving Park Road derives from traffic to/from Gary Avenue or Wright Boulevard/Rodenburg Road. For the baseline network, the ADT for these two movements accounts for 27,600 vehicles leaving the expressway westbound and 34,700 vehicles entering the expressway eastbound. With Alternative 203, the volume leaving the expressway westbound at these locations would increase by 6,400 vehicles. The ADT volume entering eastbound at these locations would only increase by 5,400 vehicles. These movements help explain both the drop-off in expressway traffic west of IL 19 (Irving Park Road), and the increase in expressway traffic that would occur as a result of implementing Alternative 203.

Build Alternative Traffic Impacts – Existing Arterial and Local Roadways

An evaluation of potential traffic impacts on the secondary (arterial and major local roadway) system was also performed at this time. The focus was to determine whether corridor-wide capacity improvements may be required along other roadways as a result of Build Alternative traffic impacts. This analysis was performed by comparing the 2030 No-Action Alternative and Alternative 203 travel forecasts on the secondary system on parallel routes such as Lake Street, Irving Park Road and Army Trail Road.

Traffic volume increases were primarily observed on the existing Elgin O'Hare Expressway (as discussed previously), with reductions in travel demand on most parallel arterial/local routes due to trip diversions onto the Elgin O'Hare corridor as shown in the screen line analysis.

Traffic analysis results generally indicated the following:

- Travel patterns and demand along existing major arterials are forecast to change within the influence area of the new access-controlled facilities, with a general trend of traffic diversions from arterials to the new expressway facilities.
- Alternative 203 appears to produce net traffic benefits (traffic reductions) along major arterial corridors parallel to new access controlled facilities. However, travel patterns will inherently change at various locations, particularly in the vicinity of new service interchanges. Localized traffic impacts and off-system improvements required to mitigate these impacts (e.g. intersection improvements) will be required at these locations to provide acceptable traffic operations.

Expanded Study Area and Supporting Improvement Requirements

As a result of the identified traffic impact along the Elgin O'Hare Expressway, the EOWB study area was expanded to include existing roadways where supporting capacity improvements will be required to address traffic impacts resulting from the Build Alternatives. The original and revised study area boundaries are shown in Exhibit 4.

A comprehensive analysis of required supporting roadway segment and intersection improvements was performed. Supporting improvements were considered justified in locations where the Build Alternative would result in corridor-wide or localized increases in traffic demand, and would result in traffic exceeding planning level threshold capacity for roadway segments. Preliminary analysis findings were presented at the April 2009 Stakeholder Workshop, at which time meeting participants were asked to comment on potential supporting improvement locations. Technical analysis findings coupled with stakeholder input were considered when determining proposed supporting improvement locations.

Planning level analyses were performed to identify roadway segments where supporting capacity improvements may be required with the Build Alternatives. For locations where a measurable traffic increase was identified (greater than 5 percent over 2030 No-Action Alternative condition), the need for capacity improvements was evaluated using general planning level minimum threshold capacity for various roadway types. A directional threshold of 18,900 daily vehicles was used for a 2-lane (each direction) arterial. A directional threshold of 28,500 daily vehicles was used for a 3-lane (each direction) arterial.

Roadway segments adjacent to the planned Elgin O'Hare Extension and the West Bypass were considered for improvements, including locations identified by project stakeholders. Roadway segments outside the EOWB study area were not considered for improvements, as they are not within the scope of this study.

Interchanges and proximate intersections were also reviewed to determine needed improvement locations. In general, intersections within the influence area of new or improved interchanges (ramp terminal intersections and adjacent signalized intersections) along the Elgin O'Hare and West Bypass corridors will be improved. For adjacent signalized intersections, a planning level threshold volume of 32,000 vehicles per day (combined ADT for both approaches

with 2 lanes in each direction) was used in this analysis. However, intersections that were recently improved were not proposed for improvements due to the minor nature of traffic impacts associated with Build Alternatives.

Roadway segments and intersections considered for supporting improvements based on technical analyses and stakeholder input are shown in Table 2 (attached) and Exhibit 5. Recommended supporting improvements needed to address traffic impacts associated with the Build Alternatives are illustrated in Table 3 and Exhibit 6.

TABLE 3
Supporting Improvements along Existing Adjacent Roadways

Roadway	Segment	Comments (1)
IL 19	Elgin O'Hare Expressway South Frontage Road to Wise Road	Design improvements proposed in vicinity of proposed Elgin O'Hare Expressway interchange improvements
Gary Avenue	Elgin O'Hare Expressway to Travis Parkway	Capacity improvements proposed to address projected traffic increase and to accommodate Build Alternative design requirements near improved interchange
Roselle Road	Elgin O'Hare Expressway to Nerge Road	Design improvements proposed in vicinity of proposed Elgin O'Hare Expressway interchange improvements
Medinah Road	Elgin O'Hare Expressway to IL 19	Capacity improvements proposed to address projected traffic increase
Wood Dale Road	Thorndale Avenue to Devon Avenue	Capacity improvements proposed to address projected traffic increase and to accommodate Build Alternative design requirements near proposed interchange
IL 72/ Touhy Avenue	Elmhurst Avenue to Mt. Prospect Road	Capacity improvements proposed to address projected traffic increase and to accommodate Build Alternative design requirements near proposed interchange
Elmhurst Road	IL 72 to Oakton Street	Capacity improvements proposed to address projected traffic increase and to accommodate Build Alternative design requirements near improved interchange
Taft Road	Franklin Avenue to O' Hare Airport Service Road	Roadway extension proposed to improve connectivity on to local roadway network
Franklin Avenue/Green Street	County Line Road to Wolf Road	Capacity improvements proposed to address projected traffic increase and to accommodate Build Alternative design requirements near proposed interchange
At all Proposed Interchanges	Systemwide	Capacity and design improvements proposed within the influence area of proposed interchanges

(1) Capacity improvements proposed at locations where traffic for Build Alternative 203 measurably exceeds traffic for 2030 No-Action Alternative (greater than 5% increase) and where traffic exceeds ADT thresholds for existing roadway segments.

Conclusions and Recommendations

Implementation of the EOWB Build Alternatives will result in some changes in the volume and distribution of vehicular travel across the major roadway network in the study area. Most notably, the Build Alternatives will result in a measurable increase in travel demand along the existing Elgin O'Hare Expressway, as well as localized increases in travel demand along existing arterials, particularly in the vicinity of new service interchanges. As a result, various

companion or off-system improvements should be incorporated into the Build Alternatives to address any resultant improvement needs on the existing highway system as follows:

- Capacity (add-lane) improvements are required along the existing Elgin O'Hare Expressway between the I-290 interchange and IL 19/Gary Ave interchange. These capacity improvements would be required to address the projected increased traffic demand resulting both from construction of the east extension of the Elgin O'Hare Expressway and from projected system-wide travel growth through the planning period. (It should be noted that capacity improvements may be required along portions of the existing Elgin O'Hare Expressway under the 2030 No-Action Alternative due to significant travel demand and capacity constraints).
- Limited capacity improvements are required along several adjacent arterial and local roadways (IL 19, Gary Avenue, Roselle Road, Medinah Road, Wood Dale Road, Touhy Avenue, Elmhurst Road, and Taft Road) due to localized travel redistribution. However, the majority of local roadways parallel to the proposed new freeway corridor would actually experience a reduction in projected travel demand (as compared to the 2030 No-Action Alternative).
- Capacity improvements are required at several intersections within the study area (Gary Avenue and Central Avenue, IL 19 and Wise Road, IL 19 and Medinah Road, Wood Dale Road and Devon Avenue, Elmhurst Ave and Oakton Road, Elmhurst Ave and IL 72, IL 72 and Mt. Prospect Road) and at intersections within the influence area of new or improved service interchanges.
- Alternative 203 does not appear to result in appreciable traffic impacts along other existing access-controlled highways in the study area (I-90, I-294, I-290/IL53, I-355).

Supporting improvements identified through this process were incorporated into the Finalist Roadway System Alternatives, and a representative concept layout and estimated footprint requirement were identified at each improvement location.

Analysis findings presented in this memorandum should be reviewed in more detail with the development of detailed preliminary engineering during future Tier Two studies in order to validate traffic redistribution patterns and the scope and limits of required supporting improvements. This should include the development of design hourly volumes and capacity and operational analyses for each location.