5.7 WATER QUALITY

Surface water and groundwater quality at the Airport are affected by onsite and offsite sources, including deicing activities, road salting, maintenance activities, and other operations. This section provides an analysis of the effects that the proposed project alternatives for the No Action Alternative (Alternative A) as well as the Build Alternatives would have on surface and subsurface water quality, and addresses the changes in water quality as a result of these alternatives. Storm water runoff has the potential to affect water quality in the three watersheds on Airport property.

5.7.1 Background and Methodology

Applicable Federal and State regulations pertaining to water quality, and a summary of the methodology used to analyze potential impacts to water quality, will be described in the following subsections.

5.7.1.1 Regulatory Context

Clean Water Act

The Clean Water Act (CWA), *33 U.S.C. 1251– 1387*, establishes the basic structure for regulating discharges of pollutants into the waters of the United States. The statute uses a variety of regulatory and non-regulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. In accordance with Section 101(a) of the Act, "the objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the nation's waters."

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA), originally passed in 1974 and amended in 1986 and 1996, created the framework that allows the United States Environmental Protection Agency (USEPA) to protect the health of the public by ensuring a safe drinking water supply exists. The act authorizes the USEPA to set national standards for acceptable levels of contaminants in drinking water referred to as National Primary Drinking Water Regulations. These drinking water standards apply to public water systems. The act also outlines how the USEPA, the states, and water systems work together to ensure these standards are met. These standards vary according to the type of water system in use. The USEPA initially sets a health goal for a contaminant based on risk of illness due to contamination and then will set a level (standard) for that contaminant, which is as close to the goal as feasible. The USEPA evaluates risks from microbial contaminants, byproducts of drinking water disinfection, radon, arsenic and water systems that don't currently disinfect their water.

General Use Water Quality Standards

The Illinois Environmental Protection Agency (IEPA) regulates water quality at the Airport through the National Pollution Discharge Elimination Program (NPDES). The Illinois Water Pollution Control Board has adopted General Use Water Quality Standards and Water Use Designations to protect water quality in the State of Illinois. General Use Water Quality Standards are applicable for water within Willow-Higgins Creek, Crystal Creek and Bensenville Ditch/Silver Creek. These water quality standards include the following:

- Except for natural causes, pH shall be within the range of 6.5 to 9.0.
- Phosphorus as P shall not exceed 0.05 mg/L in any reservoir or lake with a surface area of 8.1 hectares (20 acres) or more, or in any stream at the point where it enters any such reservoir or lake.
- Dissolved oxygen shall not be less than 6.0 mg/L during at least 16 hours of any 24-hour period, nor less than 5.0 mg/L at any time.
- Waters shall be free from any substances or combination of substances in concentrations toxic or harmful to human health, or to animal, plant or aquatic life.
- Total ammonia nitrogen shall in no case exceed 15 mg/L. Un-ionized ammonia nitrogen shall not exceed the acute and chronic standards given as:
  - From April through October, the Acute Standard shall be 0.33 mg/L and the Chronic Standard shall be 0.057 mg/L.
  - From November through March, the Acute Standard shall be 0.14 mg/L and the Chronic Standard shall be 0.025 mg/L.

There shall be no abnormal temperature changes that may adversely affect aquatic life unless caused by natural conditions. The maximum temperature rise above natural temperatures shall not exceed 2.8°C (5°F).

In Illinois, waterbodies have been classified for a variety of designated uses that include general use, public and food processing water supplies, and secondary contact and indigenous aquatic life.[1] The water quality conditions are described in terms of the degree to which the waters attain the designated uses. Water quality is rated as either "good", "fair", or "poor", with a "good" rating meaning a waterbody meets the needs of all designated uses. A rating of "fair" means that the water quality has been impaired and the waterbody meets some, but not all, of its designated uses. A waterbody rated as "poor" has water quality that has been severely impaired and cannot support a designated use to any degree.[2] The Des Plaines River, Willow-Higgins Creek, and Crystal Creek (Bensenville Ditch) were given "fair" ratings by the IEPA in 2004.[3] Water quality degradation in these water bodies is primarily due to urban surface runoff,

[1] Title 35 Illinois Administrative Code (IAC) Part 300.
[2] The Condition of Illinois Water Resources 1972-1996, Illinois Environmental Protection Agency, www.epa.state.il.us/water/water-quality/report-1996/index.html
[3] Des Plaines River Watershed, Illinois Environmental Protection Agency. www.epa.state.il.us/water/water-quality/report-1999/fact-sheets/watershed-2.pdf

municipal and industrial discharges, and to some extent channelization and flow regulation.[4] Bensenville Ditch/Silver Creek has not been assessed by the State of Illinois.

Illinois has also listed the Des Plaines River above and below the Airport as an Impaired/Threatened waterbody under Section 303(d) of the Clean Water Act. The primary pollutants for which the Des Plaines River is considered to be Impaired/Threatened include nutrients, phosphorus, total ammonia, and algal growth. The Airport does not contribute significant amounts of nutrients, phosphorus, or total ammonia to the Des Plaines River. Accordingly, none of the three creeks that drain the Airport are listed as having contributed to the Impaired/Threatened status of the Des Plaines River. Under the Clean Water Act, Illinois is responsible for developing Total Maximum Daily Loads (TMDLs) for all Impaired/Threatened Waters. For purposes of calculating TMDLs, water bodies are divided into segments. The segments of the Des Plaines River closest to O'Hare rank between 13 and 166 out of 738 (lower numbers indicate higher priority for developing TMDLs) listed streams, creeks, rivers, lakes, reservoirs, and ponds in Illinois.[5]

National Pollutant Discharge Elimination System (NPDES)

The State and Federal governments regulate water quality through the NPDES program, established by the Federal Clean Water Act. In Illinois, the USEPA has delegated the authority to issue NPDES permits to the IEPA. The NPDES permit system is a mechanism for attaining water quality standards by imposing limits for pollutants of concern on discharges from a point source into waters of the United States. A point source is a stationary location from which pollutants may be discharged or emitted. At the Airport, stormwater outfalls constitute point sources due to the use of glycol-containing deicing compounds and other maintenance activities classified as "industrial" by IEPA generating the requirement for the Airport to participate in the NPDES permit system.

Phase I of the NPDES stormwater program was established in 1990 and addressed discharges from large construction activities disturbing five acres or more of land. Phase II of the NPDES stormwater program, which became final on December 8, 1999, covers construction activities disturbing one or more acres of land. The Phase II of the NPDES stormwater program includes General Storm Water Permits for Small Municipal Separate Storm Sewer Systems (MS4s).

5.7.1.2 Thresholds of Significance

FAA Order 5050.4A (*Airport Environmental Handbook*) requires environmental documentation to demonstrate that an action will comply with applicable water quality standards and any applicable Federal, State, or local permit requirements. The *Airport Environmental Handbook* lists potential water quality issues that may need to be addressed, including stormwater and sanitary sewer design, requirements for additional water supplies or waste treatment capacity,

[4] Illinois Water Quality Report, Illinois Environmental Protection Agency, 2004. www.epa.state.il.us/water/water-quality/305b/305b-2004.html

[5] Total Maximum Daily Load Program, United States Environmental Protection Agency. www.epa.gov/owow/tmdl/states/iltmdltables.html

erosion controls to prevent siltation, measures to contain fuel spills and wastewater from aircraft washing, measures to preserve existing drainage, contamination of aquifers, and degradation of ecologically sensitive water resources (e.g., wetlands).

FAA Order 1050.1E (Appendix A, 17.3) states:

> Water quality regulations and issuance of permits will normally identify any deficiencies in the proposal with regard to water quality or any additional information necessary to make judgments on the significance of impacts. If the EA and early consultation show that there is a potential for exceeding water quality standards, identify water quality problems that cannot be avoided or satisfactorily mitigated, or indicate difficulties in obtaining required permits, an EIS may be required.

FAA Order 1050.1E (Appendix A, 17.4a) also states:

> When the thresholds indicate that the potential exists for significant water quality impacts, additional analysis in consultation with State or Federal agencies responsible for protecting water quality will be necessary. These agencies may require specific information or studies.

5.7.1.3 Methodologies

In general, the Alternatives Analysis evaluates potential water quality impacts using estimates of increased impervious surfaces and the changes in water quality that would occur as a result of the proposed alternatives. The analysis will focus on whether water quality would be affected by any of the proposed alternatives.

5.7.2 Baseline Conditions

5.7.2.1 Watersheds

The Airport is located within the watershed of the Des Plaines River. There are three creeks that originate on, or traverse, the Airport. These creeks form three sub-watersheds (Willow-Higgins Creek, Crystal Creek, and Bensenville Ditch/Silver Creek) of the Des Plaines River. **Exhibit 5.7-1** illustrates the three watershed boundaries.

The Willow- Higgins Creek watershed drains the North Airfield, the Crystal Creek watershed, located south of Willow-Higgins Creek, drains the existing terminal area and portion of the South Airfield, and the Bensenville Ditch/Silver Creek watershed drains the southwest portion of the Airport and a portion of the South Airfield. These three creeks flow to the east and are tributaries of the Des Plaines River. In addition, some stormwater runoff from O'Hare property enters the Des Plaines River directly. Areas near Mannheim Road flow into various sewer inlets then north to the Illinois Department of Transportation (IDOT) pump station at the Mannheim/I-190 interchange. From there, a storm sewer directs the water directly to the Des Plaines River. The Airport property east of Mannheim Road, south of I-190, also drains to the Des Plaines River through this pump station.

Operational activities, including deicing operations, snow removal, fueling, and aircraft/vehicle washing and maintenance, can affect the water quality of the runoff from the Airport. These operations can contribute chemical constituents and other pollutants to surface water that, if discharged to down gradient receiving bodies, can degrade the quality of water and harm

aquatic life. The State of Illinois classified creeks, stream, and lakes for designated uses that include general use, public and food processing water supplies, secondary contact, and indigenous aquatic life. The State has assigned a fair rating as an indicator of overall water quality to the Des Plaines River, Willow-Higgins Creek, and Crystal Creek indicating that, although impaired by pollutants, these water bodies can provide for some, but not all, of its designated recommended uses. Bensenville Ditch/Silver Creek has not been assessed by the State of Illinois.

Urban, industrial and commercial development increases the risk of water quality degradation because, in most cases, development increases the amount of surface area that is impervious to water infiltration. Reducing the capability of storm water to infiltrate into the ground or flow over natural surfaces to a stream not only increases the quantity of runoff but increases the amount of pollutants that can be discharged into a water body. These pollutants can include the deicing chemicals used during the winter months, spilled fuel, oils, sediment from construction projects, and other inadvertent chemical releases to the ground. Unless managed properly through adequate conveyance and detention, the quantity and quality of stormwater leaving a site can overwhelm receiving water bodies and significantly degrade water quality.

The surface of the Airport is characterized by a relatively uniform topographic gradient with impervious (built) and pervious (vegetated) surface areas. These areas have been engineered to create a drainage system defined by storm sewers, drainage ditches, and drainage basins, as well as stormwater detention basins. The drainage basins are areas that have been graded so that all stormwater runoff within that area flows to an outfall through a man-made device such as a channel, ditch, or pipe. An outfall is the location where the stormwater from the basin flows into the receiving waterbody.

5.7.2.2 NPDES Permits

The IEPA originally issued a Phase I NPDES individual discharge permit (IL0002283) to the City of Chicago for the Airport in 1975 to regulate City and tenant activities. This permit covers water quality of stormwater runoff from both airside areas, where aircraft and airfield deicing activities are conducted, and all other airport industrial activities, which include aircraft maintenance, vehicle maintenance, and large-scale food preparation operations. The permit has since been reissued on November 19, 1996,[6] with an expiration date of November 30, 2001.

Since the issuance of the Phase I NPDES discharge permit in 1996, the stormwater system at the Airport has changed. Some of the outfalls and basins have undergone engineered alterations, while others have been eliminated all together. The current outfalls, water quality sampling locations, and sub-basins are depicted in **Exhibits 5.7-2** and **5.7-3**. Data regarding these locations are included in **Tables K-1** through **K-5** in **Appendix K, Water Quality**. An application to renew the permit was submitted to IEPA on September 7, 2001, and was revised and resubmitted in August of 2002. Thereafter, a further updated application was submitted to

[6] NPDES Permit No. IL0002283, Illinois Environmental Protection Agency, November 19, 1996.

IEPA on March 3, 2005.[7] It is currently under review by the IEPA, during which time the original permit is still valid. IEPA's draft permit is likely to be available by September 2005.

Some portions of the Airport property are not included in the drainage system, or covered by the Airport Phase I NPDES permit, because aircraft and/or airfield deicing or industrial operations do not occur in these areas of the Airport. This includes portions of Airport property east of Mannheim Road and south of Irving Park Road (see **Exhibits 5.7-2** and **5.7-3**).

Current construction activities at the Airport are covered under the City of Chicago's General Storm Water Permit for Small Municipal Separate Storm Sewer Systems (MS4). The IEPA received the MS4 permit application from the City on March 10, 2003 and after review and acceptance, issued the permit to the City on September 20, 2004. This permit is valid until February 29, 2008.

The MS4 permit requires that the City develop a stormwater management program comprised of best management practices (BMPs) and measurable goals for each of the following six minimum control measures:

- Public education and outreach on stormwater impacts
- Public involvement and participation
- Illicit discharge detection and elimination
- Construction site stormwater runoff control
- Post construction stormwater management in new development and redevelopment
- Pollution prevention/good housekeeping for municipal operations

The City must also submit an annual report to IEPA in June of each year and the reports must include:

- The status of the compliance with the permit conditions, including an assessment of the BMPs and progress toward the measurable goals
- Results of any information collected and analyzed, including monitoring data
- A summary of the stormwater activities planned for the next reporting cycle
- A change in any identified best management practices or measurable goals
- If applicable, notice of relying on another governmental entity to satisfy some of the permit obligations

IEPA issued a Phase I NPDES individual permit (IL 0066567) to Airport Group International (AGI), now known as Aircraft Service International Group (ASIG), for the fuel farm, which is located within Sub-Basin 400. Since the fuel farm was located within a single basin, IEPA issued a separate permit for this facility. The permit has effluent limits and water quality sampling

[7] O'Hare NPDES Revised Permit Renewal Package Final Supplement from Kellie Rotunno, CDM, to Tom McSwiggin ,IEPA, dated March 3, 2005.

requirements. This permit became effective in May 1996, and technically expired on April 30, 2001. An application to renew the permit with IEPA is currently being developed, during which time the original permit is still valid.

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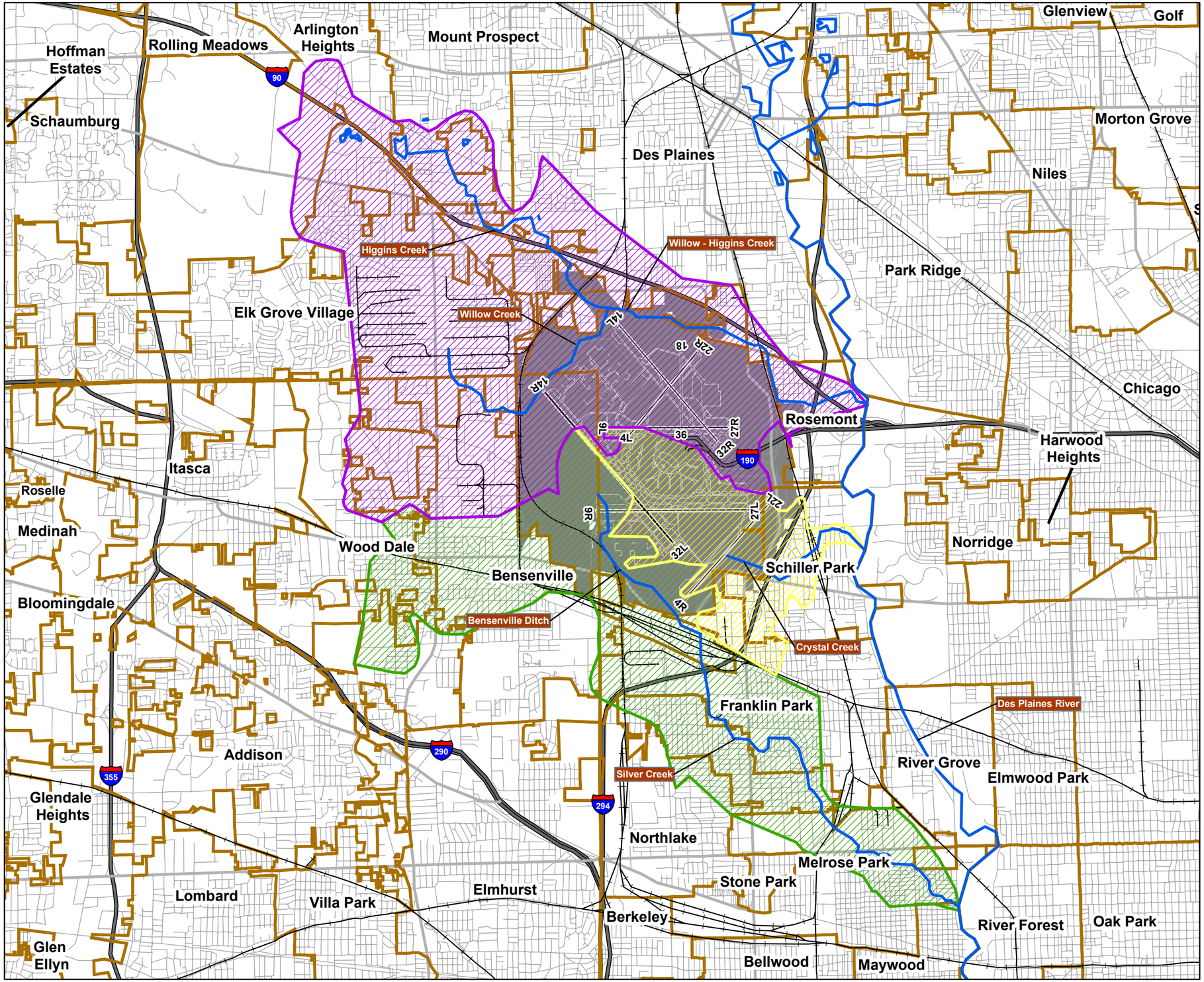

Source: Community Boundaries, Census 2000, U.S. Census Bureau 2000. Streets: StreetmapUSA, ESRI 2003. Watersheds: CTE, 2002.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

- Railroads
- Freeways
- Secondary Roads
- Roads
- Waterways
- Community Boundaries
- Bensenville Ditch/Silver Creek Watershed
- Crystal Creek Watershed
- Willow-Higgins Creek Watershed
- Existing Airport Property

N

S

0 1 2

Miles

Watershed Delineation

▶ Exhibit 5.7-1

Source: Watershed Basins: CTE Engineers, January 2003. Aerial: Aerials Express, September 2002

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

- Outfall Locations
- Water Quality Sampling Locations
- Low Flow Non-Deicing Season Diversion Structure
- Willow-Higgins Sub-Basins
- Crystal Creek Sub-Basins
- Bensenville Ditch Sub-Basins
- Willow-Higgins Watershed
- Crystal Creek Watershed
- Bensenville Ditch Watershed
- 0000 Sub-Basin Number

0 1,300 2,600
Feet

N
S

North Airfield Phase I NPDES Watershed Basins

▶ **Exhibit 5.7-2**

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

- Outfall Locations
- Water Quality Sampling Locations
- Low Flow Non-Deicing Season Diversion Structure
- Willow-Higgins Sub-Basins
- Crystal Creek Sub-Basins
- Bensenville Ditch Sub-Basins
- Willow-Higgins Watershed
- Crystal Creek Watershed
- Bensenville Ditch Watershed
- 0000 Sub-Basin Number

0 1,300 2,600
Feet

N S

South Airfield Phase I NPDES Watershed Basins

▶ Exhibit 5.7-3

Source: CTE Engineers, 2003. Aerials Express, September 2002

5.7.2.3 Airport Activities That Can Affect Water Quality

Water quality at the Airport can be affected by sources such as deicing operations, snow storage areas, underground storage tanks, aboveground storage tanks, spills, and other Airport operations-related sources.

Deicing Operations

In order to maintain safe operating conditions for aircraft, O'Hare and its tenants conduct deicing and anti-icing operations. Deicing operations consist of the removal of frost, snow, or ice from aircraft or pavement. Anti-icing operations involve the prevention of accumulation of frost, snow, or ice on those surfaces. Deicing chemicals are a necessity for safe operations at all airports subject to snow deposition or ice formation. Deicing fluid is applied to pavement to loosen the bond holding ice and snow to surfaces to maintain adequate friction for safe airside operations. Anti-icing chemicals are applied to prevent the formation of ice on runway and taxiway surfaces. In addition to deicing and anti-icing, mechanical means are also employed to remove snow and ice from pavement.

The most common deicing chemicals currently in use are organic alcohol-based compounds (ethylene-glycol, propylene glycol), as well as urea and road salt. At O'Hare, propylene glycol and urea are used as runway deicing fluids. All required information with regard to the glycol compounds necessary to be regulated at O'Hare is provided in the City's NPDES permit. Runoff from runway areas is drained to sanitary sewers or detention basins and then treated at the Stickney Treatment Plant, which is operated by the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC). Aircraft deicing fluids are applied primarily in the terminal gate areas, and under special conditions at the hangar locations. These areas drain to the South Detention Basin and the North Airfield winter detention basins, which then drain to sanitary sewers and ultimately treated at MWRDGC. Road salt is used to control ice and snow on roadways, parking structures, and parking lots. In addition, the use of urea within the landside areas is limited to the top of the terminal parking structure.

The City has a long history of implementing measures to mitigate the impacts of airport deicing agents on the surrounding creeks. Since 1979, the Airport has been routing the majority of the stormwater containing deicing fluids through the South Detention Basin system. This basin has a surface area of approximately 100 acres and an effective storage volume of approximately 1,120 acre-feet. As illustrated in **Exhibit 5.7-3**, the Airport terminal areas drain to the South Detention Basin. Aircraft deicing no longer occurs at runway ends; instead, almost all of the aircraft deicing at the Airport occurs in the terminal areas. Furthermore, much of the Airport runway and taxiway areas that do receive runway deicing fluids drain to the South Detention Basin. Therefore, most of the stormwater containing deicing fluid flows to the South Detention Basin. The South Detention Basin discharges to a MWRDGC interceptor sewer and eventually to the MWRDGC. The South Detention Basin also may discharge directly to the Des Plaines River when the water quality is in compliance with the effluent standards specified in the Phase I NPDES permit.

Even with the South Detention Basin system in place, there are areas around the perimeter of the Airport where very small amounts of airport deicing agents, almost all of which is road salt, mix with stormwater and are discharged to the creeks. Water quality sampling conducted by the City prior to 1996 showed that during the deicing season, the contaminant concentrations in effluent were at times elevated. Consequently, the City developed a Water Quality Improvement Plan, which was submitted to the IEPA and incorporated into the November 19, 1996, Phase I NPDES permit issued to the City. The improvements within the plan provided for collection, containment, and discharge of the additional stormwater containing deicing agents.

Snow Storage Areas

Snow collection practices include clearing, collecting, and removing snow from the Airport terminals, ramps, and apron areas after 0.5 inches of snow has accumulated. Snow removed from these areas may contain deicing fluid. Collected snow is directed as appropriate to either an improved snow storage area or to a snowmelter. Snow storage areas are at predetermined locations on Airport property. Snow that cannot be melted with deicing and anti-icing chemicals is stored at these locations until it either naturally melts or is artificially heated to melt by the use of snowmelters (see **Appendix K**, **Water Quality**, for a detailed description of the snowmelters). **Exhibit 5.7-4** depicts the snow storage areas (i.e., snow dumps and hold pads) and staging areas for snowmelters at the Airport.[8] The snow dumps are designated for either airside (Snow Dumps 1 or 3, and Snow Dump 9 located north of Runway 9R holdpad) or landside use (Snow Dump 7 or the back-up snow dump in the northeast corner of the Airport). Airside snow dumps store snow mixed with runway deicing fluids and residual aircraft deicing fluids. Snow stored landside contains snow mixed with road salt and urea.

The City of Chicago's Best Management Practices (BMP) guidelines for the Airport snow storage areas (included as **Attachment Q-1** in **Appendix Q**, **Construction**) are designed to reduce the amount of pollutants discharged to the surface waters surrounding the Airport.

Underground Storage Tanks and Aboveground Storage Tanks

Aboveground storage tanks (ASTs) have the potential to contribute to surface water and groundwater contamination. ASTs are regulated by the State of Illinois Title 41: Fire Protection, Parts 170 and 180. These regulations require that tanks be inspected and approved by the Office of the State Fire Marshal, be properly vented, and have safeguards against spillage, corrosion, and overfill.

Underground storage tanks (USTs) present a potential source of groundwater contamination. In addition, overfilling and subsequent spills around USTs could be a source of surface water contamination. A UST is defined as a tank of at least 110 gallons used to contain regulated substances, the volume of which is 10 percent or more beneath the surface of the ground.[9]

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[8] **Exhibit 5.7-4** illustrates all currently functioning snow storage areas. The Airport Layout Plan has not been updated to show the current status of the snow storage areas. It reflects the location of some areas as snow storage areas that are no longer used for that purpose. The amount of snow storage space necessary has decreased as the Airport has increased its use of snow melters.

[9] Title 41 IAC Part 170.10, Storage, Transportation, Sale, and Use of Petroleum and Other Regulated Substances.

However, tanks smaller than 110 gallons that contain hazardous substances are also considered USTs (refer to **Section 5.19, Solid Waste and Hazardous Materials,** and **Appendix O**, **Solid and Hazardous Waste** for more detail).

USTs and ASTs at the Airport contain aircraft fuel, gasoline, diesel, used oil, unused oil, water, deicing and anti-icing chemicals, and other vehicle and aircraft maintenance fluids.

The City of Chicago's BMP guidelines are used to minimize sources of water pollution from USTs and ASTs for the prevention of surface spills, leaks, and overfilling. The Airport has developed a Spill Prevention Control and Countermeasures Plan (SPCC Plan).[10] The SPCC Plan is a requirement of the Oil Pollution Act of 1990, which mandates a spill response system for the proper handling, storage, and transportation of oil. The Plan establishes procedures, methods and equipment, and other requirements to prevent the discharge of oil from onshore facilities into or upon the navigable water of the United States. **Appendix K**, **Water Quality**, provides more detail on the SPCC Plan.

[10] Spill Prevention Control & Countermeasure Plan, City of Chicago Department of Aviation, December 2, 1996.

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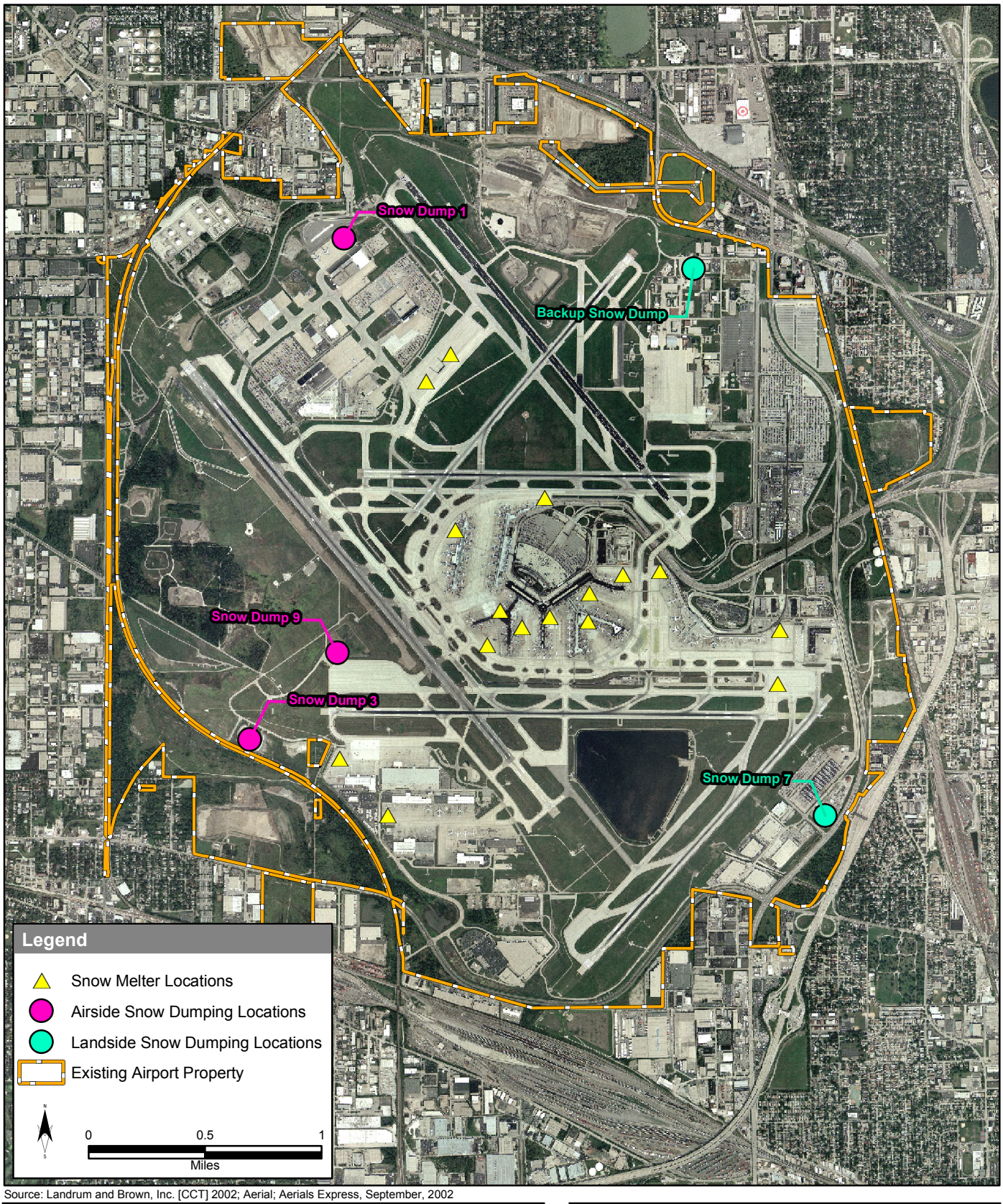

Source: Landrum and Brown, Inc. [CCT] 2002; Aerial; Aerials Express, September, 2002

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Airport Snow Dump Areas and Snow Melter Locations

▶ Exhibit 5.7-4

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Miscellaneous Sources

Other potential sources of surface pollution are accidental chemical spills from Airport operations such as aircraft/vehicle washing, maintenance, and fueling activities. These are also potential sources of groundwater pollution if allowed to leach into the soil. The BMP guidelines are used to minimize sources of water pollution from these miscellaneous sources for the prevention of surface spills and leaks.

The DOA Phase I NPDES Individual Permit specifies the completion of a Stormwater Pollution Prevention Plan (SWPPP) for the facility.[11] Revisions and updates to the SWPPP are currently underway as part of the Phase I NPDES permit renewal process. The SWPPP is a means of ensuring that the stormwater discharges from areas where other airport activities occur meet the IEPA water quality standards. The SWPPP emphasizes pollution prevention and uses the City of Chicago's BMP guidelines to reduce pollutant loadings and improve water quality. **Appendix K, Water Quality**, provides more detail on the SWPPP.

5.7.2.4 Watershed Descriptions

Each of the Airport's three watersheds is a tributary of the lower Des Plaines River, and are considered sub-watersheds of the Des Plaines River. The portion of the lower Des Plaines River watershed occupied by the Airport is 10.7 square miles (2.8 percent) of the total 381 square miles covered by the river's watershed. The portion occupied by the Airport starts in Libertyville and ends where the River empties into the Chicago Sanitary and Ship Canal at Willow Springs. The topography of the watershed was strongly influenced by Pleistocene glaciation and has minimal relief and a relatively uniform gradient. Elevations in the watershed range from a high of 900 feet above sea level to 590 feet at the outlet near Willow Springs. The entire watershed contains 243,000 acres in three counties. The watershed is highly urbanized with over 71 percent of the area in urban land uses.

The Willow-Higgins Creek watershed is located on the North Airfield, Crystal Creek is located immediately south of Willow-Higgins Creek, and Bensenville Ditch/Silver Creek is located south of Crystal Creek. The Bensenville Ditch is known as Silver Creek south of Irving Park Road. **Exhibit 5.7-1** illustrates the three watershed boundaries. All three streams generally flow from west to east into their respective confluences with the Des Plaines River. A small portion of the Airport property watershed flows directly to the Des Plaines River. The locations of the Phase I NPDES drainage basins, flow directions, and Phase I NPDES drainage basin outfall sampling sites are located on **Exhibits 5.7-2** and **5.7-3**. Each of the watersheds are discussed in detail in **Appendix K**, **Water Quality**.

5.7.2.5 Airport Stormwater Runoff

The topography of the Airport is a relatively uniform gradient with impervious (asphalt, concrete, or building) and pervious (vegetated, gravel, or other porous surface) surface areas.

[11] The SWPPP is on file with the City of Chicago Department of Aviation.

The impervious areas result in a drainage system that is highly defined by storm sewers, drainage ditches, and detention basins. The drainage system divides the Airport into basins or areas of land where the stormwater flows to an outfall through a man-made device such as a channel, ditch, or pipe. **Table 5.7-1** provides data for the current watershed areas on Airport property and impervious area information. In a few isolated areas at the Airport where no deicing/anti-icing chemicals are used, stormwater travels via sheet flow to the receiving waterbody, which means that the stormwater flows over land directly into the creek without the assistance of any man-made conveyance systems. **Appendix K**, **Water Quality** provides a detailed description of the stormwater runoff character by watershed.

TABLE 5.7-1
AIRPORT AREAS BY WATERSHED

Watershed	Watershed Area on Airport Property (Acres)(a)	Percent of Airport Covered by Watershed	Impervious Area in Watershed on Airport Property (Acres)	Percent of Impervious Area in Watershed on Airport Property
Willow-Higgins Creek	3,453	50.8%	1,332	38.6%
Crystal Creek	1,770	26.0%	1,008	56.9%
Bensenville Ditch / Silver Creek	1,381	20.3%	376	27.2%
Unassigned Watershed (b)	199	2.9%	68	34.9%

Notes: (a) Total airport acreage calculated to be 6,804.3 acres.
(b) Portions of the Airport not requiring an Phase I NPDES permit were not included in any of the three watersheds.
Source: Watershed delineation from CTE Engineers, produced for DOA NPDES permit application.

5.7.2.6 Stormwater Quality Infrastructure Improvements

Stormwater quality management at the Airport addresses both airfield and aircraft deicing activities and all other airport industrial activities. Stormwater quality infrastructure improvements include infrastructure improvements in the South Airfield and North Airfield, use of snowmelters, and implementation of pollution reduction practices and programs. These activities are further discussed in **Appendix K**, **Water Quality**.

5.7.2.7 Groundwater

The Airport receives its water supply from Lake Michigan, although, historically, municipalities near the Airport used groundwater wells as a source for potable water. The wells were screened in any of four aquifers: 1) the shallow basal "sand and gravel" aquifer; 2) the shallow Silurian Dolomite Aquifer; 3) the Galena-Platteville and Glenwood-St. Peter sandstone Aquifer; and 4) the Elmhurst-Mt. Simon Aquifer. The shallow aquifers are recharged by the seepage of precipitation downward through the soil.

The two classes of groundwater wells in the Chicago area are those dug in the glacial drift to a depth below the water table and those drilled deeper into bedrock. Some state water wells in the area have depths ranging from 32 to 225 feet. As a consequence of historical development of the Chicago area for commercial and industrial purposes, the City of Chicago and all other municipalities surrounding the Airport now have ordinances in place forbidding the use of groundwater wells as potable water sources. The wells can be used for industrial purposes

only. A discussion of the groundwater existing conditions and well locations is provided in **Appendix K**, **Water Quality**.

5.7.2.8 Potable Water Sources

All water used at the Airport originates from Lake Michigan due to a City Ordinance that prohibits the use of groundwater wells as a potable source of water. The City of Chicago treats water from Lake Michigan using a conventional treatment process. The water is used for a variety of purposes, such as consumption by passengers and employees, for drinking and sanitary purposes, maintenance and cleaning of aircraft, tenant operations, and for landside fire protection.

5.7.3 Alternatives Analysis – Build Out

The following sections present information on the potential environmental impacts on water quality by each of the alternatives retained for detailed evaluation. Only the Build Out phase is presented because this represents the time at which all components of the Build Alternatives would be completed, operational, and all potential impacts would be realized.

5.7.3.1 Alternative A - No Action

During the first year of operation, the Airport would continue to comply with the current Phase I NPDES stormwater discharge permit, which would be in effect until a revised discharge permit is issued. The City's MS4 permit would remain in effect through the Build Out + 5 phase. The NPDES and MS4 permit processes would continue to monitor and manage stormwater and construction discharge and pollutants in a similar manner and as effectively as they are today.

Operational activities that could contribute pollutants to surface water would remain the same in the future as they are today, including deicing, snow storage, fueling, and aircraft maintenance. However, the Airport would continue to evaluate means to reduce use of certain deicing fluid and evaluate new approaches to deicing with the ultimate goal of reducing pollutant load in stormwater. The DOA would continue to complete, update, and implement the SWPPP for the Airport as required under the current Phase I NPDES permit. The SWPPP would continue to require pollution prevention and the use of BMPs to prevent and reduce pollution of surface water.

Snow storage procedures, construction operations, fueling, and maintenance practices would continue, as they do today, under the No Action Alternative (Alternative A). The runoff quantity and pollutants loads generated from these procedures would not change substantially.

Under the No Action Alternative (Alternative A), the watershed boundaries at the Airport would remain the same as they are today and the creek alignments would not change. Stormwater would continue to be conveyed from the impervious areas of the Airport through existing conveyance facilities and be routed to the north and south detention basins at similar seasonal flow rates and flow volumes.

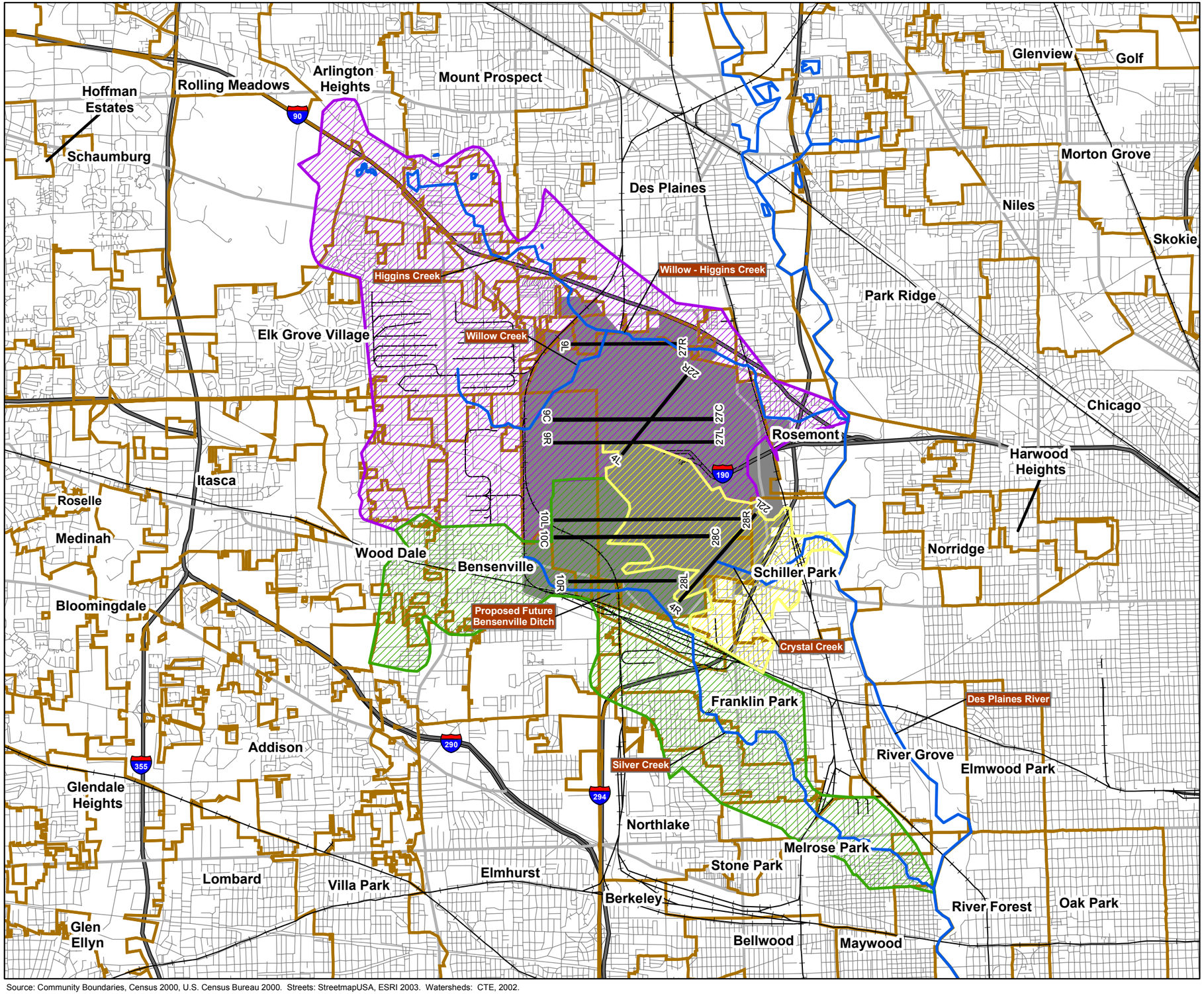
The amount of impervious surfaces (i.e., airfield pavements, terminals support facilities and access roads) would be similar to what they are today because most of the future projects focus on replacement and rehabilitation necessary to maintain the existing Airport infrastructure throughout the planning period. There may be areas converted to impervious surfaces during the first operational year, but considering that the majority of new construction would take place on previously paved or developed areas, the amount of additional impervious surfaces would not substantially increase stormwater runoff or pollutant loads to surface water.

5.7.3.2 Alternatives C, D, and G

The three Build Alternatives involve major development at the Airport that would likely result in similar water quality impacts at the Airport. Therefore, these alternatives are presented together in this section.

Changes to Watershed Boundaries and Waterways

As a result of Alternatives C, D, or G, the area within the Willow-Higgins Creek watershed would be increased by approximately 250 acres compared to Alternative A, and a corresponding decrease of 250 acres from the Bensenville Ditch/Silver Creek watershed (see **Exhibit 5.7-5**). No change in the boundaries of the Crystal Creek watershed or the area that drains directly to the Des Plaines River would be affected by Alternatives C, D, or G. These 250 acres that would be transferred from the Bensenville Ditch/Silver Creek watershed to the Willow-Higgins Creek watershed would be used for landside purposes, and would include the proposed western terminal, parking garage, collateral development, and western access roadway system. As a landside area, it would not include the use of aircraft deicing chemicals, and runoff from this area would not require treatment by MWRDGC at the Stickney Treatment Plant. Although Alternatives C, D, or G would increase the impervious surface area within the Willow-Higgins Creek watershed compared to the No Action Alternative (Alternative A), the water quality of the runoff would not change because there would be no difference in the types of surface-borne, point, and non-point source pollutants in the stormwater. However, the increased runoff generated by these proposed changes would be captured by detention basins and treated by MWRDGC at the Stickney Treatment Plant, which has the capacity to accommodate this increase in stormwater. In addition, the increases in stormwater generated by Alternatives C, D, or G would be regulated under the Phase I NPDES program. An additional discussion of the changes in surface water hydrology associated with changes to watershed boundaries, and with the changes in the amount of impervious surface areas, is provided in **Section 5.13**, **Floodplains**.



Source: Community Boundaries, Census 2000, U.S. Census Bureau 2000. Streets: StreetmapUSA, ESRI 2003. Watersheds: CTE, 2002.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

- Railroads
- Freeways
- Secondary Roads
- Roads
- Proposed Future Creeks
- Community Boundaries
- Proposed Airport Property
- Proposed Future Bensenville Ditch/Silver Creek Watershed
- Proposed Future Crystal Creek Watershed
- Proposed Future Willow-Higgins Creek Watershed

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Proposed Future Watershed Delineation (Build Out Phase)

▶ Exhibit 5.7-5

Increase in Impervious Area

Under Alternatives C, D, or G the number of acres of impervious surface areas in both the North and South Airfield would increase (see **Section 5.13, Floodplains**). The increases in impervious area would result in greater runoff volumes and require additional stormwater detention. The stormwater system proposed for Alternatives C, D, or G is designed to capture all areas where deicing chemicals and other pollutants may be used and routes stormwater to detention basins. This includes areas within 200 feet of the edge of runway/taxiway pavement that may contain glycol-contaminated snow thrown by runway clearing equipment. The detention basins proposed under Alternatives C, D, or G are designed to accommodate the increase in runoff and would not change the flow in any of the three creeks that drain the Airport. Thus, this would result in maintaining or decreasing the frequency of detention overflows that enter the three onsite creeks. The stormwater infrastructure also would capture stormwater discharges from industrial areas that discharge directly to creeks under the No Action Alternative (Alternative A). These areas include the Southwest Cargo Area and the Hangar Area, both of which have exceeded Phase I NPDES pollutant load limits in the past. Although Alternatives C, D, or G would generate additional impervious areas, the improvements to stormwater conveyance and the expansion of the on-site detention basins would accommodate any increase in runoff and would not result in any changes to the water quality of the runoff.

Airside Drainage Areas

Compared to the No Action Alternative (Alternative A), Alternatives C, D, or G would increase airside (subject to aircraft and runway deicing chemicals) drainage areas and, therefore, increase the amount of area subject to airside deicing chemicals. The DOA would modify the existing SWPPP to include the various projects that would be constructed under Alternatives C, D, or G to ensure that water quality impacts would not occur.

North Airfield - Compared to the No Action Alternative (Alternative A), Alternatives C, D, or G would increase the amount of area subject to deicing chemicals in the North Airfield from 1,600 acres to 2,130 acres. Additional airside drainage areas that would flow to the North Detention Basin include Runway 9L-27R, Runway 9C-27C, the extension of Runway 9L-27R (future Runway 9R-27L) and the northern half of the western terminal tarmac. Runway 4L-22R would remain and continue to drain into the North Detention Basin. During winter conditions, stormwater from the North Airfield would contain deicing chemicals and the drainage would be routed to the North Detention Basin prior to conveyance to the MWRDGC Stickney Treatment Plant. The proposed design of the detention basins under Alternatives C, D, or G would provide for adequate volume to manage and accommodate the increases in airside stormwater containing deicing chemicals.

South Airfield - Implementation of Alternatives C, D, or G would increase the airside area subject to deicing chemicals by approximately 900 acres over that of the No Action Alternative (Alternative A). Similar to the North Airfield, stormwater containing these chemicals would be routed to detention basins prior to conveyance to the MWRDGC Stickney Treatment Plant for

pre-discharge treatment. The proposed design of the detention basins under Alternatives C, D, or G would provide for adequate volume to accommodate and manage the increases in airside stormwater containing deicing chemicals.

Airport Operational Activities

Similar to the No Action Alternative (Alternative A), operational activities that could contribute pollutants to surface water, including deicing, snow storage, fueling, and aircraft maintenance would remain at the Airport. However, under Alternatives C, D, or G, the magnitude of these operations would be greater because of the increase in impervious surfaces. The DOA would continue to complete, update, and implement the SWPPP for the Airport as required under the current Phase I NPDES permit and require pollution prevention and the use of BMPs to prevent and reduce pollution of surface water. The DOA would continue the snow storage procedures, construction operations, fueling, and maintenance practices under Alternatives C, D, or G.

Groundwater / Aquifer Impacts

The increase in impervious surfaces at the Airport under Alternatives C, D, or G would result in less runoff percolating into the soil and into the groundwater aquifer. Because of the continued implementation of the SWPPP, the quality of runoff entering the groundwater aquifer under Alternatives C, D, or G would be the same under the No Action Alternative (Alternative A).

Stormwater Discharge Permitting

Similar to the No Action Alternative (Alternative A), the DOA would continue to comply with the current Phase I NPDES stormwater discharge permit under Alternatives C, D, or G, which would be in effect until a revised discharge permit is issued. The DOA would revise the existing SWPPP as new projects are constructed and are operational (e.g., runways, taxiways, parking aprons, etc.). However, some revisions to the Phase I NPDES stormwater discharge permit could occur to reflect alterations in watershed boundaries, addition of detention, stormwater discharge outfalls, and changes to stormwater sampling locations. The City's MS4 permit would remain in effect through the Build Out + 5 phase. The NPDES and MS4 permit processes would continue to monitor and manage stormwater and construction discharge and pollutants in an effective manner regardless of permit changes that are required to address changing water quality conditions and facilities under Alternatives C, D, and G. As discussed in **Section 5.7.2, Baseline Conditions**, IEPA previously issued a NPDES individual permit (IL 0066567) to Airport Group International (AGI), now known as Aircraft Service Group International (ASIG), for the fuel farm, which is located within Sub-Basin 400. This permit became effective in May 1996, and technically expired on April 30, 2001. An application to renew the permit with IEPA is currently being developed, during which time the existing permit is still valid.

5.7.4 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 water quality would occur under any of the Build Alternatives, no formal mitigation procedures have been identified.

5.7.5 Summary

Under the No Action Alternative (Alternative A) and each build alternative, the FAA concludes that no significant impacts related to water quality would occur. Compared to the No Action Alternative (Alternative A), the potential for water quality impacts under Alternatives C, D, or G would be greater due to the increase in impervious surface area, additional airside areas using deicing chemicals, and substantial construction activity. However, the increase in potential water quality impacts would not be significant because, in addition to the efforts to reduce contamination to surface water from deicing chemicals, adequate stormwater facilities, designed to manage, contain, and convey the calculated increases in stormwater, have been designed and would be constructed as part of each of the Build Alternatives. During winter conditions, stormwater from the North and South Airfield would contain deicing chemicals and the drainage would be routed to detention basins prior to conveyance to the MWRDGC Stickney Treatment Plant.

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