
5.18 LIGHT EMISSIONS

5.18.1 Background and Methodology

5.18.1.1 Regulatory Context

In accordance with FAA Order 5050.4A, *Airport Environmental Handbook*, the sponsor of an airport development project shall “consider the extent to which any lighting associated with an airport action will create an annoyance among people in the vicinity of the installation.” It is also prudent to consider whether lighting associated with a proposed project might confuse or interfere with the vision of the air traffic controller’s directing the aircraft in the vicinity of the Airport, or the vision of the pilots on approach to an airport runway. FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, also states that consideration should be given to impacts on Section 303 lands of the DOT Act (DOT 4(f) lands).

5.18.1.2 Thresholds of Significance

FAA Order 1050.1E (Appendix A, 12.3a) states the following with regard to light emission significant impacts:

The EIS description of potential annoyance from airport lighting and measures to minimize the effects should be documented in a similar fashion in an EIS to that in an EA. Further consideration may concentrate on previously unconsidered mitigation measures and alternatives. It is possible that the responsible FAA official will judge that a special lighting study is warranted.

5.18.1.3 Methodologies

FAA Order 1050.1E (Appendix A, 12.2a) states:

The responsible FAA official considers the extent to which any lighting associated with an action will create an annoyance among people in the vicinity or interfere with their normal activities. Because of the relatively low levels of light intensity compared to background levels associated with most air navigation facilities (NAVAIDS) and other airport development actions, light emissions impacts are unlikely to have an adverse impact on human activity or the use or characteristics of the protected properties. Information will be included in the environmental document whenever the potential for annoyance exists, such as site location of lights or light systems, pertinent characteristics of the particular system and its use, and measures to lessen any annoyance, such as shielding or angular adjustments.

A review of possible lighting sources was conducted, based on existing FAA guidance documents. The location of the lighting, intensity, and lighting directions were then compared with the land uses in the vicinity of the lighting source.

Lighting changes associated with the proposed Build Alternatives could affect one or more of the following:

Airfield Lighting

- High Intensity Runway Lights (HIRL) consists of white lights (except for yellow/amber that is used along the last 2,000 feet of the runway). These lights are located 10 feet from the edge of the pavement and spaced not more than 200 feet longitudinally, in a uniform manner.
- Taxiway edge lights define the perimeter of the useable taxiway area. These lights emit blue light at varying intensities and are located not more than 10 feet from the taxiway edge on each side of the taxiway, and spaced not more than 200 feet apart.
- Runway centerline lights consist of lighting following the runway centerline at 50 ft intervals. The last 3,000 ft portion of the lighting system is color coded to warn pilots of the end of the runway; alternative white and red lights are installed from 3,000 feet to 1,000 feet from the runway end, and red lights are installed in the last 1,000 ft portion.
- Touchdown zone lights consist of a row of light bars (three lights) located on each side of the runway centerline. Each bar consists of unidirectional lights facing the landing threshold. The rows of light bars extend a distance of 3,000 feet from the threshold, with the first light bar located 100 feet from the threshold. The HIRL, taxiway edge lights, runway centerline lights, and touchdown lighting would be observable from the airport perimeter but would not result in an off-airport light emission.
- ALSF-2 lights consist of strobe lights that guide pilots to the runway end. These light bars consist of 5 lights configured in to flash about 2 times per second. They are situated on pedestals about 4.5 feet in height, and are oriented 10-15 degrees above the horizon. The lighting for the ALSF-2 extends about 2,400 feet beyond the end of the runway at 100 foot spacing, with red side row lights for the last 1,000 feet. In general these lights produce lighting equivalent to natural lighting on an overcast day.

Terminal/Landside Lighting

- Building security lighting would consist of common lighting techniques. Lighting sources would include roof perimeter lights and lighting from the interior of the structures. The future roof perimeter and parapet lights would be shielded and directed down and generally do not spill more than 30 feet away from the source
- Roadway lighting and parking lot lights would consist of amber security lighting or older low profile street lights (lower intensity white light). Such lighting, similar to building light, is directed downward and does not typically spill more than 30-50 feet away from the light source.

5.18.2 Baseline Conditions

Existing light emission sources associated with O'Hare include: airfield lighting and terminal/landside lighting. Airfield lighting includes lighting directly at or on the airfield system, as well as airfield lighting associated with the approach systems. This lighting consists of white, white flashing, green, red, and blue lighting. In addition to taxiway lighting, the airfield consists of the following runway specific lighting:

- **9R/27L:** consists of HIRL, runway centerline lights, touchdown zone lighting, and Medium Intensity Approach Light System with Runway Alignment Indicator Lights (MALSR)¹ on each end;
- **9L/27R:** consists of HIRL, runway centerline lights, touchdown zone lighting, and MALSR on each end;
- **14R/32L:** consists of HIRL, runway centerline lights, touchdown zone lighting, and a MALSR 32R and an ALSF-2 on 14L;
- **14L/32R:** consists of HIRL, runway centerline lights, touchdown zone lighting, and a MALSR 32R and an ALSF-2 on 14L;
- **18/36:** consists of HIRL and runway centerline lights;²
- **4R/22L:** consists of HIRL, runway centerline lights, touchdown zone lighting, and a MALSR 4R and 22L;
- **4L/22R:** consists of HIRL, runway centerline lights, touchdown zone lighting, and a MALSR 22R.

Terminal and landside lighting consists of lighting at the terminal, support facilities, cargo facilities, associated parking facilities, and along the airport roadway system, as described earlier.

5.18.3 Alternatives Analysis

The types of lighting to occur would vary with each alternative. The following sections provide a summary of the types of light emissions that could impact people in the vicinity of the light installation for each of the four future years of analysis, and is also shown on **Exhibit 5.18-1**.

¹ A MALSR consists of a series of lights spaced about 200 feet apart on standards that align with the runway centerline and extend a total of 2,400 feet from the runway threshold. Nine light bars with white lights comprise the MALSR, with five sequenced flashing lights at the outer portion of the lights.

² Runway 18/36 was permanently closed in 2003 as part of a Categorical Exclusion determination by FAA on August 27, 2003.

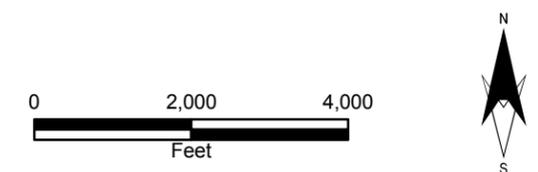
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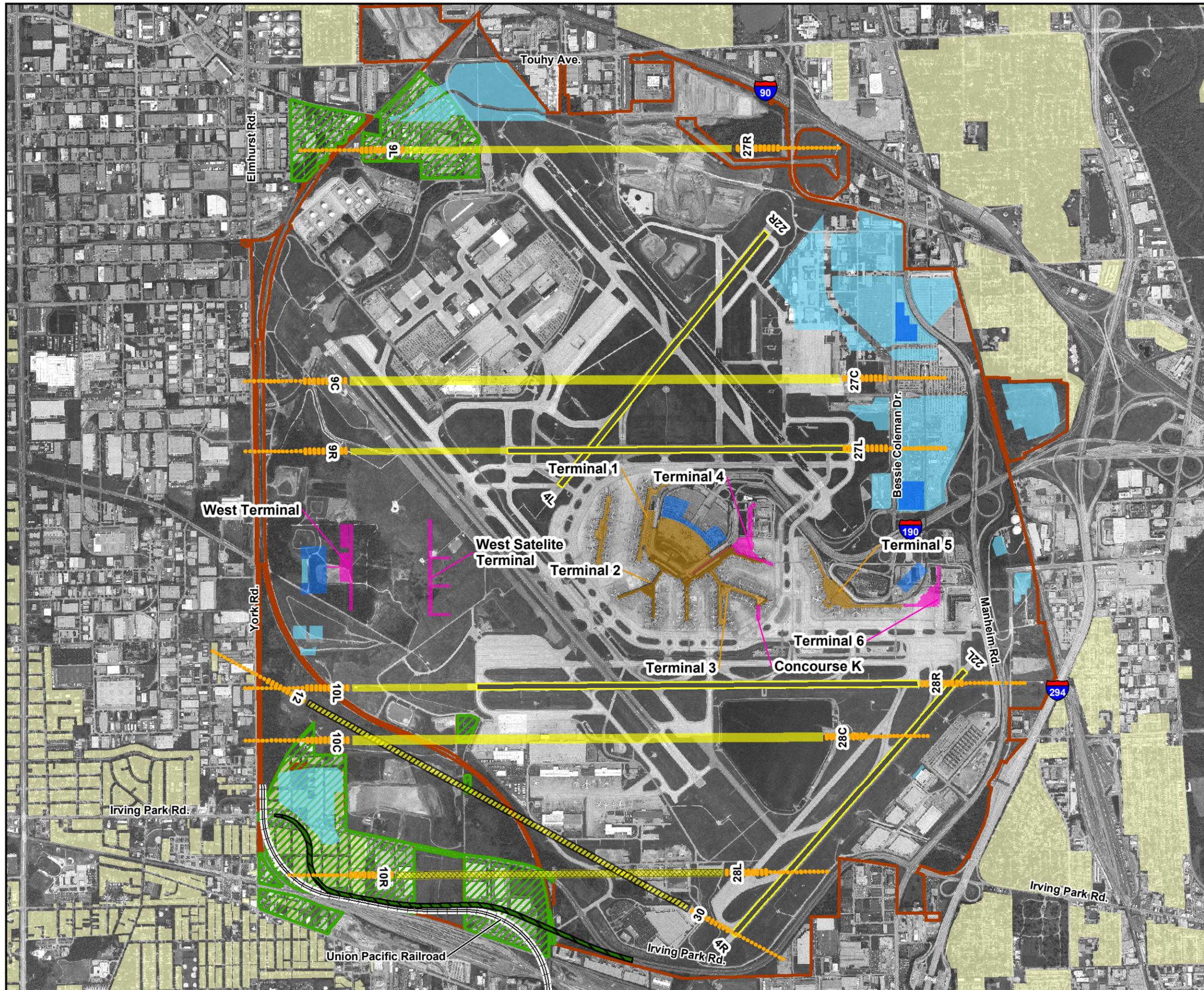
O'Hare Modernization Environmental Impact Statement

- ALSF - 2
- ≡≡≡ Relocated Union Pacific Railroad
- ▬ Relocated Irving Park Road
- ▨ Proposed Land Acquisition Areas
- ▭ Existing Airport Property
- ▭ Proposed Surface Parking
- ▭ Proposed Structured Parking
- ▭ Existing Runways Pavements (to Remain)
- ▭ Proposed Runway Pavements
- ▨ Proposed Runway (Alternative G Only)
- ▨ Proposed Runway (Alternative C Only)
- ▭ Existing Terminals
- ▭ Proposed Terminals
- ▭ Residential Areas



Airport Light Sources (Build-Out Phase)

► Exhibit 5.18-1



Source: Aerials Express, September 2002. ALP Drawing Set, Ricondo & Associates, 2004. Land Use: DuPage County, 2002; Northeastern Illinois Planning Commission, 1992; City of Park Ridge, 1996.

5.18.3.1 Construction Phase I

Alternative A – No Action

The No Action Alternative (Alternative A) consists primarily of the airport as it exists today, with a few minor approved projects to be undertaken. During this phase, these projects would occur within airport property, and would not be expected to have a material effect on lighting. No airfield lighting changes would occur during Construction Phase I with the No Action Alternative (Alternative A). Terminal and landside improvements would occur and would result in localized lighting. Because such lighting is buffered from nearby residential neighborhoods by major transportation (highways) and commercial/industrial development, no light emission impacts would be expected.

Alternatives C, D and G

During Construction Phase I for the Build Alternatives, new Runway 9L/27R would be completed. This runway is expected to be equipped with HIRL, taxiway edge lighting, and centerline lights, as well as touchdown zone lighting, an ALSF-2 approach lighting system installed on both the 9L and 27R ends. The HIRL, taxiway edge lights, runway centerline lights, and touchdown lighting would be observable from the airport perimeter, but would not result in an off-airport light emission. Runway 9L/27R, located on the very north end of the Airport, would result in new lighting at the Airport perimeter. Given the threshold locations of this runway, the east end lighting would be located south of the Northwest Tollway, approximately 100 feet east of the relocated Bessie Coleman Drive. The tollway would serve as an obstruction to light emissions from the ALSF-2 for properties located north of the tollway because of its raised elevation and lighting presence. The closest residential neighborhood south of the tollway is located about 1 mile east of the proposed site of the ALSF-2 for Runway 9L/27R. Similarly, on the west end of the runway, the ALSF-2 would end within land acquired for the project (northwest acquisition area). The closest residential neighborhood is more than 1 mile west of the last light station. Thus light emission impacts from the ALSF-2 would not be expected.

An employee parking lot is proposed for construction in the northwest area of the Airport and would be bound by Touhy Avenue to the north and the Union Pacific Railroad to the west. Overhead lighting would be installed in the parking lot. All roadway, parking lot, and building lighting would be consistent with the kind of illumination found in any intensely developed urban area. The area in the vicinity of employee parking lot consists of industrial land use. Therefore light emission impacts as a result of the proposed the employee parking lot would not be significant.

A rental car facility is proposed to be constructed in the east-northeast area of the Airport. The facility would be located on the east and west sides of Mannheim Road and would be lit with overhead lighting. Interstate I-190 would border the facility to the south, and would effectively serve as a barrier to rental car parking lot light emissions. Therefore, light emission impacts as a result of the proposed rental car facility would not be significant.

5.18.3.2 Construction Phase II

Alternative A – No Action

The No Action Alternative (Alternative A) consists primarily of the airport as it exists today, with a few minor approved projects to be undertaken. During this phase, these projects would occur within airport property, and would not be expected to have a material effect on lighting. No airfield lighting changes would occur during Construction Phase II with the No Action Alternative (Alternative A). Terminal and landside improvements would occur and would result in localized lighting. Because such lighting is buffered from nearby residential neighborhoods by major transportation (highways) and commercial/industrial development, no light emission impacts would be expected.

Alternatives C, D and G

Similar to Construction Phase I, the development associated with each of the Build Alternatives is the same during Construction Phase II. During this phase, Runway 10L/28R, Runway 10C/28C, and associated taxiways are proposed for construction. These new runways and associated taxiways would result in the installation of HIRL, runway centerline lights, taxiway edge lights, and an ALSF-2. Similar to conditions in Construction Phase I, the airfield lighting (HIRL, centerline lights, taxiway lights, etc) would be visible from off-airport locations, but would not generate light emission impacts.

New Runway 10L/28R would result from the extension of existing Runway 9R/27L. The ALSF-2 on the end of existing Runway 27L (to become 28R) would replace the existing MALSR (medium intensity approach lighting system with runway alignment indicator lights), and an ALSF-2 would be installed on the west end (10L). The ALSF-2 lighting improvements would occur in the same geographic area as the current MALSR lighting, but would consist of additional light bars/stations with 100 foot spacing instead of the MALSR spacing of 200 feet. At the outer limits of the ALSF-2 lighting (closer to the airport edge), the flashing lights would be increased from 5 stations to 15 stations. However, because of the distance from residential neighborhoods east of I-190, no off-airport light emission impacts would be expected. The Runway 10L ALSF-2 lights would extend approximately 200 feet west of York Road and be placed on top of the existing structures or cantilevered over the roof, both of which would be subject to an easement. Because they would be located above ground level, and directed up, they would not produce light emission impacts.

Light emission impacts from the ALSF-2 on new Runway 10C/28C were also considered. Like the ALSF-2 lights for the adjacent new runway 10L/28R, the west portion of the lighting would be located about 200 feet west of York Road and be elevated on undeveloped ground. The nearest residence would be located near the proposed Runway 10C end, approximately 1,150 feet southwest across the Union Pacific railroad tracks. As the lighting would be directed upward, no light emission impacts would be expected. The east end (28R) ALSF-2 lighting would be located on airport and shielded from off-airport locations by lighting from I-190.

Concourse K and the western terminal satellite concourse are also proposed for construction, as well as associated ramp areas. All ramp areas would be lit with overhead floodlights that face

toward the ground. All roadway, parking lot, and building lighting would be consistent with the kind of illumination found in any intensely developed urban area.

The development of Runway 10L/28R and Runway 10C/28C would require the relocation of the Union Pacific Railroad line. The new alignment of the rail would occur along the northern portion of the Bensenville Rail Yard. Relocation of the rail line would result in rail lighting along the rail corridor. However, rail lighting would be similar to roadway lighting, and would not spill further than about 30 feet from the light source. Residential properties located south of Irving Park Road, east of York Road, would need to be acquired and residents relocated. York Road and the Bensenville Rail yard would serve as a buffer between the lighting associated with the relocated rail line. Therefore, no light emission impacts would be expected.

5.18.3.3 Build Out

This third year of analysis represents the full build-out of each Build Alternative. As described in the following sections, the three Build Alternatives under consideration would differ from each other at this stage of development (a more detailed description of the Build Alternatives is provided in **Chapter 3, Alternatives** and **Appendix E, Alternatives**).

Alternative A – No Action

The No Action Alternative (Alternative A) consists primarily of the airport as it exists today, with a few minor approved projects to be undertaken. During this phase, these projects would occur within airport property, and would not be expected to have a material effect on lighting. No airfield lighting changes would occur during the Build Out phase with the No Action Alternative (Alternative A). Terminal and landside improvements would occur and would result in localized lighting. Because such lighting is buffered from nearby residential neighborhoods by major transportation (highways), and commercial/industrial development, not light emission impacts would be expected.

Alternative C

During the Build Out phase, future Runways 9R/27L, 9C/27C, 10R/28L and associated taxiways are proposed for construction. Runways 14L/32R and 14R/32L would be decommissioned. These new runways and associated taxiways would result in the installation of HIRL, runway centerline lights, taxiway edge lights, and an ALSF-2. Similar to conditions in Construction Phase I, the airfield lighting (HIRL, centerline lights, taxiway lights, etc) would be visible from off-airport locations, but would not generate light emission impacts. The locations of the ALSF-2 for each runway end were reviewed to consider light emission impacts. Future Runway 9R/27L reflects the existing Runway 9L/27R, with a westerly extension. The MALSR for each end would be replaced with an ALSF-2. As a result, the existing lighting system would be further intensified on the east end. As this lighting system would occur within airport property, west of I-190, no off-airport light emissions would occur. The ALSF-2 on the west end of the runway would extend about 200 feet west of Elmhurst/York Road, and occur on undeveloped lands, surrounded by industrial development. Because the lighting would be

directed upward, no light emission impacts to residential areas, the closest being about 1 mile southwest, would occur.

Runway 9C/27C would be equipped with an ALSF-2 on each end. Similar to the ALSF-2 on the other parallel runways, the east end of the system would occur within the airport property and extend adjacent to a parking lot, but would be buffered from nearby residential areas by I-190. On the west end, the ALSF-2 lighting would extend about 200 feet west of Elmhurst Road/York Road and be placed on top of the existing structures or cantilevered over the roof (subject to an easement). Because of the industrial nature of this area, the roof mounting, and upward direction of the lighting, no light emission impacts would be expected.

Runway 10R/28L would also be equipped with an ALSF-2. The lighting on the east end would occur west of Irving Park Road, moreover, development east of Irving Park Road is industrial/commercial in nature, therefore no light emission impacts are expected. The west end ALSF-2 lighting would occur on land that would need to be acquired, and would extend about 800 feet west of the relocated Irving Park Road. The closest residential uses are about 1,000 feet west of the last sequenced flasher. Because of this distance and upward directed lighting, no light emission impacts are expected.

Terminal 4 and 6 are proposed for construction, as well as the west terminal complex and associated ramp areas. All ramp areas would be lit with overhead floodlights that face toward the ground. All roadway, parking lot, and building lighting would be consistent with the kind of illumination found in any intensely developed urban area. No off-airport light emission impacts would occur from the Alternative C terminal and landside development.

The development of the far south runway (10R/28L) would require the relocation of Irving Park Road. The new alignment of the roadway would occur along the northern portion of the Bensenville Rail Yard and north of the relocated Union Pacific Railroad line. Residential properties located south of Irving Park Road, east of York Road, would have already been acquired prior to this phase and residents relocated. York Road and the Bensenville Rail yard would serve as a buffer between the lighting associated with the relocated roadway. Therefore, no light emission impacts would be expected.

Alternative D

The impacts of light emissions as a result of Alternative D would be similar to those described for Alternative C, except that Runway 10R/28L and the relocation of Irving Park Road is not proposed for construction under this alternative. This alternative would then include Future Runway 9R/27L and 9C/27C, and associated taxiways. Runways 14L/32R and 14R/32L would be decommissioned. These new runways and associated taxiways would result in the installation of HIRL, runway centerline lights, taxiway edge lights, and an ALSF-2. Similar to conditions in Construction Phase I, the airfield lighting (HIRL, centerline lights, taxiway lights, etc) would be visible from off-airport locations, but would not generate light emission impacts. The locations of the ALSF-2 for each runway end were reviewed to consider light emission impacts. Future Runway 9R/27L reflects the existing Runway 9L/27R, with a westerly extension. The MALSR for each end would be replaced with an ALSF-2. As a result, the

existing lighting system would be further intensified on the east end. As this lighting system occurs within airport property, west of I-190, no off-airport light emissions would occur. The ALSF-2 on the west end of the runway would extend about 200 feet west of Elmhurst/York Road, and occur on undeveloped lands, surrounded by industrial development. Because the lighting would be directed upward, no light emission impacts to residential areas, the closest being about 1 mile southwest, would occur.

Runway 9C/27C would be equipped with an ALSF-2 on each end. Similar to the ALSF-2 on the other parallel runways, the east end system would occur within airport property and extend adjacent to a parking lot, but be buffered from nearby residential areas by I-190. On the west end, the ALSF-2 lighting would extend about 200 feet west of Elmhurst Road/York Road and be placed on top of the existing structures or cantilevered over the roof (subject to an easement). Because of the industrial nature of this area, the roof mounting, and upward direction of the lighting, no light emission impacts would be expected.

Terminal 4 and 6 are proposed for construction as well as the west terminal complex and associated ramp areas. All ramp areas would be lit with overhead floodlights that face toward the ground. All roadway, parking lot, and building lighting would be consistent with the kind of illumination found in any intensely developed urban area. No off-airport light emission impacts would occur from the Alternative C terminal and landside development.

Alternative G

In the Build Out phase, Alternative G is similar to Alternative C, except instead of the far south runway (10R/28L), the far south runway would be oriented as Runway 12/30. Existing cargo facilities displaced by the new Runway 12/30 would be constructed south of the new runway. See **Chapter 3, Alternatives** and **Appendix E, Alternatives**, for a further description of this alternative.

This alternative would then include future Runways 9R/27L, 9C/27C, 12/30, and associated taxiways. Runways 14L/32R and 14R/32L would be decommissioned. These new runways and associated taxiways would result in the installation of HIRL, runway centerline lights, taxiway edge lights, and an ALSF-2 approach lighting system. Similar to conditions in Construction Phase I, the airfield lighting (HIRL, centerline lights, taxiway lights, etc) would be visible from off-airport locations, but would not generate light emission impacts. The locations of the ALSF-2 for each runway end were reviewed to consider light emission impacts. Future Runway 9R/27L reflects the existing Runway 9L/27R, with a westerly extension. The MALSR for each end would be replaced with an ALSF-2. As a result, the existing lighting system would be further intensified on the east end. As this lighting system would occur within airport property, west of I-190, no off-airport light emissions would occur. The ALSF-2 on the west end of the runway would extend about 200 feet west of Elmhurst/York Road, and occur on undeveloped lands, surrounded by industrial development. Because the lighting would be directed upward, no light emission impacts to residential areas, the closest being about 1 mile southwest, would occur.

Runway 9C/27C would be equipped with an ALSF-2 on each end. Similar to the ALSF-2 on the other parallel runways, the east end system would occur within the airport perimeter and extend in to the parking lot, but be buffered from nearby residential areas by I-190. On the west end, the ALSF-2 lighting would extend about 200 feet west of Elmhurst Road/York Road and be placed on top of the existing structures or cantilevered over the roof (subject to an easement). Because of the industrial nature of this area, the roof mounting, and upward direction of the lighting, no light emission impacts would be expected.

Runway 12/30 would be equipped with an ALSF-2 on each end. Similar to the ALSF-2 on the other parallel runways, the east end system would occur within airport property but extend about 450 feet east of Irving Park Road onto undeveloped commercial land. No light emissions impacts would occur because the Schiller Park commercial complex would serve as a buffer to residents about 1 mile east. On the west end, the ALSF-2 lighting would extend about 1,100 feet west of York Road and be placed on top of the existing structures or cantilevered over the roof (subject to an easement). Because of the industrial nature of this area, the roof mounting, and upward direction of the lighting, no light emission impacts would be expected.

The development of Runway 12/30, and the development of displaced cargo and support facilities noted below, would require the relocation of Irving Park Road. The new alignment of the roadway would occur along the northern portion of the Bensenville Rail Yard and north of the relocated Union Pacific Railroad line. Residential properties located south of Irving Park Road, east of York Road, would have already been acquired prior to this phase and residents relocated. York Road and the Bensenville Rail yard would serve as a buffer between the lighting associated with the relocated roadway. Therefore, no light emission impacts would be expected.

All terminal/landside improvement impacts for Alternative G would be similar to Alternative C and D (no off-airport impacts expected). However, Alternative G would also result in development of displaced cargo and support facilities being replaced on the south side of Runway 12/30. Lighting associated with these buildings (roof mounted exterior lighting) would be buffered from the surrounding area by relocated Irving Park Road, and thus, no light emission impacts would be expected.

5.18.3.4 Build Out + 5

Alternatives A, C, D and G

By the end of the Build Out + 5 phase, all development would be complete with all potential impacts. Therefore, the lighting associated with earlier phases would continue during this phase. No new lighting would occur during this phase and thus, no light emission impacts would be expected.

5.18.4 Potential Mitigation Measures

Based on the above analyses, the FAA concludes that no significant impacts would occur under any alternative. Given that no significant impacts related to light emissions would occur under

any of the Build Alternatives, no formal mitigation procedures have been identified. However, if a lighting problem occurs after installation of a facility, curtain shielding of the light emitter could be put in place to mitigate any impacts. These actions would be addressed on a case-by-case basis.

5.18.5 Summary

Under the No Action Alternative (Alternative A) and each Build Alternative, the FAA concludes that no significant impacts related to light emissions would occur. The lighting envisioned for the Build Alternatives should not create any significant annoyances for neighboring areas, tower controllers, or pilots of aircraft on approach to the Airport. To ensure that lighting from the Build Alternatives does not become an annoyance for any abutting neighborhoods, lighting fixtures could be shielded to avoid casting direct light into the neighborhoods. As is described in the preceding section, light emission impacts are localized based on the location of individual facilities. However, because the lighting would be directed upward, or would be buffered from surrounding residential areas by existing industrial, commercial, and transportation sources, the FAA concludes that no significant project-related light emission impacts would be expected.

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