APPENDIX Q
CONSTRUCTION

This Appendix contains background material, which supplements the construction impacts analysis and other related environmental resources contained in **Chapter 5, Environmental Consequences**. The total construction activity under the No Action Alternative would be substantially smaller in scope than for any of the Build Alternatives. Because of this, there is a comparison made between the relative impacts of the Build Alternatives to each other. Alternative C is utilized as the Build Alternative against which other alternatives are compared. The City has prepared detailed reports related to their proposed O'Hare Modernization Program (OMP). FAA utilized this information and modified the dataset as appropriate to identify potential impacts related to Alternatives D and G. This appendix consists of the following sections:

- Q.1 Conceptual Construction Staging Areas
- Q.2 Best Management Practices Manual
- Q.3 Sustainable Design Manual
- **Attachment Q-1 Best Management Practices Manual for O'Hare**
- **Attachment Q-2 OMP Sustainable Design Manual**
- **Attachment Q-3 Construction Outreach Program**

Q.1 CONCEPTUAL CONSTRUCTION STAGING AREAS

As discussed in **Section 5.0, Introduction**, and in **Section 5.20**, **Construction Impacts**, the following potential construction schedule scenarios were considered:

- Original Construction Schedule – As described earlier in **Section 5.0**, the original construction schedule submitted to the FAA by the City called for construction to begin in mid-2004. For reasons already identified, it is now evident that this schedule was unduly optimistic. Details of the original schedule are presented in **Section 5.20, Construction Impacts.**
- Compressed Schedule – This construction schedule would compress the construction that was originally scheduled between July 2004 (Year 1 of the Original Schedule) and September 2007 (Year 4 of the Original Schedule) into the time period of September 2005 (Year 1 of the Compressed Schedule) to September 2007 (Year 3 of the Compressed Schedule). Unlike the original schedule, the City's proposed Runway 9R/27L would be fully operational in October 2007 (Year 3 of the Compressed Schedule) instead of January 2007. All other future years of analysis would remain the same as those assessed in the original schedule.

- Delayed Schedule – This construction schedule is the same as the original construction schedule, but delayed by 14 months. Instead of construction beginning in July 2004 (Year 1 of the Original Schedule), it would begin in September 2005 (Year 1 of the Delayed Schedule). For all other future years of analysis, there would be a one-year delay (i.e. 2008, 2010, 2014, and 2019 are analyzed instead of 2007, 2009, 2013, and 2018). However, reference will continue to be made to the construction start year for each potential construction schedule (i.e., Year 1, Year 2, or Construction Phase I, Construction Phase II, Build Out, and Build Out + 5)

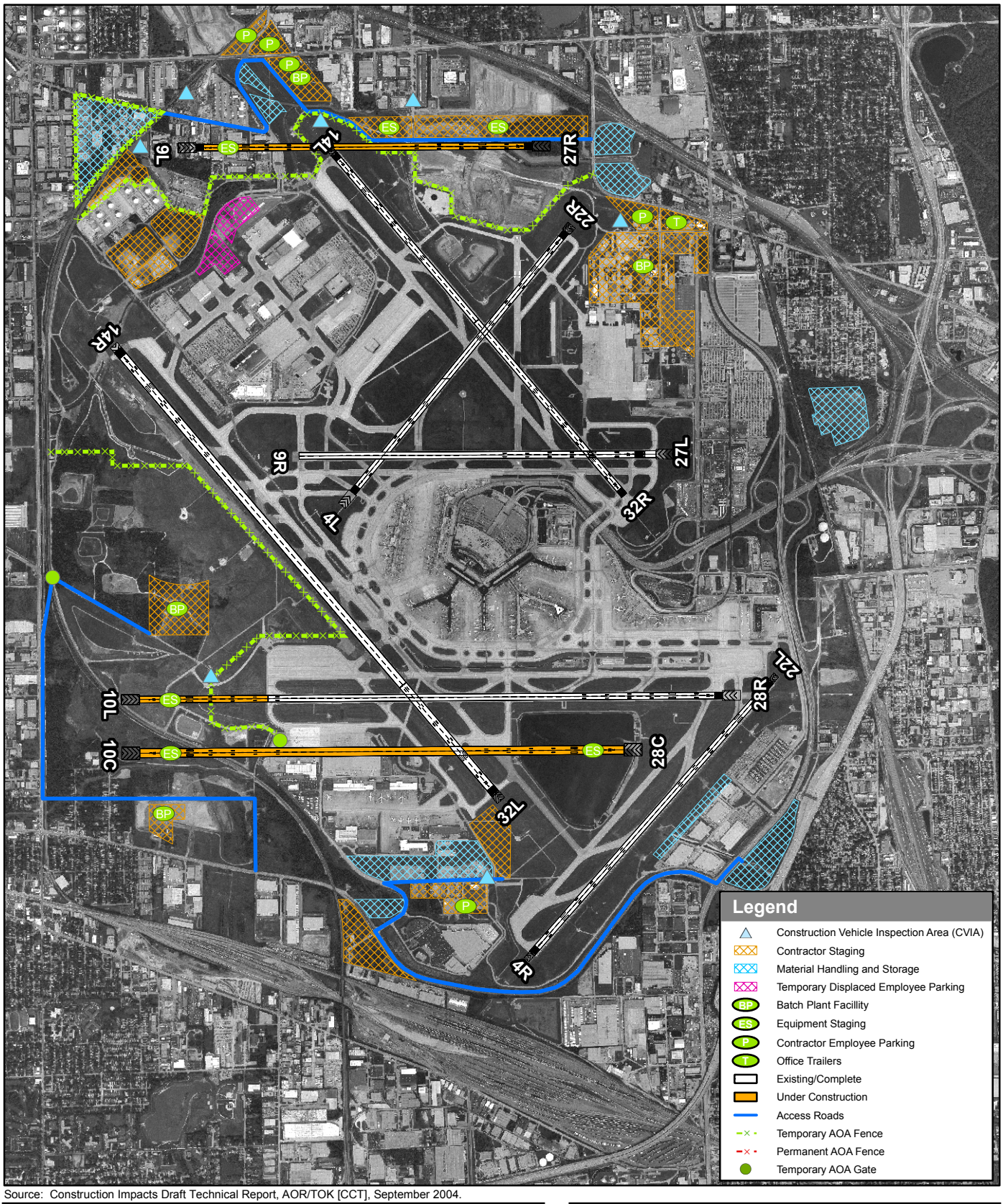
These potential construction schedules and their analyses, including the Original Schedule, are discussed in **Section 5.20**.

The following exhibits, **Exhibit Q-1** through **Q-11**, present an overview of anticipated construction activity and construction staging areas on the Airport by construction year (Year 1 through Year 10) for the implementation of Alternative C using the Original Schedule and Delayed Schedule. Since the Delayed Schedule approximately follows the Original Schedule, but delayed 14 months, the airfield construction activity and staging areas used on the Airport during construction are similar for each year.

Similarly, **Exhibit Q-12** through **Exhibit Q-20** present an overview of anticipated construction activity and construction staging areas on the Airport by construction year (Year 1 through Year 9) for the implementation of Alternative C using the Compressed Schedule. The number of construction years with the Compressed Schedule is reduced by one (compared to the other schedules) because of the early compression in the schedule.

The anticipated construction activity/staging areas for Alternatives D and G would be comparable for each potential construction schedule. Each exhibit includes the location of the following:

- Batch Plant Facilities
- Equipment Staging Areas
- Contractor Employee Parking
- Office Trailers
- Temporary Aircraft Operations Area (AOA) Gates
- Contractor Staging Areas
- Material Handling and Storage Areas
- Temporary Displaced Employee Parking Areas
- Construction Vehicle Inspection Locations
- Access Roads
- Temporary AOA Fence



Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 1) Original and Delayed Schedules

▶ Exhibit Q-1

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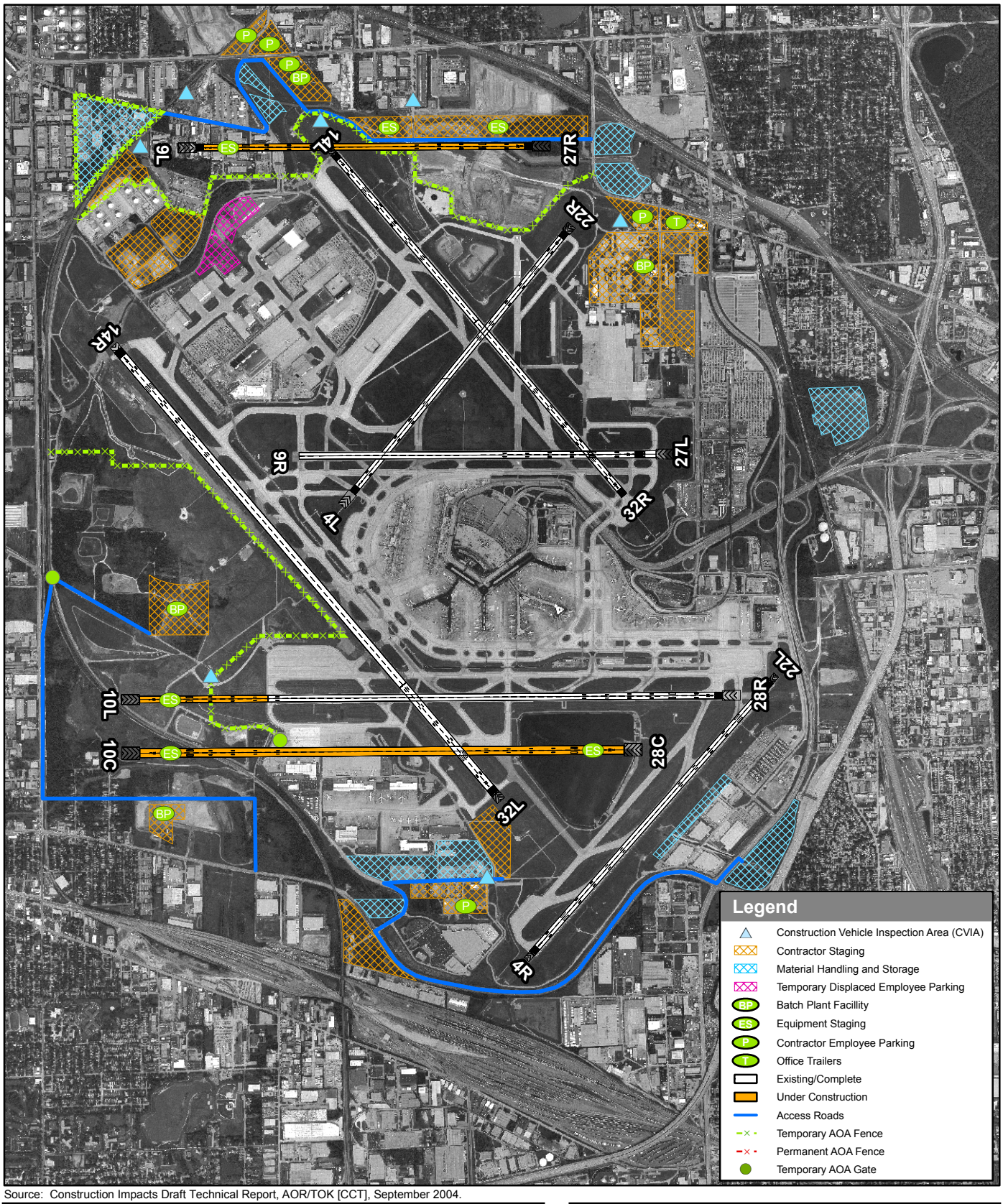

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 2) Original and Delayed Schedules

▶ Exhibit Q-2

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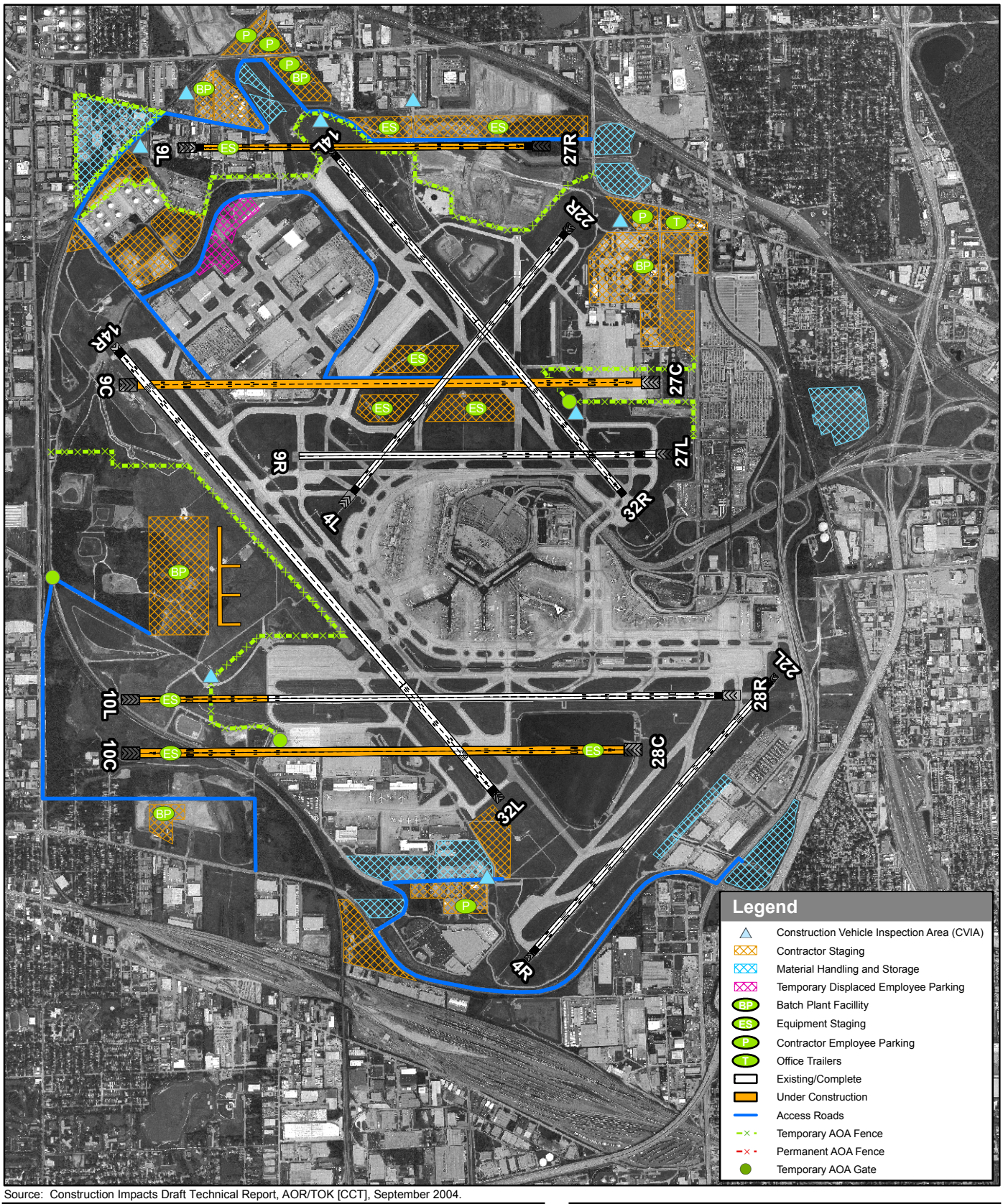

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 3) Original and Delayed Schedules

▶ Exhibit Q-3

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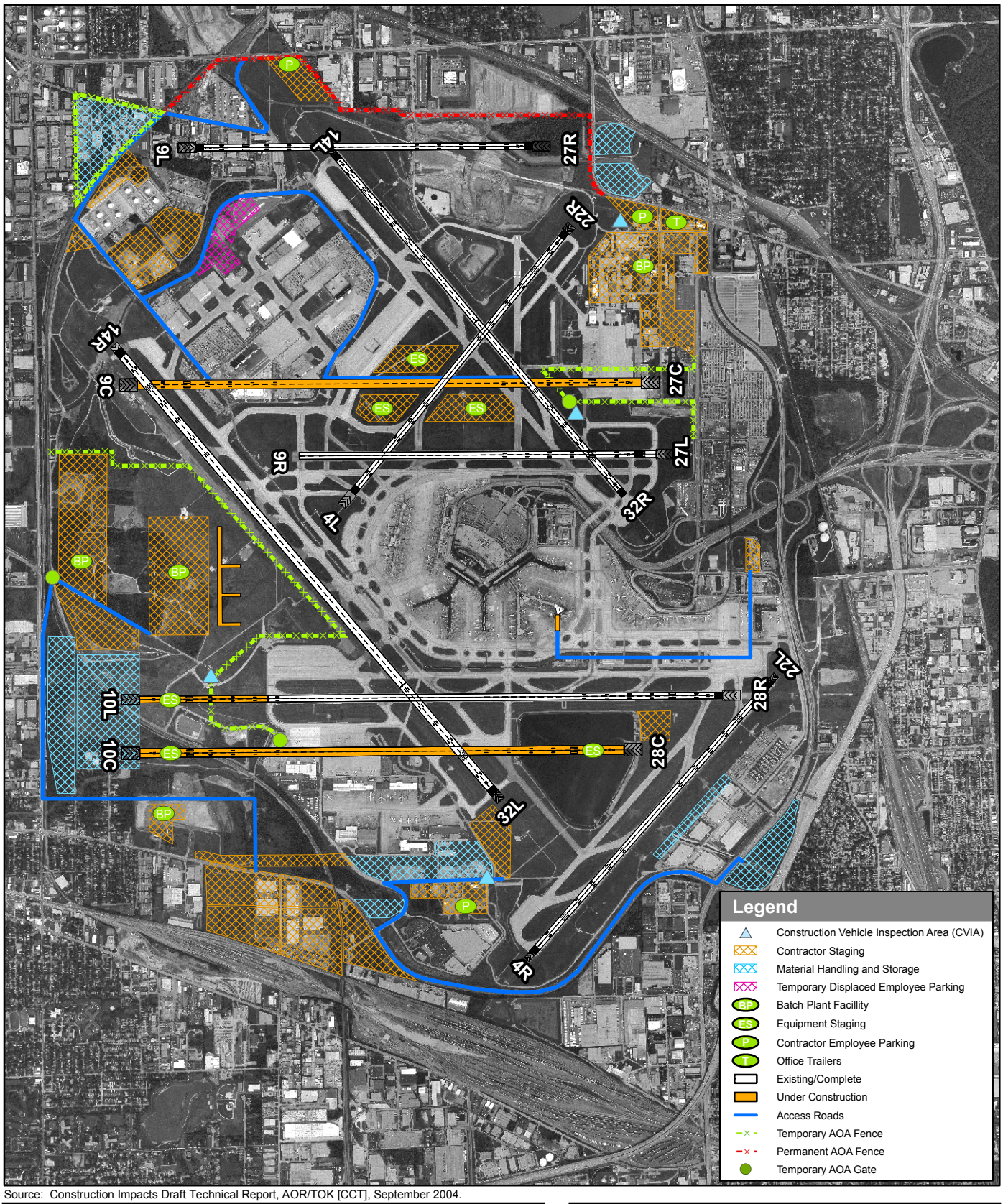

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 4) Original and Delayed Schedules

▶ Exhibit Q-4

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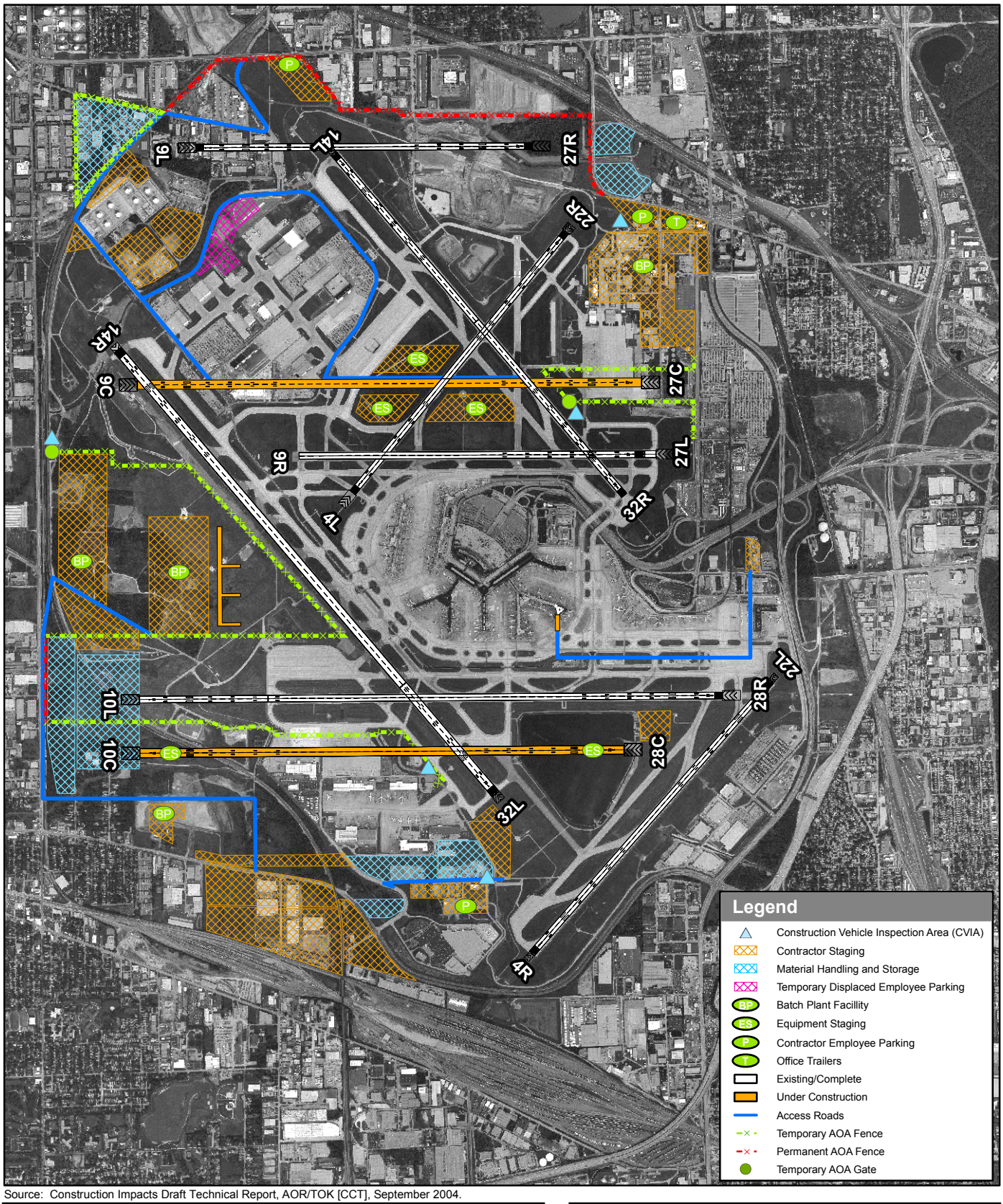

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 5) Original and Delayed Schedules

▶ Exhibit Q-5

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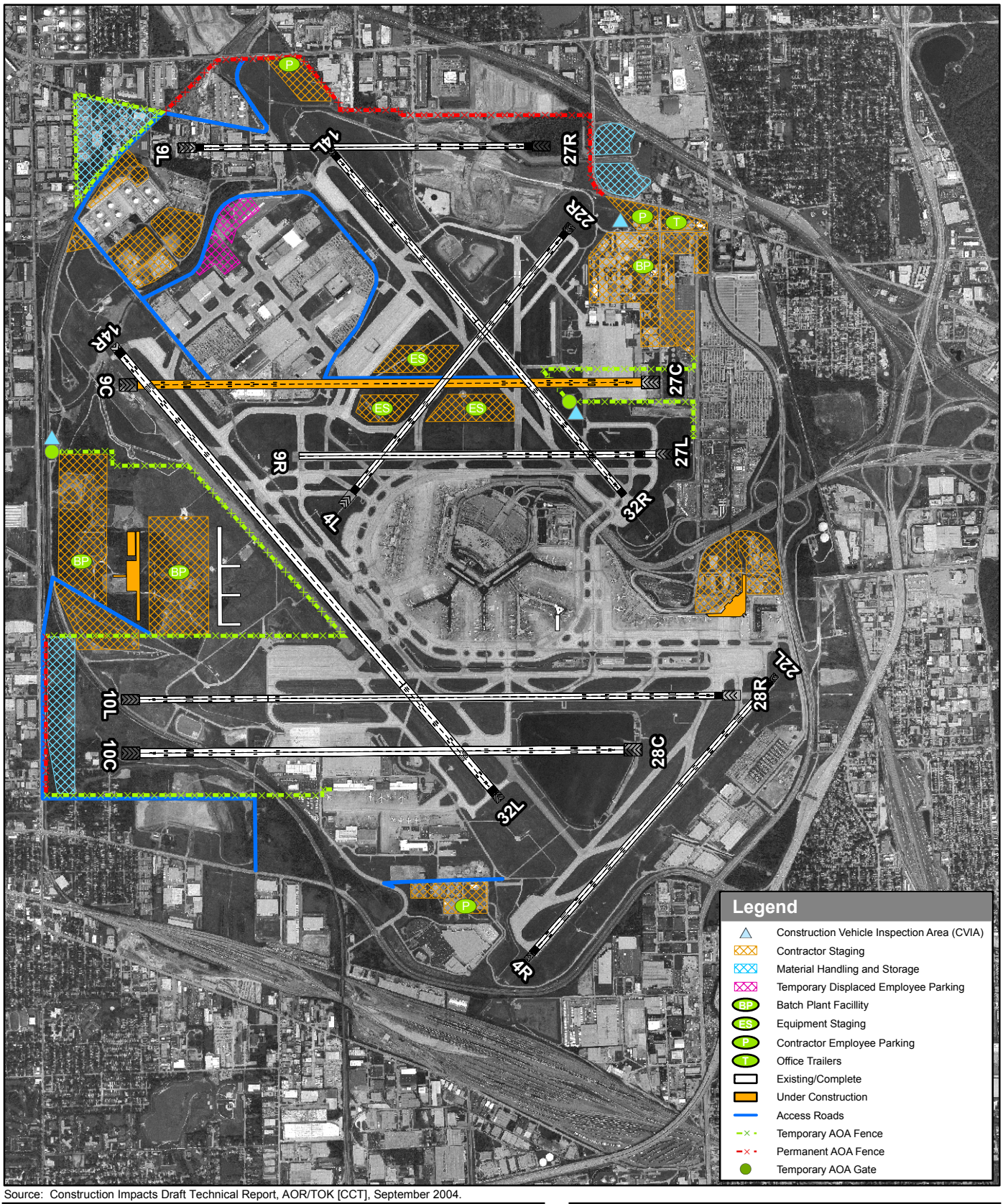

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 6) Original and Delayed Schedules

▶ Exhibit Q-6

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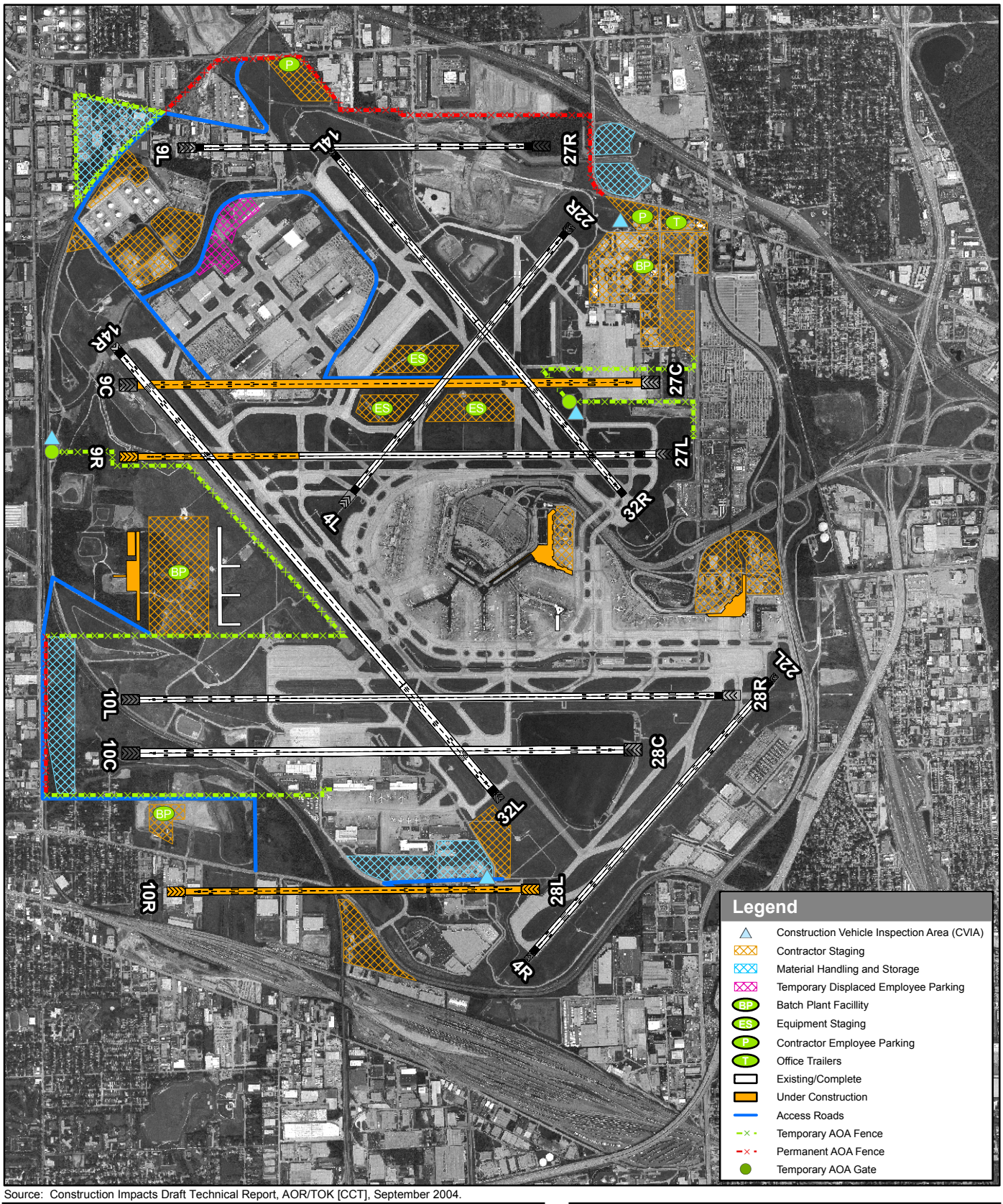

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 7) Original and Delayed Schedules

▶ Exhibit Q-7

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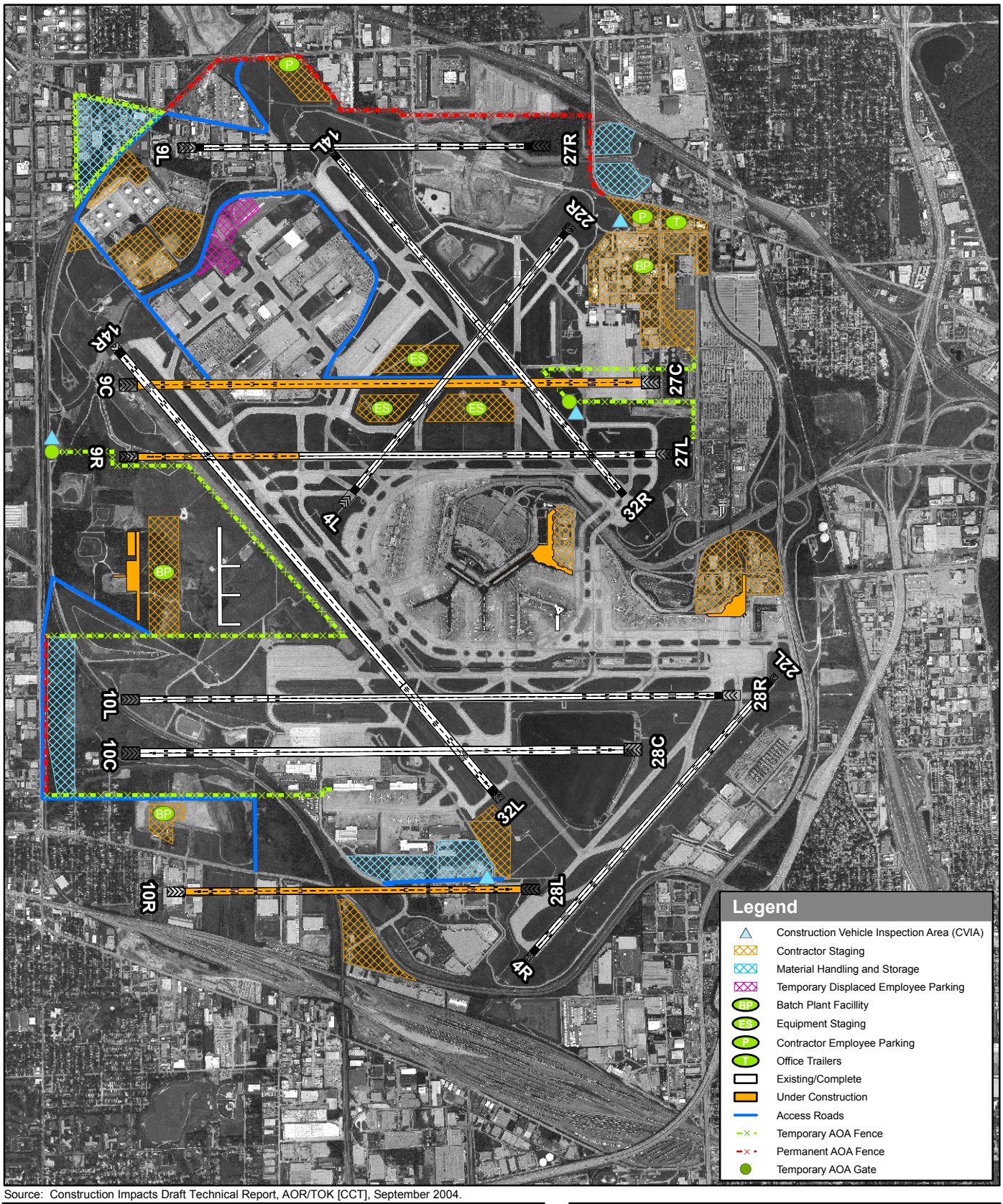

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 8) Original and Delayed Schedules

▶ Exhibit Q-8

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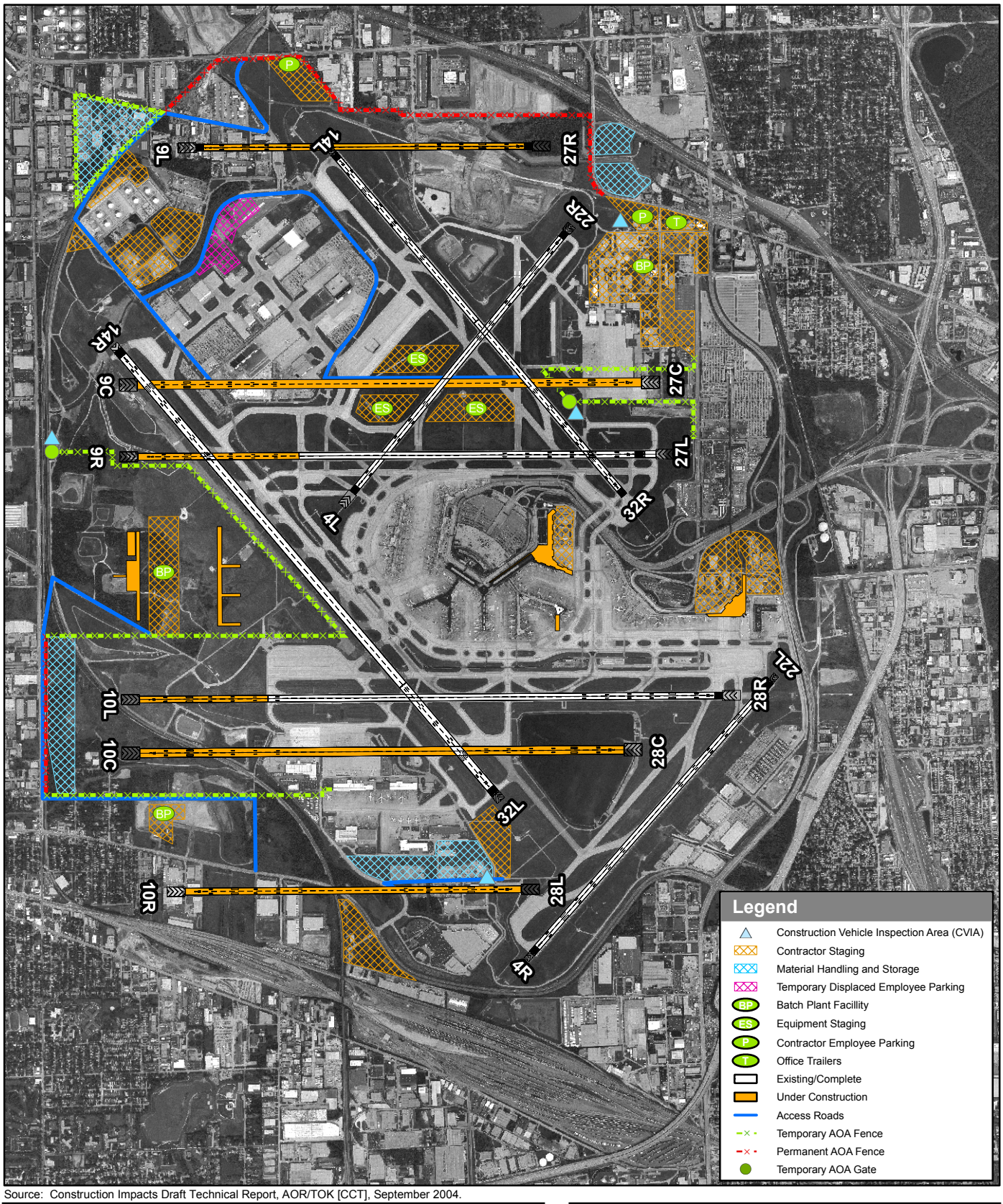

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 9) Original and Delayed Schedules

▶ Exhibit Q-9

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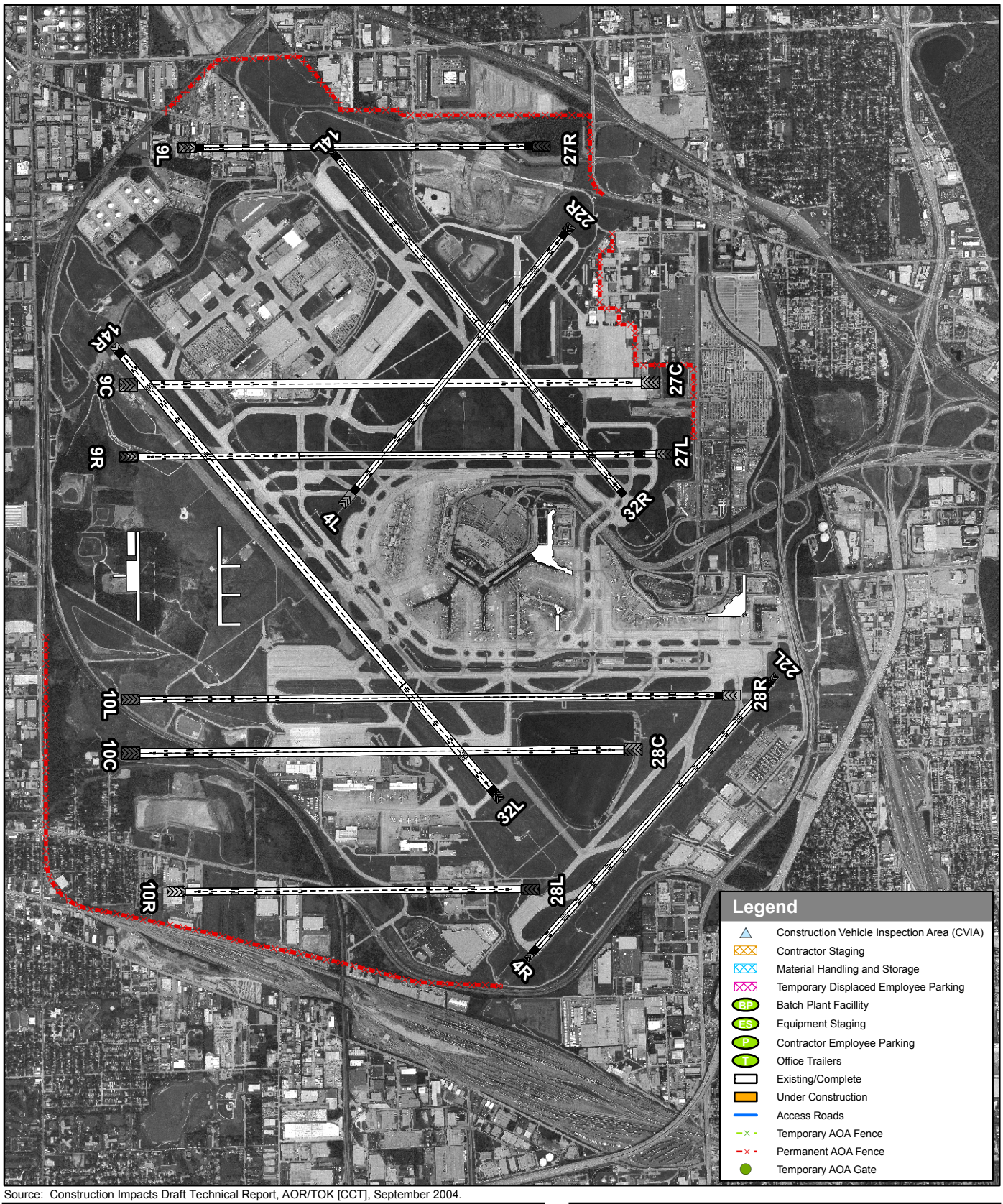

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 10) Original and Delayed Schedules

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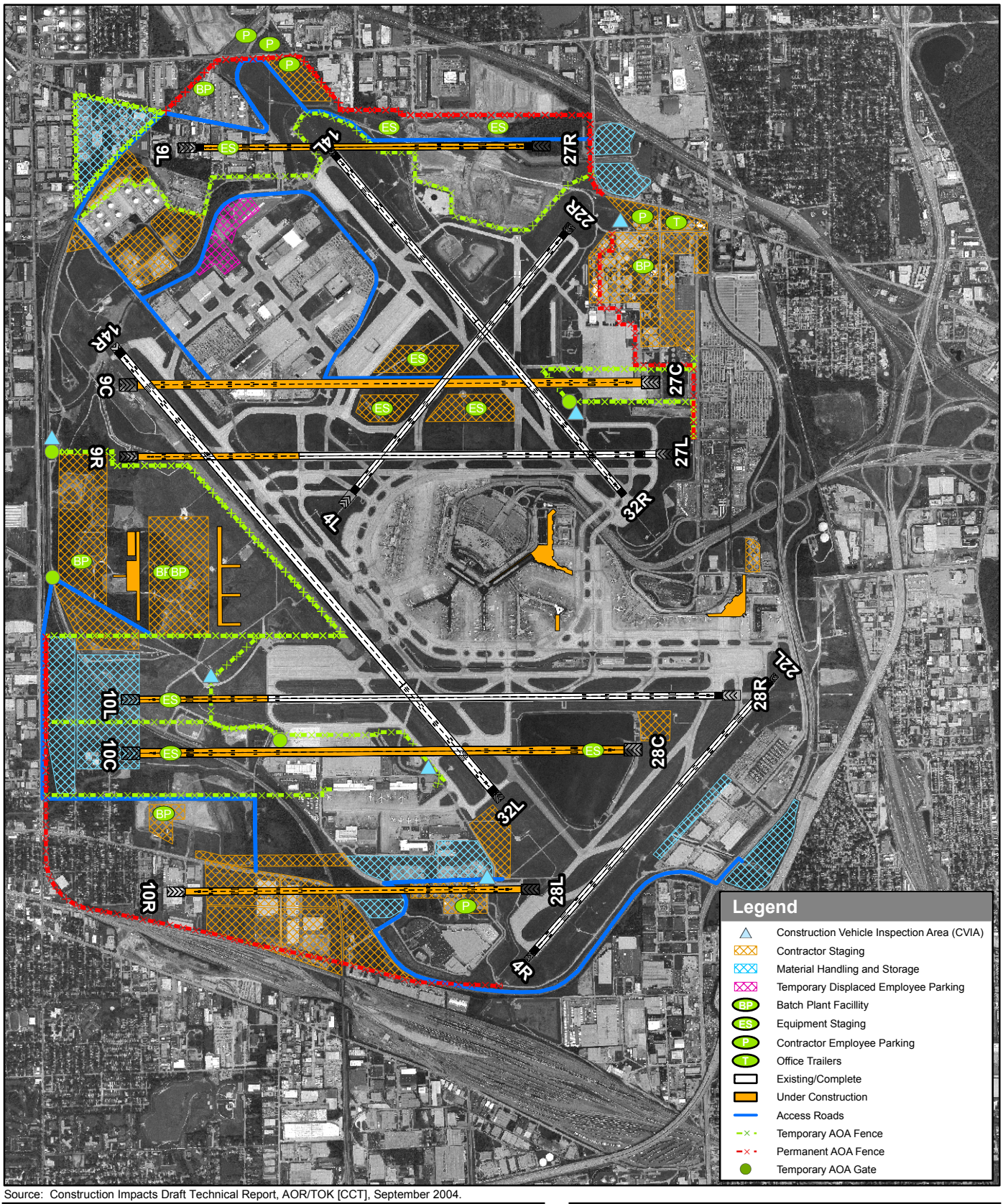

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (All Years) Original and Delayed Schedules

▶ Exhibit Q-11

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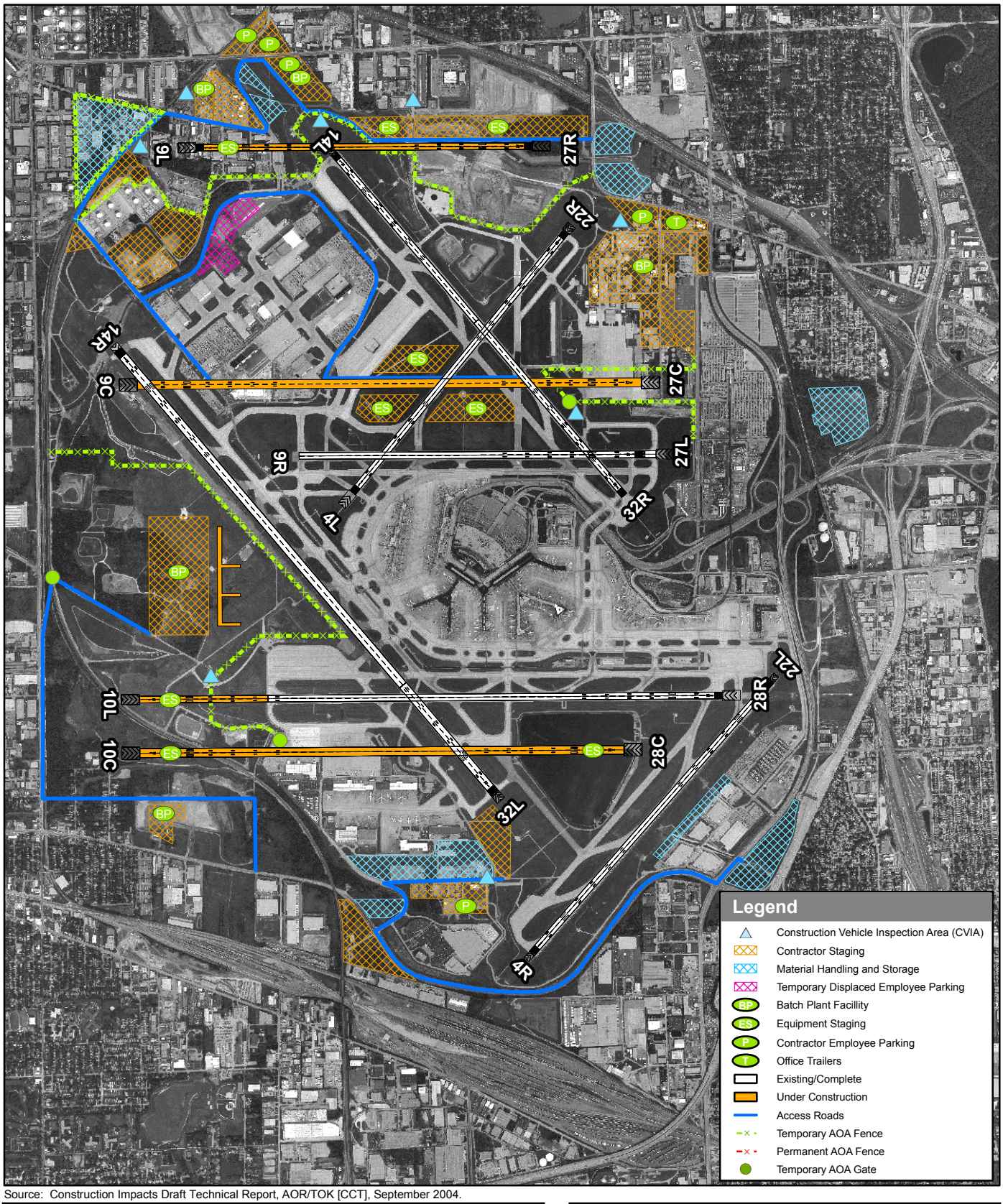

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 1) Compressed Schedule

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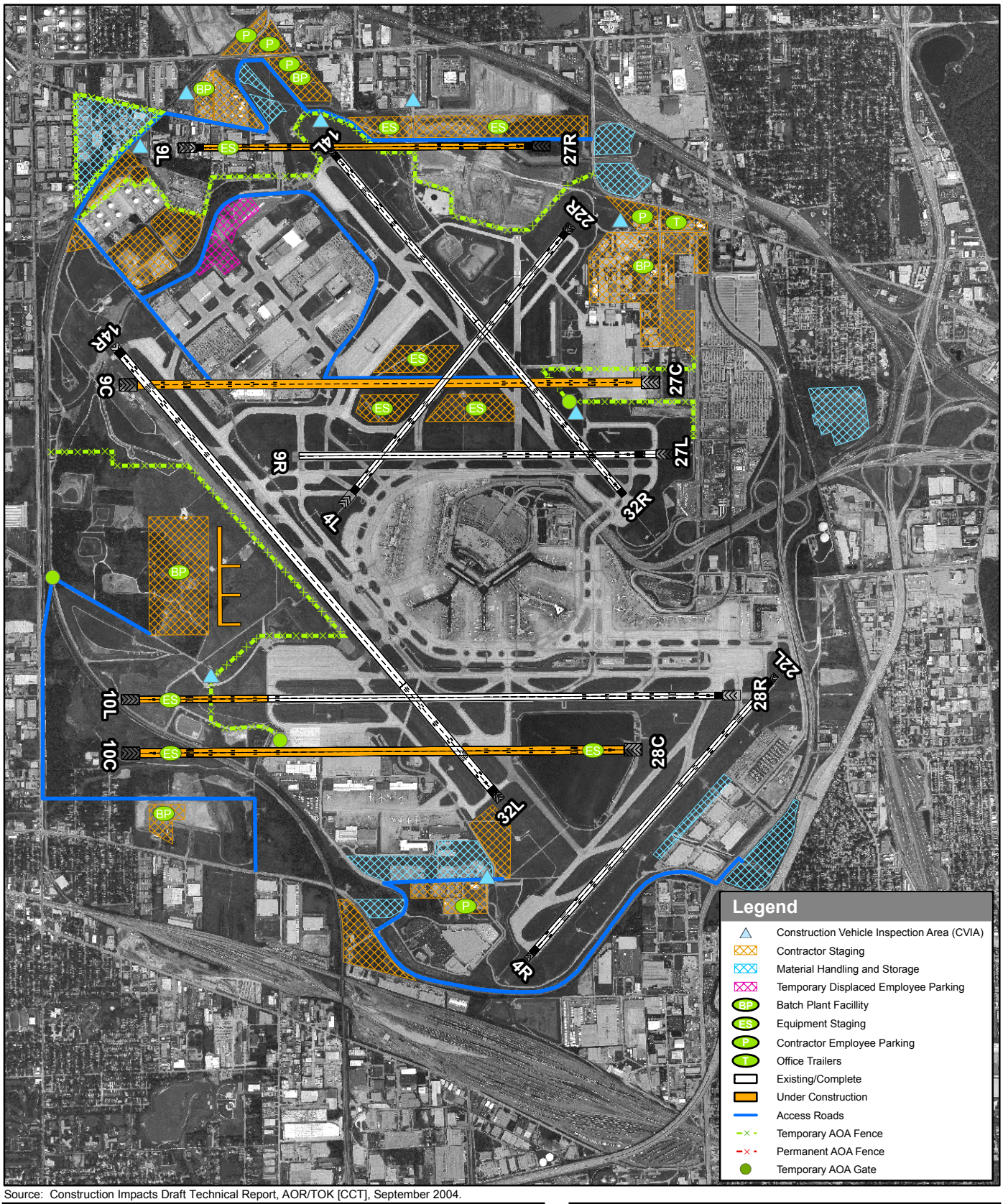

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 2) Compressed Schedule

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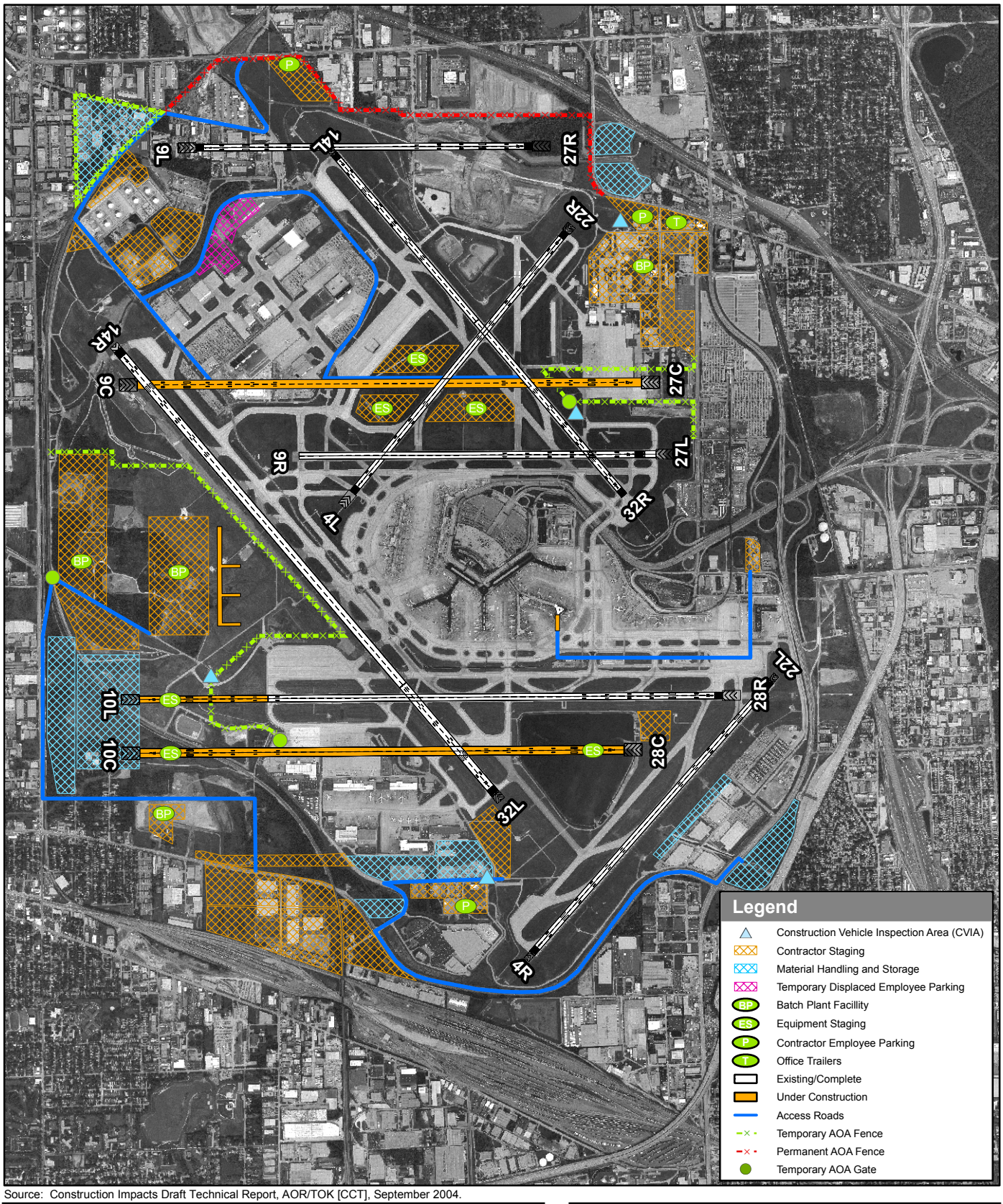

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 3) Compressed Schedule

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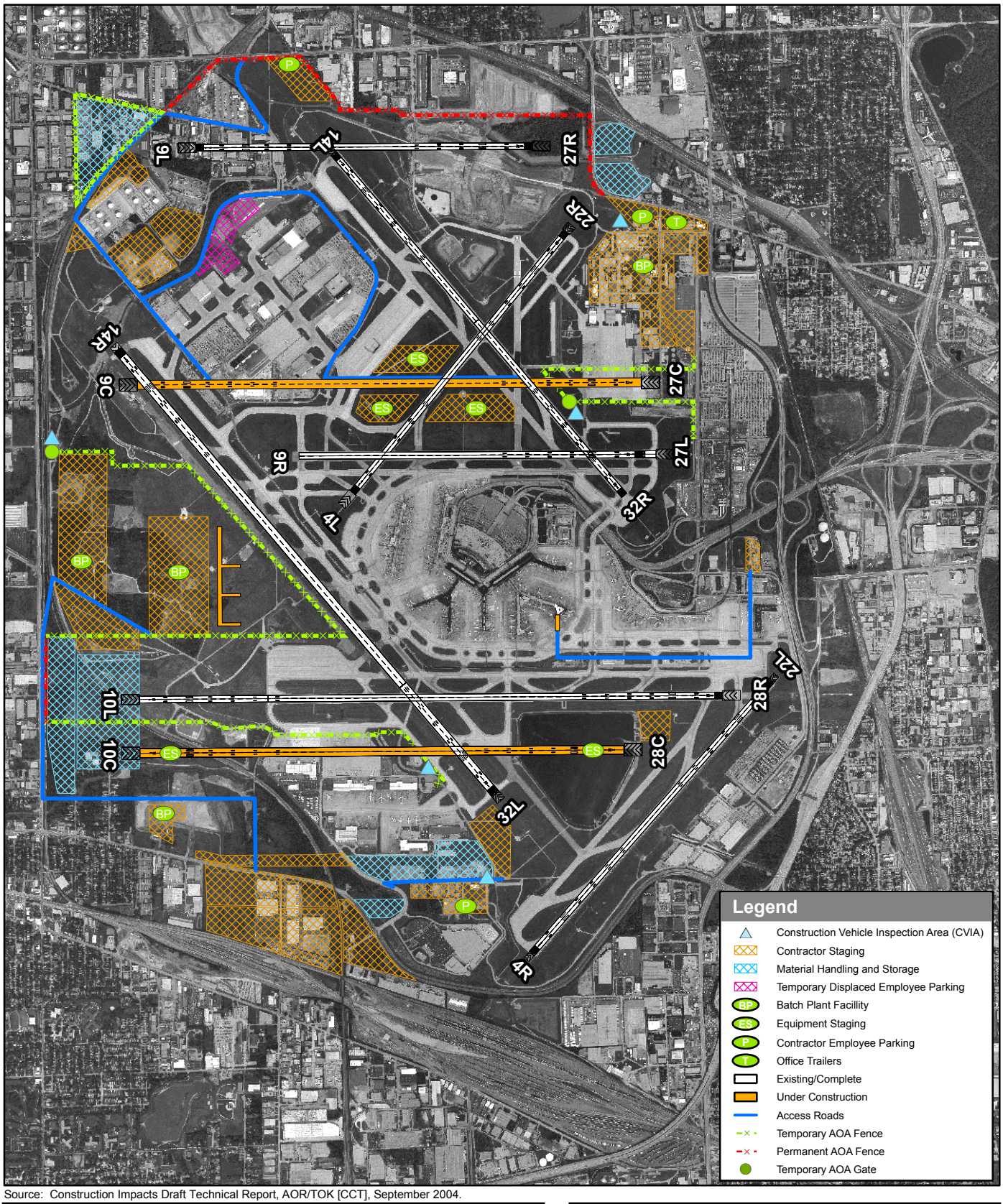

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 4) Compressed Schedule

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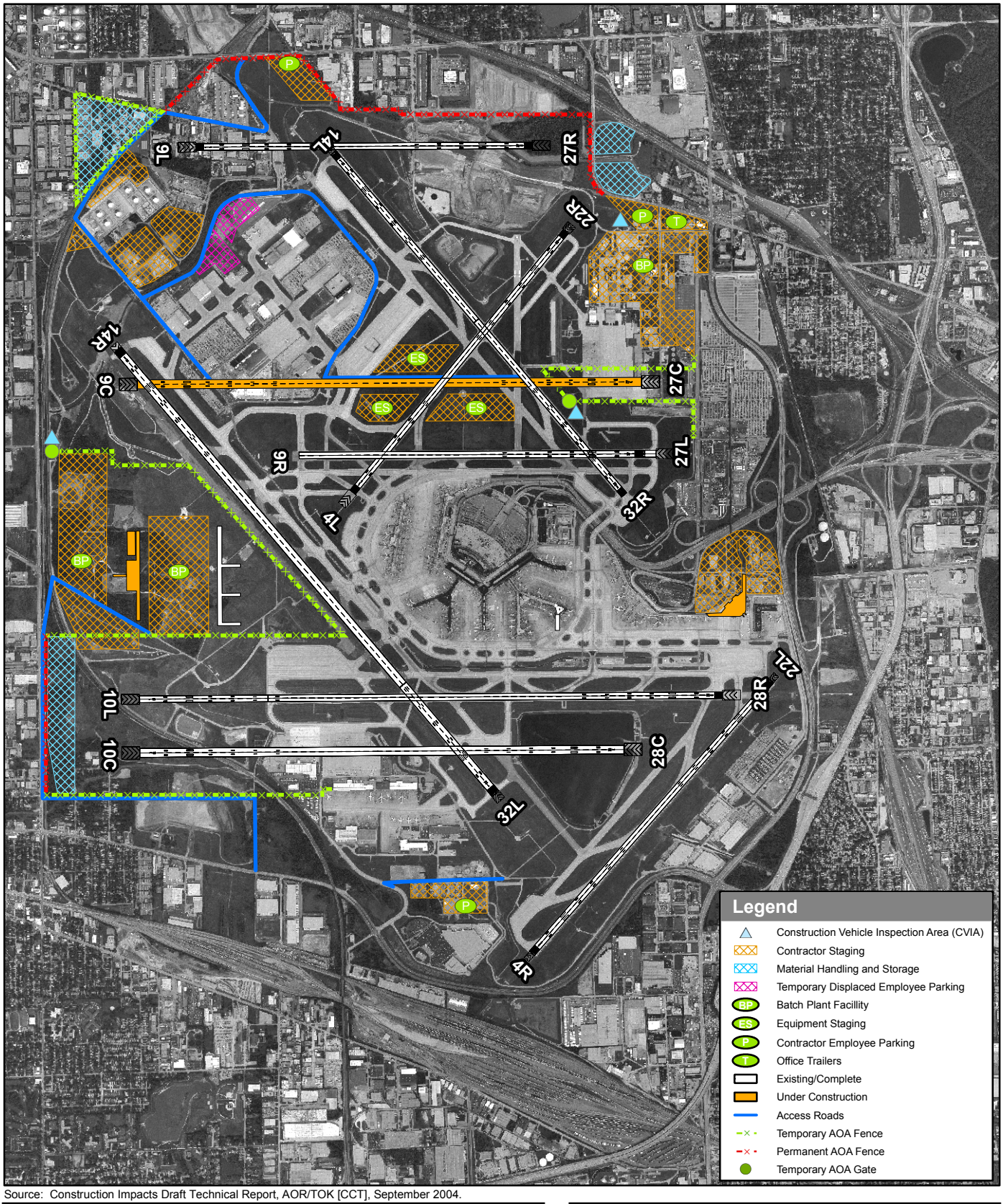

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 5) Compressed Schedule

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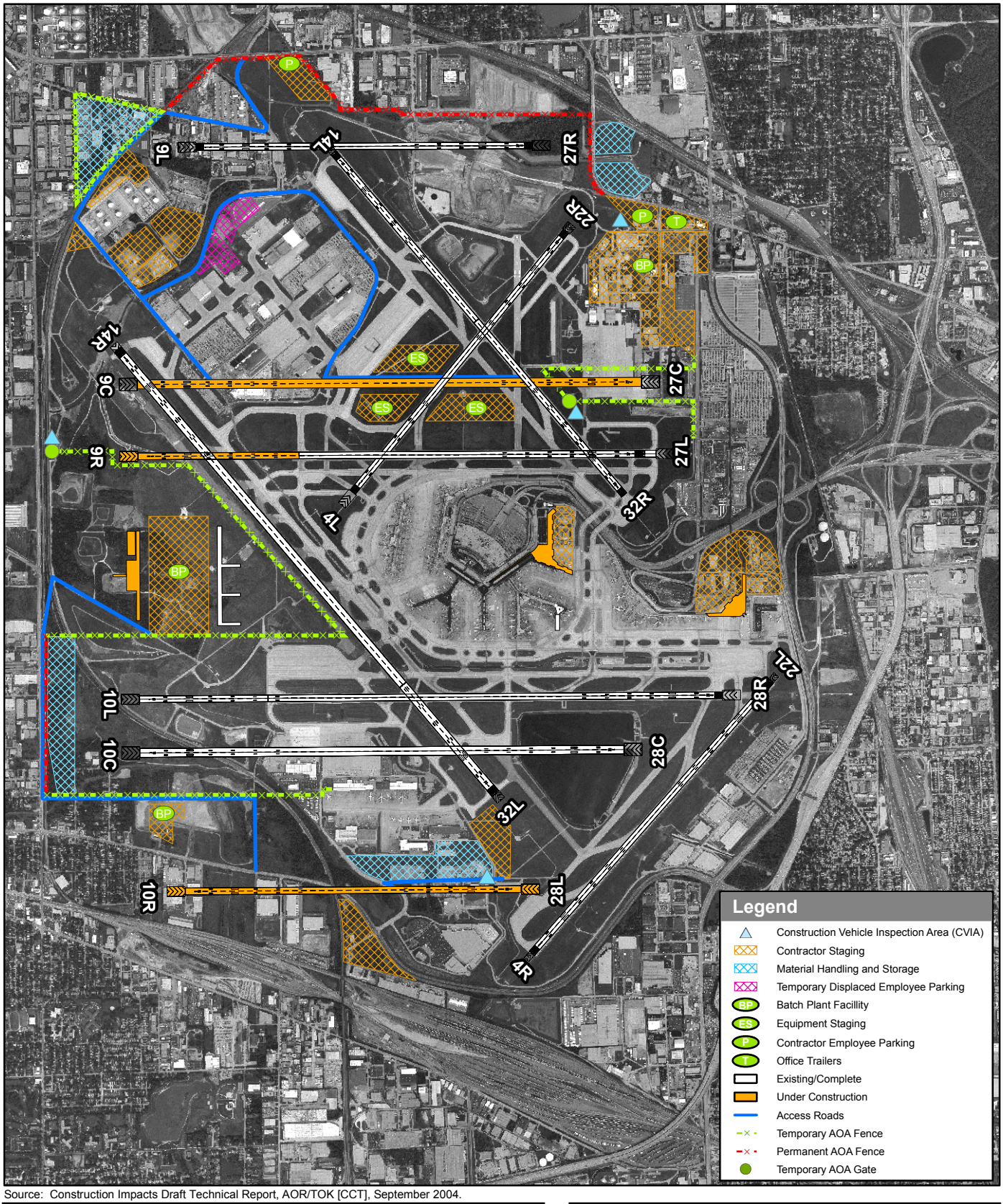

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 6) Compressed Schedule

▶ Exhibit Q-17

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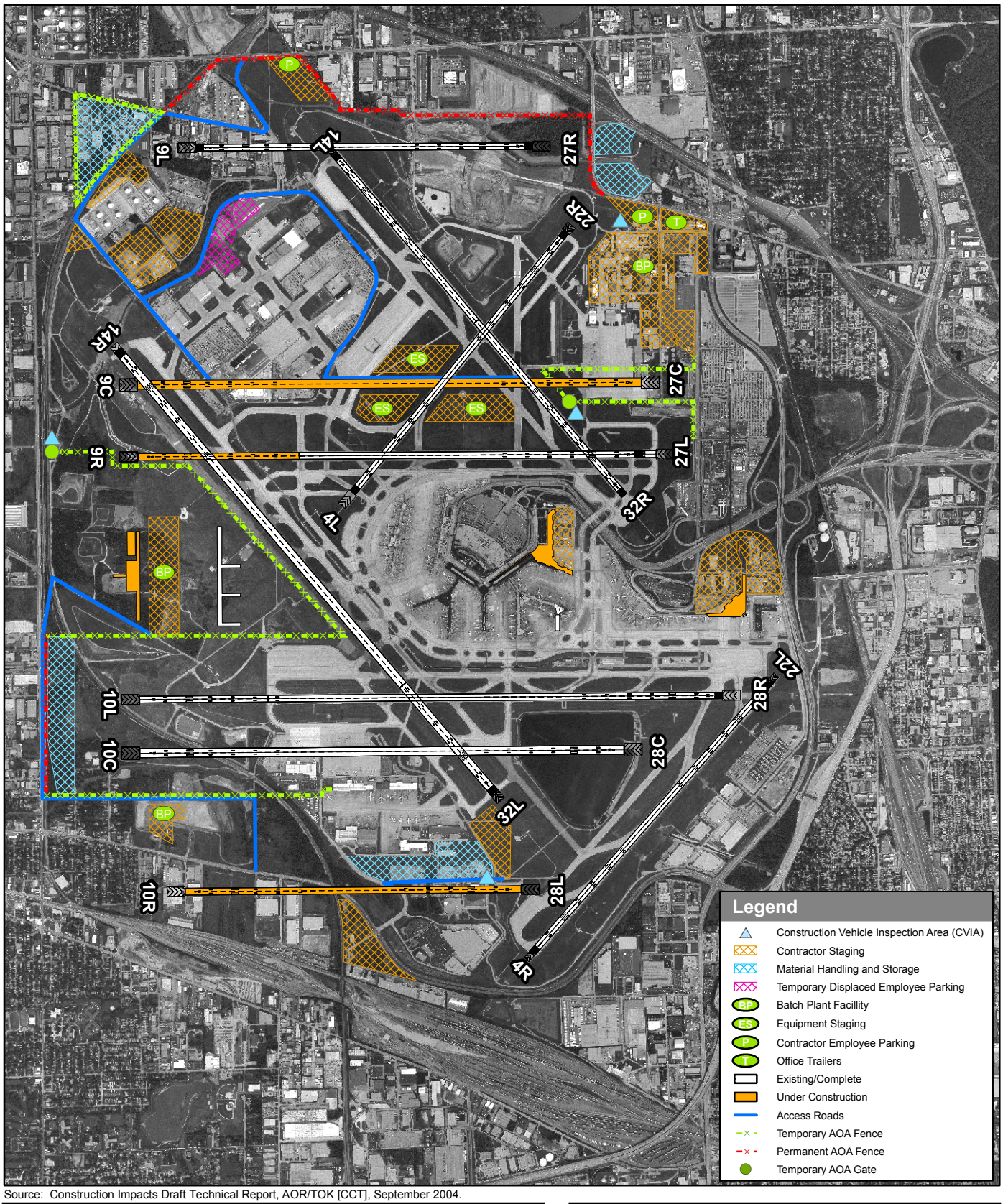

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 7) Compressed Schedule

▶ Exhibit Q-18

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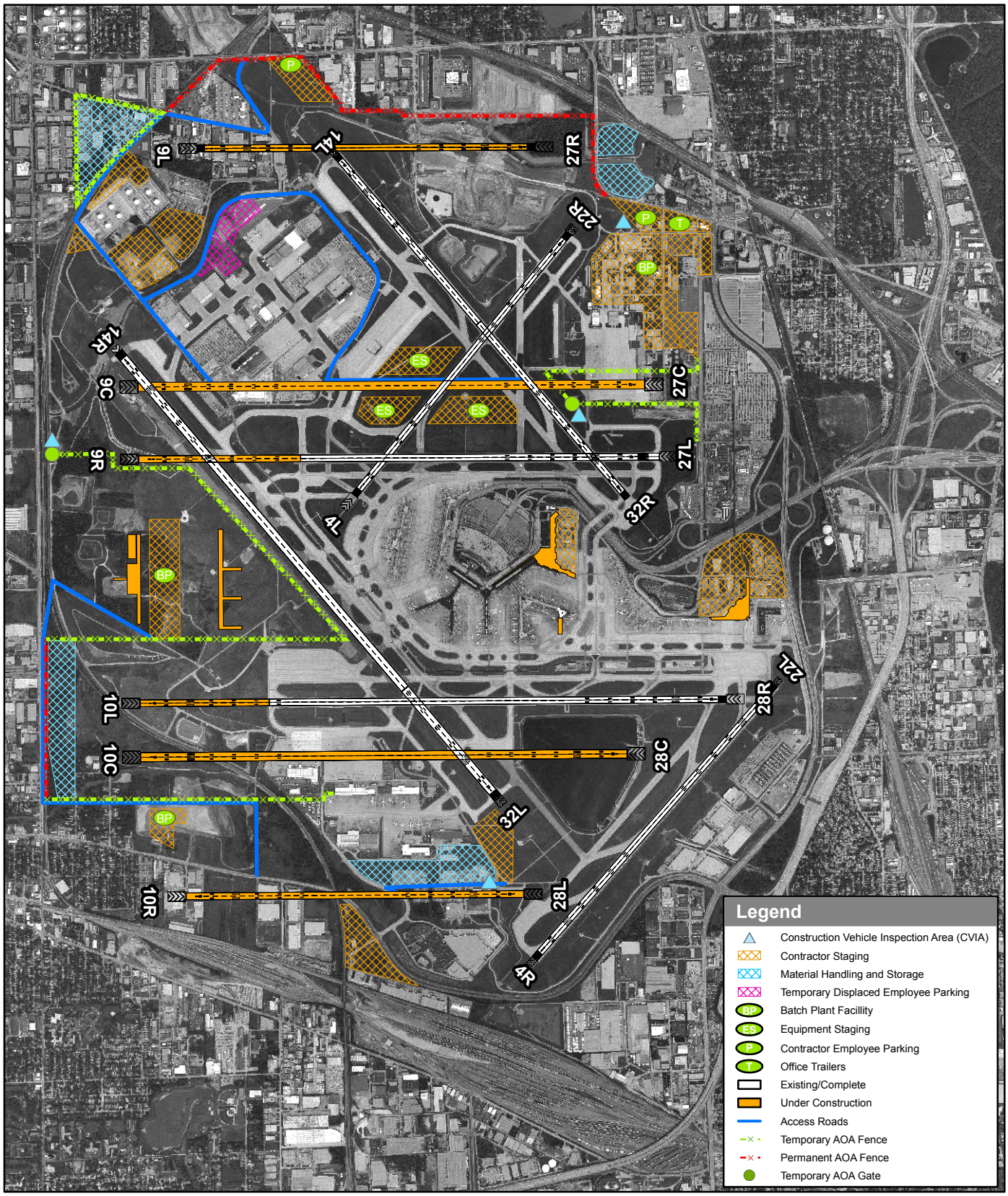

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 8) Compressed Schedules

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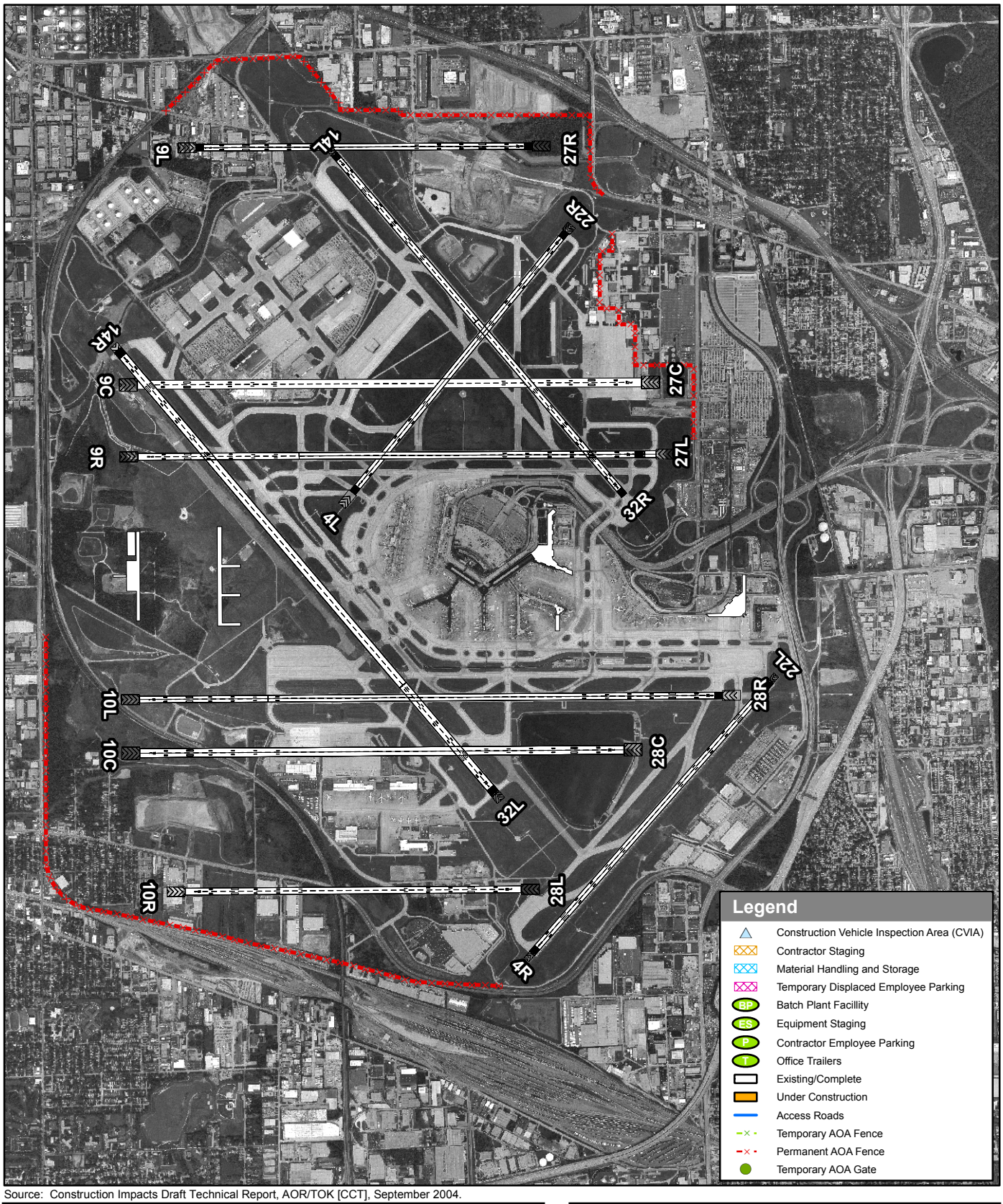

Source: Construction Impacts Draft Technical Report, AOR/TOK [CCT], September 2004.

Chicago O'Hare International Airport

O'Hare Modernization Environmental Impact Statement

Conceptual Construction Staging Areas (Year 9) Compressed Schedule

▶ Exhibit Q-20

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Q.2 BEST MANAGEMENT PRACTICES MANUAL

Attachment Q-1, Best Management Practices Manual, was developed by the City of Chicago in 2003 and documents the procedures used in the control and management of potential discharges of pollutants to the surface waters surrounding O'Hare.

As discussed in **Section 5.7**, **Water Quality**, the City of Chicago Department of Aviation (DOA) Phase I NPDES Individual Permit specifies the completion of a Stormwater Pollution Prevention Plan (SWPPP) for the facility.[1] 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 attached City of Chicago's BMP guidelines to reduce pollutant loadings and improve water quality. The Phase I NPDES permit is for the use of glycol-containing deicing compounds and activities classified as industrial at the Airport

The Phase II of the NPDES stormwater program includes General Storm Water Permits for Small Municipal Separate Storm Sewer Systems (MS4s). The City's MS4 permit is for construction activities at the Airport and at other locations in the City, and 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 the Build Alternatives.

Q.3 SUSTAINABLE DESIGN MANUAL

Attachment Q-2, Sustainable Design Manual, was developed by the City of Chicago in 2003 and is an integral part of the overall design and construction standards for the City's O'Hare Modernization Program.

[1] The SWPPP is on file with the City of Chicago Department of Aviation. The SWPPP is currently being revised as part of the NPDES permit renewal process.

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ATTACHMENT Q-1
BEST MANAGEMENT PRACTICES MANUAL
CHICAGO O'HARE INTERNATIONAL AIRPORT
(03/2003)

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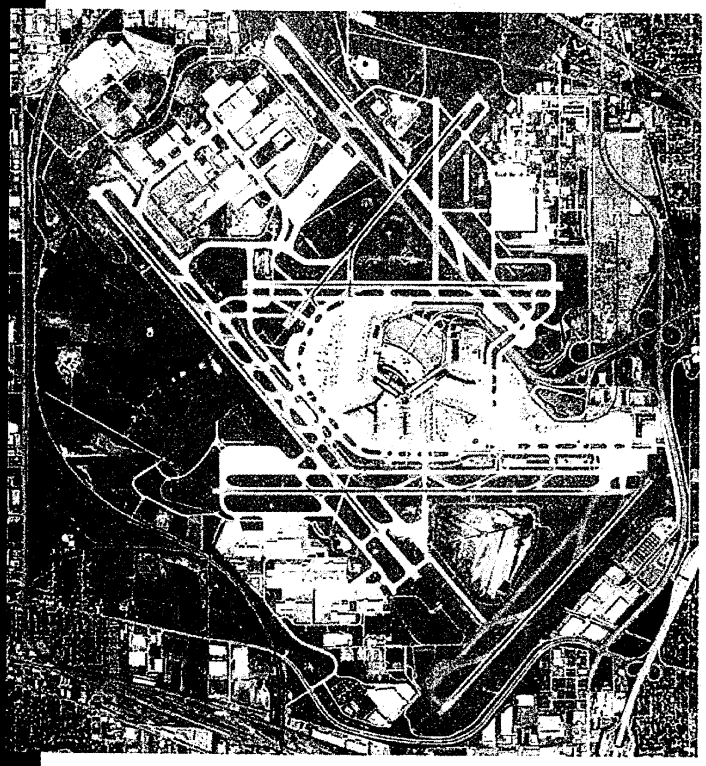
Best Management Practices Manual
Chicago O'Hare International Airport

Department of Aviation



Richard M. Daley Mayor
Thomas Walker Commissioner

August 19, 2002
Revised March 2003

For questions or comments regarding this BMP Manual, contact 773.686.3485

BMP Fact Sheet: Introduction/Definitions	BMP No.	Cover Sheet

Definitions (cont.)

Storm Drain - A slotted opening leading to an underground pipe or an open ditch for carrying surface runoff.

Storm Water - Runoff from a storm event, snow melt runoff, and surface runoff and drainage.

Surface Water - All water naturally open to the atmosphere (rivers, lakes, reservoirs, streams, wetlands, impoundments, seas, estuaries, etc.); also refers to springs, wells, or other collectors which are directly influenced by surface water.

Tarp - A sheet of waterproof canvas or other material used to cover and protect materials, equipment, or vehicles.

Underground Storage Tanks (USTs) - Storage tanks with at least 10 percent or more of their storage capacity underground (the complete regulatory definition is contained within 40 CFR part 280.12).

Waste – Unwanted materials left over from a manufacturing or other process.

LEGEND

- Δ Designates a preferred practice or control measure for implementation of the BMP. New construction or renovated facilities should incorporate this BMP.
- ▫ Designates a minimum requirement necessary to conform with the BMP.

BMP Fact Sheet: Introduction/Definitions	BMP No.	Cover Sheet
APPLICABILITY City of Chicago O'Hare International Airport		

Best Management Practice (BMP) - Practices or measures used to reduce the amount of pollution. BMPs may take the form of a procedure, activity or physical structure. The BMPs presented in this manual are specifically developed to reduce potential discharges of pollutants to the surface waters surrounding Chicago O'Hare International Airport.

Biodegradable - The ability to break down or decompose under natural conditions and processes.

Chock - A block or wedge used to keep rolling vehicles in place.

Dike - An embankment to confine or control water, often built along the banks of a river to prevent overflow of lowlands; a levee.

Discharge - A release or flow of storm water or other substance from a conveyance or storage container.

Industrial Activity - Activity associated with manufacturing and processing of products, raw material storage areas, waste materials, by-products used or created by the facility, material handling sites, refuse sites, sites used for the application or disposal of process waste water, storage and maintenance of material handling equipment, vehicle maintenance (vehicle rehabilitation, mechanical repairs, painting, fueling, lubrication and washing), residual treatment, storage or disposal areas, recycling of materials, shipping and receiving areas, areas where industrial activity has taken place in the past, and significant materials remain and are exposed to storm water.

Inlet - An entrance into a ditch, storm sewer, or other waterway.

Oil/Water Separator - A device installed, usually at the entrance to a drain, which removes oil and grease from water flows entering the drain.

Secondary Containment - Structures, usually dikes or berms, surrounding tanks or other storage containers and designed to catch spilled material from the storage containers.

Significant Materials - raw materials, fuels, solvents, detergents, finished materials, chemicals, pesticides, fertilizers, and waste products that have the potential to be released with storm water discharge.

SPCC - Spill Prevention Control and Countermeasures Plan. Plan consisting of structures and management plans to prevent and respond to spills of hazardous substances as defined in the Clean Water Act.

Table of Contents

BEST MANAGEMENT PRACTICES

GENERAL

BMP Fact Sheet: Equipment/Vehicle Washing	BMP No. 001

APPLICABILITY

This BMP should be implemented at all facilities where vehicles are washed as well as where pressure washing of equipment and miscellaneous items is performed.

TARGET CONSTITUENTS

- Oil and Grease
- Sediment
- Toxic Organic Compounds
- Surfactants

PRACTICES

Washing Procedures

Facilities can comply with this BMP by two options.

Option 1 - Indoor Vehicle Washing (Preferred Practice)

- ▵ *All vehicle and equipment washing should be completed indoors in designated areas (see Figure 1).*
- ▫ Wash waters from vehicle wash areas/operations should be discharged to the sanitary sewer and should be prevented from entering a storm drain.
- ▫ Where wash waters tend to run out of the indoor area through a doorway, curbing should be installed along the doorway to minimize the escaping of wash water (see Figure 1).
- ▫ Storm drains in the vicinity of the washing area should be protected during the washing activities (see BMP No. 020).

Option 2 - Outdoor Vehicle Washing

- ▫ A permanent or temporary dike should be constructed around the vehicle or equipment washing area.
- ▫ The wash waters in the diked area should be collected and discharged to a sanitary sewer or hauled away for offsite disposal.
- ▫ Storm drains in the vicinity of the washing area should be protected during the washing activities (see BMP No. 020).

BMP Fact Sheet: Equipment/Vehicle Washing	BMP No. 001

FIGURES

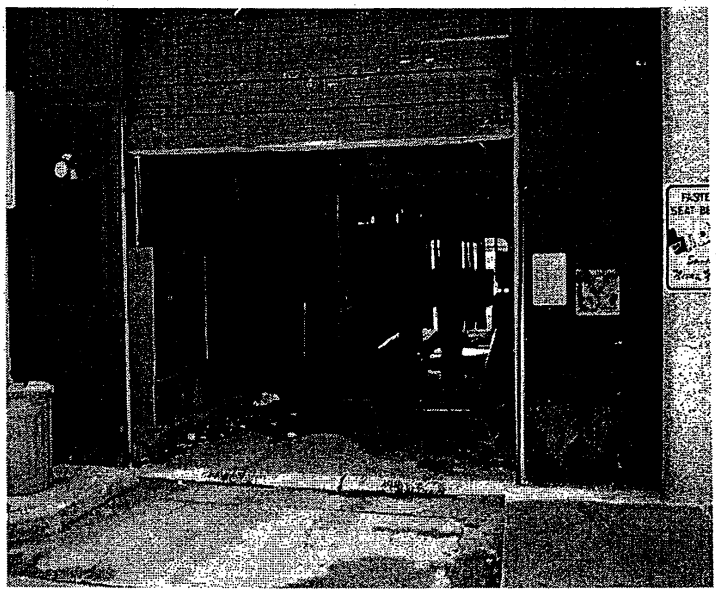


Figure 1 - Indoor vehicle washing operation with water retention curbing.

BMP Fact Sheet: Equipment/Vehicle Fueling	BMP No. 002

APPLICABILITY

This BMP covers all operations where diesel fuel and gasoline are dispensed into equipment and vehicles (excluding aircraft).

TARGET CONSTITUENTS

- Oil and Grease
- Toxic Organic Compounds

PRACTICES

Structural Controls

Δ *Preferred Practice: Where possible, a canopy should be present over the fueling area to limit storm water contact with the fueling area (see Figure 1).*

□ If storm water drains are present within 50 feet of a vehicle fueling area the drains should be: (1) connected to a dead end sump, or (2) equipped with an oil/water separator, or (3) covered with an inlet protection mat or boom during fueling activities.

□ Fueling areas and portable fueling vehicles should display a sign similar to below:

If a fuel spill occurs:

*****SAFETY FIRST*****
Immediately Contact O'Hare Command Center
773/894-9111

Keep all sources of ignition away from the spill

For any spill:
- Stop the flow, shut down power to pumps, close valves.
- Use absorbents to contain product and protect storm drains.
- Prevent spilled product from going off-site.
- Follow direction of Chicago Fire Department.

Note: For United and American the sign should be modified to have employees first contact on-site emergency coordinators who will then notify the O'Hare Command Center, as follows:

American Airlines:	24-hour Emergency Contact 773/686-4631
United Airlines:	Station Control Center 773/601-4222

□ Fueling areas should be paved with impermeable concrete to reduce infiltration of petroleum product spills (see Figure 2).

BMP Fact Sheet: Equipment/Vehicle Fueling	BMP No. 002

PRACTICES (cont.)

- Dispenser hoses should be equipped with automatic shutoff nozzles and breakaway couplings.
- An emergency dispenser shutoff switch should be installed in the fueling area. The shutoff switch should be marked by a sign which is readily visible from the dispenser area.

Operations and Maintenance

- Dispensing equipment including pumps and hoses should be inspected periodically for evidence of deterioration, leaks, or malfunction.
- Where any irregularities are noticed in a fuel dispensing system, the system should be investigated, and if the basis of the irregularity cannot be determined, a qualified person should be promptly contacted to repair the system.
- A Spill Control Kit should be present in the fueling area (see BMP No. 018).
- All spills should be cleaned in accordance with the applicable site specific SPCC plan. Spilled materials and used absorbent materials are to be properly disposed in accordance with federal, state and local regulations. The responsible party should retain waste manifests and make such documentation available for inspection.

BMP Fact Sheet: Equipment/Vehicle Fueling	BMP No. 002

FIGURES

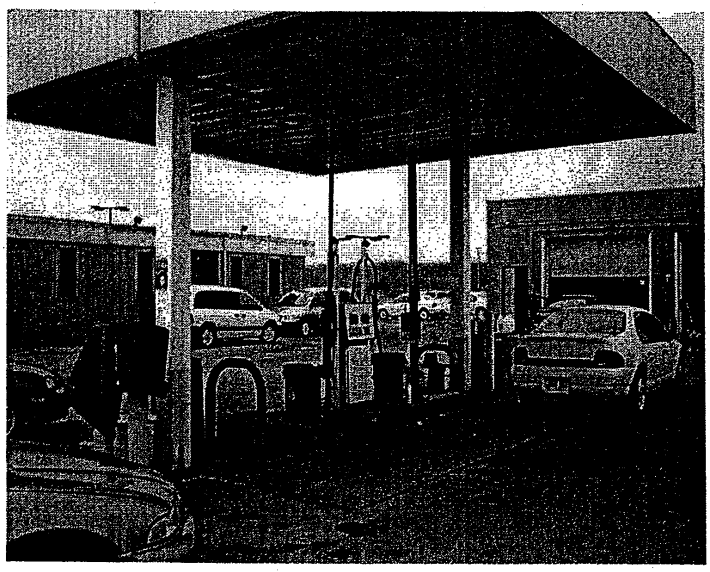


Figure 1 - Fueling area with canopy.

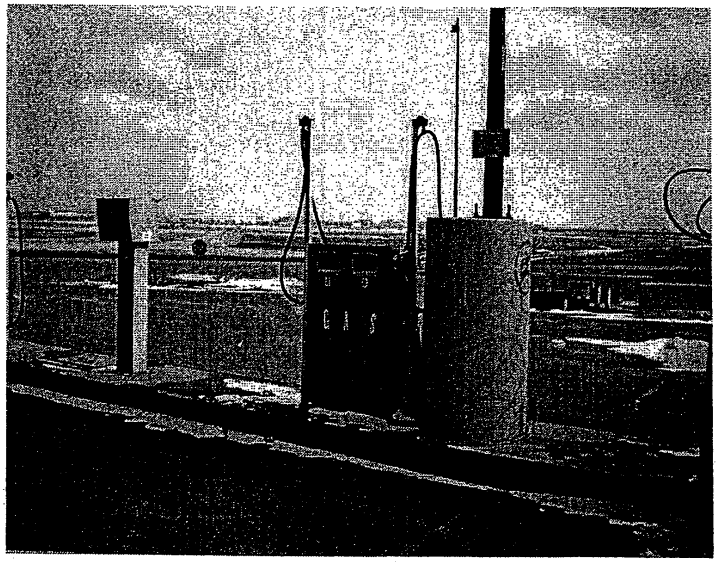


Figure 2 - Concrete paved fueling area.

BMP Fact Sheet: Equipment/Vehicle Maintenance	BMP No. 003

APPLICABILITY

This BMP applies to maintenance activities including vehicle and equipment fluid changes and mechanical repairs. This BMP applies to maintenance activities that have the potential for a release of liquid products (oil, grease, lubricants, antifreeze, transmission oil, brake fluid, window washing fluid, etc.).

TARGET CONSTITUENTS

- Oil and Grease
- Toxic Organic Compounds

PRACTICES

Maintenance Procedures

- △ *Where possible, vehicle and equipment maintenance should be performed indoors (see Figure 1).*
- ▫ Floor drains in indoor maintenance areas should discharge to the sanitary sewer and not to the storm sewer system.
- ▫ Where wash waters tend to flow out of the building through doors or maintenance bays, curbs should be installed along such doors or bays to contain floor wash waters in the maintenance area.
- ▫ Outdoor maintenance activities with spill potential should be avoided.
- ▫ Outdoor maintenance should be performed in a designated area which is paved with impervious concrete. The maintenance area should be a minimum of 50 feet from any storm drain inlet.
- ▫ Any spills or residues from maintenance activities should be cleaned up immediately upon completion of the work. Spilled materials/used absorbents are to be properly disposed in accordance with federal, state and local regulations. The responsible party should retain waste manifests and make such documentation available for inspection.
- ▫ Where grinding or sanding operations are conducted, dust and other particulate matter should be swept up immediately upon completion of the work.
- ▫ Oily parts should never be placed directly on the ground and instead should be placed in drip pans or on absorbent pads (see Figure 2).
- ▫ Part washing should never be performed outdoors.
- ▫ A Spill Control Kit should be readily accessible to the maintenance area (see BMP No. 18).

BMP Fact Sheet: Equipment/Vehicle Maintenance	BMP No. 003

FIGURES

Figure 1 - Vehicle maintenance performed indoors.

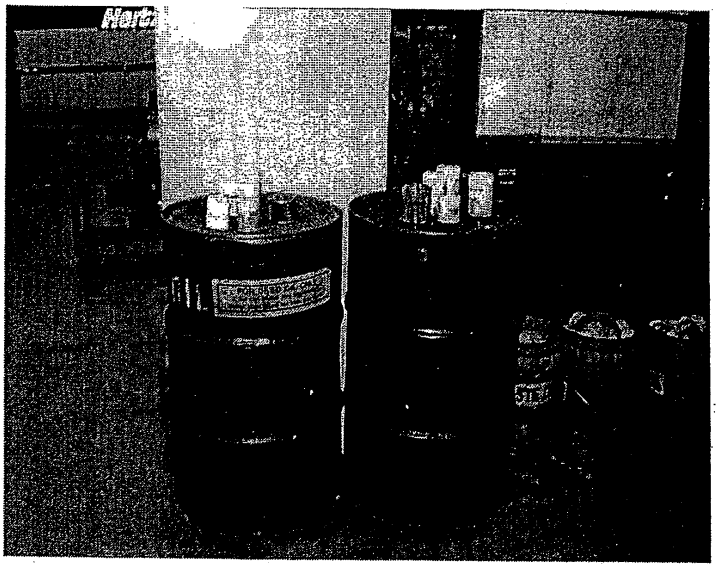


Figure 2 - Oily maintenance parts on drip pans.

BMP Fact Sheet: Equipment/Scrap Material Storage

BMP No. 004

APPLICABILITY

This BMP covers the outdoor storage of obsolete equipment and scrap material that has the potential to impart pollutants if exposed to storm water. Materials meeting this criteria are those that have residues or may otherwise be degraded by storm water. Representative example materials include: 1) engine, transmission or drive line components with oil/grease residue; 2) scrap metal from machining operations with cutting oil residue; and 3) paper or cardboard products or other materials that may degrade and release pollutants when exposed to storm water.

TARGET CONSTITUENTS

- Oil and Grease
- Toxic Organic Compounds
- Metals

PRACTICES

General

- △ *Preferred Practice: Every attempt should be made to minimize the quantity of equipment and scrap metal stored outside exposed to storm water.*

Motorized Equipment

(Tugs, loaders, forklifts, ground equipment, etc).

- ▫ Motorized equipment may be stored outdoors provided all enclosures are in place so that contact of storm water with fluid containing components is minimized.
- ▫ Out-of-service motorized equipment stored longer than 24-hours should be provided with a covering (i.e., stored under a roof, overhang, canopy, or tarp) to protect any exposed fluid containing component.
- ▫ Prior to outdoor storage of any engine, transmission, or similar mechanical component, all fuel, engine oil, transmission fluid, antifreeze, and any other fluids should be drained. The exterior of the equipment should be stored under an overhang, canopy, tarp or otherwise protected to prevent exposure to storm water.
- ▫ Motorized equipment should be maintained so that drips or leaks of any fluid will be minimal. Where a piece of equipment is prone to drips or leaking fluids, drip pans should be used and maintained to contain the leaking fluid (see Figure 1).
- ▫ Where out-of-service equipment is intended to be repaired or reused, fluids may remain in the equipment to protect against corrosion provided the exterior is cleaned and all other protections cited are in place to prevent leakage (refer to above-listed practices).

PRACTICES (cont.)

- Equipment which has the potential to leak fluids should be inspected periodically. Where leaks are noted, additional fluid draining or drip pans should be used to mitigate future leaks. Leaked fluids should be cleaned up with absorbent materials and properly disposed.

Non-Motorized Equipment

(Baggage carts, dollies, tow bars, mobile stairs, etc.)

- Non-motorized equipment designed for outdoor use is not subject to the requirements of this BMP provided the equipment has no fluid containing components exposed to storm water.

Scrap Materials

(Miscellaneous materials, materials awaiting recycling , tires, etc.)

- *Preferred Practice: Scrap materials that have the potential to degrade, corrode, or release pollutants should be stored on pallets, racks, shelving or otherwise elevated so that storm water contact is minimized (see Figure 2).*

- Scrap materials that are not clean, exhibit a residual pollutant, or are corroded, should be stored under an overhang, canopy, tarp or otherwise protected so they will not be exposed to storm water.

- Scrap material that can degrade (i.e., paper, cardboard, wood, etc.) should only be stored outdoors for a period of time that does not allow for breakdown and or decay of the material such that storm water would be impacted.

- Scrap material storage areas should be inspected periodically (i.e. monthly) to ensure that materials are not contributing pollutants to storm water.

FIGURES

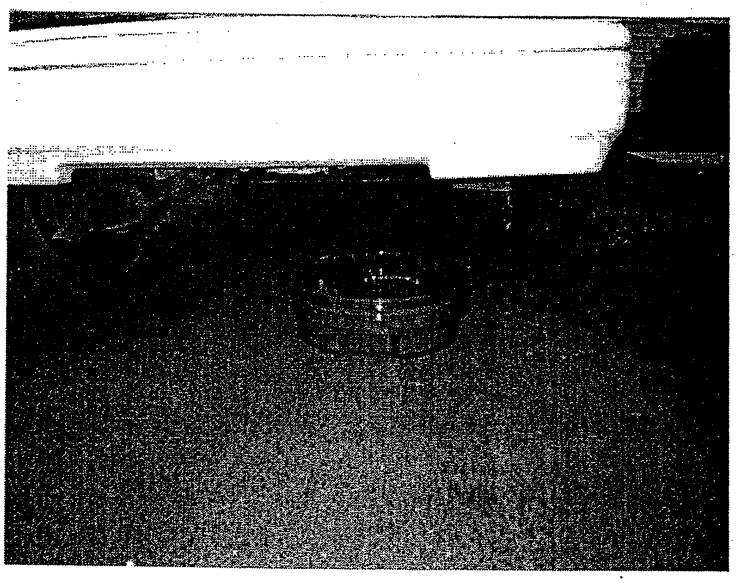


Figure 1 - Drip pan under leaking equipment.

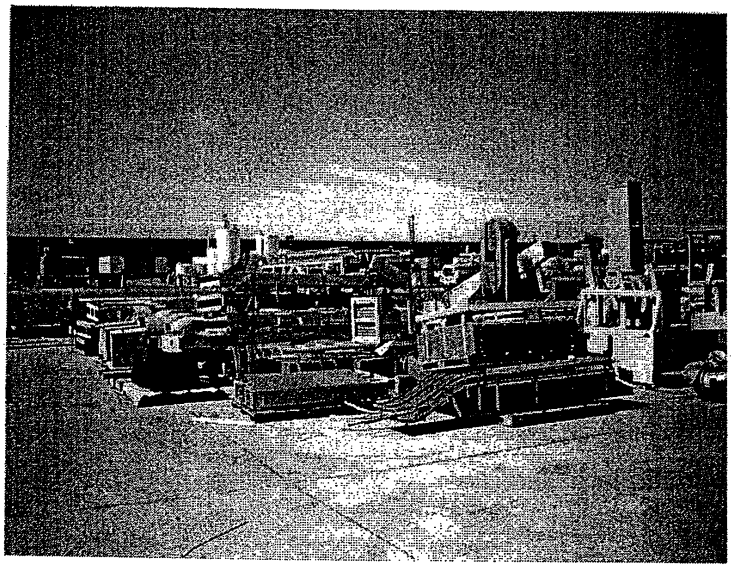


Figure 2 - Equipment stored on pallets.

BMP Fact Sheet: Vehicle Parking

BMP No. 005

APPLICABILITY

This BMP applies to ground equipment, bus, and commercial vehicle parking areas including car rental facilities. Employee and customer parking areas are not subject to this BMP. This BMP also applies to wrecked vehicle storage. A wrecked vehicle is one that has any engine, transmission, drive train, or other fluid containing component exposed to storm water.

TARGET CONSTITUENTS

- Oil and Grease
- Toxic Organic Compounds

PRACTICES

Vehicle Parking Requirements

- Vehicles should be inspected periodically (i.e. weekly) for evidence of leaking fluids.
- Where evidence of a leak from a vehicle is observed, the vehicle should be repaired as soon as practical.
- Where immediate maintenance of a leaking vehicle is not practical, a drip pan should be used to contain the leaking fluids until the vehicle can be repaired.
- Where leakage from a vehicle does result in spillage or staining, the area should be cleaned with an enzyme cleaning agent or biodegradable cleaner. Residual materials should be containerized and properly disposed. Never flush spilled materials into a storm sewer.

Wrecked Vehicle Storage

- Wrecked vehicles should be stored indoors or under an overhang, canopy, tarp, or otherwise protected so that they will not be exposed to storm water (Figure 1).
- Prior to outdoor storage of any wrecked vehicles, all fuel, engine oil, transmission fluid, antifreeze, and any other fluids should be drained, if it is determined that a threat of leakage exists.
- Where a vehicle part (i.e., engine or transmission) is intended for reuse, fluids may remain in the equipment to protect against corrosion, provided the exterior is cleaned and all other protections cited are in place to prevent leakage.
- Where a vehicle has any potential to leak fluids after it has been drained, drip pans should be used to contain such leaks.

BMP Fact Sheet: Vehicle Parking	BMP No. 005

PRACTICES (cont.)

- Wrecked vehicles which have any potential to leak fluids should be inspected periodically (i.e., weekly). Where leaks are noted, additional fluid draining or drip pans should be used to mitigate future leaks. Leaked fluids should be cleaned up with absorbent materials and properly disposed.

FIGURES

Figure 1 – Wrecked vehicles covered with tarps.

BMP Fact Sheet: Aircraft Fueling	BMP No. 006
APPLICABILITY This BMP applies to all aircraft fueling activities.	**TARGET CONSTITUENTS** • Oil and Grease • Toxic Organic Compounds

PRACTICES

Fueling Procedures

- Aircraft fueling should be performed in the Terminal area that discharges to the South Detention Pond.
- When performing maintenance activities in the Hangar area, aircraft de-fueling is allowed. Aircraft should only re-fuel with enough fuel to taxi back to the Terminal area. A Spill Control Kit should be in the vicinity of the de-fueling/fueling activity.
- Where fueling is completed from a mobile source, a Spill Control Kit should be present on the truck or in the vicinity of fueling operations.
- Storm drains and discharge outfalls should be determined for each fueling area. Fueling/de-fueling procedures should not be performed within 50 feet* of any storm drain. If fueling/de-fueling within 50 feet is unavoidable, the catch basin should be protected during these operations.
- Spill response should be performed in accordance with the ORD Spill Response Guide.
- Fuel transfer valves and hoses should be inspected periodically. Where damage or deterioration is observed, the equipment should be taken out of service until repaired.

* 50 foot radius is based on previous airport spill experience as reported by the Chicago Fire Department.

BMP Fact Sheet: Aircraft Washing	BMP No. 007
APPLICABILITY This BMP applies to all aircraft washing activities.	**TARGET CONSTITUENTS** • Oil and Grease • Toxic Organic Compounds • Surfactants

PRACTICES

Aircraft Washing Procedures

- Where possible, aircraft washing should be performed inside a hangar where wash waters enter a sanitary drain connected to an oil/water separator. If any storm drains are present in the vicinity of the washing area, the drains should be protected in accordance with BMP No. 020.

- When performed outdoors, all storm drains within 50 feet of the washing area should be protected in accordance with BMP No. 020. Further, a permanent or temporary dike should be used to contain the wash waters. The wash waters should be collected with a vacuum truck and transported offsite for proper treatment or disposal.

BMP Fact Sheet: Aircraft Maintenance	BMP No. 008
APPLICABILITY This BMP applies to all aircraft maintenance activities including fluid changes and mechanical repairs.	**TARGET CONSTITUENTS** • Oil and Grease • Toxic Organic Compounds

PRACTICES

Maintenance Procedures

- △ *Preferred Practice: Where possible, aircraft maintenance with spill potential should be performed indoors.*
- ▫ Floor drains in indoor maintenance areas should discharge to the sanitary sewer and not to the storm sewer.
- ▫ Where wash waters tend to flow out of the building through doors or maintenance bays, curbs should be installed along such doors or bays to contain floor wash waters in the maintenance area.
- ▫ Outdoor maintenance activities with spill potential should be avoided.
- ▫ When outdoor maintenance is conducted, it should be performed in a designated area which is paved with impervious concrete.
- ▫ A mobile spill response cart with absorbent materials and other devices should be available in the vicinity of the aircraft during outdoor maintenance activities for spill response. In the event of a spill, storm drains within 100 feet of the area should be immediately protected (See BMP No. 020).
- ▫ Oily parts should not be placed directly on the ground and instead should be placed in drip pans or on absorbent pads.
- ▫ Parts washing should not be performed outdoors.

BMP Fact Sheet: Aircraft Deicing	BMP No. 009
APPLICABILITY This BMP applies to all aircraft deicing activities.	**TARGET CONSTITUENTS** • Toxic Organic Compounds

PRACTICES

Aircraft Deicing Procedures

- Deicing should be performed in designated areas of the airport which discharge to the north or south detention basins; the Terminal Gates, the Southwest Cargo Area, the Hangar Area and the Scenic Hold Pad.

Aircraft Deicing Procedures on the Military Ramp (General Aviation/North Cargo Area)

- Deicing must take place in the designated deicing area as defined by DOA (see Deicing Pad Map).
- Non-General Aviation aircraft should enter and exit the designated area under tow.
- Deicing of General Aviation aircraft may be performed on the Signature Ramp or designated deicing area.
- After an aircraft is deiced on the Deicing Pad, the aircraft may not return to the Military Ramp.
- The Deicing Pad is used on a first come first serve basis.

EMERGENCY deicing conditions approved by the Department of Aviation at the Military Area:

1) Snow or ice is blocking the engine ports and the engine needs to be used.
2) The aircraft controls have snow or ice on them and they need to be tested prior to leaving the area.
3) Wet, heavy snow is anticipated while aircraft are parked in these areas. The heavy snow on the tail of the aircraft could cause it to upend, therefore, after deicing the aircraft, an anti-icer would be applied.

When deicing occurs in this area, a temporary dike or other contaminant method should be used around the aircraft prior to the deicing activities. Deicing fluids should be collected with a vacuum truck or other method and properly disposed. Storm drains should be protected during deicing activities (see BMP No. 20).

*After deicing occurs in this area, DOA Operations should be notified at 686-2255.

- Unused aircraft deicing fluids should not be discharged to the storm sewers.

BMP Fact Sheet: Underground Storage Tanks (USTs)

BMP No. 010

APPLICABILITY

This BMP applies to underground storage tanks (USTs) used to store petroleum products and hazardous substances. USTs are regulated by federal, state and local regulations. This BMP concerns only issues related to storm water pollution prevention and does not assure compliance with all regulations applicable to USTs including SPCC requirements as stated in 40 CFR 112.

TARGET CONSTITUENTS

- Oil and Grease
- Toxic Organic Compounds

PRACTICES

UST Equipment

- USTs should be equipped with an overfill prevention valve which restricts flow when tank capacity reaches 90 percent.
- Each UST fill port should be equipped with a containment bucket with a minimum capacity of 5 gallons.
- Transfer valves which extend above ground surface should be protected from traffic with concrete posts (see Figure 1). Such transfer valves should be enclosed in a secondary containment curb.
- UST vent pipes should be equipped with a device to prevent overfill through the vent pipes.
- A Spill Control Kit should be present in the vicinity of the fill/pumpout port or fuel dispenser island. (see Figure 2).

Bulk Material Transfer

- A facility representative familiar with this BMP and relevant sections of the site-specific SPCC plan should be present during all UST product deliveries and pumpout.
- If any storm drains are present within a 50 ft. radius of the delivery/pumpout, they should be protected in accordance with BMP No. 020.
- A system of UST inventory control and record-keeping should be implemented to prevent overfilling.
- All spills should be cleaned up in accordance with the ORD Spill Response Guide.

BMP Fact Sheet: Underground Storage Tanks (USTs)	BMP No. 010

FIGURES

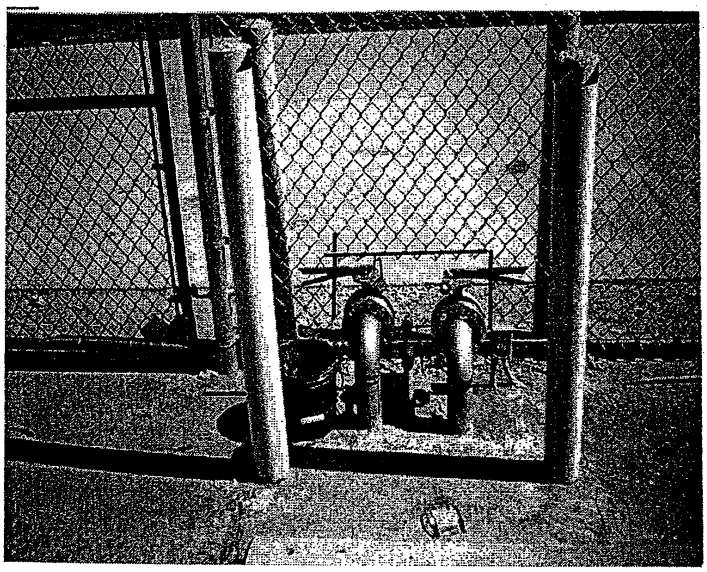


Figure 1 - Transfer valves protected with concrete posts.

Figure 2 - Spill control kit near fuel fill/pumpout port.

BMP Fact Sheet: Underground Storage Tanks (USTs)	BMP No. 010

FIGURES

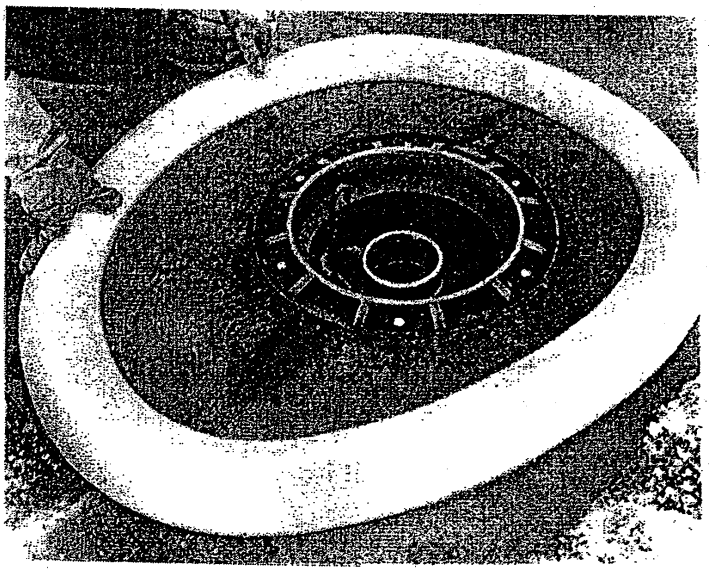


Figure 3 - Temporary secondary containment around fill port.

BMP Fact Sheet: Aboveground Storage Tanks (ASTs)

BMP No. 011

APPLICABILITY

This BMP applies to aboveground storage tanks (ASTs) used to store petroleum products and hazardous substances. ASTs are regulated by federal, state and local regulations. This BMP concerns only issues related to storm water pollution prevention and does not assure compliance with all regulations applicable to ASTs.

TARGET CONSTITUENTS

- Oil and Grease
- Toxic Organic Compounds

PRACTICES

AST Equipment

- All ASTs shall be in compliance with applicable Spill Prevention, Control and Countermeasure (SPCC) Regulations (40 CFR Part 112). Also refer to the Chicago O'Hare International Airport Spill Prevention Program document.
- If feasible, construct a canopy over containment area to minimize accumulation of rainwater (see Figure 2).

Bulk Material Transfer

- A facility representative familiar with this BMP and relevant sections of the site-specific SPCC plan should be present during all AST product deliveries and pumpouts.
- If delivery/pumpout is being performed outside of the South Detention Basin (see South Detention Basin Map), temporary secondary containment such as booms or dikes, should be placed around the perimeter of the delivery or pumper truck. Secondary containment should be of a capacity to contain the volume of the largest single compartment with sufficient freeboard to contain precipitation.
- If any storm drains are present within a 50 ft radius of the delivery/pumpout, they should be protected in accordance with BMP No. 020.
- A Spill Control Kit should be present in the vicinity of the AST (see BMP No. 018).
- A system of AST inventory control and record keeping should be implemented to prevent overfilling.
- All spills should be cleaned up in accordance with the ORD Spill Response Guide. Residual materials should be properly disposed.

BMP Fact Sheet: Aboveground Storage Tanks (ASTs)	BMP No. 011

FIGURES

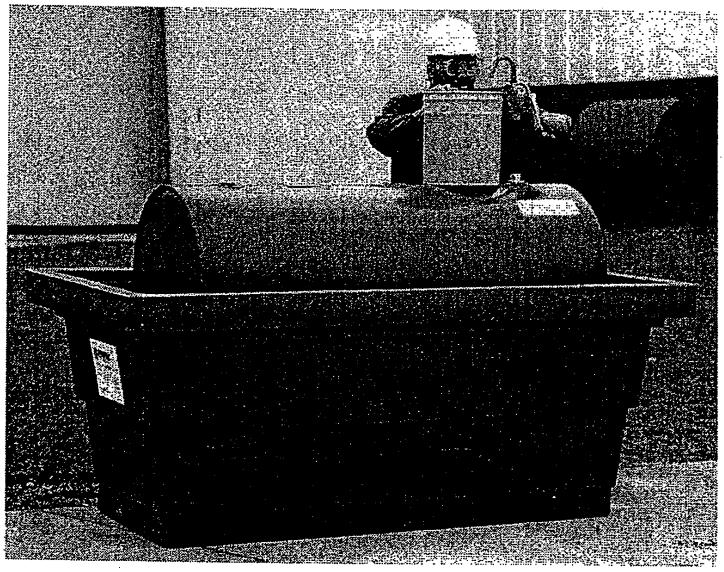


Figure 1 - AST in secondary containment dike.

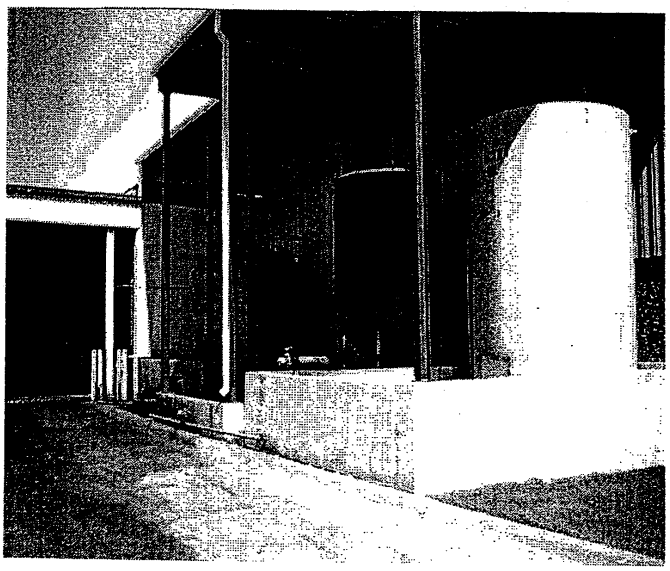
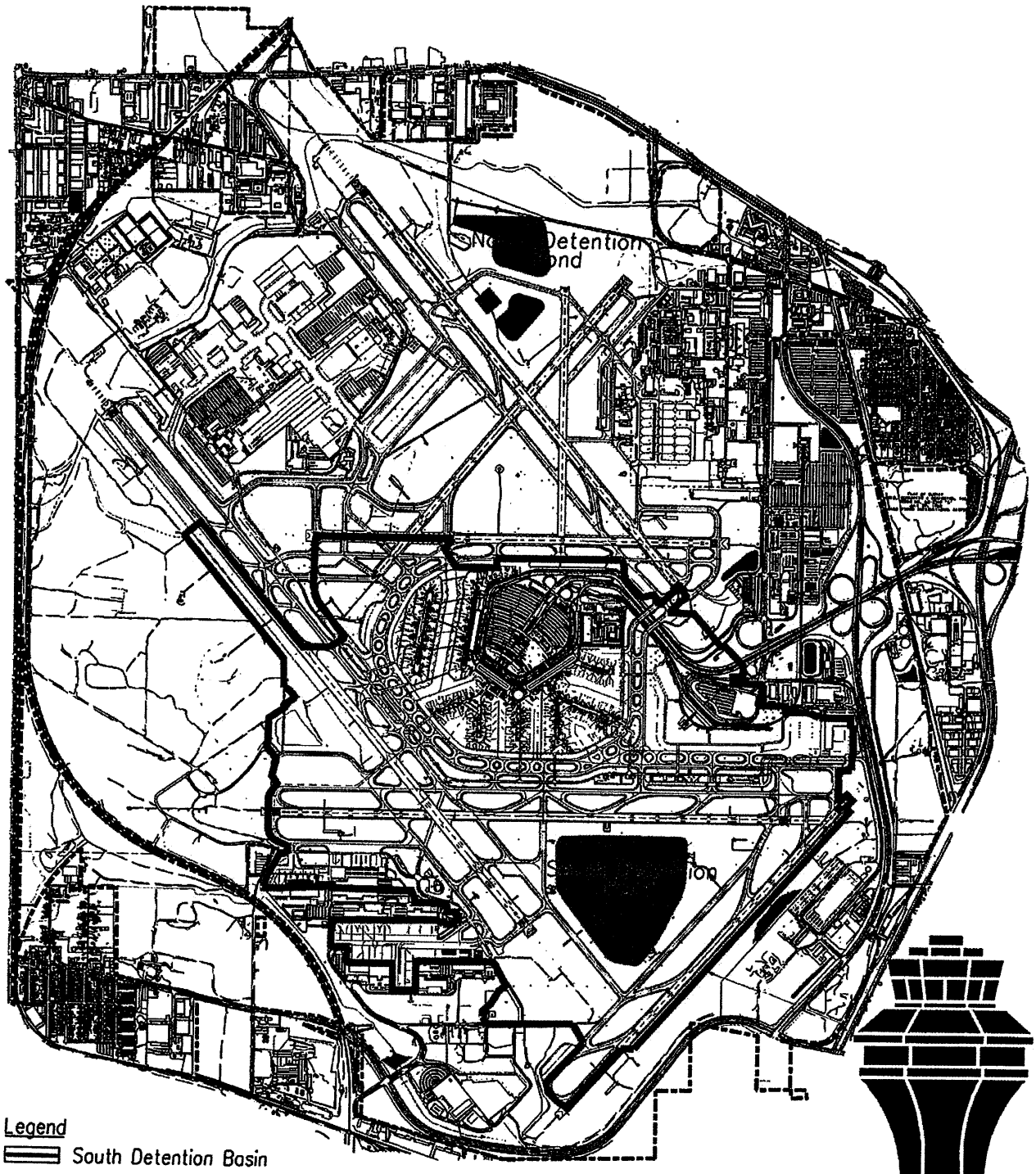


Figure 2 - Canopy over secondary containment dike.



Chicago O'Hare International Airport
Richard M. Daley • Mayor

Department of Aviation
Thomas R. Walker • Commissioner

Harding ESE

BEST MANAGEMENT PRACTICES MANUAL FOR ORD

Date: August 13, 2002

Scale: 1" = 2800'-0"

BMP #11-
South Detention Basin

NORTH

DGN: 2002-BMPM-Area-outside-of-South-Detention-basin-REV1.dgn

BMP Fact Sheet: Mobile Tank Trucks

BMP No. 012

APPLICABILITY

This BMP applies to mobile or portable oil storage tank trucks used to transport petroleum products and hazardous substances to stationary ASTs and USTs. This BMP also applies to mobile fuelers and mobile deicers used to service aircraft on airport property. This BMP concerns only issues related to storm water pollution prevention and does not assure compliance with all rules and regulations applicable to mobile tank trucks.

TARGET CONSTITUENTS

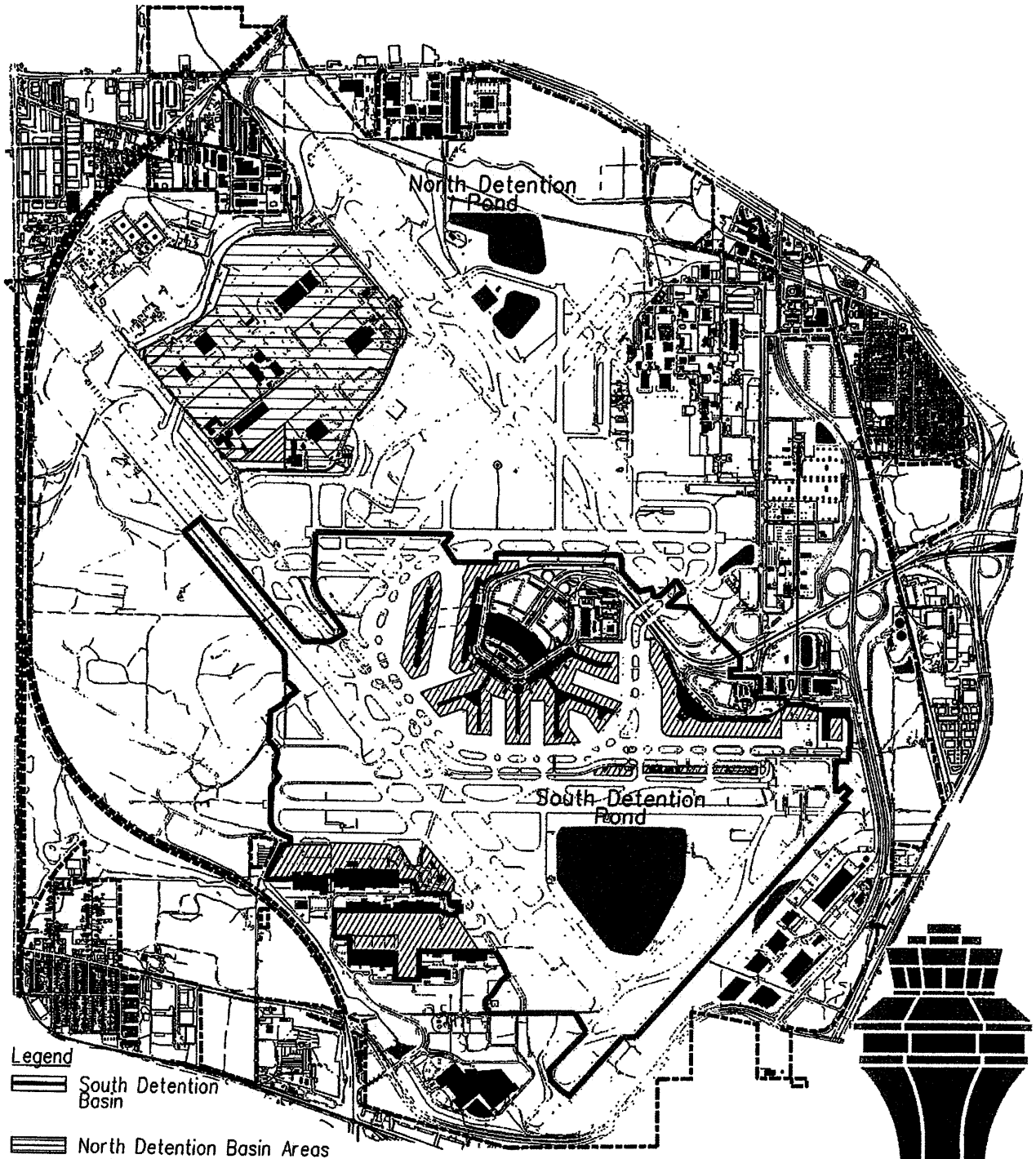
- Oil and Grease
- Toxic Organic Compounds

PRACTICES

Mobile Tank Trucks

In accordance with SPCC regulations (40 CFR Part 112.8 (b)(11), mobile fueling trucks are included as aboveground storage tanks (ASTs) and therefore all unattended mobile tank trucks are subject to secondary containment regulations.

- Δ *Preferred Practice: When unattended, mobile fuel trucks must be parked in the South Detention Basin drainage area. The South Detention Basin area drains to oil/water separators and therefore, is considered to have secondary containment.*
- ▫ When unattended, mobile fuel trucks must be parked at least 50 feet away from any existing building (National Fire Protection Association 407).
- ▫ If parked outside of the South Detention Basin drainage area, an unattended mobile fuel truck must be parked in an area of secondary containment (see Mobile AST Parking Area Map). Secondary containment should be of a capacity to contain the entire volume of the single largest tank compartment within the secondary containment area.
- ▫ Overnight parking of mobile fuel trucks is prohibited in the area southeast of Post 11that drains to the north.
- Δ *Preferred Practice: During non-deicing season, (May-September), mobile deicing trucks should be emptied of all residual deicing fluid and stored in conformance with BMP 004 "Equipment/Scrap Material Storage".*
- ▫ Unattended mobile deicing trucks containing product must be parked in the North or South Detention Basin drainage area (see Mobile AST Parking Area Map) or in an area with a secondary containment structure.
- ▫ Mobile or portable storage tank trucks should be equipped with a spill kit including a storm drain cover (see BMP No. 018).



Chicago O'Hare International Airport
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Harding ESE

BEST MANAGEMENT PRACTICES MANUAL FOR ORD

Date: December 18, 2002

Scale: 1" = 2800'-0"

BMP #12=
Mobile AST Parking Areas

NORTH

DOA- 2002-BMPM-Mobile-AST-Parking-Areas-PV1.dgn

BMP Fact Sheet: Chemical Handling/Storage	BMP No. 013

APPLICABILITY

This BMP applies to activities where chemicals are stored or transferred from their shipment containers to smaller containers for employee use.

TARGET CONSTITUENTS

- Oil and Grease
- Toxic Organic Compounds

REQUIREMENTS

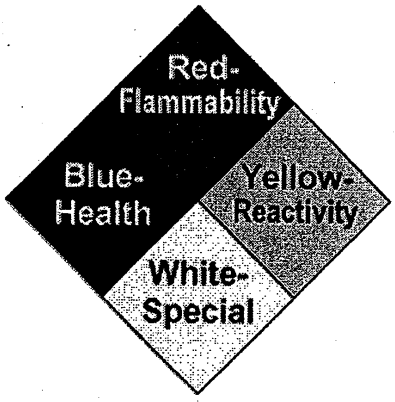
Labeling

△ *Preferred Practice: Use the National Fire Protection Association (NFPA) system (Figure 1) or the Hazardous Materials Identification System (HMIS) (Figure 2) to provide instant hazard recognition for employees and emergency responders. This system will be used as a minimum standard for all hazardous material labeling of ASTs, USTs (where possible) and outdoor areas of chemical storage.*

- Each employer will maintain a list of all the hazardous chemicals used on the premises.
- Each container containing a hazardous chemical will be labeled with the identity and the appropriate hazard warning of the contents. Containers containing hazardous chemicals, when received from a supplier or shipped to a customer, will also have the name and address of the manufacturer or the responsible party.
- It is the responsibility of the employer to assure that the identity and the hazard warnings are placed on all containers that have been transferred from the original drum or container. (OSHA Hazard Communication Standard (HCS) 29 CFR1910.1200).

Handling and Storage

- Material transfer from drums or other large container into smaller containers for employee use should be completed indoors. A Spill Control Kit should be present in proximity to the material transfer area (see BMP No. 018).
- Drip pans should be placed underneath each dispenser nozzle (Figure 3).
- Where waste oils or other materials are poured into drums, a drum funnel should be used (Figure 4).
- When employees transfer materials from their shipment container, only containers with covers or caps should be used outdoors. The container material should be compatible with the chemical stored.
- Use of open containers should be limited to specific indoor maintenance activities where a closed container is not practical. Open containers should only be used with a drip pan and should not be used for storage.
- When not in use, small containers should be stored indoors or in a cabinet or containment structure located underneath a canopy.
- All containers should be appropriately labeled as to their contents.



		Health (Blue)
4	**Danger**	May be fatal on short exposure. Specialized protective equipment required
3	**Warning**	Corrosive or toxic. Avoid skin contact or inhalation
2	**Warning**	May be harmful if inhaled or absorbed
1	**Caution**	May be irritating
0		No unusual hazard
		Flammability (Red)
4	**Danger**	Flammable gas or extremely flammable liquid
3	**Warning**	Flammable liquid flash point below 100 degrees F
2	**Caution**	Combustible liquid flash point of 100 degrees to 200 degrees F
1		Combustible if heated
0		Not combustible
		Reactivity (Yellow)
4	**Danger**	Explosive material at room temperature
3	**Danger**	May be explosive if shocked, heated under confinement or mixed with water
2	**Warning**	Unstable or may react violently if mixed with water
1	**Caution**	May react if heated or mixed with water but not violently
0	**Stable**	Not reactive when mixed with water
		Special Notice Key (White)
W		Water reactive
Oxy		Oxidizing Agent

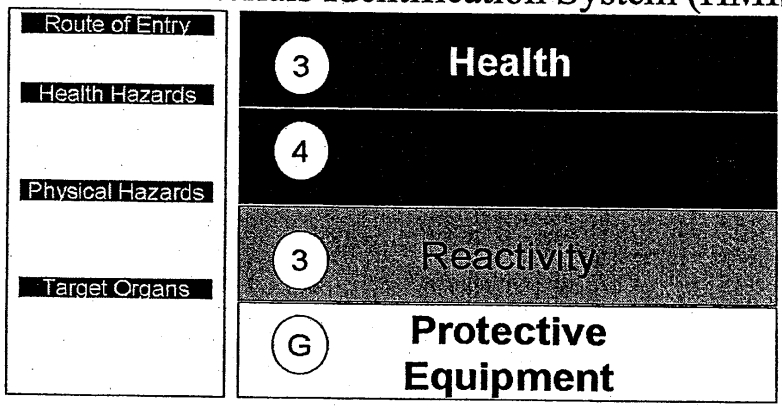
Figure 1- NFPA Diamond and Rating Summary

BMP Fact Sheet: Chemical Handling/Storage

BMP No. 013

FIGURES

Hazardous Materials Identification System (HMIS)



*Health (Blue), *Flammability (Red), *Reactivity (Yellow), *Protective Equipment (White)

The HMIS label, Like the NFPA 704 diamond, provides hazardous information. Color for type of hazard and numbers for the degree of the hazard, four being the most hazardous.
In addition the HMIS system provides information on the type of personal protective equipment (PPE) that should be used when handling this material. In this category a letter is used to indicate what combination of PPE should be used.

A = Safety glasses
B = Safety glasses, gloves
C = Safety glasses, gloves, chemical apron
D = Face shield, gloves, chemical apron
E = Safety glasses, gloves, dust respirator
F = Safety glasses, gloves, chemical apron, dust respirator
G = Safety glasses, gloves, vapor respirator
H = Splash goggles, gloves, chemical apron, vapor respirator
I = Safety glasses, gloves, dust and vapor respirator
J = Splash goggles, gloves, chemical apron, dust and vapor respirator
K = Air line hood or mask, gloves, full chemical suit, boots
X = Ask Supervisor

Finally, the HMIS label also provides information regarding Route of entry, health hazards, physical hazards, and target organs. This information is found to the left of the other hazard information.

BMP Fact Sheet: Chemical Handling/Storage	BMP No. 013

FIGURES

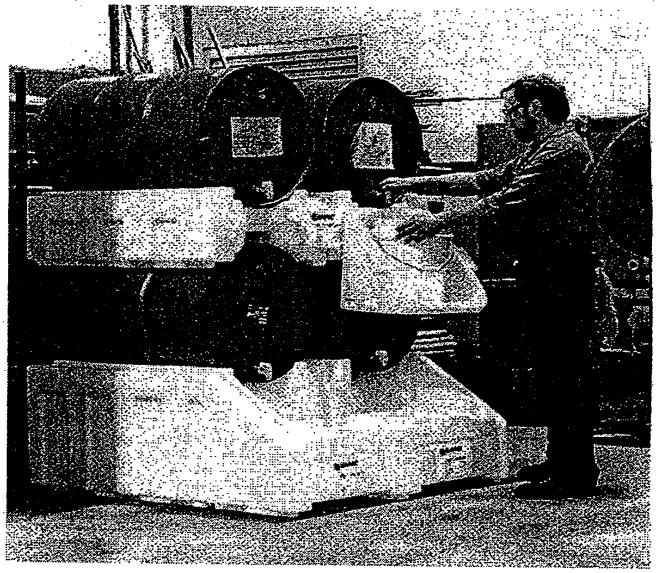


Figure 3 - Drip containment underneath drum dispense nozzle.

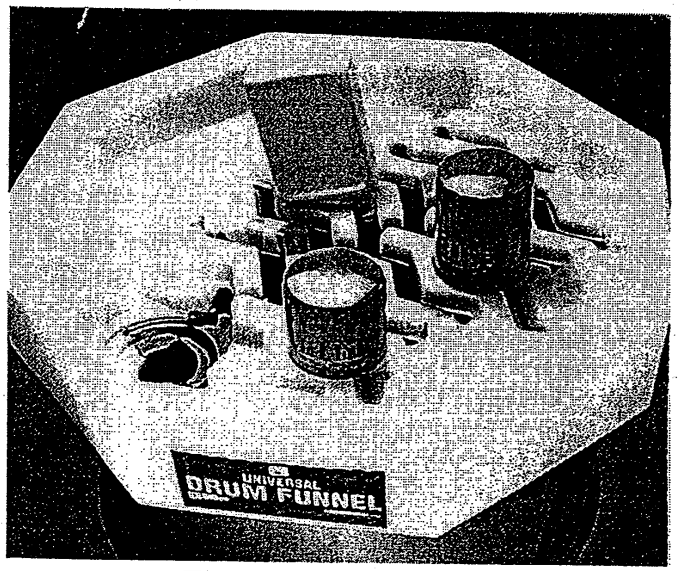


Figure 4 – Drum funnel.

BMP Fact Sheet: Drum Storage

BMP No. 014

APPLICABILITY

This BMP applies to all facilities where drums of petroleum products or other substances are stored. Full drums are those actively used for product storage. Used empty drums are those where more than 90% of the original product has been removed. Storage of hazardous materials/wastes in drums is regulated by federal, state and local regulations. This BMP concerns only issues related to storm water pollution prevention and does not assure compliance with all regulations applicable to drum storage.

TARGET CONSTITUENTS

- Oil and Grease
- Toxic Organic Compounds

PRACTICES

All drum storage should be in compliance with applicable Spill Prevention Control and Countermeasure (SPCC) regulations (40 CFR Part 112.7).

Indoor/ Outdoor Drum Storage

- △ *Preferred Practice: Where feasible, drums should be stored indoors with secondary containment.*
- □ Drums should be labeled as to their contents and stored on an impervious concrete pad.
- □ Eliminate unnecessary drum storage where possible (i.e. excess product storage, obsolete produce, empty drum storage).
- □ Drums should be stored with adequate aisle space to allow inspection of each drum and to clean leaks or spills, as needed.
- □ Drum openings and/or bung-holes should be capped when not in use.
- □ A Spill Control Kit should be kept in the drum storage area (see BMP No. 018).
- □ The drums and drum storage area should be kept free of spillage and staining.

Used Empty Drums

- △ *Preferred Practice: Where feasible, used empty drums should be stored indoors.*
- □ Empty drums should be stored with drum lids attached, bung holes capped, and labeled 'EMPTY'.
- □ Used drums not intended for reuse should be removed as soon as practical but in no case longer than one year.

BMP Fact Sheet: Drum Storage	BMP No. 014

FIGURES

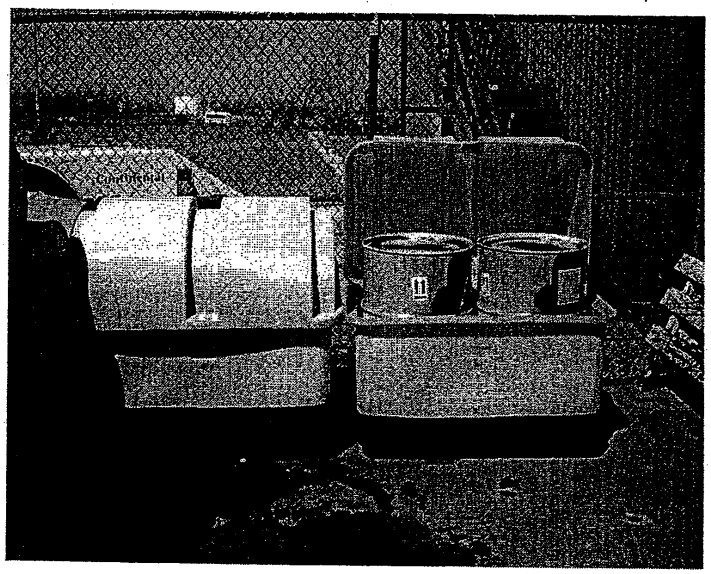


Figure 1 - Drum storage with secondary containment and cover.

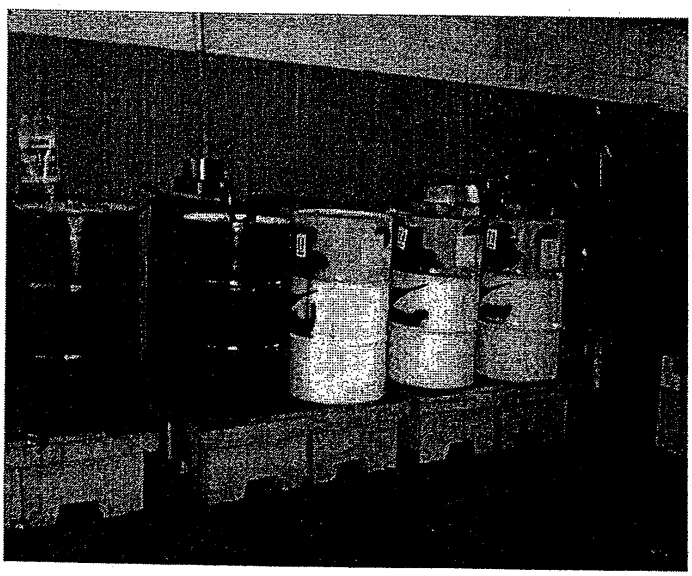


Figure 2 - Drums stored indoors on spill pallet.

BMP Fact Sheet: Battery Storage	BMP No. 015
APPLICABILITY This BMP covers the storage of batteries.	**TARGET CONSTITUENTS** • Acids • Metals

PRACTICES

Storage Requirements

- *Preferred Practice: Batteries should be stored indoors.*
- Where outdoor battery storage is used, the batteries should be protected from contact with storm water by use of a covered enclosure, roof overhang, canopy, or tarp.
- When batteries are stored outdoors, a secondary containment pallet should be used (Figure 1).

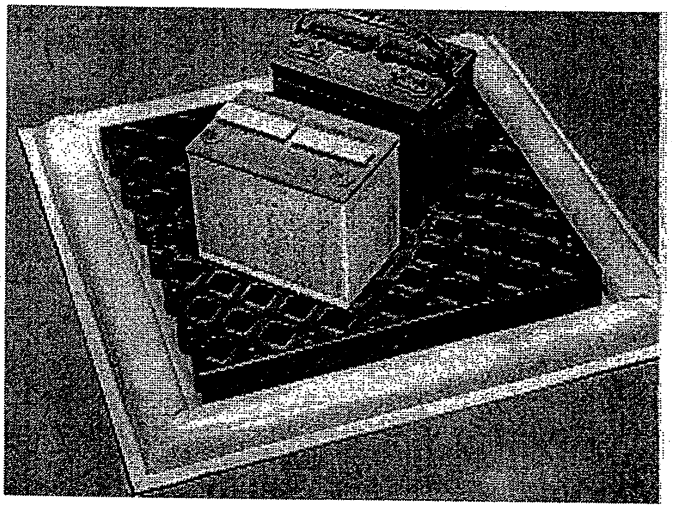


Figure 1 – Battery storage pad

BMP Fact Sheet: Floor Washdown	BMP No. 016
APPLICABILITY This BMP applies to interior floor washing activities.	**TARGET CONSTITUENTS** • Oil and Grease • Toxic Organic Compounds • Surfactants

PRACTICES

Floor Washdown Procedures

- Where indoor areas are sprayed down, the wash waters should not be directed outdoors. The wash waters should be directed to a sanitary sewer.
- Where floor cleaning machines are used, the wash waters should not be discharged into a storm sewer.
- If any storm drains are present in the vicinity of the washing area, they should be protected in accordance with BMP No. 020.

BMP Fact Sheet: Truck Loading/Unloading	BMP No. 017
APPLICABILITY This BMP applies where materials are delivered to or shipped from the facility via trucks.	**TARGET CONSTITUENTS** • Oil and Grease • Toxic Organic Compounds

PRACTICES

Loading/Unloading Requirements

- Cargo which has the potential for liquid release should be placed indoors as soon as possible to avoid contact with storm water.
- Where possible, truck loading and unloading should be conducted at a loading dock and not in an open lot. This reduces the possibility of a spill during loading/unloading operations.
- Truck docks should be protected from storm water by use of a canopy or overhang (see Figure 1). Alternatively, door skirts can be used (see Figure 2). Door skirts reduce storm water contact with materials and reduce the possibility that dropped or spilled materials would impact storm water.
- Drivers are required to apply their emergency brake during loading/unloading. Dock locks and/or wheel chocks should be used. These practices reduce the possibility of a spill caused by accidental movement of the truck during loading/unloading.
- A Spill Control Kit should be present in proximity to the loading/unloading area (See BMP No. 018).
- Storm drains in the vicinity of the loading/unloading area should be protected if a spill occurs (see BMP No. 020).
- If a spill occurs in a loading/unloading area without storm drains, the spill must be confined to a diked area, containerized and disposed of properly.

BMP Fact Sheet: Truck Loading/Unloading	BMP No. 017

FIGURES

Figure 1 - Covered loading dock.

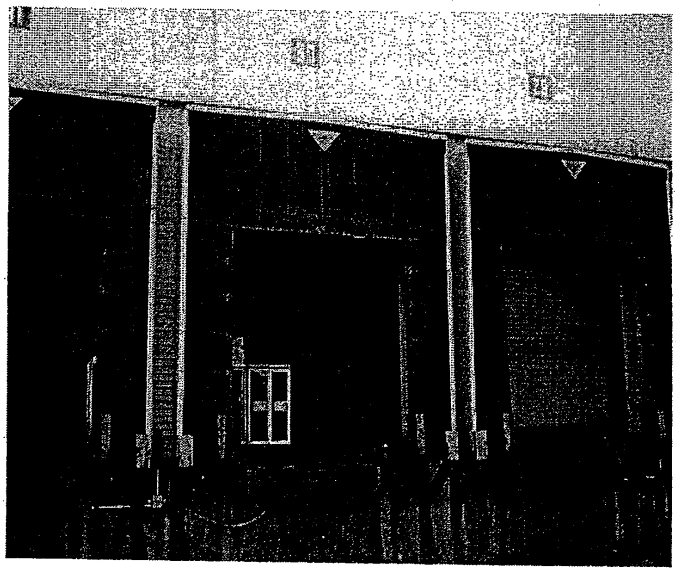


Figure 2 - Loading dock with door skirts.

BMP Fact Sheet: Spill Control Kits & Spill Response	BMP No. 018

APPLICABILITY

Spill Control Kits meeting the specifications outlined in this BMP should be present at locations specified in BMP No. 002, BMP No. 011, BMP No. 012, BMP No. 013, BMP No. 014, BMP No. 017 and BMP No. 021.

TARGET CONSTITUENTS

- Oil and Grease
- Toxic Organic Compounds

PRACTICES

- Spill Control Kits should be selected based on the area of their intended use. Material quantities will vary depending on the size of potential spills. Spill Control Kits are intended only as a first response measure in the event of a spill. Refer to the site specific SPCC Plan for additional response actions.

- Recommended contents for Spill Control Kits (Figure 1) are as follows:
  - Granular/loose absorbent (i.e., oil dry) (1)(2)
  - Absorbent pillows/pads (2)
  - Absorbent booms/socks (2)
  - Non-sparking shovel and/or push broom
  - Personal Protective Equipment (PPE), including coveralls, goggles and gloves (3)
  - Storm drain protection devices

Notes:
1) Granular absorbents are preferred over absorbent pillows/pads in areas subject to foreign object debris (FOD) restrictions.
2) Where gasoline or jet fuel spills are possible, static dissipative absorbents (absorbents with polypropylene textiles that are designed to dissipate electricity) should be used. Other absorbent types should be selected with respect to the type of hazardous materials involved (i.e. acids, corrosives, bases, fuel/petroleum).
3) Exact PPE requirements should be determined for each location when the spill kit is assembled.

- Spill Control Kit materials should be stored in such a manner as to prevent precipitation from damaging absorbent materials.

- Spill Control Kits should be stored in areas where they are easily accessible and clearly identified with a sign.

- Where two or more BMPs requiring a Spill Control Kit apply at a facility, the same Spill Control Kit can meet the requirements for both BMPs provided that it is easily accessible to both locations.

- Periodic inspections (i.e., quarterly) should be made of each Spill Control Kit to ensure that all required materials are present and in usable condition. The results of such inspections should be documented.

BMP Fact Sheet: Spill Control Kits & Spill Response	BMP No. 018

APPLICABILITY

This BMP applies to any spill, leak, or release of fuel, oil or chemical substance from anywhere at Chicago O'Hare International Airport. This BMP was developed to assist in the prevention or mitigation of the impact of spills to storm water.

TARGET CONSTITUENTS

- All Pollutants

PRACTICES (Cont.)

All spills will be immediately reported by the person who detected the spill to the O'Hare Communications Center (OCC) at 773-894-9111. American Airlines and United Airlines employees will contact their company's internal operations and communication center, which will notify the OCC. The OCC will dispatch the Chicago Fire Department, a DOA Supervisor, the Chicago Police Department and Airport Group International (AGI), as appropriate. Tenants should NOT notify the CFD or AGI directly. The caller will be asked to provide information regarding name, employer, location, type of material, volume/area of spilled material, direction of movement and actions being taken.

Personnel should only undertake spill response activities for which they have been properly trained.

When any spill occurs:

- Notify anyone in surrounding area and follow directions of the Chicago Fire Department.
- An absorbent material should be applied to the area of the spill. Protect any storm drain inlets that may be impacted by the spill by application of absorbent materials, booms, or socks.
- The resulting contaminated absorbent materials should be placed in a container or dumpster which is protected from storm water (i.e., covered dumpster or 55-gal drum). Used absorbent materials should be promptly disposed of in accordance with federal, state and local regulations. (Note: absorbents used to control petroleum product spills would typically require disposal as a "special waste" material, not general refuse).
- All spill response and follow-up reporting should be performed in accordance with the ORD Spill Response Guide.

Spill Reporting:

- Various local, state and federal government agencies require verbal notification in the event of a release.
- **The OCC will automatically notify the appropriate agencies if the release is applicable.**
- Tenants/FBO who are responsible parties will be responsible for all follow up reporting to appropriate agencies.
- **Refer to the O'Hare Spill Response Guide for appropriate reporting procedures.**

In cases where spills result from the fueling of an aircraft, the carrier is considered the responsible party.

BMP Fact Sheet:

Good Housekeeping

BMP No. 019

APPLICABILITY

This BMP applies to all facilities.

TARGET CONSTITUENTS

- Oil and Grease
- Toxic Organic Compounds
- Floatable Materials

PRACTICES

Good Housekeeping Procedures

- Facility grounds should be kept free of litter and debris.
- When a spill of solid material such as powder or pellets occurs, the spill should be swept up immediately.
- When feasible, existing oil staining should be cleaned up. An enzyme type cleaner or biodegradable cleaner can be used to assist in degrading the oil stains. The wash waters generated during the oil stain cleaning should be contained with a temporary dike structure and collected. Wash waters should be discharged into the sanitary sewer.
- All spill response should be performed in accordance with the procedures described in the site specific SPCC Plan. When a minor spill occurs it should be cleaned up with absorbent material. Liquid spills should never be washed down the storm drain.

Pallet Storage

- Pallets should not be stored in areas subject to flooding or ponding during heavy rain.
- Prior to outdoor storage, each pallet should be inspected for evidence of chemical residue or staining. If chemical residue or staining is present the pallet should not be stored outdoors.

Used Tire Storage

- Used tires should not be stored in areas subject to flooding or ponding during heavy rain.
- Used tires stored outdoors should be covered with a tarp or under a roof overhang, if feasible.

BMP Fact Sheet: Good Housekeeping	BMP No. 019

PRACTICES (Cont.)

General Waste Storage

This covers the outdoor storage of non-hazardous general wastes including general refuse, food wastes, and recyclable materials such as aluminum cans and paper scrap.

- Waste receptacles stored outdoors should be completely covered so that the contents of the receptacle will not be exposed to storm water.
- Waste receptacles that receive material that may yield liquids should be leak proof or stored in such a manner that the liquid can be collected and properly disposed. Do not discharge liquids into a storm sewer.
- Where general waste (i.e., food waste, waste with chemical/oily residue, or degradable material) has the potential to impart pollutants to storm water the waste receptacles should be provided with a cover to prevent exposure. Dumpsters with covers (see Figure 1) or rolloff boxes with a tarp may be used. Alternatively, receptacles may be located under a canopy, roof overhang or otherwise protected.
- All waste materials which have the potential to leak fluids such as oil cans or filters should be drained and wiped clean of fluids before being placed in a waste receptacle.
- Waste hauling should be scheduled so that waste receptacles do not overflow.

Figure 1 - Waste dumpster with lids.

BMP Fact Sheet: Storm Drain Protection	BMP No. 020

APPLICABILITY

This BMP applies where certain high risk activities are performed in the vicinity of storm drains. Storm Drain Inlet protection is required by BMP No. 001, BMP No. 003, BMP No. 007, BMP No. 008, BMP No. 009, BMP No. 010, BMP No. 011, BMP No. 013, BMP No. 016 and BMP No. 201.

TARGET CONSTITUENTS

- Oil and Grease
- Toxic Organic Compounds

PRACTICES

Storm Drain Inlet Protection Requirements

- Prior to engaging in the activities described in the above referenced BMPs, storm drains should be identified that could be impacted in the event of a spill. The number of storm drain inlet devices available in the Spill Control Kit should be adequate to protect all identified storm drains.
- In the event of a release from an activity that could impact a storm drain, the storm drain should be blocked so that the released material will not enter the storm sewer system.
- Storm drains can be protected using a drain mat (see Figure 1) or a temporary dike (see Figure 2).

FIGURES

Figure 1 – Mat for storm drain protection.

Figure 2 – Temporary dike used for storm drain protection.

BMP Fact Sheet: Cargo Handling & Transport Across Airfield of Hazardous Materials	BMP No. 021

APPLICABILITY

This BMP applies to the handling & transport of hazardous material cargo loaded and unloaded from airplanes and transported across the airfield (e.g., plane to plane, plane to other transport vehicle, plane to cargo bays, etc.)

TARGET CONSTITUENTS

- Oil and Grease
- Toxic Organic Compounds

PRACTICES

Cargo Handling/ Transport Procedures

- Δ *Preferred Practice: Use the International Air Transport Association (IATA) regulations regarding Dangerous Goods/ Hazardous Materials during cargo movement/handling across the airfield, which can be found in the International Civil Aviation Organization (ICAO) Technical Instructions Manual.*
- ▫ All loading, unloading and storage functions performed by a carrier in the course of transporting a hazardous material in commerce are regulated under the Department of Transportation (DOT) Hazardous Materials Regulations (HMR) 49 CFR Part 171-180.
- ▫ If hazardous materials are used or moved from one area on airport property to another area on airport property and stay solely within the confines of the airport, the HMR does not apply.
- ▫ The shipper (not the handler) must ensure that these items comply with DOT's HMR for ground transport as well as by air.
- ▫ All links in the transportation chain must know what they are transporting, how to properly load and handle goods and what to do if an incident or accident occurs.
- ▫ Cargo which has the potential for liquid release should be placed indoors as soon as possible to avoid contact with storm water.
- ▫ Cargo should be stored indoors with adequate aisle space to facilitate inspection of the containers so that it is possible to quickly respond to a leak from one of the containers.
- ▫ A Spill Control Kit meeting the requirements of BMP No. 018 should be present in all cargo handling areas.

BMP Fact Sheet:
Disposal of Water Containing Glycol

BMP No. **022**

APPLICABILITY

This BMP applies to DOA and airport tenants in the disposal of water containing glycol. This BMP is directed towards DOA, airlines, and contractors who collect used or spilled aircraft deicing fluids. This BMP does not apply to actual aircraft deicing or runway/ taxiway deicing activities.

TARGET CONSTITUENTS

- Biological Oxygen Demand
- Total Dissolved Solids

PRACTICES

- △ *Preferred Practice: Water containing glycol should be discharged into a sanitary sewer.*
- □ Water containing glycol should not be discharged into a storm sewer.
- □ Tenants and DOA Operations should obtain approval by DOA-Environmental Section prior to disposal of water containing glycol into a storm drain connected to the North or South Detention Basins.

BMP Fact Sheet:

Trench Drain and Oil/Water Separator Cleaning

BMP No. 023

APPLICABILITY

This BMP applies to periodic cleaning of trench drains at Chicago O'Hare International Airport. This BMP includes trench drains, triple catch basins and oil/water separators located near industrial activity areas and/or where there is potential for a chemical spill.

TARGET CONSTITUENTS

- All Constituents

PRACTICES

- Tenants are responsible for all trench drains, triple catch basins and oil/water separators that are included in their lease line.
- Tenants and DOA should have a complete understanding of their trench drain and sanitary sewer connection(s). Questions regarding trench drain and sanitary sewer connections should be addressed to DOA Environmental Section at 773-686-3485.
- Inspections of the trench drains should be performed at least on a monthly basis. Inspection records should be completed and should include: the name of the inspector, date, time, visual observations, corrective actions, and an implementation schedule for corrective actions.
- Regular cleaning of trench drains should be performed on an annual basis or more frequently if necessary. Cleaning should consist of pumping out the catch basin and taking residual material offsite for proper disposal.

Triple Catch Basins & Oil/Water Separators

- Triple catch basins and oil/water separators should also be inspected on a regular basis (i.e. monthly) for excess accumulated oil, grease, and other floating debris. Accumulated material should be pumped out of the triple catch basins or oil/water separators and properly disposed of in accordance with federal, state and local regulations.
- Discharge from the triple catch basin or the oil/water separator to the sanitary sewer should be monitored for oil sheen.
- Facility maintenance personnel should maintain their triple catch basins and oil/water separators according to the manufacturer's recommended guidelines.

BMP Fact Sheet: Pesticide, Fertilizer, and Herbicide Application	BMP No. 024

APPLICABILITY

This BMP applies to pesticide, fertilizer, and herbicide application to landscaped areas at Chicago O'Hare International Airport. This BMP was developed to limit the potential for storm water pollution from pesticide, fertilizer, and herbicide application.

TARGET CONSTITUENTS

- Excessive Nutrients

PRACTICES

- △ *Preferred Practice: Follow the manufacturer's recommended guidelines for pesticide, fertilizer, and herbicide storage and application. Fertilizers, pesticides, and herbicides should not be stored in a manner which allows exposure to storm water.*
- ▫ Fertilizers, pesticides, and herbicides should not be applied before an expected rainfall unless specified in the manufacturer's recommended guidelines.
- ▫ Conduct soil testing (as necessary) to determine the amount of nutrients needed for a healthy landscape. Over-application of fertilizers may damage the landscape.
- ▫ Never wash spilled fertilizers, pesticides, or herbicides into the street and storm drains.

BMP Fact Sheet: Training	BMP No. 025

APPLICABILITY	TARGET CONSTITUENTS
This BMP provides a list of training requirements and guidelines to assist in implementation of BMPs at Chicago O'Hare International Airport.	• All Pollutants

PRACTICES

- Employee training programs shall inform personnel at all levels of their responsibility under the SWPPP. Employees responsible for activities with the potential to release pollutants to the storm sewer should be trained in the requirements of applicable BMPs.
- Training sessions will address topics such as spill response, good housekeeping, material management, and deicing procedures.
- Training sessions will be implemented on a site specific basis.
- Training sessions should be conducted annually at a minimum.
- All training sessions should be documented (i.e. log of BMP training). These logs may include name of personnel, date of training and sign-off by supervisor and employee.
- Training logs should be retained and updated on a regular (annual and 'new hire') basis.
- Training is required only on BMPs applicable for site operations.

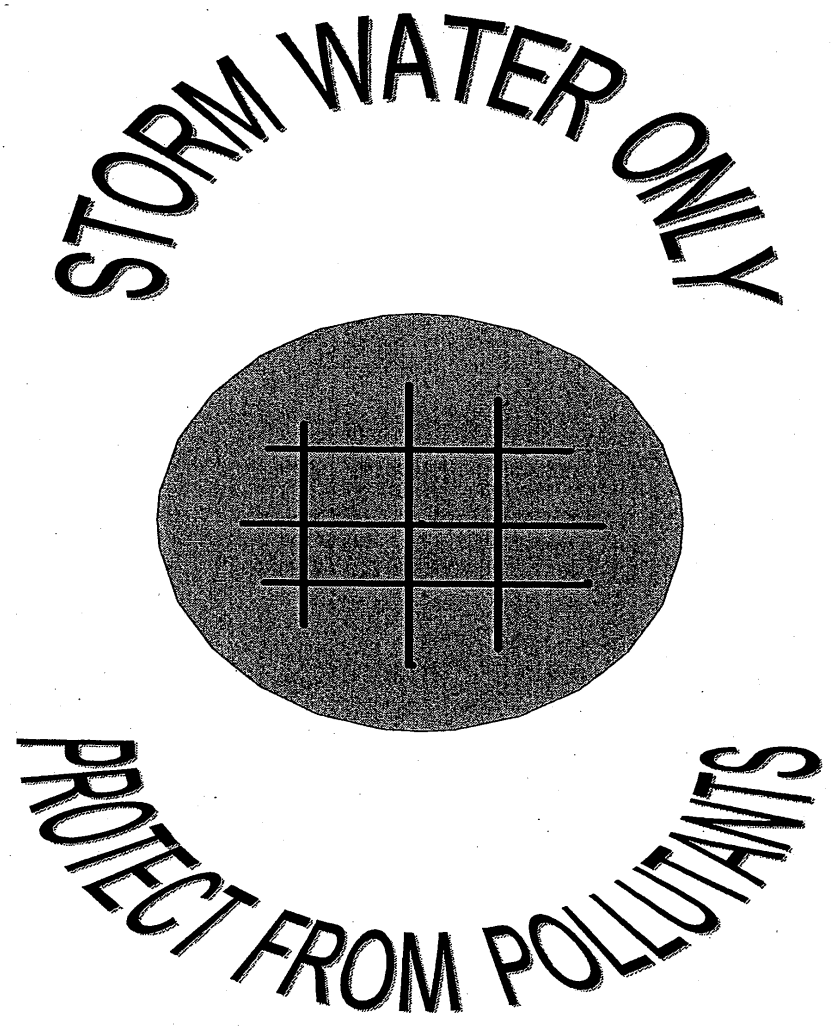
BEST MANAGEMENT PRACTICES

DEPARTMENT OF AVIATION

BMP Fact Sheet: Storm Drain Identification	BMP No. 101
APPLICABILITY This BMP should be implemented in areas of the airport where industrial activity takes place. Implementation will be the responsibility of the City of Chicago, Department of Aviation.	**TARGET CONSTITUENTS** • All Constituents

PRACTICES

Storm drain inlets should be identified by stenciling of the following labels at each storm drain inlet:



Color Code:

Blue Lettering	-	Storm drains leading to surrounding creeks
Orange Lettering	-	Storm drains discharging to the South Detention Basin.
Green Lettering	-	Storm drains discharging to the North Detention Basin.

BMP Fact Sheet: Airfield Deicing	BMP No. 102
APPLICABILITY This BMP applies to all airfield deicing activities.	**TARGET CONSTITUENTS** • Ammonia • Total Dissolved Solids

PRACTICES

Airfield Runway/Taxiway Deicing Procedures

Mechanical means, such as brooms and plows, should be used to remove the maximum amount possible of snow and ice.

- Excess snow and ice should be removed prior to application of deicing agents. (Preferably to less than 1/8 inch.)
- Slush or soft ice should be removed with rubber cutting edges prior to deicing agent application.
- Airfield anti-icing may be appropriate in specific locations since anti-icing pavements prior to freezing conditions reduces the bonding of ice to pavements, thereby subsequently requiring the application of less deicing fluid. (*The impacts of anti-icing operationally critical airfield pavements must be considered and coordinated given that anti-icing is a two-step process versus deicing which is a one-step process.*)
- DOA may consider alternative airfield deicing compounds for the purpose of reducing chemical usage and/or reducing the impacts to storm water quality. The effectiveness and safety of alternative airfield deicing compounds must be assessed prior to use.
- Deicing/anti-icing chemicals should be applied to airfields at the recommended rates to avoid application of excessive amounts.
- Deicing/anti-icing application equipment should be calibrated at the start of each season to help ensure that the appropriate amount of deicer/anti-icer is applied.
- Inspecting, repairing, and maintaining deicing equipment prior to and during the deicing season will help ensure that this equipment is in working order when needed and reduce the potential for equipment failure that may carry with it a possibility of uncontrolled release of deicing/anti-icing compounds.

Note: The application of deicing fluid is prohibited on the Military Ramp.

BMP Fact Sheet: Sanitary and Storm Sewer Manhole Inspection	BMP No. 103

APPLICABILITY

This BMP applies to routine sanitary and storm sewer manhole inspection, maintenance, and repair at Chicago O'Hare International Airport. This BMP was developed to prevent clogging and to remove accumulated pollutants from the sanitary and storm sewer manholes.

TARGET CONSTITUENTS

- All constituents

PRACTICES

Sanitary and Storm Sewer Drain Inspection

- Catch basins, storm drains, and sanitary drains should be inspected at least once per year. Inspection should help determine if any illicit connections to the storm sewers exist and determine if the drains need to be cleaned or repaired.

Sanitary and Storm Sewer Drain Maintenance and Repair

- Catch basins, storm drains, and sanitary drains on roadways and underneath overpasses should be routinely cleaned to minimize clogging and remove accumulated debris. Cleaning can be performed manually with a shovel, bucket loader, vacuum eductor, or a vacuum attachment to a street sweeper (Figure 1). Cleaning should be performed once per year, or more frequently if necessary. Records should be maintained for all cleaning activity.

- Any structural deterioration in the drains should be repaired or replaced immediately.

- Accumulated sediment from the catch basin should be properly disposed off airport property in accordance with federal, state, and local regulations. At minimum, all sediment removed from airside sewers should be considered as a special waste based on the potential for glycol contamination. Analytical testing of such sediment should be evaluated on a case-by-case basis depending on specific landfill disposal requirements.

BMP Fact Sheet: Sanitary and Storm Sewer Manhole Inspection	BMP No. 103

FIGURES

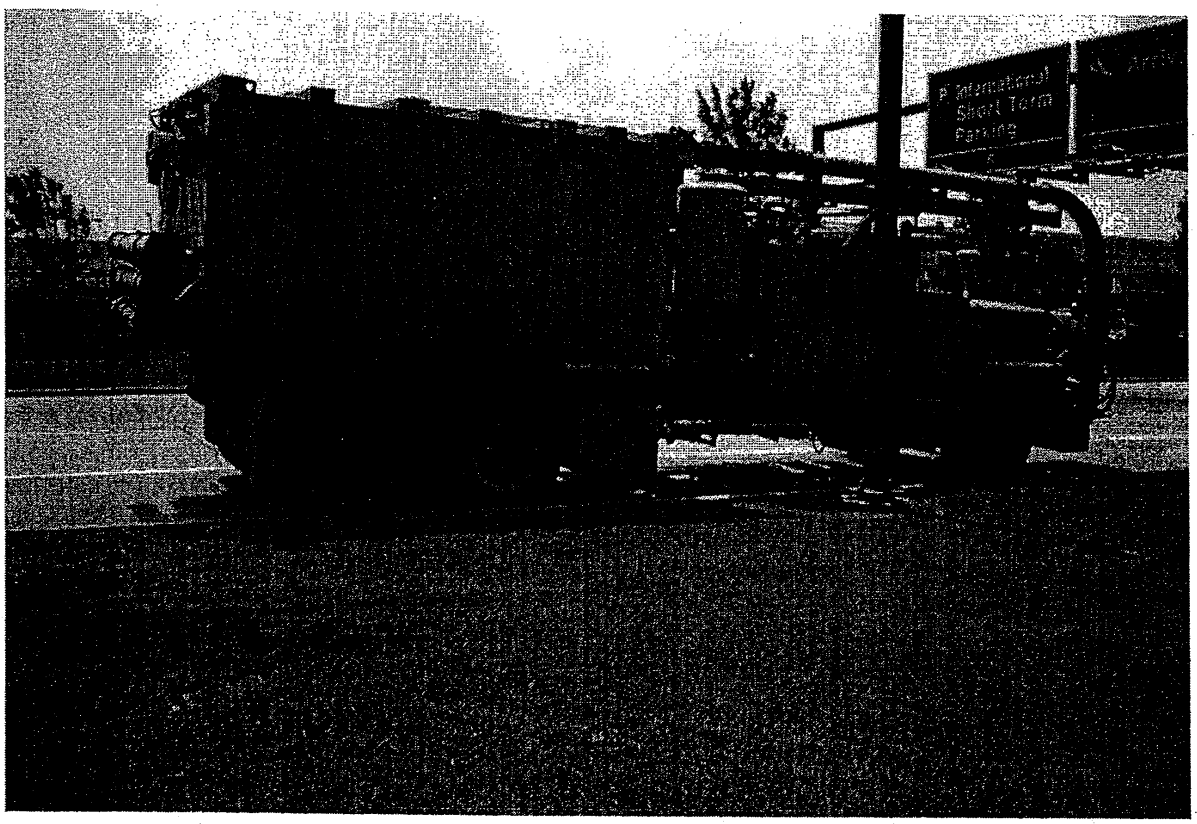


Figure 1 - The Vactor truck is used to periodically clean out sanitary and storm sewer manholes.

BMP Fact Sheet: Street Sweeping	BMP No. 104

APPLICABILITY

This BMP applies to periodic dry sweeping of streets and parking lots at Chicago O'Hare International Airport. This BMP was developed to limit the amount of trash, litter, and particulate matter from entering the storm drains.

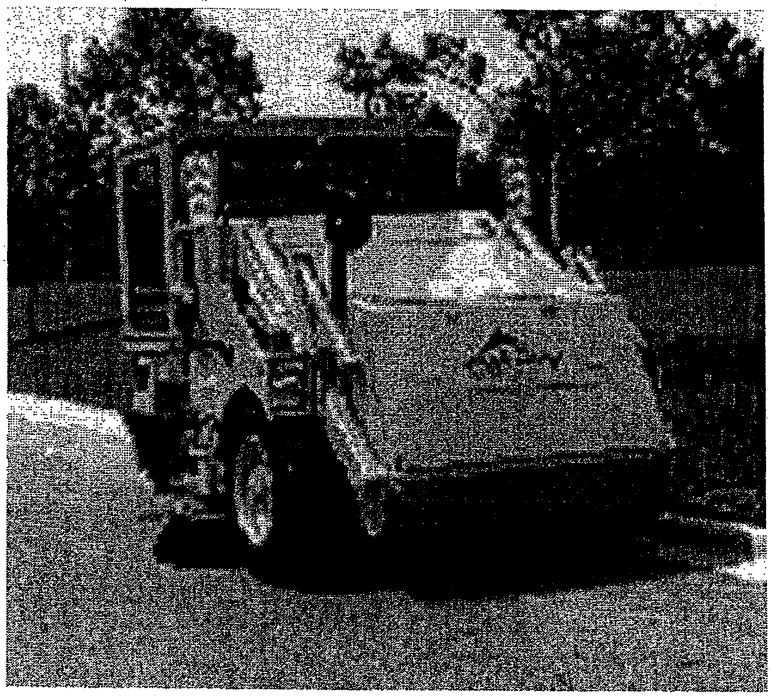
TARGET CONSTITUENTS

- All constituents

PRACTICES

Street Sweeping

- Dry sweeping of all DOA scheduled air and landside sweeper routes should be performed on a regular basis.
- Dry sweeping should be conducted often when generation of more particulate matter than usual is expected.



BMP Fact Sheet: Runway Maintenance

BMP No. 105

APPLICABILITY

This BMP applies to the maintenance of runways at Chicago O'Hare International Airport. Repeated aircraft take-off and landings result in residual tire debris build-up on the runways. This build-up can reduce friction levels on the runway. This BMP was developed to assist in meeting the requirements set forth by FAA AC 150/5320-12B and 150/5320-12C for removing tire debris, performing friction testing and other runway maintenance.

TARGET CONSTITUENTS

- Heavy Metals
- Biological Oxygen Demand
- COD
- Total Dissolved Solids
- pH

PRACTICES

Removal of Tire Debris on Runways

- *Preferred Practice: High pressure washing using only water is a preferred practice for rubber removal from the runway. High pressure water jets (30,000-40,000 psi) are directed at the pavement surface to remove the rubber particulates. This process is performed as needed but no more than two times per year (April-November) on all runways at O'Hare except Runway 9R-27L.*
- After a high pressure washer has removed the rubber residue from the surface, a vacuum sweeper immediately follows and collects the wash water and debris off the runway in order to limit the potential for storm water pollution.
- All wash water collected is discharged to a sanitary sewer or taken offsite for proper disposal.

Chemical Removal (Runway 9R-27L only)

- Runway 9R-27L is comprised of a special asphalt mix, therefore tire debris is removed using a chemical (Avion 50). The chemical is sprayed onto the runway, a scrubber truck immediately follows removing the tire debris, and a vacuum sweeper collects the residual waste water and tire debris. This process is performed once a year.
- All residual waste water resulting from the chemical application/scrubbing of the runway is collected immediately using a vacuum sweeper and is discharged to a sanitary sewer or taken offsite for proper disposal.
- Chemical removal should be avoided when rain is ongoing or imminent.

BMP Fact Sheet: Landside Elevated Parking Structure – Level 6	BMP No. 106

APPLICABILITY

This BMP applies to the application of urea to level 6 of the elevated parking structure. The elevated parking structure is generally not subject to the use of runway or aircraft deicing fluids.

TARGET CONSTITUENTS

- Ammonia
- Salinity
- Total Dissolved Solids

PRACTICES

During the course of the snow melting or deicing within and on the elevated parking structures, the following BMPs should be implemented:

- Urea will be used as a deicing agent only on level 6 or within the elevated parking structures.
- Roadways and all surface parking areas will receive salt as the preferred deicing agent.
- Urea will be applied to Level 6 of the elevated parking structures for snow melting during snow falls of less than two inches.
- If a snow fall exceeds two inches, the application of urea will be discontinued.
- Snow in excess of two inches will be removed from Level 6, during which time no urea will be applied.
- After all snow has been removed from Level 6, urea will be applied to prevent icing and potential slip and fall injuries, as needed.
- Selection of deicing agents for the elevated parking structures should consider the potential pollution impact.
- DOA is investigating alternative deicing agents to reduce the use of salt on roadways and surface parking areas.

BMP Fact Sheet: Landside Roadway & Parking Lot Deicing	BMP No. 107

APPLICABILITY

This BMP applies to the use of deicing agents on landside roadways and parking lots at Chicago O'Hare International Airport. This BMP was developed to minimize the potential for storm water pollution due to deicing agents.

TARGET CONSTITUENTS

- Total Dissolved Solids
- Salinity

PRACTICES

General

- Δ *Preferred Practice: Remove as much snow as possible by mechanical means (e.g. plowing) before using deicing agents.*

Roadsalt

- ▫ Pre-wetting, or applying water or deicing solution to road salt before or during application, uses less road salt and may be as effective as road salt alone.

Handling and Storage

- Δ *Preferred Practice: All bulk quantity road salt should be stored in order to minimize contact with storm water.*
- ▫ Road salt may be stored in a concrete bunker elevated above ground level to prevent storm water from entering the salt pile. The bunker should be covered by a lean-to type canopy.
- ▫ After each bulk salt delivery and salt truck loading, any road salt which has been spilled or tracked outside the storage area should be returned to the storage unit with a front end loader or other equipment. Any residual salt should be cleaned up following the snow event.
- ▫ DOA is investigating alternative deicing agents to reduce the use of salt on roadways and surface parking areas.

BEST MANAGEMENT PRACTICES

BMPs that also apply to CONSTRUCTION ACTIVITIES

BMP Fact Sheet: Paving and Grinding Operations	BMP No. 201

APPLICABILITY

This BMP applies to paving, surfacing, resurfacing, saw-cutting, or seal coating of existing asphalt/concrete at Chicago O'Hare International Airport. This BMP was developed to assist in the prevention or mitigation of pollutants to storm water.

TARGET CONSTITUENTS

- Oil and Grease
- Sediment
- Surfactants

PRACTICES

Paving Operations

- Paving operations, including asphalt roadway or parking lot work, should be avoided when rain is ongoing or imminent.
- If work during rainfall is unavoidable, efforts should be made to minimize the potential for pollutants entering the storm drain. (Refer to BMP No. 020)
- When paving involves asphaltic concrete (AC), the following steps shall be implemented to prevent the discharge of grinding residue, uncompacted or loose AC, tack coats, equipment cleaners, or unrelated paving materials:
  - Prevent sand or gravel from washing into storm drains and creeks by sweeping where practical.
  - AC grindings, pieces, or chunks used in embankments must not be allowed to enter any storm drains or creeks. Apply temporary perimeter controls until structure is stabilized or permanent controls are in place.
  - Collect and remove all broken asphalt and recycle when practical; otherwise dispose of properly.

Grinding Operations and Runway Grooving

- Cutting or creating grooves in existing or new pavement on the runway is an effective technique for providing skid resistance and prevention of hydroplaning during wet weather. The groover (concrete saw) simultaneously collects the waste slurry as it is cutting the runway surface.
- The collected waste slurry should be taken off site for proper disposal. The waste slurry should not be allowed to drain into the storm sewers or into the grass shoulders adjacent to the runway. The waste slurry must be removed from the runway surface, as described above.

BMP Fact Sheet: Soil and Erosion Control	BMP No. 202

APPLICABILITY

This BMP applies to all development activities greater than one acre at Chicago O'Hare International Airport.

TARGET CONSTITUENTS

- Sediments
- Trace Chemicals & Metals

PRACTICES

The DOA has procured Illinois Environmental Protection Agency NPDES Permit #ILR105869, issued May 14, 1998 and effective through May 31, 2003. This permit will be made available to all contractors, who must agree to the standards set therein.

Details on soil erosion and sediment control measures, NPDES permits, and SWPP Plans can be found in the DOA, NPDES and SWPP Plan Guidelines Manual, August 2001, prepared by the Airport Owners Representatives.

All projects more than one acre will include soil erosion and sediment control measures and have a Storm Water Pollution Prevention Plan (SWPPP) prepared by the design engineer and signed by the implementing contractor.

In addition, the following practices are presented here:

- The Illinois Urban Manual is to be referenced in the design aspects of erosion and sedimentation control.
- All activities at the airport should be performed in a manner to minimize soil erosion and prevent the introduction of sediment into wetlands and surrounding waterways. This applies to all construction projects that modify the existing vegetative cover and the underlying soils to the extent that there is a risk of soil erosion and/or introduction of sediment into wetlands and waterways.
- The design engineer will reference the specific pollution prevention site controls in all project plans and specifications. The plans will also include specific descriptions regarding the responsibilities of the developer's construction contractor to install, monitor, and maintain proposed pollution prevention facilities.
- Developers and contractors will control soil erosion and sedimentation during the construction period until the construction is complete and the site is permanently stabilized to manage stormwater and prevent soil erosion and sedimentation.
- Sedimentation control measures shall be installed before any significant grading or filling is initiated on the site to prevent the movement of eroded sediments off site or into the channel.

PRACTICES (Cont.)

- The construction area shall be minimized to preserve the maximum vegetation possible. Construction shall be scheduled to minimize the time soil is exposed and unprotected. In no case shall the existing vegetation be destroyed, removed, or disturbed more than **15 days** prior to the initiation of improvements.

- Temporary and/or permanent soil stabilization shall be applied to denuded areas as soon as possible. As a minimum, soil stabilization shall be provided within 15 days after final grade is reached on any portion of the site, and within 15 days to denuded areas which may not be at final grade but will remain undisturbed for longer than **60 days**.

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ATTACHMENT Q-2
OMP SUSTAINABLE DESIGN MANUAL
(12/2003)

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City of Chicago
Mayor Richard M. Daley

O'Hare Modernization Program
Executive Director Rosemarie S. Andolino

SUSTAINABLE DESIGN MANUAL

December 2003

Conserve Chicago Together

O'Hare Modernization Program
O'HARE INTERNATIONAL AIRPORT

Richard M. Daley
Mayor
City of Chicago

Rosemarie S. Andolino
Executive Director
O'Hare Modernization Program

City of Chicago
O'Hare Modernization Program

Sustainable Design Manual

Richard M. Daley
Mayor, City of Chicago

Rosemarie S. Andolino
Executive Director, O'Hare Modernization Program

December 2003

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O'Hare Modernization Program
O'HARE INTERNATIONAL AIRPORT

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Message from Executive Director Rosemarie S. Andolino

The O'Hare Modernization Program will reconfigure O'Hare's current intersecting airfield layout into a more modern, parallel configuration. This will substantially reduce delays and increase capacity at the airport. The O'Hare Modernization Program will also maintain O'Hare as the economic engine of our region and state by creating an additional 195,000 jobs and generating an additional $18 billion in economic activity each year. O'Hare already generates 450,000 jobs and $38 billion in economic activity for the region and state.

The development of the O'Hare Modernization Program (OMP) Sustainable Design Manual was an extremely successful collaborative effort between OMP staff, other City Departments and stakeholders to ensure that the sustainable design objectives are appropriate and applicable during the development and implementation of the Program.

The City of Chicago continues to lead the nation in developing innovative approaches to address urban environmental and energy issues. Traditional regulatory programs are a core function, but many voluntary initiatives are underway that go well beyond conventional programs. The City's programs are focused on achieving environmental improvements while providing long-term sustainability, economic benefits and improved quality of life for Chicago's citizens and businesses. That is why we have developed the "OMP Sustainable Design Manual," which will allow O'Hare International Airport to continue to evolve as a benchmark for environmental stewardship in design and construction.

We have already selected our master civil engineering team and lead engineering firms that will help move the project from the planning into the implementation phase. Every engineering team working on the O'Hare Modernization Program has been issued the "OMP Sustainable Design Manual" for incorporation of sustainable elements in their designs and ultimate implementation. The O'Hare Modernization Program will embrace the best possible environmental, social and fiscally responsible practices to enhance the quality of life and maintain consistency with the overall mission and goals of the City of Chicago. We will be tracking our progress as the plan evolves to ensure that sustainable design measures are incorporated in every element of the OMP as possible.

Sincerely,

Executive Director Rosemarie S. Andolino

O'Hare International Airport will continue to evolve as a benchmark for environmental stewardship in design and construction. The O'Hare Modernization Program will embrace the best possible environmental, social and fiscally responsible practices to enhance the quality of life and maintain consistency with the overall mission and goals of the City of Chicago.

The City of Chicago strives to be the leader in sustainable design and construction. To aid in reaching this goal, the O'Hare Modernization Program Sustainable Design Manual (Manual) has been developed as an integral part of the overall design and construction standards for the O'Hare Modernization Program (OMP). This manual supports the City of Chicago's ongoing efforts toward implementing more environmentally sustainable buildings and civic infrastructure.

The manual is written with the organizational structure developed by the U.S. Green Building Council (USGBC) for the Leadership in Energy and Environmental Design (LEED™) green building rating system. The Manual is written to apply the LEED rating system's concepts to all aspects of the OMP including civil and unoccupied buildings. LEED is also the referenced standard of the proposed *Chicago Standard* for the City of Chicago. While it is not mandated that the tasks/projects undertaken by the OMP achieve a LEED rating through the USGBC, specific projects may find this to be a valuable goal.

The contents of this document should be considered in every step of the design, planning, and implementation of the OMP, without jeopardizing the budgets and project schedules agreed upon during the awarding of contracts. The City of Chicago is aware of competing interests surrounding the development of O'Hare International Airport (i.e., greening vs. wildlife mitigation or construction recycling vs. the FAA construction standards for runways/taxiways). The achievement of the issues in this Manual to the fullest extent possible will be one way of measuring the OMP's success in balancing these interests.

O'Hare and the City of Chicago can be a leader in sustainable design and construction.

Fundamental to the Manual is the belief that an integrated design process will enable the OMP to achieve a thoughtful sustainable design effort with no or minimal impact to the schedule or budget of the task/project. To reach this target all members of the design team must establish goals and work toward them with a careful eye to design, schedule and budget synergies both within the task and between tasks.

This Manual has been written with consideration of the four general project categories that are part of the O'Hare Modernization Program. These project categories are listed below.

- **Civil - Landside** including guard post relocation, roads, tunnels and bridges, perimeter roads, stormwater conveyance systems, stormwater detention facilities, creek relocations, electrical lighting systems, airport utility systems, vehicle parking facilities and fencing, and rail relocation.
- **Civil - Airside** including runways, taxiways and shoulders, airside roads and perimeter roads, stormwater conveyance systems, stormwater detention facilities, electrical lighting systems, airport utility systems, vehicle parking facilities, and fencing.
- **Occupied Buildings** including terminals, concourses, access guard posts, DOA communications building, facility relocation south, cargo facilities, and air traffic control towers.
- **Unoccupied Buildings** including lighting vaults and fuel stations.

To help with the application of each sustainable design issue, a Project Categories Summary is included as an appendix. This summary highlights the issues to be considered for a project category and includes a cross reference with the USGBC LEED™ rating system and the proposed *Chicago Standard*. This summary should be considered a "Table of Contents" for each project category

Within the Manual's main body, each issue has three subsections; *Intent*, *Recommendations*, and *Technology/Strategy*. The primary environmental motivation for any issue is the Intent. The Recommendations summarize the goal(s) of the intent and the Technology/Strategy highlights specific ways of meeting the Recommendation within the OMP's work. To aid with consideration of applicable strategies and technologies, this section is organized around "Current Practices", "Design Recommendations", and "Design Guidelines".

- **Current Practices** are requirements. They are a restatement of practices already in place that also meet sustainable design goals. Other items are included in the current O'Hare International Airport's standards for design and construction and will also need to be accounted for within the design process.
- **Design Recommendations** are expected to have no cost or schedule impact and should be incorporated into the design.
- **Design Guidelines** are strategies and practices that will enhance the environmental design efforts of the City but are anticipated to have an impact on the cost and/or schedule.

While not all strategies will be applicable to every project category, the design team is highly encouraged to think creatively and to consider the intent of each issue throughout the decision process.

In all cases, it is the design teams' responsibility to evaluate and review with the OMP's management any anticipated cost or schedule impact.

Compliance with the issues in this Manual will need to be reviewed with the OMP management team. In most instances a goal or metric for each issue will need to be established early in the design process. Throughout the design process the design team will need to demonstrate how and to what extent compliance is being met. The means by which this is demonstrated will vary. In some instances this will be through studies and calculations, in others it will be through product and material data. In other areas the responsibility to meet the intent will be primarily the general contractor's. In these areas, specifications will need to clearly detail the execution and submittal requirements the contractor will need to adhere to. The OMP management team will review both the specifications and the general contractor's submittals. To aid in this effort, it is suggested that the teams use the compliance and submittal requirements developed by the USGBC for the LEED™ process.

The Manual is meant to supplement the existing federal, state or local regulatory requirements with additional best practice environmental strategies and considerations. Existing federal, state or local regulatory requirements include those listed below.

- Federal Aviation Administration
- U.S. Environmental Protection Agency
- Illinois Environmental Protection Agency
- U.S Department of Agriculture
- Illinois Department of Transportation standards
- City of Chicago Department of Aviation Design and Construction Standards, Stormwater Pollution Prevention Plan, Underground Storage Tank Management Plan
- City of Chicago codes and ordinances including landscape and stormwater
- City of Chicago 2003 Water Agenda
- City of Chicago Best Management Practices to minimize groundwater contamination from Stormwater Runoff Infiltration
- OMP Recyclable Excavation Materials (REM) Initiative.

This Manual does not supercede any existing standards, regulations, codes, guidelines or practices currently in place or adopted by the City of Chicago or O'Hare International Airport and its tenants. The Manual represents additional actions for consideration during the design and construction process. If conflicting regulations are encountered, it is the responsibility of the design team to review with the OMP's management any impact. It is expected that, as much as is feasible, the most rigorous requirement will be met.

1.1 Erosion & Sedimentation Control

LEED V2.1 prerequisite: No points available

Intent:

Control erosion to retain soil resources and to reduce negative impacts on water & air quality.

Recommendations:

Design an erosion and sedimentation control plan specific to the overall OMP and Phase Task consistent with the EPA Document No. EPA 832/R-92-005 (September 1992), Stormwater Management for Construction Activities, Chapter 3. IEPA mandates plans and measures as a function of normal construction practices.

Technology / Strategy

Current Practice
O'Hare's current construction activities meet the basic requirements of this strategy:
• Develop an erosion and sediment control strategy plan to be implemented by stages and phases to control erosion at the source and retain sediment on the construction site.
• Incorporate temporary sedimentation basins, temporary ditch checks, diversion dikes, temporary ditches, pipe slope drains into the construction plans.
• Establish temporary and permanent seeding plans.
Design Recommendations
Design Guidelines
• Monitor water quality impacts before and during construction.
• Develop an inventory of topsoil for potential re-use.
• Develop a policy to chip or compost all vegetation for re-use on site.

Value Implications:

- Protection and maintenance of the site environment, water, soil and air quality.
- No anticipated schedule impacts to OMP or airside operations

1.2 Brownfield Redevelopment

LEED V2.1 SS C3: 1 point possible

Intent:

Develop on a site documented as contaminated by ASTM E1903-97 Phase II Environmental Site Assessment OR classified as a brownfield by a local state and federal government agency and therefore reducing pressure on undeveloped land.

Recommendations:

Work with the OMP to plan for and implement to effectively remediate and/or encapsulate site contamination.

Technology / Strategy

Current Practice

Design Recommendations

- The following strategies are required by IEPA for any development in a brownfield:
  - Develop and implement a site remediation plan using strategies such as pump-and-treat, bioreactors, land forming and on-site remediation. Remediation would meet the standards identified in the Illinois Tiered Approach to Corrective Action (TACO).
  - Opportunity to enter into the Illinois Site Remediation Program (voluntary cleanup program) that offers a No Further Remediation (NFR) Letter.

Design Guidelines

Value Implications:

- Land value for remediated lands increases.
- No anticipated schedule impacts.

Funding Sources:

- Federal and State Grants. Federal grants through the U.S. EPA Brownfield program such as the Brownfield Cleanup Revolving Loan fund for remediation and Assessment Demonstration Pilots. (See attached list.)

1.3 Alternative Transportation – Public Transportation Access

LEED V2.1 SS C4.1: 1 point possible

Intent:

Reduce pollution and land development impacts from automobile use.

Recommendations:

Provide public rail systems within 0.5 miles and provide public bus lines within 0.25 miles of the Airport.

Technology / Strategy

Current Practice

- O'Hare's current transportation plan meets the basic requirements of this strategy. The OMP's planned extension of the Automated People Mover extends this infrastructure to the west terminal.

Design Recommendations

- Work with the OMP to plan for and implement strategies aimed at the following goals:
  - Improved and increased public transportation access from the City and suburbs.
  - Reduce parking needs.
  - Improve efficiency of access.

Design Guidelines

- Below are additional suggestions that could bolster public transportation but are beyond the scope of the present OMP. Design team should consider impact of future implementation.
  - Provide incentives to employees to use public transportation.
  - Consolidate rental car facilities and mini-bus transportation to minimize congestion on terminal roads.
  - Operate satellite 'check-in' facilities (downtown and suburban locations) to minimize congestion on terminal access roads and encourage use of public transportation.
  - Construct O'Hare-Midway high-speed rail connection.
  - Develop O'Hare-Downtown CTA express connection.
  - Develop METRA Starline service from the northwest suburbs.

Value Implications:

- Cost savings due to reduced parking infrastructure and detention required.
- Reduction of the urban heat island effect.
- Minimize traffic congestion and air pollution.
- No anticipated schedule impacts to OMP or airside operations, except possibly during construction. Project(s) can be constructed independent of OMP.

1.4 Alternative Transportation – Bicycle Storage & Changing Rooms

LEED V2.1 SS C4.2: 1 point possible

Intent:

Reduce pollution and land development impacts from automobile use. Provide secure bicycle storage with convenient changing/shower facilities.

Recommendations:

Work with the OMP to plan for and implement strategies aimed at the following goals.

- Encourage bicycle use for employees.
- Reduce parking needs.

Technology / Strategy

Current Practice

Design Recommendations

Design Guidelines

- Provide safe bicycle lanes/paths.
- Provide a centralized facility(s) for secure bicycle storage with convenient changing/shower areas.
- Provide incentives to employees to bike to work.

Value Implications:

- Cost savings due to reduced construction for future parking infrastructure and amount of detention required.
- Reduction of the urban heat island effect.
- Minimize traffic congestion and air pollution.
- No anticipated schedule impacts to OMP or airside operations. Project(s) can be constructed independent of OMP.

1.5 Alternative Transportation – Alternative Fuel Vehicles & Parking Capacity

LEED V2.1 SS C4.3 & SS C4.4: 2 points possible

Intent:

Reduce pollution and land development impacts from automobile use.

Recommendations:

Work with the OMP to plan for and implement strategies aimed at the following goals.

- Encourage increased use of alternative fuel vehicles for airport operations, public transportation, and employee vehicles.
- Provide preferred parking for carpools or vanpools.
- Reduce parking needs.

Technology / Strategy

Current Practice
• O'Hare already has programs for alternative fuel vehicles within the airport operations. Design so that these programs are enhanced and supported.
Design Recommendations
Design Guidelines
• Increase use of alternative fuel vehicles for airport operations particularly indoor cargo operations.
• Provide preferred parking for staff and public alternative fuel vehicles.
• Install alternative fuel refueling stations for public use.
• Provide preferred parking for vanpools and carpools for staff.
• Plan for the development of preferred parking and/or lot locations for rental fleets, which offer alternative fuel rental vehicles.

Value Implications:

- Cost savings due to reduced construction for future parking infrastructure and amount of detention required.
- Reduction of the urban heat island effect.
- Minimize traffic congestion and air pollution.
- No anticipated schedule impacts to OMP or airside operations. Additional alternative fuel programs can be realized independent of OMP.

1.6 Stormwater Management, Rate & Quantity

LEED V2.1 SS C6.1: 1 point possible

Intent:

Limit disruption and pollution of natural water flows by managing stormwater runoff. Encourage groundwater infiltration. Use detention to reduce storm water flow, velocities and sedimentation loads into the receiving streams.

Recommendations:

Work with the OMP to plan for and implement strategies aimed at the following goals.

- Minimize the amount of impervious surface constructed within the task/project and the OMP. Remove existing pavement areas not planned for future use.
- Calculate the peak flow rates from impervious surfaces and with the use of pervious surfaces to define impact of pervious pavement use.
- Reduce flow velocities in storm water conveyance systems to encourage settling of sediments (for later removal).
- Provide opportunities for storm water to infiltrate into the groundwater to reduce volume of runoff, improve water quality and recharge the aquifer.
- Recycle the storm water runoff for non-potable water use and/or irrigation at landside facilities.
- Evaluate alternatives to curbs and gutters and an enclosed drainage system such as curb breaks and drainage ditches and/or bioswales.

Technology / Strategy

Current Practice

Design Recommendations

- Evaluate pervious pavements for roadways, shoulders, non-traffic pavements, maintenance roads, utility yards, airside and landside parking facilities. Peak storm water runoff rates could be reduced. Storm sewer conveyance systems could be designed with reduced diameter pipes.
- Install landscape to reduce runoff. See discussion of “Water Efficient Landscaping”.
- Evaluate curb breaks and drainage ditches, and/or bioswales.

Design Guidelines

- Use of “extensive” green roof systems with 1 to 5 inches of topsoil encourages filtration and treatment of rainwater, evaporation of rainfall to the atmosphere and storm water retention. An estimated 25% of rainfall on a green roof becomes runoff.
- Use rainwater cisterns for landside irrigation during the plant growth season. Storm water runoff from the collection systems would be directed into the cisterns for storage. Collected water would be utilized for irrigation during dry periods. Cisterns would attenuate peak storm water runoff flows to the downstream storm sewer systems. Cisterns improve water quality by the removal of sediments due to the reduced velocities of flow in the system. (Sediment must be periodically removed.)

Value Implications:

- Cost of pervious pavement is comparable to standard pavements on large-scale projects.
- Maintaining porous characteristics of pavement may require additional maintenance costs.
- Potential increased first cost for green roof systems and plumbing infrastructure.
- Increased costs for rainwater cisterns for structural components, distribution system, and maintenance.
- Cost savings realized by reduced stormwater detention needs, water treatment costs, and storm water conveyance systems.
- Irrigation during dry periods without reliance on public water systems.
- No anticipated schedule impacts to OMP or airside operations.

1.7 Stormwater Management, Treatment

LEED V2.1 SS C6.2: 1 point possible

Intent:

Limit disruption of natural water flows by eliminating stormwater runoff, increasing on-site infiltration and eliminating contaminants.

Recommendations:

Treat stormwater to remove solids and contaminants.

Technology / Strategy

Current Practice

Design Recommendations

- Evaluate Best Management Practices outlined in Chapter 4, Part 2 (Urban Runoff), on the United States environmental Protection Agency's Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, January 1993 (document No EPA-840-B-92-002.
- Evaluate first flush systems including slotted edge drains connected to underground holding tanks. First flush sediment would settle in the tanks and be removed at a later date for treatment and/or disposal.
- Evaluate detention basins, detention ditches, ditch checks and other BMP's for effective first flush treatment.
- Evaluate bioswales along roadways and parking areas to encourage groundwater infiltration of stormwater runoff. On airside projects, these strategies should not encourage animal habitat.
- Minimize current treatment of all stormwater at O'Hare by reducing runoff. See discussion of "Storm water Management – Rate and Quantity"

Design Guidelines

- Develop collection systems for de-icing runoff. The proposed runway and taxiway pavements would contain first flush systems along the edge of pavements and Central Deicing Facilities for aircraft.

  The first flush system could consist of slotted edge drains connected to underground holding tanks. Glycol contaminated snowmelt and minor storm water runoff would be captured in the tanks and removed for treatment, disposal or recycling. Toronto Airport reports that in an experimental pilot project, they were able to obtain glycol fluids in a concentration of at least 50% from recycled spent fluids having an original concentration of 8 to 10 percent.
- Central Deicing Facilities could also be utilized to capture excess glycol from aircraft deicing operations in underground storage tanks. Toronto Airport reports that glycol water quality exceedence events were reduced by 62.5% from 2001 to 2002 by the use of central deicing facilities.

Value Implications:

- Collection systems constructed with the new runways and taxiways would:
  - Potentially increase storm sewer construction costs. The cost of a first flush system could be offset by reduced size of the remaining storm water conveyance system.
  - Reduce the discharge of high concentrations of glycol in runoff to the local waterways.
  - Reduce MWRDGC sewerage treatment costs of the glycol contaminated storm water.

1.8 Landscape & Exterior Design to Reduce Heat Islands, Non-Roof

LEED V2.1 SS C7.1: 1 point possible

Intent:

Reduce Heat Islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat

Recommendations:

Provide shade and/or use light colored/high albedo materials (reflectance of at least 0.3) for at least 30% of the site's non-roof impervious surfaces for airside and landside uses. Albedo is the ratio of the amount of solar radiation reflected from a material to the amount incident on the material.

Technology / Strategy

Current Practice

Design Recommendations

- Maximize light colored/high albedo pavement, such as portland cement concrete, for roadways, parking lots, sidewalks and plaza areas. Reflectance must be a minimum of 0.3. ['White' portland cement – 0.7 to 0.8, typical portland cement – 0.35 to 0.5, typical asphalt pavement – 0.05 (new) to 0.15 (over 5 years)].

Design Guidelines

- For Landside projects, install trees to provide shade within 5 years for at least 30% of dark colored impervious surfaces, including parking, roadways, walkways, and outdoor plazas. (Requires approx. 2 -3 more trees than required by City code for off-street parking.)
- A creative combination of the above strategies to reach this goal is encouraged. For example, a task/project can provide 5% shading of dark colored impervious surfaces and 25% light colored/high albedo pavement to achieve this goal.
- Evaluate structured parking in lieu of asphalt paved surface lots. This provides additional 'green' areas and reduces stormwater runoff from roofs and potentially the size of storm sewer systems.
- Evaluate open grid pavement for surface lots and site pavement.

Value Implications:

- Reduction of the urban heat island effect.
- No anticipated schedule impacts to OMP or airside operations.
- Potential materials cost increase.
- Reduced cooling energy consumption due to reduced temperature.

1.9 Landscape & Exterior Design to Reduce Heat Islands, Roof

LEED V2.1 SS C7.2: 1 point possible

Intent:

Reduce urban heat island effect (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

Recommendations:

Use ENERGY STAR compliant and high emmissivity materials (at least 0.9 when tested in accordance with ASTM 408) for at least 75% of the roof surface OR install a "green" vegetated roof for at least 50% of the roof area.

The implementation of a "green roof" system should be evaluated with consideration to technical feasibility, the impact on energy savings and stormwater, and visibility. The placement of a green roof on one or more buildings will be determined through discussions with the OMP.

Technology / Strategy

Current Practice

Design Recommendations

- Evaluate and utilize an ENERGY STAR compliant roofing system, such as aluminum coating and light-colored coatings. Thermoplastic and white PVC roofing systems meet these standards.

Design Guidelines

- Install a "green" vegetated roof on all or portions of new and existing buildings.

Value Implications:

- Reduction of "heat island". (Green roof can reduce air temperature by 3 to 7°F.)
- A green roof may provide a 10% reduction on air conditioning costs.
- Reduction of stormwater detention requirements and, potential cost savings in stormwater conveyance infrastructure.
- Increased roof life by two or three times the standard roof. Protected underlayment from mechanical damage, UV-rays, hail and extreme temperature.
- Improved indoor sound levels. Can reduce indoor sound by up to 40 decibels.
- Potential for increased first costs due to increased structure, drainage and waterproofing.
- Structural elements must be designed for increased roof load.

1.10 Light Pollution Reduction

LEED V2.1 SS C7.3: 1 point possible

Intent:

Eliminate light trespass from the building and site, improve night sky access and reduce development impact on nocturnal environments.

Recommendations:

Meet or provide lower light levels and uniformity ratios than those recommended by the Illuminating Engineering Society of North America (IESNA) *Recommended Practice Manual: Lighting for Exterior Environments* (RP-33-99).

Technology / Strategy

Current Practice
Design Recommendations
• Adopt site lighting criteria to maintain safe light levels while avoiding off-site lighting and night sky pollution.
• Minimize site lighting where possible
• The maximum candela value of all interior lighting shall fall within the building (not out through windows) and the maximum candela value of all exterior lighting shall fall within the property.
Design Guidelines
• Model the site lighting using a computer model.
• Consider full cutoff luminaries, low-reflectance, non-specular surfaces and low-angle spotlights for roadway and building lighting.

Value Implications:

- No anticipated schedule impacts to OMP or airside operations.

2.1 Water Efficient Landscaping

LEED V2.1, WE C1.1 & WE C1.2: 2 points possible

Intent:

Limit or eliminate the use of potable water for landscape irrigation.

Recommendations:

- Eliminate irrigation systems, use high-efficiency irrigation technology OR use captured rain or recycled site water to reduce potable water consumption for irrigation.
- Install drought-tolerant and native vegetation.

Technology / Strategy

Current Practice
Design Recommendations
• Do not install an irrigation system.
• Utilize native vegetation, which may be acceptable for site use. Utilize vegetation to reduce or eliminate irrigation requirements for landside areas
Design Guidelines
• Perform a soil and climate analysis to determine the appropriate landscape strategy.
• Evaluate stormwater and/or greywater cisterns for capturing rainwater from all new roofs for irrigation.

Value Implications:

- Reduction in environmentally harmful landscape maintenance practices.
- 48% reduction in annual maintenance costs of traditional landscape after seven years.
- Approximately a 30% reduction in detention requirements from that required for a typical Kentucky bluegrass landscape.
- No anticipated schedule impacts to OMP or airside operations.

2.2 Innovative Wastewater Technologies

LEED V2.1, WE C2: 1 point possible

Intent:

Reduce generation of wastewater and potable water demand, while increasing the local aquifer recharge.

Recommendations:

Reduce the use of municipally provided potable water for building sewage conveyance by specifying high-efficiency fixtures and dry fixtures to reduce water usage and wastewater volumes.

Technology / Strategy

Current Practice
Design Recommendations
• Use High-efficiency fixtures and valves.
• Utilize fixtures such as dual flush toilets and waterless urinals to reduce wastewater volumes.
• Evaluate reusing stormwater for non-potable uses.
Design Guidelines
• Capture greywater from lavatories, showers and institutional dishwashing facilities for sewage conveyance or on-site wastewater treatment systems.

Value Implications:

- Potential increased first cost for plumbing infrastructure.
- Reduction of municipal water usage up to 2.8 gallons per day per person.
- Savings in water and sanitary sewer conveyance and treatment.

2.3 Water Use Reduction

LEED V2.1 WE C3.1 & WE C3.2: 2 points possible

Intent:

Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Recommendations:

After meeting the Energy Policy Act of 1992 fixture performance requirements, quantify and demonstrate to the OMP strategies that in aggregate use less water than the water use baseline for the building. Target water use reduction at 30%.

Technology / Strategy

Current Practice
Design Recommendations
• Use high-efficiency fixtures and valves, such as automatic sensors, aerators on lavatories and dual-flush toilets.
Design Guidelines
• Dry fixtures such as composting toilets and waterless urinals to reduce wastewater volumes.
• Use reclaimed water for cooling tower makeup.
• Evaluate pulsed-power electromagnetic water treatment, ultraviolet treatment, or ozone treatment for cooling tower water.
• Establish a water supply system that supports vehicle maintenance without the use of potable water by using recycled water or diverted stormwater for vehicle washing.

Value Implications:

- Savings in water and sewage conveyance.
- Cooling tower water treatment systems will reduce chemical use and water blowdown volume.
- Potential increased first cost for plumbing infrastructure.

3.1 Systems Commissioning

LEED V2.1 Prerequisite & EA C3: 1 point possible

Intent:

Verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended.

Recommendations:

Implement or have a contract in place to implement the following fundamental best practice commissioning procedures.

Technology / Strategy

Current Practice
Design Recommendations
• Review the design intent and the basis of design documentation.
• Incorporate commissioning requirements into the construction documents.
• Develop and utilize a commissioning plan.
• Verify installation, functional performance, training, operations and maintenance documentation.
• Complete a commissioning report.
• Provide the owner with a single manual that contains the information required for re-commissioning systems.
• Engage a commissioning team that does not include individuals directly responsible for project design or construction management to evaluate both building and site systems as part of the commissioning plan.
• Priority Systems - high energy consuming systems
○ Central Building Automation system
○ All HVAC system equipment
○ Lighting controls and sensors
○ Site Lighting
○ Refrigeration systems
○ Vertical Transport
○ Building Envelope

- Lower Priority Systems – low energy consuming system.
  - Emergency Power Generators and Automatic Transfer Switching
  - Uninterruptible Power Supply systems
  - Life Safety systems; Fire protection Fire alarm, Egress pressurization
  - Lightning Protection
  - Domestic and Process water pumping and mixing systems
  - Equipment sound control systems
  - Data and Communication systems
  - Paging systems
  - Security systems
  - Irrigation systems
  - Plumbing
- For Runways, Civil/Stormwater and Roadways/Rail projects this scope should include the following project components.
  - For support and ancillary buildings include all of the applicable systems and assemblies noted above
  - Runway lighting and illuminated signage
  - Runway NAVAIDS
  - Site lighting systems
  - Traffic signals
  - Pump stations
  - Oil/water separators

Design Guidelines

Value Implications:

- Cost for Commissioning Authority's fees.
- Ensures that the building systems are installed and calibrated to provide optimal performance in accordance with the design documents.
- Operations and maintenance costs are reduced.
- Staff systems training is ensured
- Contractor "callbacks" are reduced

3.2 Minimum Energy Performance

LEED V2.1 Prerequisite EA P2: No points possible

Intent: Establish the minimum level of energy efficiency for the base building and systems.

Recommendations:
Design the building or site systems to comply with the requirements of ASHRAE/IESNA Standard 90.1-1999 (without amendments).

Technology / Strategy

Current Practice

- Meet the Chicago Energy Conservation Code.

Design Recommendations

- Design all buildings to comply with ASHRAE/IESNA Standard 90.1-1999. (This will ensure compliance with the Chicago Energy Conservation Code).
- For Runways, Civil/Stormwater and Roadways/Rail, to the greatest extent possible, design site systems to comply with ASHRAE/IESNA Standard 90.1-1999.

Design Guidelines

Value Implications:

- Initial costs typically offset by operations and maintenance savings.

3.3 CFC Reduction

LEED V2.1 Prerequisite EA P3 & Credit EA C4: 1 point possible

Intent:

Reduce ozone depletion.

Recommendations:

- Zero use of CFC and HCFC-based refrigerants in base building HVAC&R systems.
- Fire suppression systems shall not contain Halon.

Technology / Strategy

Current Practice
Design Recommendations
• Specify new base building HVAC equipment that uses no CFC or HCFC refrigerants.
• When reusing existing HVAC systems, conduct an inventory to identify equipment that uses CFC and HCFC refrigerants and adopt a replacement schedule for these refrigerants.
Design Guidelines

Value Implications:

None

3.4 Optimize Energy Performance

LEED V2.1 EA C1: 10 points possible

Intent:

Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.

Recommendations:

Develop an overall strategic Energy Efficiency Plan to reduce design energy cost compared to the energy cost budget for energy systems regulated by ASHRAE/IESNA Standard 90.1-1999 (without amendments), as demonstrated by a building simulation using the Energy Cost Budget Method described in Section 11 of the Standard.

The Energy Efficiency Plan should identify specific design strategies for regulated energy systems and provide detailed information to the OMP on the percent of energy efficiency achieved. Provide to the OMP a cost analysis illustrating both "first cost" and annual savings. Consider operations, maintenance and energy costs in this analysis.

Regulated energy systems include HVAC, service hot water and interior lighting. Non-regulated systems include plug loads, exterior lighting, garage ventilation and elevators.

Technology / Strategy

Current Practice
Design Recommendations
• Use a computer simulation model to assess energy performance and identify the most cost effective energy measures.
• Provide high-efficiency motors and systems.
• Provide energy efficient lighting systems.
• Organize circuiting of lighting and building systems so that individual areas may be separately controlled relative to daylight and heating/cooling zones.
• Orient building to optimize passive solar and/or daylight penetration.
• Optimize architectural features for daylighting and glare control. Consider light shelves, ceiling design, window placement, and window treatments
• Provide motion sensors in stairs, toilet rooms, storage rooms and equipment rooms unless life safety is compromised.
• Provide "Energy Star" compliant equipment and appliances
• Provide appropriate training for the operations and maintenance of the facility. Coordinate with the Commissioning Agent.
• Control air infiltration through all exterior openings including loading docks.

Design Guidelines

- Quantify energy performance compared to the baseline building and provide a summary report to the OMP.
- The following technologies and strategies should be evaluated for Building/Structures:
  - Evaluate cogeneration for new terminals and concourses.
  - Provide energy efficiency upgrades to relocated facilities.
  - Use LED "exit" signs in buildings.
  - Provide daylight harvesting control systems.
  - Optimize lighting controls for energy savings and function.
  - Integrate lighting systems with Building Automation System.
  - Use high performance glazing (double glazed, low-e, spectrally selective) and window systems.
  - Evaluate underfloor air distribution systems in office-type spaces.
  - Evaluate appropriate levels of insulation and thermal mass for building envelope.
  - Utilize premium efficiency motors where applicable.
  - Ground-source heat pumps for pre-heating/pre-cooling of water systems.
- Technologies and strategies to be evaluated for Runways include LED lighting and signals
- Technologies and strategies to be evaluated for Civil/Stormwater and Roadways/Rail include LED lighting and signals
- Investigate non-electrified snowmelt procedures, including Hydronic runway pavement for snowmelt and Epoxy overcoat with glycol for controlling snow on runways.
- Evaluate cogeneration for tasks/projects and for coordinated intra-task/project power requirements.

Value Implications:

- Substantial operational cost savings can be expected. Energy Cost Analyses will demonstrate these savings.
- Additional first costs can be expected for many strategies.
- Lower maintenance costs.
- FAA approval required for use of LED signaling and landing equipment. FAA evaluation pending.
- City of Chicago Department of Fire Prevention approval required for use of LED exit signs. Current standard for federal construction.

Funding Sources:

Illinois Clean Energy Community Foundation
U.S. Department of Energy

3.5 Renewable Energy

LEED V2.1 EA C2.1, EA C2.1 & EA C2.3: 3 points possible

Intent:

Encourage and recognize on-site renewable energy self-supply in order to reduce atmospheric pollutants, operations costs, and the environmental impacts associated with fossil fuel energy use.

Recommendations:

- Investigate the feasibility of supplying a percentage of the task/project's energy use through the use of on-site renewable energy systems.
- Demonstrate to the OMP through the energy cost budget the first costs and annual energy savings. Take advantage of net metering with local utility when applying these strategies.

Technology / Strategy

Current Practice
Design Recommendations
Design Guidelines
• Discrete photovoltaic power source for outlying equipment, ancillary buildings, and parking and site lighting.
• Solar hot water pre-heat.
• Solar trombe-walls for passive solar heating.
• Building-integrated photovoltaics.
• Fuel cells.

Value Implications:

- Operational cost savings can be expected due to reduced energy costs. The Energy Cost Analyses will demonstrate these savings.
- All technologies require additional first costs for technology and system infrastructure.
- Reduced reliance on grid sourced power.
- All discrete alternate energy sources require an automatic utility/generator backup for critical functions.

Funding Sources:

- US Department of Energy
- Illinois Clean Energy Community Foundation

3.6 Measurement & Verification

LEED V2.1 EA C5: 1 point possible

Intent:

Ensure ongoing accountability and optimization of energy and water consumption.

Recommendations:

Provide a mechanism for the accountability and optimization of building energy and water consumption performance over time.

Technology / Strategy

Current Practice

Design Recommendations

- Install continuous metering equipment for the following end-uses:
  - Lighting systems and controls
  - Constant and variable motor loads
  - Variable frequency drive (VFD) operation
  - Chiller efficiency at variable loads (kW/ton)
  - Cooling load
  - Air and water economizer and heat recovery cycles
  - Air distribution static pressures and ventilation air volumes
  - Boiler efficiencies
  - Building-related process energy systems and equipment
  - Indoor water risers and outdoor irrigation
- Develop a Measurement and Verification plan that incorporates the monitoring information from the above end-uses and is consistent with Option B, C or D of the 2001 *International Performance Measurement & Verification Protocol (IPMVP) Volume I: Concepts and Options for Determining Energy and Water Savings*.
- Investigate whether these facilities will be included in the City of Chicago's Global Building Monitoring System.

Design Guidelines

- Draft a Measurement & Verification Plan to apply during building operation that compares predicted savings to those achieved.

Value Implications:

- Long-term operational cost savings can be expected.
- Additional first cost can be expected for some additional BAS control points.

Funding Sources:

- Illinois Clean Energy Community Foundation

3.7 Green Power

LEED V2.1 EA C6: 1 point possible

Intent:

Encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis.

Recommendations:

This is an operational strategy that should be reviewed with the City of Chicago's energy purchasing agreements.

Provide detailed information to the OMP on the percent of renewable sourced energy purchased.

Renewable sources are as defined by the Center for Resource Solutions (CRS) Green-e products certification requirements.

Technology / Strategy

Current Practice
Design Recommendations
• Determine the City of Chicago's Green Power requirements for the task/project and investigate opportunities to engage in a green power contract with the utility.
• Visit www.green-e.org for details about the Green-e program.
Design Guidelines

4.1 Storage & Collection of Recyclables

LEED V2.1 Prerequisite MR P1: No points possible

Intent:

Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.

Recommendations:

Provide an easily accessible area serving the entire building, including ancillary buildings, dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, corrugated cardboard, glass, plastics and metals.

Technology / Strategy

Current Practice

Design Recommendations

- Investigate and incorporate collection rooms for recycling streams that make sense for each facility.
- Coordinate recyclable waste collection with hauler capability.
- Evaluate the following waste for recycling:
  - Aluminum
  - Glass
  - Paper, newspapers, magazines and cardboard
  - Carpet
  - Food Waste
  - Gas & oil filters
  - Motor oil and Anti-freeze
  - Scrap metal
  - Batteries
  - Light bulbs
  - Toner cartridges
  - Tires
  - Electrical wiring
  - Electronics including monitors
  - Deicing fluid
- Instruct users and occupants on recycling procedures.
- Designate an area for recyclable collection and storage that is appropriately sized and located in a convenient area.

Design Guidelines

- Employ cardboard balers, aluminum can crushers, recycling chutes and other technologies to enhance the recycling program.

Value Implications:

- Space requirements for trash/recycling operations.
- Reduced waste hauling costs

4.2 Structure & Building Reuse

LEED V2.1 MR C1.1, MR C1.2 & MR C1.3: 3 points possible

Intent:

Extend the life cycle of existing runways and infrastructure, conserve resources, reduce waste, and reduce environmental impacts as they relate to materials manufacturing and transport.

Recommendations:

Demonstrate to the OMP the strategies for reuse and quantities of reused runway and infrastructure. Reuse refers to existing structures that are left in place, or have been relocated for reuse with the new OMP airport configuration.

Technology / Strategy

Current Practice
• Evaluate relocation of existing structures for reuse. Consider adaptive reuse of building(s) / structure(s) and potential relocation for the same program use.
• Evaluate maximizing reuse of existing runway and infrastructure.
• Quantify the extent of reuse.
Design Recommendations
Design Guidelines
• Remove elements that pose contamination risk
• Upgrade outdated components

Value Implications:

- Savings are realized through runway reuse.
- Savings are realized due to reduced waste generation and hauling.

4.3 Construction Waste Management

LEED V2.1 MR C2.1 & MR C2.2: 2 points possible

Intent:

Divert construction, demolition and land clearing debris from landfill disposal. Redirect recyclable recovered resources back to the manufacturing process. Redirect reusable materials to appropriate sites.

Recommendations:

Develop and implement a waste management plan, quantifying material diversion goals. Establish a target percentage of recycled and/or salvaged construction, demolition and land clearing waste. Calculations can be done by weight or volume, but must be consistent throughout.

Work with the OMP to identify intra-task/project resources. The waste management plan for each task/project shall be a part of the overall waste management strategy. Data shall be provided in such a way that it is easily integrated into the OMP's master waste resource database.

Identify intra-task/project resources that can be used for the current task/project. Analyze the applicability of these resources and specify their use to the greatest extent possible.

Coordinate with OMP for a balanced earthwork plan

Technology / Strategy

Current Practice
Design Recommendations
• Develop a balanced earthwork plan
• Establish goals for landfill diversion and adopt a construction waste management plan to achieve these goals.
• Coordinate recyclable waste collection with hauler capability. Evaluate (at a minimum) the following waste for recycling:
○ land-clearing debris
○ cardboard
○ metal
○ brick
○ concrete
○ asphalt
○ plastic
○ clean wood

- glass
- gypsum wallboard
- carpet
- insulation

- Require haulers to cover truck beds, maintain at least two feet of freeboard and restrict engine idle times
- Identify the waste from one project that is a potential resource to another project. Resources may include the following.
  - Concrete
  - Asphalt
  - Land clearing debris
  - Small ancillary buildings or structures
  - Building components
- Work with the OMP to designate a specific site area for recycling.
- Track recycling efforts throughout the construction process in a way that identifies progress toward the goals and the resources generated for upcoming tasks/projects.
- Evaluate subcontractor materials practices for refused or rejected material (in particular concrete loads). Requirements and processes for recycling of such material should be specified.
- Coordinate construction waste management with salvaged materials efforts. (See 7.1 for Salvaged Materials Guidelines.)

Design Guidelines

Value Implications:

- Savings in materials costs may be realized from intra-task/project resource reuse.
- Potential income generation for recycled materials.
- Moderate general conditions cost for tracking and managing the construction waste goals.
- Additional costs or savings may be found by requiring materials suppliers to comply with refused materials recycling programs in their plants.

4.4 Recycled Content

LEED V2.1 MR C4.1 & MR C4.2: 2 points possible

Intent:

Specify building products that incorporate recycled content materials, therefore reducing impacts resulting from extraction and processing of new virgin materials.

Recommendations:

Establish a goal with the OMP for the use of materials with recycled content. Identify the value of both the post-consumer recycled content and the post-industrial content so that they can be compared with of the total value of the materials in the project.

Dividing the weight of recycled content in the item by the total weight of all material in the item, then multiplying the resulting percentage by the total value of the item shall determine the value of the recycled content portion of a material or furnishing.

Mechanical and electrical components shall not be included in this calculation. Recycled content materials shall be defined in accordance with the Federal Trade Commission document, *Guides for the Use of Environmental Marketing Claims, 16 CFR 260.7 (e),* available at www.ftc.gov/bcp/grnrule/guides980427.htm.

Technology / Strategy

Current Practice
Design Recommendations
• Establish a project goal for recycled content materials and identify material suppliers that can achieve this goal
• Consider the following major building components for specifying a maximum recycled content:
○ Aggregate in cast in place concrete
○ Fly-ash in cast in place concrete
○ Aggregate in pre-cast concrete including site work and infrastructure piping
○ Fly-ash in pre-cast concrete including site work and infrastructure piping
○ Bituminous concrete pavement
○ Unit pavers
○ Steel reinforcement
○ Structural steel
○ Miscellaneous steel
○ Steel fencing and furnishings
○ Unit masonry
○ Ductile iron pipe

- Aluminum products
- Site generated broken concrete for gabions
- Railroad rails
- Railroad ties
- Railroad track base material
- Steel doors and frames
- Aluminum doors and windows
- Plaster
- Terrazzo
- Acoustical ceilings
- Drywall
- Finish flooring including carpet, resilient flooring and terrazzo
- Toilet and shower compartments
- Special finishes
- Equipment
- Sheet metal ductwork
- Site Lighting

- During construction, ensure that the specified recycled content materials are installed and quantify the total percentage of recycled content materials installed.

Design Guidelines

Value Implications:

- Consideration should be given to materials procurement volume and lead times. Early orders may be required for some items.
- Moderate general conditions cost for tracking and managing the construction waste goals.

4.5 Local/Regional Materials

LEED V2.1 MR C5.1 & MR C5.2: 2 points possible

Intent:

Specify building materials and products that are extracted and manufactured within the region, thereby supporting Chicago's regional economy and reducing the environmental impacts resulting from transportation.

Recommendations:

Establish a goal for the minimum percentage of local/regional materials and products that are manufactured regionally within a radius of 500 miles. Identify the value of local/regional materials so that they can be compared with of the total value of the materials in the task/project.

Manufacturing refers to the final assembly of components into the building product that is furnished and installed by the tradesmen.

Of the regionally manufactured materials establish a percentage goal of building materials and products that are extracted, harvested, or recovered (as well as manufactured) within 500 miles of the project site.

Technology / Strategy

Current Practice

Design Recommendations

- Identify and specify materials and material suppliers that can achieve the regional manufacture goal.
- Identify and specify materials and material suppliers that can achieve the regional extraction, harvesting, or recovering goal.
- Materials that will contribute greatly to this goal are:
  - Concrete
  - Asphalt
  - Structural steel
  - Masonry
  - Post-industrial recycled gypsum wallboard
  - Storm system concrete pipe of all sizes
  - Manholes and handholes
  - Electrical ductbanks
  - Cable
  - Gas and water piping
  - Rail tracks
  - Rail ties

- Rail ballast
- Landscape material and seed

- For buildings, specify mechanical, electrical and plumbing equipment and components that meet the regional goals.
- During construction, ensure that the specified local materials are installed and quantify the percentage of local materials installed based on a percentage of overall construction cost.

Design Guidelines

Value Implications:

- Local and regional economy is supported.
- Transportation costs are reduced.
- Moderate general conditions cost for tracking and managing the construction waste goals.

4.6 Rapidly Renewable Materials

LEED V2.1 MR C6: 1 point possible

Intent:

Reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials.

Recommendations:

Establish a goal for the minimum percentage of rapidly renewable building materials and products (made from plants that are typically harvested within a ten-year cycle or shorter) so that they can be compared with of the total value of the materials in the task/project.

Technology / Strategy

Current Practice

Design Recommendations

- Identify materials and suppliers that can achieve this goal.
- Consider finish materials and temporary construction materials. Temporary construction materials will be applicable for the runway, civil/stormwater and Roadways/Rail task/project types.
- Consider materials such as:
  - For formwork, temporary construction and underlayment
    - Poplar OSB
    - Straw board or “agriboard”
  - Bamboo flooring
  - Cork
  - Wool carpets and fabrics
  - Cotton-batt insulation
  - Linoleum flooring
  - Sunflower seed board
  - Wheat grass or Straw board cabinetry and others.
- During construction, ensure that the specified rapidly renewable materials are installed.

Design Guidelines

Value Implications:

- Consideration should be given to materials procurement volume and lead times. Early orders may be required for some items.
- Moderate general conditions cost for tracking and managing the construction waste goals.

4.7 Certified Wood

LEED V2.1 MR C7: 1 point possible

Intent:

Encourage environmentally responsible forest management

Recommendations:

Establish a goal for wood-based materials and products, certified in accordance with the Forest Stewardship Council's Principles and Criteria, for wood building components including, but not limited to, structural framing and general dimensional framing, flooring, finishes, furnishings, and non-rented temporary construction applications such as bracing, concrete form work and pedestrian barriers so that they can be compared with of the total value of the materials in the task/project.

Technology / Strategy

Current Practice
Design Recommendations
• Identify suppliers that can achieve this goal during construction.
• Specify construction materials; finish products, and temporary construction materials that are FSC certified.
• Evaluate temporary construction materials that may be applicable for the runway, civil/stormwater, and Roadways/Rail task/project types. This will include all non-rented materials such as bracing and formwork.
• Ensure that the FSC-certified wood products are installed and quantify the total percentage of FSC-certified wood products installed.
Design Guidelines

Value Implications:

- Potential slight increase in materials cost.
- Materials availability and scheduling will need to be considered. Early orders may be required for some items.
- Moderate general conditions cost for tracking and managing the construction waste goals.

5.1 Minimum Indoor Air Quality Performance

LEED V2.1 Prerequisite EQ P1: No points possible

Intent:

Establish minimum indoor air quality (IAQ) performance to prevent the development of indoor air quality problems in buildings, thus contributing to the comfort and well being of the occupants.

Recommendations:

Meet the minimum requirements of voluntary consensus standard ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality, and approved Addenda (see ASHRAE 62-2001, Appendix H, for a complete compilation of Addenda) using the Ventilation Rate Procedure.

Technology / Strategy

Current Practice

- Identify potential IAQ problems on the site and locate air intakes away from contaminant sources, including loading areas, exhaust fans, and cooling towers.
- Locate air intakes in secure areas for protection from potential attacks.

Design Recommendations

- Design the HVAC system to meet the ventilation requirements of the referenced standard.
- Evaluate carbon or electrostatic filters on outdoor air for terminal buildings.
- Provide a security monitoring system for outdoor air intakes for terminal buildings.
- In cases where conflicts with the City of Chicago ventilation code arise, meet the requirements of the more stringent code.

Design Guidelines

Value Implications:

- Reduced sick time or complaints may increase productivity in office spaces and passenger satisfaction in terminal buildings.
- Energy use may increase if the HVAC systems do not include heat recovery or demand-controlled ventilation.

5.2 Environmental Tobacco Smoke Control

LEED V2.1 Prerequisite EQ P2: No points possible

Intent:

Prevent exposure of building occupants and systems to Environmental Tobacco Smoke (ETS).

Recommendations:

Zero exposure of non-smokers to ETS.

Technology / Strategy

Current Practice

Design Recommendations

- Prohibiting smoking in the public areas of buildings and locating any exterior designated smoking areas away from entries and operable windows
- Require all parts of the construction sites to be non-smoking.
- Work with unions in privately leased cargo spaces to designate these areas as non-smoking.

Design Guidelines

- Provide a designated smoking room designed to effectively contain, capture and remove ETS from the building. At a minimum, the smoking room must be directly exhausted to the outdoors with no recirculation of ETS-containing air to the non-smoking area of the building, enclosed with impermeable deck-to-deck partitions and operated at a negative pressure.

  Performance of the smoking rooms shall be verified by using tracer gas testing methods as described in the ASHRAE Standard 129-1997. Acceptable exposure in non-smoking areas is defined as less than 1% of the tracer gas concentration in the smoking room detectable in the adjoining non-smoking areas. Smoking room testing as described in ASHRAE Standard 129-1997, Section 8, is required in the contract documents and critical smoking facility systems testing results must be included in the building commissioning plan and report or as a separate document.

Value Implications:

- Schedule should be considered for the tracer gas test for smoking rooms.

5.3 Carbon Dioxide Monitoring

LEED V2.1 EQ C1: 1 point possible

Intent:

Provide capacity for indoor air quality (IAQ) monitoring to help sustain long-term occupant comfort and well-being.

Recommendations:

Install a permanent carbon dioxide (CO_2) monitoring system that provides feedback on space ventilation performance in a form that affords operational adjustments. Refer to the CO_2 differential for all types of occupancy in accordance with ASHRAE 62-2001, Appendix D.

This monitoring system will be most effective for buildings with highly variable occupancies, such as terminal buildings.

Technology / Strategy

Current Practice
Design Recommendations
• Design HVAC systems for terminal buildings with carbon dioxide monitoring sensors in each space and integrate these sensors with the building automation system (BAS).
• Provide for real-time control of terminal unit (VAV box) flowrates and total outdoor air flowrates based on carbon dioxide levels.
Design Guidelines

Value Implications:

- Increased first cost for systems installation
- Decreased operations cost due to reduced energy required for conditioning outdoor air.
- Increased occupant comfort and productivity.

5.4 Ventilation Effectiveness

LEED V2.1 EQ C2: 1 point possible

Intent:

Provide for the effective delivery and mixing of fresh air to support the safety, comfort and well being of building occupants.

Recommendations:

For mechanically ventilated buildings, design ventilation systems that result in an air change effectiveness (ε_{ac}) greater than or equal to 0.9 as determined by ASHRAE 129-1997.

For naturally ventilated spaces demonstrate a distribution and laminar flow pattern that involves not less than 90% of the room or zone area in the direction of air flow for at least 95% of hours of occupancy.

Technology / Strategy

Current Practice
Design Recommendations
• Select and place air diffusers for all mechanically ventilated spaces, particularly office and terminal spaces, following the recommended design approaches in the ASHRAE 2001 Fundamentals, Chapter 32, Space Air Diffusion.
Design Guidelines
• Increase air change effectiveness using the following strategies:
○ Displacement ventilation in terminal areas.
○ Underfloor air distribution in office areas.
○ Operable windows and skylights in cargo buildings.
• Increase air movement in cargo facilities with ceiling fans.
• Install trickle ventilators in cargo facilities to provide natural winter ventilation.
• Install relief vents or operable skylights in cargo facilities to provide stack effect natural ventilation.

Value Implications:

- Increased occupant comfort and productivity.

5.5 Construction IAQ Management Plan

LEED V2.1 EQ C3.1 & EQ C3.2: 2 points possible

Intent:

Prevent indoor air quality problems resulting from the construction process in order to help sustain the health, comfort and well-being of construction workers and building occupants.

Recommendations:

Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building.

Technology / Strategy

Current Practice

Design Recommendations

- During construction meet or exceed the recommended Design Approaches of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, Chapter 3.
- Protect stored on-site or installed absorptive materials from moisture damage.
- Do not operate air-handling equipment during construction.
- Sequence the installation of materials to avoid contamination of absorptive materials such as insulation, carpeting, ceiling tile and gypsum wallboard.
- If air handlers are used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 must be used at each return air grill, as determined by ASHRAE 52.2-1999.
- Replace all filtration media immediately prior to occupancy. Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13, as determined by ASHRAE 52.2-1999 for media installed at the end of construction.

Design Guidelines

- After construction ends and prior to occupancy, conduct a two-week building flush out with 100% outside air.

Value Implications

- Reduced risk of occupant comfort and health complaints.
- Increased productivity and occupant comfort.
- Reduced risk of harm to construction workers during construction.
- Sequenced material installation and building flush out may affect schedules.
- Moderate general condition costs for administering IAQ Management Plan

5.6 Low Emitting Materials

LEED V2.1 EQ C4.1, EQ C4.2, EQ C4.3, & IEQ C4.4: 4 points possible

Intent:

Reduce the quantity of indoor air contaminants that are odorous, potentially irritating and/or harmful to the health, comfort and well being of installers and occupants.

Recommendations:

For Adhesives and Sealants the VOC content used must be less than the current VOC content limits of South Coast Air Quality Management District (SCAQMD) Rule #1168, AND all sealants used as fillers must meet or exceed the requirements of the Bay Area Air Quality Management District Regulation 8, Rule 51.

For interior paints and coatings VOC emissions must not exceed the VOC and chemical component limits of Green Seal's Standard GS-11 requirements.

For carpet systems VOC emissions must meet or exceed the requirements of the Carpet and Rug Institute's Green Label Indoor Air Quality Test Program.

Composite wood and agrifiber must contain no added urea-formaldehyde resins.

Technology / Strategy

Current Practice

Design Recommendations

- Specify Low-VOC adhesives and sealants.
- Specify Low-VOC field applied paints and coating.
- Specify Low-VOC carpet systems. Ensure that VOC limits are clearly stated where carpet systems are addressed. Be attentive to carpet installation requirements.
- Specify wood and agrifiber products with no added urea-formaldehyde resins.

Design Guidelines

- Specify that all shop finished material meet the VOC emission requirements. Materials to consider are:
  - Primed steel
  - Finished metals including aluminum
  - Finished millwork
  - Finished steel and wood doors and windows

Value Implications:

- Increased occupant comfort and productivity.
- Procurement lead-time considerations should be researched.

5.7 Indoor Chemical & Pollutant Source Control

LEED V2.1 EQ C5: 1 point possible

Intent:

Avoid exposure of building occupants to potentially hazardous chemicals that adversely impact air quality.

Recommendations:

Design to minimize pollutant cross-contamination of regularly occupied areas:

Technology / Strategy

Current Practice
Design Recommendations
• Employ permanent entryway systems (grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entryways.
• Where chemical use occurs (including housekeeping areas and copying/printing rooms), provide segregated areas with deck to deck partitions with separate outside exhaust at a rate of at least 0.50 cubic feet per minute per square foot, no air re-circulation and maintaining a negative pressure.
• Provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs.
• Select finish materials and assemblies that resist mold growth.
• Designate central locations in terminal and office buildings for storage of concentrated cleaning chemicals and other pollutant sources.
• Install permanent architectural entryway systems such as grills or grates to prevent occupant-borne contaminants from entering the building.
Design Guidelines
• Design separate exhaust and plumbing systems for rooms or areas with contaminants to achieve physical isolation from the rest of the building.
• Encourage the use of electric vehicle uses in indoor cargo facilities

Value Implications:

- Increased productivity and employee retention.
- Reduced cleaning costs due to control of airborne particulates at the source.

5.8 Controllability of Systems

LEED V2.1 EQ C6.1 & EQ C6.2: 2 points possible

Intent:

Provide a high level of thermal and ventilation system control by individual occupants or specific groups in multi-occupant spaces to promote the health, productivity, comfort and well being of users.

Recommendations:

Provide controls for each individual in office spaces for airflow, temperature and lighting of the occupied space, and for the occupants in non-perimeter, regularly occupied areas.

Provide areas with varying indoor conditions in terminals, allowing passengers to choose an area whose conditions best match their needs.

Technology / Strategy

Current Practice

Design Recommendations

- Tie lighting in public areas of terminals to flight schedules.
- Design terminal areas to provide a variety of levels of light and sound in different areas simultaneously.
- Provide operable windows in areas that are not noise-sensitive, such as cargo buildings.
- Provide task lighting or more light switching zones in office areas.

Design Guidelines

- Provide underfloor air distribution systems with individual diffusers for office spaces.

Value Implications:

- Increased productivity and employee retention.
- Increased passenger comfort in terminal facility.

5.9 Thermal Comfort

LEED V2.1 EQ C7.1 & EQ C7.2: 2 points possible

Intent:

Provide a thermally comfortable environment that supports the productivity and well being of building occupants.

Recommendations:

Comply with ASHRAE Standard 55-1992, Addenda 1995, for thermal comfort standards including humidity control within established ranges per climate zone. For naturally ventilated buildings, utilize the adaptive comfort temperature boundaries, using the 90% acceptability limits as defined in the California High Performance Schools (CHPS) Best Practices Manual, Appendix C – A Field Based Thermal Comfort Standard for Naturally Ventilated Buildings, Figure 2.

Install a permanent temperature and humidity monitoring system configured to provide operators control over thermal comfort performance and the effectiveness of humidification and/or dehumidification systems.

Technology / Strategy

Current Practice
Design Recommendations
Design Guidelines
• Provide ceiling fans or natural ventilation to increase air movement in cargo spaces.
• Provide humidification in HVAC systems serving office and terminal areas.
• For spaces with humidification, install humidistats in addition to thermostats.

Value Implications:

- Increased productivity and employee retention.
- Improved respiratory health for spaces with humidification.

5.10 Daylight & Views

LEED V2.1 EQ C8.1 & EQ C82: 2 points possible

Intent:

Provide for the building occupants a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas.

Recommendations:

Achieve a minimum Daylight Factor (as defined by LEED 2.1) of 2% (excluding all direct sunlight penetration) in 75% of all space occupied for critical visual tasks.

Achieve direct line of sight to vision glazing for building occupants in 90% of all regularly occupied spaces.

Spaces excluded from these requirements include copy rooms, storage areas, mechanical plant rooms, laundry and other low occupancy support areas. Other exceptions for spaces where tasks would be hindered by the use of daylight and will be considered by the OMP on their merits.

Technology / Strategy

Current Practice

- Evaluate building design to maximize interior daylight. Consider:
  - Building orientation
  - Shallow floor plates
  - Increased building perimeter
  - Floor-to-ceiling heights
  - Ceiling configurations
- Design the building to maximize view opportunities.

Design Recommendations

- Provide sky or clerestory lighting as appropriate in cargo facilities.
- Coordinate daylight strategy with BAS and lighting control system.

Design Guidelines

- Provide exterior and interior permanent shading devices
- Provide spectrally selective glazing to maximize daylight while minimizing heat gain.
- Provide photo-integrated light sensors to dim artificial lights.
- Predict daylighting via calculations or model daylighting strategies to assess footcandle levels and daylight factors achieved.

Value Implications:

- Decreased operating costs due to energy savings in lighting use.
- Increased productivity.

5.11 Fuel Vapor Monitoring

LEED V2.1 possible ID credit: 1 points possible

Intent:

Limit exposure of airport visitors and employees to fuel vapors.

Recommendations:

Require fuel vapor monitoring systems in sub-grade wells near terminal buildings and other public areas, per existing NFPA requirements.

Technology / Strategy

Current Practice
• Install remote monitoring systems for detection of fuel vapors.
Design Recommendations
Design Guidelines

Value Implications:

- Improved employee and passenger comfort, well-being and health.

5.12 Noise Transmission

LEED V2.1 possible ID credit: 1 of 4 points possible

Intent:

Limit noise levels in noise-sensitive spaces such as terminals and office spaces.

Recommendations:

Require predicted noise levels in terminal areas and office spaces to be below a threshold criterion, such as NC 40.

Technology / Strategy

Current Practice

Design Recommendations

- Place glazing and other noise transmission surfaces away from the most noise-sensitive spaces, such as private offices.
- Orient buildings such that glazed surfaces are not directed toward noise sources.

Design Guidelines

- Specify laminated glazing to reduce noise transmission.

Value Implications:

- Increased employee productivity.
- Increased passenger comfort.

6.1 Maintenance Equipment

LEED V2.1 possible ID credit: 1 of 4 points possible

Intent:

Minimize the environmental impact of maintenance for O'Hare facilities

Recommendations:

Develop facility operational programs to eliminate toxic housekeeping agents and practices.

Technology / Strategy

Current Practice
Design Recommendations
• During design, evaluate required maintenance procedures for materials and systems specified with attention to disposal requirements and indoor environmental quality.
• Operation and maintenance manuals should specify environmentally friendly cleaning products and processes for installed systems and products.
• Review maintenance and janitorial program to eliminate toxic agents in favor of more environmentally friendly choices.
Design Guidelines

Value Implications:

- Increased occupant health and productivity.
- Reduced health risk.

6.2 Furniture, Fixtures & Equipment

LEED V2.1 possible ID credit: 1 of 4 points possible

Intent:

Reduce the use of furniture and equipment that may release indoor air contaminants, which might be harmful to installer and occupant health, comfort and well-being.
Reduce energy use of Owner-installed equipment

Recommendations:

- Select recycled wood furniture.
- Select green furniture.
- Install EnergyStar equipment.

Technology / Strategy

Current Practice
Design Recommendations
• Specify and install recycled furniture.
• Select furniture systems that are Greenguard certified.
• Specify and install EnergyStar appliances and computers.
Design Guidelines

Value Implications:

- No additional cost can be expected for specifying furniture, fixtures and equipment that meets these requirements.
- Indoor environmental quality is improved.
- Operational cost savings due to reduced energy consumption.

6.3 Exterior Pest Management Program

LEED V2.1 possible ID credit: 1 of 4 points possible

Intent:

Minimize the environmental impact of pest control measures.

Recommendations:

Design with consideration toward environmentally benign pest management procedures.

Technology / Strategy

Current Practice
Design Recommendations
• Establish a non-toxic pest control program
Design Guidelines

Value Implications:

- Reduced health risk to employees and travelers.

6.4 Brownfield Prevention Program

LEED V2.1 possible ID credit: 1 of 4 points possible

Intent:

Minimize or eliminate environmental site pollution and contamination from facility operations.

Recommendations:

Work with the OMP to create and implement a Brownfield Prevention Program developed with the explicit purpose of implementing strategies for environmental site pollution prevention and waste minimization.

Technology / Strategy

Current Practice
Design Recommendations
• Establish procedures and practices aimed at preventing the environmental contamination of the O'Hare properties.
• Create a Brownfield Prevention Program implementing strategies for pollution prevention and waste minimization.
• Evaluate solid and fluid waste containment methods and disposal protocols and design to support no or minimal site contamination.
Design Guidelines

Value Implications:

- Reduced health risk to employees and travelers.

6.5 Exterior Air Quality

LEED V2.1 possible ID credit: 1 of 4 points possible

Design team should reference current OMP & O'Hare requirements. This section is included to assist with the cataloguing of all the sustainable efforts.

6.6 Noise and Acoustical Quality

LEED V2.1 possible ID credit: 1 of 4 points possible

Design team should reference current OMP & O'Hare requirements. This section is included to assist with the cataloguing of all the sustainable efforts.

7.1 Salvaged Materials and Resources

LEED V2.1 possible ID credit: 1 of 4 points possible

Intent:

Establish procedures, which make salvaged resources available to other OMP projects and the regional construction community.

Recommendations:

Establish procedures for materials salvaging with the goal that resources can continue to be used at their highest use (not "down-sourced").

Technology / Strategy

Current Practice

Design Recommendations

- Identify salvageable materials. This should include an analysis of both structures and site furnishings such as site lighting and fencing.
- Advertise for salvage activities of materials from construction site prior to, in coordination with demolition activities.

Design Guidelines

- Create a public information site to list salvaged materials from construction site to offer for sale or donation.

Value Implications:

- Diverts greater percentage of materials from waste stream/landfills.
- Potential revenue source.
- Cost reduction from reduced landfill tickets.

7.2 Planning for Deconstruction

LEED V2.1 possible ID credit: 1 of 4 points possible

Intent:

Design with consideration toward the building or structure disassembly so that resources can be reused when they have outlived their usefulness at O'Hare.

Recommendations:

Evaluate potential reuse of building components and detail for disassembly.

Technology / Strategy

Current Practice
Design Recommendations
• Evaluate potential future uses for the structure and building components.
• Consider the future value of materials and systems during selection.
• Use homogenous material whenever possible.
• Detail connections for disassembly.
• Provide a flexible structural system.

Value Implications:

- Disassembled buildings are resources.

8.1 Reference 1.1 – Erosion and Sedimentation Control

8.2 Reference 3.1 – Systems Commissioning

8.3 Reference 4.3 – Construction Waste Management

8.4 Reference 5.5 – Construction IAQ Management Plan

8.5 Clean Fuel Construction Vehicles

LEED V2.1 possible ID credit: 1 of 4 points possible

Intent:
Improve the exterior air quality during construction.

Recommendations:
Require that a portion of the construction vehicle fleet be clean fuel vehicles and/or incorporate clean air technologies.

Technology / Strategy

Current Practice

Design Recommendations

- Require construction vehicles that use high technology diesel emissions traps
- Require construction vehicles to use ultra low sulfur diesel (ULSD).
- Require construction vehicles that use clean fuel engines in lieu of diesel.
- Require all construction vehicles to limit idle times
- Consider fitting particulate filters on any vehicle that will be on site for more than 6 months.

Design Guidelines

Value Implications:

- Any cost implication would be embedded in construction bid numbers. On a project of this size, the cost could be better absorbed and a market for these types of vehicles created.

8.6 Alternative Transportation During Construction

LEED V2.1 possible ID credit: 1 of 4 points possible

Intent:
Minimize the amount of truck and vehicle traffic onto the construction site.

Recommendations:
Develop a staging and transportation strategy that transports construction workers to the site through bussing, or other methods of mass transportation.

Technology / Strategy

Current Practice
Design Recommendations
• Plan for coordinated, staged private vehicle parking during construction.
• Require a transportation plan for “mass” transportation to and from the construction site.
• Include bike racks at staging locations.
Design Guidelines

Value Implications:

- Reduce cross-airport construction traffic and mitigate noise and air pollution.
- Potential advantage to security measures.

8.7 Construction Materials Conveying

LEED V2.1 possible ID credit: 1 of 4 points possible

Intent:
Minimize the amount of truck and vehicle traffic onto the construction site.

Recommendations:
Evaluate an automatic materials conveyance system as a method of bringing materials into the construction site.

Technology / Strategy

Current Practice

Design Recommendations

- Request that contractors consider the use of a conveyor in logistics and staging plans in pre-construction reviews.

Design Guidelines

Value Implications:

- Reduce cross-airport construction traffic and mitigate noise and air pollution.
- Potential advantage to security measures.

8.8 Construction Noise and Acoustical Quality

LEED V2.1 possible ID credit: 1 of 4 points possible

Intent:
Improve the exterior noise quality during construction.

Recommendations:
Develop construction standards, which limit and reduce construction-generated noise.

Technology / Strategy

Current Practice
Design Recommendations
• Require contractors to submit sound reduction construction plans to mitigate unwanted construction noise.
• Require mufflers on all construction equipment
• Establish construction vehicle speed limits
Design Guidelines

Value Implications:

- Abates exterior noise during construction.
- Limited operational hours could result in additional construction costs.

8.9 Construction Equipment Maintenance

LEED V2.1 possible ID credit: 1 of 4 points possible

Intent:

Minimize the environmental impact of site construction activities

Recommendations:

Develop construction operational programs to eliminate toxic agents and practices.

Technology / Strategy

Current Practice
Design Recommendations
• Require contractors to submit pre-construction plan to recycle oil and use environmentally friendly maintenance agents during construction.
Design Guidelines

Value Implications:

- Increased occupant health and productivity.
- Reduced health risk.

	Sustainable Design Categories & Issues	Potential LEED V2.1 Points	Civil - Airside	Civil - Landside	Occupied Buildings	Unoccupied Buildings
1.0	**Sustainable Site Management**					
1.1	**Erosion & Sedimentation Control**	Pre	☼	☼	☼	☼
1.2	**Brownfield Redevelopment**	1	☼	☼	☼	☼
1.3	**Alternative Transportation**, Public Transportation Access	1	☼	☼	☼	
1.4	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1		☼	☼	
1.5	**Alternative Transportation**, Alt. Fuel Vehicles & Parking Capacity	1		☼	☼	
1.6	**Stormwater Management**, Rate and Quantity	1		☼	☼	☼
1.7	**Stormwater Management**, Treatment	1	☼	☼		
1.8	**Landscape & Exterior Design to Reduce Heat Islands**, Non-Roof	1	☼	☼	☼	☼
1.9	**Landscape & Exterior Design to Reduce Heat Islands**, Roof	1			☼	☼
1.10	**Light Pollution Reduction**	1	☼	☼	☼	☼
2.0	**Water Efficiency**					
2.1	**Water Efficient Landscaping**	2	☼	☼	☼	☼
2.2	**Innovative Wastewater Technologies**	1			☼	☼
2.3	**Water Use Reduction**	2			☼	☼
3.0	**Energy & Atmosphere**					
3.1	**Systems Commissioning**	1			☼	☼
3.2	**Minimum Energy Performance**	Pre			☼	☼
3.3	**CFC Reduction**	2			☼	☼
3.4	**Optimize Energy Performance**	10	☼	☼	☼	☼
3.5	**Renewable Energy**	3	☼	☼	☼	☼
3.6	**Measurement & Verification**	1			☼	☼
3.7	**Green Power**	1	☼	☼	☼	☼
4.0	**Materials & Resources**					
4.1	**Storage & Collection of Recyclables**	Pre			☼	
4.2	**Structure & Building Reuse**	3	☼	☼	☼	☼
4.3	**Construction Waste Management**	2	☼	☼	☼	☼
4.4	**Recycled Content**	2	☼	☼	☼	☼
4.5	**Local/Regional Materials**	2	☼	☼	☼	☼
4.6	**Rapidly Renewable Materials**	1			☼	☼
4.7	**Certified Wood**	1			☼	☼

	Sustainable Design Categories & Issues	Potential LEED V2.1 Points	Civil - Airside	Civil - Landside	Occupied Buildings	Unoccupied Buildings
5.0	Indoor Environment Quality					
5.1	Minimum Indoor Air Quality (IAQ) Performance	Pre			☼	
5.2	Environmental Tobacco Smoke (ETS) Control	Pre	☼		☼	☼
5.3	Carbon Dioxide (CO2) Monitoring	1			☼	
5.4	Ventilation Effectiveness	1			☼	
5.5	Construction IAQ Management Plan	2			☼	☼
5.6	Low-Emitting Materials	4			☼	☼
5.7	Indoor Chemical & Pollutant Source Control	1			☼	
5.8	Controllability of Systems	2			☼	
5.9	Thermal Comfort	2			☼	
5.10	Daylight & Views	2			☼	
5.11	Fuel Vapor Monitoring				☼	
5.12	Noise Transmission				☼	
6.0	O'Hare Facility Operations					
6.1	Maintenance Equipment		☼	☼	☼	☼
6.2	Furniture, Fixtures & Equipment				☼	☼
6.3	Exterior Pest Management Program		☼	☼	☼	☼
6.4	Brownfield Prevention Program		☼	☼	☼	☼
6.5	Exterior Air Quality		☼	☼	☼	☼
6.6	Noise and Acoustical Quality		☼	☼	☼	☼
7.0	OMP Intertask Resource Coordination					
7.1	Salvaged Materials and Resources		☼	☼	☼	☼
7.6	Planning for Deconstruction		☼	☼	☼	☼
8.0	OMP Construction Practices					
8.1	Reference 1.1 - Erosion and Sedimentation Control		☼	☼	☼	☼
8.2	Reference 3.1 - Systems Commissioning				☼	☼
8.3	Reference 4.3 - Construction Waste Management		☼	☼	☼	☼
8.4	Reference 5.5 - Construction IAQ Management Plan				☼	☼
8.5	Clean Fuel Construction Vehicles		☼	☼	☼	☼
8.6	Alternative Transportation, During Construction		☼	☼	☼	☼
8.7	Construction Materials Conveying		☼	☼	☼	☼
8.8	Construction Noise and Acoustical Quality		☼	☼	☼	☼
8.9	Construction Equipment Maintenance		☼	☼	☼	☼

Project/Task:

Date:

Issue	Goals	Met (%)	Verified
1.1 - Erosion & Sedimentation Control			
Develop an erosion and sediment control strategy plan			
Incorporate temporary sedimentation basins, temporary ditch checks, diversion dikes, temporary ditches, pipe slope drains into the construction plans.			
Establish temporary and permanent seeding plans.			
Monitor water quality impacts before and during construction.			
Develop an inventory of topsoil for potential re-use.			
Develop a policy to chip or compost all vegetation for re-use on site.			
1.2 - Brownfield Redevelopment			
Develop and implement a site remediation plan using strategies such as pump-and-treat, bioreactors, land forming and on-site remediation. Remediation would meet the standards identified in the Illinois Tiered Approach to Corrective Action (TACO).			
1.3 - Alternative Transportation – Public Transportation Access			
Work with the OMP to plan for and implement strategies aimed at reducing parking needs and improving efficiency of access.			
Design with support for incentives to employees to use public transportation.			
Evaluate consolidation of rental car facilities and mini-bus transportation to minimize congestion on terminal roads.			
Evaluate development of satellite 'check-in' facilities (downtown and suburban locations) to minimize congestion on terminal access roads and encourage use of public transportation.			
1.4 - Alternative Transportation – Bicycle Storage & Changing Rooms			
Provide safe bicycle lanes/paths.			
Provide a centralized facility(s) for secure bicycle storage with convenient changing/shower areas.			
Provide incentives to employees to bike to work.			
1.5 - Alternative Transportation – Alternative Fuel Vehicles & Parking Capacity			
Design to enhance and support O'Hare's existing programs for alternative fuel vehicles within the airport operations			
Increase use of alternative fuel vehicles for airport operations particularly indoor cargo operations.			
Provide preferred parking for staff and public alternative fuel vehicles.			
Install alternative fuel refueling stations for public use.			
Provide preferred parking for vanpools and carpools for staff.			
Plan for the development of preferred parking and/or lot locations for rental fleets, which offer alternative fuel rental vehicles.			

1.6 - Stormwater Management, Rate & Quantity

Evaluate pervious pavements for roadways, shoulders, non-traffic pavements, maintenance roads, utility yards, airside and landside parking facilities.			
Evaluate landscaping and plant materials to reduce runoff.			
Evaluate curb breaks and drainage ditches, and/or bioswales.			
Evaluate the use of green roof systems.			
Evaluate rainwater cisterns for landside irrigation.			

1.7 - Stormwater Management, Treatment

Evaluate Best Management Practices outlined in Chapter 4, Part 2 (Urban Runoff), on the United States environmental Protection Agency's Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, January 1993 (document No EPA-840-B-92-002.			
Evaluate first flush systems including slotted edge drains connected to underground holding tanks.			
Evaluate detention basins, detention ditches, ditch checks and other BMP's for effective first flush treatment.			
Evaluate bioswales along roadways and parking areas to encourage groundwater infiltration of stormwater runoff. On airside projects, these strategies should not encourage animal habitat.			
Minimize current treatment of all stormwater at O'Hare by reducing runoff.			
Evaluate and develop collection systems for de-icing runoff.			

1.8 - Landscape & Exterior Design to Reduce Heat Islands, Non-Roof

Maximize light colored/high albedo pavement, for roadways, parking lots, sidewalks and plaza areas.			
For Landside projects, evaluate the installation of trees to provide shade within 5 years for at least 30% of dark colored impervious surfaces.			
Evaluate structured parking.			
Evaluate open grid pavement.			

1.9 - Landscape & Exterior Design to Reduce Heat Islands, Roof

Utilize an ENERGY STAR compliant roofing system.			
Evaluate a "green" vegetated roof.			

1.10 - Light Pollution Reduction

Evaluate site lighting criteria.			
Minimize site lighting where possible			
Monitor maximum candela value of all interior lighting			
Monitor maximum candela value of all exterior lighting.			

2.1 - Water Efficient Landscaping

Do not install an irrigation system.			
Utilize native vegetation for site use.			
Perform a soil and climate analysis			
Evaluate stormwater and/or greywater cisterns.			

2.2 - Innovative Wastewater Technologies

Use High-efficiency fixtures and valves.			
Utilize fixtures such as dual flush toilets and waterless urinals.			
Evaluate reusing stormwater for non-potable uses.			
Evaluate capturing greywater for sewage conveyance or on-site wastewater treatment systems.			

2.3 - Water Use Reduction			
Evaluate high-efficiency fixtures and valves.			
Evaluate dry fixtures such as composting toilets and waterless urinals.			
Evaluate using reclaimed water for cooling tower makeup.			
Evaluate pulsed-power electromagnetic water treatment, ultraviolet treatment, or ozone treatment for cooling tower water.			
Establish a water supply system that supports vehicle maintenance without the use of potable water.			

3.1 - Systems Commissioning			
Review the design intent and the basis of design documentation.			
Incorporate commissioning requirements into the construction documents.			
Develop and utilize a commissioning plan.			
Verify installation, functional performance, training, operations and maintenance documentation.			
Complete a commissioning report.			
Provide the owner with a single manual that contains the information required for re-commissioning systems.			
Engage a commissioning team.			
Evaluate commissioning requirements for the following high priority, high energy consuming systems.			
Central Building Automation system			
All HVAC system equipment			
Lighting controls and sensors			
Site Lighting			
Refrigeration systems			
Vertical Transport			
Building Envelope			
Evaluate commissioning requirements for the following lower priority, low energy consuming systems.			
Emergency Power Generators and Automatic Transfer Switching			
Uninterruptible Power Supply systems			
Life Safety systems; Fire protection Fire alarm, Egress pressurization			
Lightning Protection			
Domestic and Process water pumping and mixing systems			
Equipment sound control systems			
Data and Communication systems			
Paging systems			
Security systems			
Irrigation systems			
Plumbing			

3.2 - Minimum Energy Performance			
Meet the Chicago Energy Conservation Code.			
Design all buildings to comply with ASHRAE/IESNA Standard 90.1-1999.			
For Runways, Civil/Stormwater and Roadways/Rail, design site systems to comply with ASHRAE/IESNA Standard 90.1-1999.			

3.3 - CFC Reduction

Specify new base building HVAC equipment that uses no CFC or HCFC refrigerants.			
When reusing existing HVAC systems, conduct an inventory to identify equipment that uses CFC and HCFC refrigerants and adopt a replacement schedule for these refrigerants.			

3.4 - Optimize Energy Performance

Use a computer simulation model to assess energy performance and identify the most cost effective energy measures.			
Provide high-efficiency motors and systems.			
Provide energy efficient lighting systems.			
Evaluate organizing circuiting of lighting and building systems so that individual areas may be separately controlled.			
Evaluate building orientation for passive solar/daylight penetration.			
Evaluate architectural features for daylighting and glare.			
Evaluate motion sensors in stairs, toilets, storage & equipment rooms.			
Evaluate and provide “Energy Star” compliant equipment and appliances			
Provide appropriate training for the operations and maintenance.			
Evaluate and control air infiltration through all exterior openings.			
Quantify energy performance compared to the baseline building and provide a summary report to the OMP.			
The following technologies and strategies should be evaluated for Building/Structures:			
Cogeneration for terminals and concourses.			
Energy efficiency upgrades to relocated facilities.			
Use LED “exit” signs in buildings.			
Provide daylight harvesting control systems.			
Optimize lighting controls.			
Integrate lighting systems with BAS.			
Use high performance glazing and window systems.			
Evaluate underfloor air distribution systems.			
Evaluate levels of insulation and thermal mass.			
Utilize premium efficiency motors.			
Ground-source heat pumps			
For runways evaluate LED lighting and signals			
For Civil/Stormwater and Roadways/Rail evaluate LED lighting and signals			
Investigate non-electrified snowmelt procedures, including Hydronic runway pavement for snowmelt and Epoxy overcoat with glycol for controlling snow on runways.			
Evaluate cogeneration for tasks/projects and for coordinated intra-task/project power requirements.			

3.5 - Renewable Energy

Evaluate and implement as applicable discrete photovoltaic power source for outlying equipment, ancillary buildings, and parking and site lighting.			
Evaluate solar hot water pre-heat.			
Evaluate solar trombe-walls for passive solar heating.			
Evaluate building-integrated photovoltaics.			
Evaluate fuel cells.			

3.6 - Measurement & Verification

Evaluate the installation of continuous metering equipment for the following:			
Lighting systems and controls			
Constant and variable motor loads			
Variable frequency drive (VFD) operation			
Chiller efficiency at variable loads (kW/ton)			
Cooling load			
Air and water economizer and heat recovery cycles			
Air distribution static pressures and ventilation air volumes			
Boiler efficiencies			
Building-related process energy systems and equipment			
Indoor water risers and outdoor irrigation			
Develop a Measurement and Verification plan that incorporates the monitoring information from the above end-uses and is consistent with Option B, C or D of the 2001 *International Performance Measurement & Verification Protocol (IPMVP) Volume I: Concepts and Options for Determining Energy and Water Savings*.			
Investigate whether these facilities will be included in the City of Chicago's Global Building Monitoring System.			
Draft a Measurement & Verification Plan			

3.7 - Green Power

Determine the City of Chicago's Green Power requirements for the task/project and investigate opportunities to engage in a green power contract with the utility.			

4.1 - Storage & Collection of Recyclables

Incorporate collection rooms for recycling.			
Coordinate recyclable waste collection with hauler capability.			
Evaluate the following waste for recycling:			
Aluminum			
Glass			
Paper, newspapers, magazines and cardboard			
Carpet			
Food Waste			
Gas & oil filters			
Motor oil and Anti-freeze			
Scrap metal			
Batteries			
Light bulbs			
Toner cartridges			
Tires			
Electrical wiring			
Electronics including monitors			
Deicing fluid			
Instruct users and occupants on recycling procedures.			
Evaluate cardboard balers, aluminum can crushers, recycling chutes and other technologies.			

4.2 - Structure & Building Reuse

Evaluate relocation of existing structures for reuse.			
Evaluate reuse of existing runway and infrastructure.			

4.3 - Construction Waste Management

Develop a balanced earthwork plan			
Adopt a construction waste management plan.			
Evaluate (at a minimum) the following waste for recycling:			
land-clearing debris			
cardboard			
metal			
brick			
concrete			
asphalt			
plastic			
clean wood			
glass			
gypsum wallboard			
carpet			
insulation			
Require haulers to cover truck beds,			
Identify project waste that is a resource to another project such as:			
Concrete			
Asphalt			
Land clearing debris			
Small ancillary buildings or structures			
Building components			
Designate a specific site area for recycling.			
Track recycling efforts throughout the construction process.			
Evaluate subcontractor materials practices for refused or rejected material.			
Coordinate with salvaged materials efforts.			

4.4 - Recycled Content

Establish a project goal for recycled content materials.			
Consider the following major building components:			
Aggregate in cast in place concrete			
Fly-ash in cast in place concrete			
Aggregate in pre-cast concrete I			
Fly-ash in pre-cast concrete			
Bituminous concrete pavement			
Unit pavers			
Steel reinforcement			
Structural steel			
Miscellaneous steel			
Steel fencing and furnishings			
Unit masonry			
Ductile iron pipe			
Aluminum products			
Site generated broken concrete for gabions			
Railroad rails			
Railroad ties			
Railroad track base material			

Steel doors and frames			
Aluminum doors and windows			
Plaster			
Terrazzo			
Acoustical ceilings			
Drywall			
Finish flooring including carpet, resilient flooring and terrazzo			
Toilet and shower compartments			
Special finishes			
Equipment			
Sheet metal ductwork			
Site Lighting			
Ensure that the specified materials are installed.			

4.5 - Local/Regional Materials

Establish a regional extraction, harvesting, or recovering goal.			
Evaluate the following materials for contributions to this goal:			
Concrete			
Asphalt			
Structural steel			
Masonry			
Post-industrial recycled gypsum wallboard			
Storm system concrete pipe of all sizes			
Manholes and handholes			
Electrical ductbanks			
Cable			
Gas and water piping			
Rail tracks			
Rail ties			
Rail ballast			
Landscape material and seed			
For buildings, specify MEP equipment and components that meet goals.			
Ensure that the specified local materials are installed.			

4.6 - Rapidly Renewable Materials

Establish a rapidly renewable materials goal.			
Consider temporary construction materials.			
Evaluate the following materials for contributions to this goal:			
Formwork, temporary construction and underlayment			
Poplar OSB			
Straw board or “agriboard”			
Bamboo flooring			
Cork			
Wool carpets and fabrics			
Cotton-batt insulation			
Linoleum flooring			
Sunflower seed board			
Wheat grass or Straw board cabinetry and others.			
Ensure specified rapidly renewable materials are installed.			

4.7 - Certified Wood

Establish a FSC certified wood products goal.			
Specify construction materials; finish products, and temporary construction materials that meet the goal.			
Evaluate temporary construction materials that may be applicable.			
Ensure that the FSC-certified wood products are installed			

5.1 - Minimum Indoor Air Quality Performance

Identify potential IAQ problems on the site and locate air intakes away from contaminants, including loading areas, exhaust fans, and cooling towers.			
Locate air intakes for protection from potential attacks.			
Meet the ventilation requirements of the referenced standard.			
Evaluate carbon or electrostatic filters.			
Provide a security monitoring for outdoor air intakes for terminal buildings.			

5.2 - Environmental Tobacco Smoke Control

Prohibit smoking in the public areas of buildings and locating any exterior designated smoking areas away from entries and operable windows			
Require all parts of the construction sites to be non-smoking.			
Work with unions in privately leased cargo spaces to designate these areas as non-smoking.			
Consider providing a designated smoking room designed to effectively contain, capture and remove ETS from the building.			

5.3 - Carbon Dioxide Monitoring

Evaluate HVAC systems for terminal buildings with carbon dioxide monitoring sensors in each space and integrate these sensors with the building automation system (BAS).			
Provide for real-time control of terminal unit (VAV box) flowrates and total outdoor air flowrates based on carbon dioxide levels.			

5.4 - Ventilation Effectiveness

Select and place air diffusers for all mechanically ventilated spaces, particularly office and terminal spaces, following the recommended design approaches in the ASHRAE 2001 Fundamentals, Chapter 32, Space Air Diffusion.			
Increase air change effectiveness using:			
Displacement ventilation in terminal areas.			
Underfloor air distribution in office areas.			
Operable windows and skylights in cargo buildings.			
Increase air movement in cargo facilities with ceiling fans.			
Evaluate trickle ventilators in cargo facilities.			
Evaluate relief vents or operable skylights in cargo facilities.			

5.5 - Construction IAQ Management Plan

During construction meet or exceed the recommended Design Approaches of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, Chapter 3.			
Protect stored on-site or installed absorptive materials from moisture damage.			

	As much as possible, do not operate air-handling equipment during construction.			
	Sequence the installation of materials to avoid contamination.			
	If air handlers are used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 must be used at each return air grill, as determined by ASHRAE 52.2-1999.			
	Replace all filtration media immediately prior to occupancy.			
	Evaluate conducting a two-week building flush out with 100% outside air.			

5.6 – Low Emitting Materials

	Evaluate Low-VOC adhesives and sealants.			
	Evaluate Low-VOC field applied paints and coating.			
	Evaluate Low-VOC carpet systems.			
	Evaluate wood and agrifiber products with no added urea-formaldehyde resins.			
	Evaluate that all shop finished material meet the VOC emission requirements. Materials to consider are:			
	Primed steel			
	Finished metals including aluminum			
	Finished millwork			
	Finished steel and wood doors and windows			

5.7 - Indoor Chemical & Pollutant Source Control

	Evaluate drains plumbed for appropriate disposal of liquid waste			
	Evaluate finish materials and assemblies that resist mold growth.			
	Evaluate designating central locations in terminal and office buildings for storage of concentrated cleaning chemicals and other pollutant sources.			
	Evaluate separate exhaust and plumbing systems for rooms/areas with contaminants.			
	Encourage use electric vehicle uses in indoor facilities			

5.8 - Controllability of Systems

	Evaluate tying lighting in public areas of terminals to flight schedules.			
	Consider designing terminal areas with a variety of light and sound levels.			
	Evaluate operable windows in areas that are not noise-sensitive.			
	Evaluate task lighting or more light switching zones in office areas.			
	Evaluate underfloor air distribution systems with individual diffusers in office areas.			

5.9 - Thermal Comfort

	Evaluate ceiling fans or natural ventilation in cargo spaces.			
	Evaluate humidification in HVAC systems serving office and terminal areas.			
	For spaces with humidification, install humidistats.			

5.10 - Daylight & Views

	Evaluate maximizing interior daylight. Consider:			
	Building orientation			
	Shallow floor plates			
	Increased building perimeter			
	Floor-to-ceiling heights			
	Ceiling configurations			
	Design the building to maximize view opportunities.			
	Provide sky or clerestory lighting as appropriate in cargo facilities.			
	Coordinate daylight strategy with BAS and lighting control system.			
	Provide exterior and interior permanent shading devices			

	Provide spectrally selective glazing to maximize daylight while minimizing heat gain.			
	Provide photo-integrated light sensors to dim artificial lights.			
	Predict daylighting via calculations or model daylighting strategies to assess footcandle levels and daylight factors achieved.			

5.11 - Fuel Vapor Monitoring

	Evaluate installing remote monitoring systems for detection of Jet A vapors.			

5.12 - Noise Transmission

	Place glazing and other noise transmission surfaces away from the most noise-sensitive spaces.			
	Evaluate building orientation such that glazed surfaces are not directed toward noise.			
	Specify laminated glazing to reduce noise transmission.			

6.1 - Maintenance Equipment

	Evaluate required maintenance procedures.			
	Evaluate materials and systems for environmentally sound maintenance.			
	Ensure that operation and maintenance manuals specify environmentally friendly cleaning products and processes.			

6.2 - Furniture, Fixtures & Equipment

	Evaluate recycled furniture.			
	Evaluate furniture systems that are Greenguard certified.			
	Evaluate EnergyStar appliances and computers.			

6.3 - Exterior Pest Management Program

	Establish a non-toxic pest control program			

6.4 - Brownfield Prevention Program

	Evaluate procedures and practices to prevent environmental contamination of O'Hare properties.			
	Assist in the creation of a Brownfield Prevention Program.			
	Evaluate solid and fluid waste containment methods and disposal protocols and design to support minimal or no site contamination.			

6.5 - Exterior Air Quality

6.6 - Noise and Acoustical Quality

7.1 - Salvaged Materials and Resources

	Evaluate salvageable materials.			
	Advertise for salvage activities prior to demolition activities.			
	Evaluate creating a public information site to list salvaged materials to offer for sale or donation.			

7.2 - Planning for Deconstruction

	Evaluate potential future uses for the structure and building components.			
	Consider the future value of materials and systems during selection.			
	Evaluate using homogenous material whenever possible.			
	Evaluate detailing connections for disassembly.			
	Evaluate structural system for flexibility.			

8.1 - Reference 1.1 – Erosion and Sedimentation Control			
8.2 - Reference 3.1 – Systems Commissioning			
8.3 - Reference 4.3 – Construction Waste Management			
8.4 - Reference 5.5 – Construction IAQ Management Plan			
8.5 - Clean Fuel Construction Vehicles			
Evaluate requiring construction vehicles that use high technology diesel emissions traps			
Evaluate requiring construction vehicles to use ultra low sulfur diesel (ULSD).			
Evaluate requiring construction vehicles that use clean fuel engines in lieu of diesel.			
Evaluate requiring construction vehicles to limit idle times			
Consider fitting particulate filters on vehicles on site more than 6 months.			
8.6 - Alternative Transportation During Construction			
Evaluate coordinated, staged private vehicle parking during construction.			
Evaluate and, if appropriate require, a transportation plan to and from the construction site.			
Evaluate including bike racks at staging locations.			
8.7 - Construction Materials Conveying			
Request that contractors consider the use of a conveyor in logistics and staging plans in pre-construction reviews.			
8.8 - Construction Noise and Acoustical Quality			
Evaluate a requirement that contractors to submit sound reduction construction plans to mitigate unwanted construction noise.			
Evaluate a requirement for mufflers on all construction equipment			
Establish construction vehicle speed limits			
8.9 - Construction Equipment Maintenance			
Evaluate a requirement that contractors to submit pre-construction plan to recycle oil and use environmentally friendly maintenance agents during construction.			

ATTACHMENT Q-3
CONSTRUCTION OUTREACH PROGRAM
(7/8/2005)

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Chicago O'Hare International Airport
O'Hare Modernization Program
Construction Communication Plan
July 8, 2005

The O'Hare Modernization Program (OMP) will utilize a number of communication tools to reach the public about construction activity. It is our responsibility to inform and prepare the general public about the impact that construction will have as they travel near O'Hare. Our goal is to share as much information as possible in "real time" so that area residents are aware of, and can plan for, alternate routes during construction.

The example practices listed below have been used in the past for various DOA and City of Chicago construction activities and will be used as effective public-coordination devices for the Proposed OMP Projects.

Communication Outreach to General Public

- Construction-related information will be posted on the OMP public website.
  - www.OhareModernization.org

- Issue traffic alert bulletins to OMP website alert subscribers
  - The OMP currently has more than 550 individuals and organizations, including media outlets, signed up to receive updated news and information about the Program. The OMP will conduct further outreach to alert the public of its existence and encourage them to sign up for the service.

- Display construction traffic information on static and dynamic signage for vehicles traveling near the airport or entering airport roadways.
  - Such practices have already been implemented upon entering the O'Hare roadway system, along I-190 westbound, which displays construction and parking updates.
  - The OMP will coordinate with IDOT and ISTHA to utilize their communications tools to alert drivers about construction zones.

- Distribute information to area City Halls and libraries, as well as construction information kiosks for passengers traveling through terminals at O'Hare.
  - Brochures will be updated frequently with accurate information.

- Continue to issue quarterly print or online editions of *O'Hare Modernization News* newsletter to residents and businesses near O'Hare.

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Communication Outreach for elected officials, area businesses, local governments

- Hold meetings with delivery companies, ground transportation companies, and the airlines at O'Hare to discuss OMP construction activities.

- Hold public outreach meetings to discuss OMP construction activities and answer questions.
  - Meetings will be held with local elected officials, community leaders, Rotary Clubs, Chambers of Commerce, and other business groups, allowing for feedback from the public

- Work closely with area police and fire departments, notifying them of any road closures or heavy construction traffic.

Media Communication

- Work with local radio affiliates to include OMP construction updates as necessary during morning and afternoon traffic reports.
  - Radio stations include WBBM AM, WGN AM, and WYLL AM.

- Broadcast continuous construction traffic reports on dedicated O'Hare AM radio "station."
  - Options include 800 AM or a new dedicated station.

- Release OMP construction project outlook report at start of construction season to local media outlets
  - Media outlets include *Chicago Tribune*, *Daily Herald*, *Chicago Sun-Times*, WLS TV, WMAQ TV, WBBM TV, WFLD TV, WGN TV, WTTW TV.

- Work with the City of Chicago's Traffic Management Authority to post regular traffic updates.

- Hold press conferences and issue press releases in conjunction with construction changes and milestones.

- Coordinate special events (i.e. ribbon-cutting ceremonies) to announce project completions.

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