

FILE COPY

**JUSTIFICATION FOR NON-COMPETITIVE PROCUREMENT**

COMPLETE THIS SECTION IF NEW CONTRACT(S)

For contract(s) in this request, answer applicable questions in each of the 4 major subject areas below in accordance with the Instructions for Preparation of Non-Competitive Procurement Form on the reverse side.

Request that negotiations be conducted only with Kidde Fire Trainers for the product and/or services described herein.  
(Name of Person or Firm)

This is a request for: \_\_\_ (One-Time Contract Per Requisition # 35920, copy attached) or X Term Agreement or \_\_\_ Delegate Agency (Check one). If Delegate Agency, this request is for "blanket approval" of all contracts within the  
\_\_\_\_\_ (Attach List) Pre-Assigned Specification No. \_\_\_\_\_  
(Program Name) Pre-Assigned Contract No. \_\_\_\_\_

COMPLETE THIS SECTION IF AMENDMENT OR MODIFICATION TO CONTRACT

Describe in detail the change in terms of dollars, time period, scope of services, etc., its relationship to the original contract and the specific reasons for the change. Indicate both the original and the adjusted contract amount and/or expiration date with this change, as applicable. Attach copy of all supporting documents. Request approval for a contract amendment or modification to the following:

Contract #: \_\_\_\_\_ Company, or Agency Name: \_\_\_\_\_

Specification #: \_\_\_\_\_ Contract or Program Description: \_\_\_\_\_  
Mod #: \_\_\_\_\_ (Attach List, if multiple)

James Mauer  
Originator Name

686-2397  
Telephone

[Signature]  
Signature

D.O.A. 11-9-07  
Department Date

Indicate SEE ATTACHED in each box below if additional space needed:

DAVID F. UCHAL 1st Dep Comm

PROCUREMENT HISTORY

See attached description:

ESTIMATED COST

See attached proposal from Kidde

SCHEDULE REQUIREMENTS

Kidde Fire Trainers has committed to complete the project by 1 July 2008.

EXCLUSIVE OR UNIQUE CAPABILITY

Kidde Fire Trainers have proprietary rights to the software that controls the simulators and will not modify the software to work with the enhancements as party to a contractor or as a subcontractor. Modifications to the system will be made entirely by Kidde Fire Trainers.

OTHER

See attached

**S. S. R. B.**

DATE 11/5/7

APPROVED S-O

CONDITIONALLY APPROVED \_\_\_\_\_

RETURN TO DEPT. \_\_\_\_\_

DISAPPROVED \_\_\_\_\_

APPROVED BY:

[Signature]  
DEPARTMENT HEAD OR DESIGNEE

11-9-07  
DATE

[Signature]  
BOARD CHAIRPERSON

11/5/7  
DATE

**JUSTIFICATION FOR NON-COMPETITIVE PROCUREMENT**

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**COMPLETE THIS SECTION IF AMENDMENT OR MODIFICATION TO CONTRACT**

Describe in detail the change in terms of dollars, time period, scope of services, etc., is relationship to the original contract and the specific reasons for the change. Indicate both the original and the adjusted contract amount and/or expiration date with this change, as applicable. Attach copy of all supporting documents. Request approval for a contract amendment or modification to the following:

Contract #:      Company, or Agency Name:       
 Specification #:      Contract or Program Description:       
 Mod #:      (Attach List, if multiple)

James Mauer 686-2397 [Signature] D.O.A. 11-9-07  
 Originator Name Telephone Signature Department Date  
 Indicate SEE ATTACHED in each box below if additional space needed: DAVID F. OCIMAL 1ST DEPT COMM

<input type="checkbox"/> PROCUREMENT HISTORY	<b>S. S. R. B.</b> DATE _____ APPROVED _____ CONDITIONALLY APPROVED _____ RETURN TO DEPT _____ DISAPPROVED _____
See attached description:	
<input type="checkbox"/> ESTIMATED COST	
See attached proposal from Kidde	
<input type="checkbox"/> SCHEDULE REQUIREMENTS	
Kidde Fire Trainers has committed to complete the project by 1 July 2008.	
<input type="checkbox"/> EXCLUSIVE OR UNIQUE CAPABILITY	
Kidde Fire Trainers have proprietary rights to the software that controls the simulators and will not modify the software to work with the enhancements as party to a contractor or as a subcontractor. Modifications to the system will be made entirely by Kidde Fire Trainers.	
<input type="checkbox"/> OTHER	
See attached	

APPROVED BY: [Signature] 11-9-07  
 DEPARTMENT HEAD OR DESIGNEE DATE BOARD CHAIRPERSON DATE

# INSTRUCTIONS FOR PREPARATION OF NON-COMPETITIVE PROCUREMENT FORM (Rev 9/97)

If a City Department has determined that the purchase of supplies, equipment, work and/or services can not be done on a competitive basis, a sole source justification must be prepared on this Justification for Non-Competitive Procurement Form in which procurement is requested on a non-bid or non-competitive basis in accordance with 65 ILCS 5/8-10-4 of the Illinois Compiled Statutes. All applicable questions in each Subject Area below must be answered. The information provided must be complete and in sufficient detail to allow for a decision to be made by the Non-Competitive Procurement Review Board. The Board will not consider justifications with incomplete information or documentation. Also, attach Form F-7 (if One Time Contract); F-8 (if Delegate Agency Contract) or F-26 (if Term Agreement) to obtain a pre-assigned Specification and Contract Number for each contract in this request.

## PROCUREMENT HISTORY (INCLUDING FUTURE PROCUREMENT OBJECTIVES)

1. Describe the requirement and how it evolved from initial planning to its present, status.
2. Is this a first time requirement or a continuation of previous procurement from the same source? If so, explain the procurement history.
3. Explain attempts made to competitively bid the requirement. (Attach copy of notices and list of sources contacted).
4. Describe any research done to find other sources (List other cities contacted, companies in the industry contacted, professional organizations, periodicals and other publications used).
5. Explain future procurement objectives. Is this a one-time request or will future requests be made for doing business with the same source?
6. Explain whether or not future competitive bidding is possible. If not, why not?

## ESTIMATED COST

1. What is the estimated cost for this requirement (or for each contract, if multiple awards contemplated)? What is the funding source?
2. What is the estimated cost by fiscal year, if the job, project or program covers multiple years?
3. Explain the basis for estimating the cost and what assumptions were made and/or data used (ie. budgeted amount, previous contract price, current catalog or cost proposal from firms solicited, engineering or in-house estimate, etc).
4. Explain whether the proposed Contractor or the City has a substantial dollar investment in original design, tooling or other factors which would be duplicated at City expense if another source was considered. Describe cost savings or other measurable benefits to the City which may be achieved.
5. Explain what negotiation of price has occurred or will occur. Detail why the estimated cost is deemed reasonable.

## SCHEDULE REQUIREMENTS

1. Explain how the schedule was developed and at what point the specific dates were known.
2. Is lack of drawings and/or specifications a constraining factor to competitive bidding? If so, why is the proposed Contractor the only person or firm able to perform under these circumstances? Why are the drawings and specifications lacking? What is the lead time required to get drawings and specifications suitable for competition? If lack of drawings and specifications is not a constraining factor to competitive bidding, explain why only one person or firm can meet the required schedule.
3. Outline the required schedule by delivery or completion dates and explain the reasons why the schedule is critical.
4. Describe in detail what impact delays for competitive bidding would have on City operations, programs, costs and budgeted funds.

## EXCLUSIVE OR UNIQUE CAPABILITY

1. If contemplating hiring a person or firm as a Professional Service Consultant, explain in detail what professional skills, expertise, qualifications or other factors make this person or firm exclusively or uniquely qualified for the project. Attach copy of cost proposal and scope of services.
2. Does the proposed firm have personnel considered unquestionably predominant in the particular field?
3. What prior experience of a highly specialized nature does the person or firm exclusively possess that is vital to the job, project or program?
4. What technical facilities or test equipment does the person or firm exclusively possess of a highly specialized nature which is vital to the job?
5. What other capabilities and/or capacity does the proposed firm possess which is necessary for the specific job, project or program which makes them the only source who can perform the work within the required time schedule without unreasonable costs to the City?
6. If procuring products or equipment, describe the intended use and explain any exclusive or unique capabilities, features and/or functions the items have which no other brands or models, etc possess. Is compatibility with existing equipment critical from an operational standpoint? Explain why.
7. Is competition precluded because of the existence of patent rights, copyrights, trade secrets, technical data, or other proprietary data? Explain why.
8. If procuring replacement parts and/or maintenance services, explain whether or not replacement parts and/or services can be obtained from any other sources? If not, is the proposed firm the only authorized or exclusive dealer/distributor and/or service center? If so, attach letter from manufacturer.

## OTHER

1. Explain other related considerations and attach all applicable supporting documents (Information Technology Strategy Committee (ITSC) Approval form, etc.)
2. Explain what opportunities of direct/indirect involvement of Minority or Women Business Enterprises have been discussed and/or are available this contract.

## REVIEW AND APPROVAL

This form must be signed by both the Originator of the request and approved by the Department Head or, authorized designee.

## Procurement History

In April 1996, live fire training simulators, designed by Symtron Systems, Inc. were put into operation at a site located on the north side of O'Hare International Airport. This system is used to provide Firefighters with realistic live fire training and to meet the FAA requirements mandated in FAR Part 139 requiring that all ARFF personnel attend an annual "live fire exercise". In addition to ARFF personnel from around the world having access to this Training Facility, and in keeping up with Mayor Daley's "Good Neighbor Policy", O'Hare offers its Training Facility to the numerous Suburban Fire Departments that surround the Chicago airports to provide specialized training in handling aircraft emergencies. These simulators are used to provide realistic emergency scenarios involving flammable liquids fires and aircraft emergencies such as engine fires, wheel and brake assembly fires, fires on the flight deck, galley and main cabin lavatory.

The burn pit operates by having liquid propane dispersed by pumps through piping within a 125' diameter circle. This propane is ignited and stays ignited until an agent (water or foam) is laid out on the fire. Sensors determine when the proper amount of agent has been placed on the fire, in the correct pattern and for the correct amount of time. Once these criteria are met, the system shuts the flow of propane to the areas properly attacked by firefighters until the whole fire area has been extinguished. It is this constant heating followed by rapid cooling of the metal piping that causes fatigue cracks and ultimate failure of the piping throughout the pit. Up until now, these broken pipes have been repaired using repair kits purchased from Kidde Fire Trainers. During operations of the facility in 2005, several of these failures occurred that were repaired using the kits purchased from Kidde. There is also a serious deterioration to the concrete around the pit. This includes the curb around the pit, and the concrete bunker that houses all of the propane distribution equipment at the site. Age and use is also taking its toll on some of the electrical wiring and pneumatic piping in the bunker. There is no way to prevent these failures; they are an inherent problem brought on by heavy usage and the age of the facility, and obviously, one cannot expect to continue using kits and patches to make repairs.

With a new emphasis being placed on ARFF personnel being capable of conducting aircraft interior search and rescue and aircraft interior fire attacks, it is our request that this upgrade package be instituted.

Included with this form I have enclosed a copy of the proposal from Kidde Fire Trainers that lists all pertinent information in regards to this project.

Along with the proposal for the upgrading our existing system, I am also including a proposal from Kidde Fire Trainers that will allow us to keep a Kidde System Maintenance specialist on site to ensure that the system is running properly and to conduct any repairs that need to be done.

Due to the fact that the existing system is a "Kidde" system, all of the additions listed **MUST** be designed and installed by Kidde Fire Trainers. No other companies can make changes or additions to our existing simulators because the software and various components are protected by a patent.

The possibility of competitive bidding was attempted by designing the enhancements are repairs with a Department of Aviation task order design firm. Upon completing the plans, DOA was unable to contract with Kidde Fire Trainers to upgrade the software once the mechanical changes were made. Kidde Fire Trainers stated that they would not work in part or as a partner to any other firm for liability reasons.

If nothing is done to address the situations listed in this document, and we do in fact lose the use of our simulator, then we will be in a position of having to send all of our ARFF personnel (ORD and MDW) to another facility for their required live fire training. One can be assured that this will be an unmitigated disaster for operations at both airports, including the possibility of legal action that could lead to monetary fines or the revocation of the airports operating certificates.

In closing, the Chicago Airport System is the worlds BUSIEST and BEST airport system in the world, and we feel that the Chicago Fire Department and the Chicago Department of Aviation have the best-trained and professional ARFF personnel in the world. Supporting this statement, we submit that along with numerous awards and letters of recommendation, the FAA, International Civil Aviation Organization, NTSB, United States Armed Forces, and ARFF agencies from around the world have called upon our expertise. By implementing the above request(s), we are showing the citizens of the City of Chicago, the citizens of communities that surround our airports, and the international aviation community in general that the City of Chicago places safety and security at the forefront of its priorities.

**TO:** Nuria Fernandez,  
Commissioner

**FROM:** James Mauer  
Managing Deputy Commissioner  
Security and Safety

**DATE:** 31 August 2007

**SUBJECT:** Request for a Sole Source Contract to rehabilitate the Aircraft Rescue and Fire  
Fighting Training Facility (BURN PIT).  
**VENDOR:**

The Safety and Security section of the Department of Aviation and the Chicago Fire Department request that a new contract be negotiated with Kidde Fire Trainers to rebuild the Fire Training Facility (Burn Pit). The new agreement will continue the operation of the Burn Pit as well as provide for the installation of enhancements that simulate various aviation fire fighting situations. The attached justification for non-competitive procurement details the above request and explains why this requirement cannot be competitively bid. The agreement will also include a three year maintenance agreement to keep the facility operational.

The burn pit is an integral part of the ARFF training and is also used by neighboring community fire departments in order to train in the case of an airplane crash off airport premises. It is a Regional training facility for all fire fighters.

If you concur with this request, please sign the attached EPS Form F-26, Justification for Non-Competitive Procurement Form, and return the entire package to David Bowman, to continue processing of the new contract request.

Thank you.

**Procurement Type:** Non-Competitive

**Cost:** See attached proposal from Kidde

**Funding:** 86-751-85-0540-B2003-4971-9071-B200371E

User Contact: Tom Wager / CFD Phone: 686-4814  
User Deputy: Jim Mauer Phone: 686-2397

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Nuria Fernandez, Commissioner  
Approval to proceed with Non-Competitive Procurement



**CHICAGO FIRE DEPARTMENT**  
**BUREAU OF OPERATIONS**  
**DISTRICT 3 - AIRPORT OPERATIONS**  
**Office: 773-686-4814 Fax: 773-686-4813**



August 29, 2007

To: Valerie Walker  
 Assistant Commissioner  
 Procurement

From: John McNicholas  
 District Chief  
 3<sup>rd</sup> District Airport Fire Operations

Subject: Cost of Live Fire Burn Training

Commissioner,

Per our meeting on Thursday August 23<sup>rd</sup> with regards to the loss of the Burn Pit Training Facility the following are cost factors that would be associated with meeting our FAA requirements.

Each year assigned members of the 3<sup>rd</sup> District are required to complete one live fire evolution. Members would have to attend this session on an "off-duty" work day which would require overtime pay per the current labor contract. Addition expenses of travel, the live fire training class and per-diem would also be included. This situation also places us at the mercy of the weather which could include additional expenses of cancellations, overnight stays and additional labor costs.

We have been placed in an unfortunate situation that has been in process for over two years. If additional information is needed from my office please do not hesitate to contact me.

Battalion Chief (6):	Labor cost \$11,400	Class/Travel \$4200	Total: \$15,600
Captain (7):	\$11,900	\$7105	\$19,005
Lieutenant (25):	\$40,000	\$25,375	\$65,375
Engineer (53):	\$74,200	\$53,795	\$127,995
Firefighter (111):	\$133,200	\$112,665	\$245,865
			Total: \$473,840

John McNicholas  
 District Chief  
 3<sup>rd</sup> District

# DPS PROJECT CHECKLIST

For DPS Use Only	
Date Received	_____
Date Returned	_____
Date Accepted	_____
CA/CN's Name	_____

**IMPORTANT:** PLEASE READ AND FOLLOW THE INSTRUCTIONS FOR COMPLETING THE PROJECT CHECKLIST AND CONTACT THE APPROPRIATE UNIT MANAGER IF YOU HAVE ANY FURTHER QUESTIONS. ALL INFORMATION SHOULD BE COMPLETED, ATTACH ALL REQUIRED MATERIALS AND SUBMIT FOR HANDLING TO THE DEPARTMENT OF PROCUREMENT SERVICES, ROOM 403, CITY HALL, 121 N. LASALLE STREET, CHICAGO, ILLINOIS 60602.

**GENERAL INFORMATION:**

Date: Friday, Nov. 9, 2007  
 REQ No.: 35920  
 SPEC. No.: 61600

Contact Person: DAVID BOWMAN  
 AC(773) Tel: 686-7089 Fax: 894-1841 E-mail:  
 AV00289@cityofchicago.org

PO No.: (if known): N/A

Project Manager: THOMAS WAGNER  
 AC(773) Tel: 686-4814 Fax: 686-4813 E-mail:  
 twagner@cityofchicago.org

Modification No.: (if known): N/A

Previous PO No.: (if known): T24317

**Project Description:** REQUEST FOR SOLE SOURCE CONTRACT TO REHABILITATE THE AIRCRAFT RESCUE AND FIRE FIGHTING TRAINING FACILITY (ARFF BURN PIT) AT O'HARE INTL. AIRPORT.

**FUNDING:**

- |          |                                       |  |                                     |                                 |                                |
|----------|---------------------------------------|--|-------------------------------------|---------------------------------|--------------------------------|
| City:    | <input type="checkbox"/> Corporate    | <input checked="" type="checkbox"/> Bond | <input type="checkbox"/> Enterprise | <input type="checkbox"/> Grant* | <input type="checkbox"/> Other |
| State:   | <input type="checkbox"/> IDOT/Transit | <input type="checkbox"/> IDOT/Highway    | <input type="checkbox"/> FAA        | <input type="checkbox"/> Grant* | <input type="checkbox"/> Other |
| Federal: | <input type="checkbox"/> FHWA         | <input type="checkbox"/> FTA             |                                     | <input type="checkbox"/> Grant* | <input type="checkbox"/> Other |

LINE	FY	FUND	DEPT	ORGN	APPR	ACTV	OBJT	PROJECT	RPTG	\$ DOLLAR AMOUNT
	086	0751	085	4971	9071	---	220540	B200371E	---	\$3,819,065.00
	086	0751	085	4971	9071	---	220540	B200371E	---	\$15,000.00

Estimated Value \$3,834,065.00

\*IF GRANT FUNDED, A COPY OF THE APPROVED GRANT AND APPLICATION ARE REQUIRED and any other Terms and Conditions that may apply.

**SCOPE STATEMENT:**

Attached is a Detailed Scope of Services and/or Specification

**IMPORTANT:** THIS IS A CRITICAL PORTION OF YOUR SUBMITTAL. IN ORDER FOR DPS TO ACCEPT YOUR SUBMITTAL YOU MUST COMPLETE THE SPECIFIC SCOPE REQUIREMENTS AS SET FORTH IN THE SUPPLEMENTAL CHECKLIST FOR THAT UNIT.

The following is a general description of what should be included in a Scope of Services or Specification:

A clear description of all anticipated services and products, including: time frame for completion, special qualifications of prospective vendors, special requirements or needs of the project, locations, anticipated participating user departments, citation of any applicable City ordinance or state/federal regulation or statute.

**TYPE OF PROCUREMENT REQUESTED (check all that apply):**

**NEW REQUEST**

- Blanket Agreement
- Standard Agreement
- Small Orders

**MOD/AMENDMENT**

- Time Extension
- Vendor Limit Increase
- Scope Change/Price Increase/Additional Line Item(s)
- Other (specify):

**FORMS:**  Requisition  Special Approvals  Non-Competitive Review Board (NCRB)

**CONTRACT TERM:** Requested Term (number of months): THIRTY SIX (36) MONTHS.

**PRE BID/SUBMITTAL REQUIREMENTS:**

Requesting Pre Bid/Submittal Conference?  Yes  No Requesting Site Visit?  Yes  No



# DPS PROJECT CHECKLIST

## ARCHITECTURAL/ENGINEERING SUPPLEMENTAL CHECKLIST

**Required Attachments:** Scope of Services, including location, description of project, services required, deliverables, and other information as required

**Risk Management**

Will services be performed within 50 feet of CTA train or other railroad property?

Yes  No

Will services be performed on or near a waterway?

Yes  No

**If applicable, Pre-Qualification** Category No.                      Category Description:

For Pre-Qualification Program, attach list of suggested firms to be solicited

**Other Agency Concurrence Required:**  None  State  Federal  Other (fill in)

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## AVIATION CONSTRUCTION SUPPLEMENTAL CHECKLIST

DOA sign-off for final design documents:  Yes  No

**Required Attachments:**

Copy of Draft Contract Documents and Detailed Specifications.

**Risk Management:**

Current Insurance Requirements prepared/approved by Risk Management: Yes  No

Will work be performed within 50 feet of CTA or ATS structure or property? Yes  No

Will work be performed airside? Yes  No

**\*NOTE:** Any non-construction Aviation request, complete the applicable section.

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## COMMODITIES SUPPLEMENTAL CHECKLIST

**Required Attachments:** Detailed Specifications (Scope of Services) including detailed description of the product, delivery location, user department contact, price escalation considerations, Bidder's qualification, contract term and extension options, Contractor's qualifications, citation of any applicable City/State/Federal statutes or regulations, citation of any applicable technical standards and Price Lists/Catalogs, technical drawings and other exhibits and attachments as appropriate.

**If Modification request**, please verify and provide the following:

Contractor's Name:

Contractor's Address:

Contractor's e-mail Address:

Contractor's Phone Number:

Contractor's Contact Person:

---

## CONSTRUCTION SUPPLEMENTAL CHECKLIST

**Required attachments:**

Copy of Draft (80% Completion), Contract Documents and Detailed Specifications

**Risk Management**

Will services be performed within 50 feet of CTA train or other railroad property?

Yes  No

Will services be performed on or near a waterway?

Yes  No

---

# DPS PROJECT CHECKLIST

## VEHICLES/HEAVY EQUIPMENT SUPPLEMENTAL CHECKLIST

### Required Attachments:

- Detailed Specifications including detailed description of the vehicle(s) or equipment, mounted equipment, if any, and options/accessories.
- Special Provisions (Delivery, Warranty, Manuals, Training, Additional Unit Purchase Options, Bid Submittal Information, etc.)
- Delivery Location(s)
- Technical Literature
- Drawings, if any
- Part Number List (            Manufacturer; or            Dealer;            or Other Source:            )
- Current Price List(s)/Catalog(s)
- Special Approval Form
- Exhibits and Attachments

If Modification request, please verify and provide the following:

Contractor's Name:

Contractor's Address:

Contractor's e-mail Address:

Contractor's Phone Number:

Contractor's Contact Person:

---

## PROFESSIONAL SERVICES SUPPLEMENTAL CHECKLIST

- Detailed description of project listing obligations of each party.
- The Schedule of Compensation
- Deliverables
- Request for individual contract services (if applicable)
- The appropriate EPS form
- ITSC (approved by BIS)
- OBM (approved by Budget form/memo)
- Grant document attached

Attach any documentation indicating any previous purchase activity to assist in the procurement process

## TELECOMMUNICATIONS AND UTILITIES SUPPLEMENTAL CHECKLIST

**Required Attachments:** Detailed Scope of Services/Specification which sets forth all of the anticipated services and products the user department wants provided, including time frame for completion, special qualifications of prospective vendors, special requirements or needs of the project, locations, anticipated participating user departments, citation of any applicable City ordinance or state/federal regulation or statute.

Has the project been reviewed by DGS?             Yes    No

Attach copy of DGS Recommendation; Reservation(s); or participate under current contract.

Does the project include software?             Yes    No

If yes, is signed ITSC form attached?             Yes    No

Does the location involve:

A public way?             Yes    No

Any concession in the City's facilities?             Yes    No

Is it anticipated City Council approval of the project or contract will be required?             Yes    No

# DPS PROJECT CHECKLIST

## WORK SERVICES/FACILITY MAINTENANCE SUPPLEMENTAL CHECKLIST

**Required Attachments:** Detailed Specifications (Scope of Services) including detailed description of the work, locations (with supporting detail), user department contacts, work hours/days, laborer/supervisor mix, compensation and price escalation considerations, Bidder's qualification, contract term and extension options, Contractor's qualifications, citation of any applicable City/State/Federal statutes or regulations, citation of any applicable technical standards and Price Lists/Catalogs, technical drawings and other exhibits and attachments as appropriate.

### Risk Management:

Will services be performed within 50 feet (50') of CTA train or other railroad property?  Yes  No

Will services be performed on or near a waterway?  Yes  No

Will services require the handling of hazardous/bio-waste material?  Yes  No

Will services require the blocking of streets or sidewalks which may affect public safety?  Yes  No

**If Modification or Amendment request**, please verify and provide the following:

Contractor's Name:

Contractor's Address:

Contractor's e-mail Address:

Contractor's Phone Number:

Contractor's Contact Person:

Kidde Fire Trainers, Inc.  
17 Philips Parkway  
Montvale, NJ 07645-1810 USA  
Tel +1 201.300.8100  
Fax +1 201.300.8101  
www.kiddeftr.com



9 November 2007

Refer to: Q1509-LO-9Nov2007  
Via Email: lpianto@cityofchicago.org

William Maurer, Managing Deputy Commissioner  
Safety and Security, Bldg. 850  
Patten Road  
O'Hare International Airport  
Chicago IL 60666

Attention: William Lonergan, Deputy Commissioner, Safety and Security

**Subject: Firm Price & Scope Proposal  
for Walk-On AquaMesh™ Fuel Spill FIRETRAINER® A-2000  
Refurbishment at Chicago O'Hare International Airport**

07 NOV -9 PM 3:48

Mr. Maurer:

Kidde Fire Trainers, Inc. is pleased to provide the following firm price & scope proposal for a Walk-On AquaMesh™ Fuel Spill FIRETRAINER® A-2000 refurbishment at Chicago O'Hare International Airport.

This proposal consists of:

- Firm Fixed Price Proposal
- Statement of Work & Specification, Burn Pit Refurbishment
- Statement of Work, Warranty and Maintenance Services

This price & scope proposal does not address the terms and conditions that are being addressed separately between Kidde and Chicago DOA. This proposal is conditioned on a resolution of these terms that is acceptable to Kidde Fire Trainers.

We are confident that the proposed solution will serve your fire training needs for years to come, and we look forward to serving the Chicago DOA once again. If needed, please contact the undersigned with any questions at 201-300-8100 x210.

Sincerely,  
KIDDE FIRE TRAINERS, INC.

Louis Orotelli  
Int'l Marketing Manager

**PROPOSAL FOR**

**WALK-ON AQUAMESH™ FUEL SPILL FireTrainer® A-2000  
BURN PIT REFURBISHMENT  
AND WARRANTY & MAINTENANCE SERVICES  
CHICAGO O'HARE INTERNATIONAL AIRPORT**

**Prepared for:**

**Department of Aviation  
O'Hare Central Field Office  
10601 West Higgins, Bldg. 500  
Chicago, IL 60666**

**Prepared by:**

**Kidde Fire Trainers, Inc.  
17 Philips Parkway  
Montvale, NJ 07645-1810 USA**

**Bid No. Q1509**

This proposal includes data that is proprietary to Kidde Fire Trainers, Inc that will not be disclosed outside of the City of Chicago and will not be duplicated, used or disclosed - in whole or in part - for any reason other than to evaluate this proposal. If, however, a contract is awarded to this offeror as a result of or in conjunction with the submission of this data, City of Chicago will have the right to duplicate, use or disclose the data to the extent provided in the resulting contract. This does not limit City of Chicago's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in sheets marked with the following legend: "Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal."

**LIMITED RIGHTS NOTICE -TECHNICAL DATA / DOCUMENTATION.**

**This technical document will not, without the written permission of Kidde Fire Trainers, Inc. be either (a) used, released, disclosed or reproduced in whole or in part or (b) used in whole or in part for manufacture except that (i) such release, disclosure or use is necessary for emergency repair or overhaul; (ii) such release, disclosure, or use is made subject to a prohibition that the person to whom the data is released or disclosed may not further release, disclose, or use such data; (iii) Kidde Fire Trainers, Inc. is notified of such release, disclosure or use.**

**COPYRIGHT© 2007 KIDDE FIRE TRAINERS, INC. ALL RIGHTS RESERVED. REPRODUCTION OF THIS DOCUMENT IN ANY MEDIUM WITHOUT THE EXPRESS WRITTEN PERMISSION OF KIDDE FIRE TRAINERS, INC. IS PROHIBITED.**

**9 November 2007**

**Firm Fixed Price Proposal**

<b>Item</b>	<b>Description</b>	<b>Price</b>
<b>1</b>	<b>Refurbishment of the Burn Pit At O'Hare International Airport using AquaMesh™ Walk-On Fuel Spill FIRETRAINER® A-2000 Technology</b> in accordance with the Statement of Work & Specification dated 9 Nov 2007 and subject to defining mutually acceptable terms & conditions.	\$3,798,800
<b>2</b>	<b>Option: Add Full-time Safety Rep (performs no other function)</b>	\$58,860
<b>3</b>	<b>Option: Omit Footings for Future Aircraft Mockup</b>	(\$11,500)
<b>4</b>	<b>Warranty &amp; Maintenance Service of Existing SAFT Fire Trainer during Burn Pit Refurbishment.</b>	\$15,000
<b>5</b>	<b>Year-1 Warranty &amp; Maintenance Service (Burn Pit &amp; SAFT)</b>	\$40,450
<b>6</b>	<b>Year-2 Warranty &amp; Maintenance Service (Burn Pit &amp; SAFT)</b>	\$41,650
<b>7</b>	<b>Year-3 Warranty &amp; Maintenance Service (Burn Pit &amp; SAFT)</b>	\$42,900
	<b>Unit Prices: Repair of Burn Pit Floor</b> Price adjustments to the burn pit floor to be made at the following rates.  Crack repair per SOW  Spall repair per SOW	\$23.00 per linear foot  \$41.00 per sq-foot

**Proposal Validity Period**

Price is firm and valid through 20 December 2007.

This price & scope proposal does not address the terms and conditions that are being addressed separately between Kidde and Chicago DOA. This proposal is conditioned on a resolution of these terms that is acceptable to Kidde Fire Trainers.

**Payment Terms**

Kidde will invoice at based on the following milestones.

Payments are due Net 60 days in accordance with Chicago's payment rules.

10% invoiced upon execution of a contract

10% invoiced upon submittal of shop drawings

20% invoiced upon mobilization

20% invoiced upon beginning of construction

20% invoiced upon completion of the construction

20% invoiced upon acceptance of the trainer by DOA

**Taxes**

Prices exclude any applicable sales or use taxes.

**Surety Bonding**

Price includes a 100% payment and performance bond.

**MBE / WBE Participation**

Proposal includes 24% MBE and 4% WBE participation

**Schedule**

Refer to the schedule in the Statement of Work.

**STATEMENT OF WORK & SPECIFICATION**

**FOR THE**

**Walk-On AquaMesh™ FUEL SPILL FireTrainer® A-2000**

**BURN PIT REFURBISHMENT AT**

**CHICAGO O'HARE INTERNATIONAL AIRPORT**

**Revision 9 November 2007**

**Prepared By:**

**Kidde Fire Trainers, Inc.**

**17 Philips Parkway**

**Montvale, New Jersey 07645 USA**



## **SCOPE**

This specification describes the work scope to be performed by Kidde Fire Trainers, Inc. for the proposed Walk-On AquaMesh™ FUEL SPILL FIRETRAINER® A-2000 refurbishment at Chicago O'Hare International Airport.

### **Kidde's Approach to the Project**

Kidde has taken the following approach to the project.

- Kidde will supply a "Walk-On" grating system (no vehicular traffic)
- Kidde will utilize a submerged grating system (nominal water depth 0.5-inches). The submerged grating system provides a more realistic training by permitting trainees to float firefighting foam on the water surface. At the same time, the submerged grating system permits the use of grating with less height for cost savings.
- Kidde will utilize a more efficient support structure for cost savings
  - Less field labor
  - Less complex support mechanism- fewer machined parts
  - Fewer drilled and adhesive anchored holes in concrete pit
- Kidde will reuse existing piping manifolds. Inspection has found them to be in sound mechanical condition. We will descale and add a corrosion inhibiting paint.
- Kidde will reuse and reseal existing thermocouple bunker penetration sleeves as they are in sound condition.
- Kidde will utilize a less complex manual drain system. Opening and closing of the drains is not a daily or weekly occurrence, and does not warrant automatic controls.

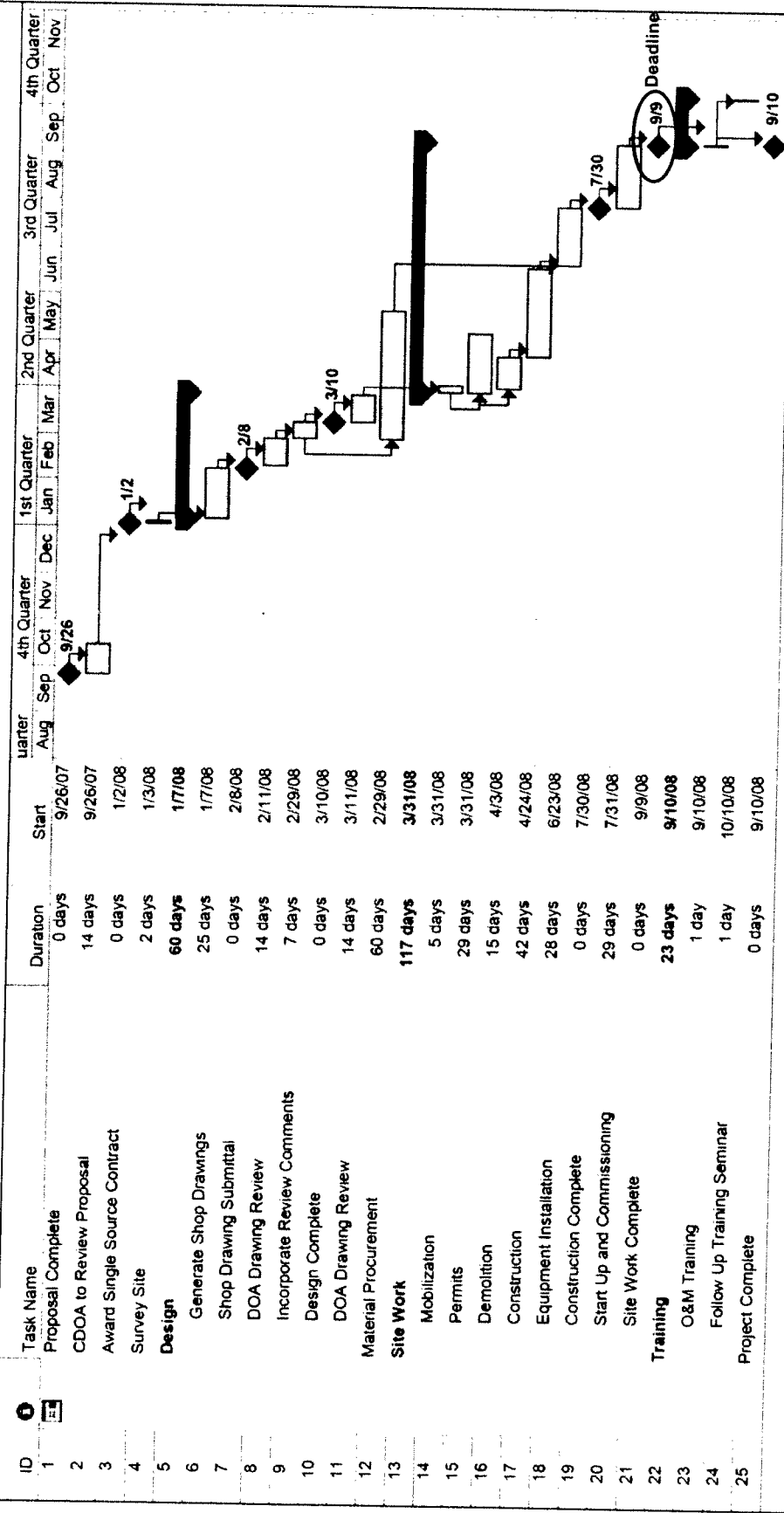
## **DRAWINGS**

Kidde's work scope includes revision of the HOH drawing packaged for Project No. H6164.07-00, dated 8-13-07 as described below. Kidde will contract with HOH Engineers, Inc. to modify the existing drawing package to incorporate Kidde-specified design details as well as produce as-built drawings.

The edits to the drawings span multiple pages to incorporate the cost savings and the safety/reliability corrections, but generally the edits relate to the following items:

- Revise the grating and grating support structure design detail
- Change drain valves to manual valves. Omit drain valves control conduits
- Revise design details of burner zone piping to Kidde's proven burner design
- Call out the refurbishment of existing piping manifolds and bunker penetration thermocouple sleeves, rather than replacement.
- Omit all details related to HVAC, roofing or pump room work scope
- Revise 125-ft curb height to accommodate submerged grating design
- Revise vertical location of drain piping through 125-ft curb to permit more complete drainage of the burn pit
- Revise the thermocouple mounting locations and mounting details
- Revise the propane supply line routings to increase reliability
- Other edits as required to ensure the safety and reliability of the completed system

# O'HARE INTERNATIONAL AIRPORT AIRCRAFT RESCUE FIRE FIGHTING TRAINING CENTER BURN PIT REHABILITATION PROPOSED SCHEDULE Rev. A



Project: O'Hare Proposed Schedule A  
Date: Mon 11/5/07

Legend:

- Task
- Split
- Progress
- Milestone
- Summary
- Project Summary
- External Tasks
- External Milestone
- Deadline

Page 1

Use or disclosure of data contained on this sheet is subject to the restriction on the title page of this proposal

## Responsibility Matrix

The following responsibility matrix and detailed notes further outline the scope of work provided by Kidde Fire Trainers, Inc. as part of this project.

Work Scope	Kidde Fire Trainers	City of Chicago
<b>GENERAL CONDITIONS</b>		
Provide access to the Fuel Spill FireTrainer for Kidde FT employees and all subcontractors.		X
Provide 10,000 gallons of propane fuel for use during the integration and testing phases.		X
Provide firefighting water, firefighting hand lines, and use of ARRF vehicles (operated by owner-provided firefighters) for use during integration and acceptance testing phases.		X
Obtain required permits and inspections	X	
Provide project management and craft supervision for mechanical contractor scope of work	X	
Provide site office trailer(s) and supplies for the duration of the project	X	
Provision of utilities		X
Hookup utilities	X	
Provide required safety equipment	X	
Provide storage cargo box(es)	X	
Provide sanitary facilities	X	
Provide required first aid	X	
Provide general liability insurance	X	
Provide site trucks compliant with security program	X	
Provide construction signs	X	
Provide tools, forklifts and equipment	X	
Provide fire extinguishers	X	
MBE & WBE business participation	X	
Coordinate MBE/WBE subcontracts including required reporting documents	X	
Coordinate all badging and security compliance	X	
Safety rep - See note.	X	
Provide shop drawings and as-built drawings	X	
Accommodate winter conditions	X	
Welding inspections, material testing and Quality Control Program for mechanical contractor scope of work	X	

Work Scope	Kidde Fire Trainers	City of Chicago
<b>DEMOLITION</b>		
Remove gravel from the pit and re-deposit on the site	X	
Remove all thermocouples and guide sleeves in pit and discard	X	
Remove burner elements and associated piping and discard	X	
Remove and discard bunker cooling water (CW) piping (Approx. 100ft for both bunkers)	X	
Remove and discard 8 liquid propane valve manifold assemblies (incl. 78 burner valves)	X	
Reuse and reposition the engine fuel line leak pilot assy and burner element	X	
Remove the two (2) thermocouple junction boxes in the pit perimeter buffer zone. Install watertight conduits through the new curb walls to route the thermocouples from the j-boxes to their respective burner elements	X	
Discard all scrap materials (pit gravel excluded)	X	
Removal or disposal of hazardous materials		X
<b>CONCRETE</b>		
Form & pour new circular concrete curb	X	
Basic repair of the pit floor and bunker after removal of gravel. Repair 200 linear feet of crack fill and 100 sq-ft of spalling/broken concrete repair. See note.	X	
More extensive repair of the pit floor and bunker after removal of gravel. See note.		X
Waterproof all concrete surfaces inside the pit area including bunkers and curbs with epoxy. Includes sealing of all expansion and construction joints.	X	
Re-install stored gravel in the buffer zone (apron area)	X	
Cut opening in slab, form, and pour <u>footings/slab for future aircraft mockup extension</u>	X	
<b>GRATING SYSTEM</b>		
Provide and install the hot-dipped galvanized carbon steel grating support structure & corrosion resistant grating support system suitable for foot traffic. Grating surface to be serrated. (Includes I-beams, pipe posts, thermocouples & burner supports as necessary, adhesive anchors, grout and support angles for concrete curbs).	X	

Work Scope	Kidde Fire Trainers	City of Chicago
<b>INSTALLATION</b>		
Fabricate and install 4 new drain vaults over the existing perimeter drains	X	
Install new pit water drain pipes (4 places)	X	
Provide four (4) 2-inch water drain valves (manual)	X	
Install 2-inch water drain valves (manual)	X	
Provide 8 new stainless steel valve manifold assemblies	X	
Install 8 new stainless steel valve manifold assemblies	X	
Wire brush & re-paint all gas piping with rust inhibiting paint. Apply new labeling to the gas piping after painting.	X	
Provide and install stainless steel bunker water cooling pipes (100 ft estimated)	X	
Provide new stainless steel flex hoses for all burner elements	X	
Install new stainless steel flex hoses for all burner elements	X	
Provide 78 KFT-design (waterdeck) stainless steel burner elements	X	
Provide 234 new thermocouple sensors	X	
Install new burner elements	X	
Provide and install ½" stainless steel, Sched. 80 interconnect gas piping (no supports required on floor of pit)	X	
Install 234 new thermocouples (conduits not required)	X	
Provide 234 thermocouple guards	X	
Install 234 thermocouple guards on the grating surface	X	
Provide dual float switch assembly (redundant sensor)	X	
Install dual float switch assembly including conduit and signal wiring to bunker	X	
Re-install the engine fuel line leak fire	X	
Provide new thermocouple junction boxes (2)	X	
Install new thermocouple junction boxes (2)	X	
Re-use existing bunker covers	X	
Re-use existing 78 sleeves in bunker wall	X	

Work Scope	Kidde Fire Trainers	City of Chicago
<b>FUEL SPILL FIRE TRAINER SYSTEM INTEGRATION</b>		
Create/install updated PC & PLC system software	X	
Perform complete system I/O test	X	
Perform Safety Systems Test	X	
Test & adjust all burner flame heights during extensive main flame testing	X	
Test & adjust all thermocouple sensor channels to achieve accurate automatic agent detection	X	
<b>INTEGRATED SYSTEMS ACCEPTANCE TESTING</b>	X	
Operation & Maintenance Training	X	
Follow-up Training Seminar (30 days after acceptance)	X	
<b>SITE CLEANUP &amp; DEMOBILIZATION</b>	X	

**Other Scope of Work Notes:**

**Repair of Concrete Pit Floor**

The repair of the pit floor assumes the concrete is in good condition. Kidde will repair up to 200 linear feet of cracks and up to 100 square-feet of broken or spalled concrete (up to 20 individual locations) per the instructions in the specifications. Repair of this quantity is already included in the proposal price.

Kidde offers to pro-rate the price of the repairs based on the actual repairs performed, ranging from zero repairs up to a limit of 3-times the originally proposed repairs.

Crack Repair	200 linear feet	x	\$23 per linear foot	=	\$ 4600
Spall Repair	100 sq-feet	x	\$41 per sq-ft	=	\$ 4100
			<b>Total</b>		<b>\$ 8700</b>

As the pit floor is inaccessible prior to contract award, it is not feasible to know the current condition of the floor. This proposal assumes only the minor repairs described here.

**Safety Representative**

Kidde's mechanical subcontractor's Project Manager will be onsite full-time and will handle this duty. This person will have 30 hours of OSHA and Red Cross training.

In case of emergencies, and as needed for key meetings, Kidde's mechanical contractor's Corporate Safety Director will be available with a one-hour response time. This person will also visit the site periodically and review all jobsite safety requirements.

Optionally, Kidde offers a full-time, dedicated Safety Representative. This person will have no other responsibility related to the project, and will have a 30 OSHA card.

**Security Fencing**

Provision of security fencing is not included.

**Welding Inspector**

This proposal does not include a full-time welding inspector. Periodic inspections of welds by a qualified inspector during the erection of the grating and support structure will be provided. Welding inspections will be performed in accordance with the QA/QC manual.

**Warranty on Construction**

Warranty on construction (curbs, walkable grating, et. al.) will be (one) 1 year from project acceptance.

**Daily Reports. Weekly Meetings. Daily Progress Documentation**

Kidde's mechanical contractor will be onsite for the duration of the project and fill out daily manpower reports for the project (task time not to exceed 15 minutes) and will attend weekly meetings on behalf of Kidde (meeting duration not to exceed 1 hour). Kidde will take job progress photos as the job progresses (not necessarily on a daily basis.)

**Bunker Doors**

Kidde will reuse the existing bunker doors and will reattach to the bunkers.

**Bunker Nipples**

Kidde will replace the 78 nipples that penetrate the bunker wall.  
Kidde will reseal the existing 78 bunker wall sleeves.

**Specialized Aircraft Fire Trainer (SAFT) Operation**

The SAFT will remain operational during the refurbishment of the fuel spill burn pit.



## **Warranty**

- (a) Kidde Fire Trainers warrants to Buyer that all equipment deliverables will be free from defects in materials or workmanship for a period of three (3) years from the date of equipment acceptance.
- (b) Warranty adjustment
  - 1. If any defect appears within the warranty period, Buyer shall immediately provide Kidde Fire Trainers notification thereof, with written confirmation.
  - 2. Kidde Fire Trainers sole and exclusive liability, and Buyer's sole and exclusive remedy shall be for Kidde Fire Trainers to repair or furnish a replacement part for any Live Fire Training System, which, upon test and examination by Kidde Fire Trainers, proves defective within the above warranty.
  - 3. Kidde Fire Trainers will repair or furnish a replacement for any Live Fire Training System that, upon test and examination by Kidde Fire Trainers, proves defective within warranty period.
  - 4. The Buyer shall not take a corrective action with respect to the warranty without written authorization from Kidde Fire Trainers.
- (c) Exclusions from Warranty
  - 1. THE FOREGOING WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
  - 2. Kidde Fire Trainers will not be liable for any special or consequential damages or for loss, damages or expense directly or indirectly arising from the use and maintenance of the Fire Simulation Training equipment or any inability to use such equipment either separately or in combination with any other equipment or material or from any other cause, nor shall Kidde Fire Trainers be liable for personal injury, death, or property damage arising from or connected with the use or maintenance of the Fire Simulation Training Equipment made the basis of this agreement.
  - 3. The warranty does not extend or apply to any equipment deliverable that has been subjected to misuse, neglect, accident, or improper use in violation of the operator's manual.
  - 4. The warranty does not extend or apply to any equipment deliverable that has been repaired, altered, or disconnected by persons not expressly approved by Kidde Fire Trainers, nor to any equipment deliverables or assembly thereof, the serial number of which has been removed or defaced or changed.

## **FUNCTIONAL SPECIFICATION**

### **1.0 SCOPE**

This specification provides the functional performance requirements for the proposed Walk-On AquaMesh™ FUEL SPILL FIRETRAINER® A-2000 refurbishment at Chicago O'Hare International Airport.

### **2.0 GENERAL**

The Fuel Spill Trainer (FST) shall continue to be used to train and certify firefighters in the control and extinguishment of large-scale fuel spill fires. The modified trainer shall support the weight of training personnel, with no trip hazards such as exposed piping.

The FST shall continue to simulate an intense large area aviation fuel fire. To meet the training needs of the Owner, the upgraded trainer shall provide following capabilities:

- 1) Allow trainees to safely walk on the designated burn surface, free from obstructions.
- 2) Handle the application of high-pressure flow lines to the fuel spill surface with no negative effects.
- 3) Generate flame appearance in height, color, density and temperature similar to the existing propane fueled fires or better.
- 4) Operate in either full or partial engulfment modes, with 78 selectable burn zones to simulate varying aircraft incidents, and quantity of spilled fuel.
- 5) Eliminate the requirement for maintenance leveling of a graveled surface.
- 6) Allow for more immediate main flame shutdown times.
- 7) Permit more realistic training during evolutions by accommodating the flow of firefighting foam across the fuel spill surface.
- 8) Allow for more convenient inspection of sub-surface elements and components.

### **3.0 APPLICABLE STANDARDS**

#### **3.1 Standards**

Trainer equipment design and installation shall comply with the following standards:

- ◆ NFPA 402M - Aircraft Rescue and Fire Fighting Operations
- ◆ NFPA 54 - National Fuel Gas Code
- ◆ NFPA 58 - LP Gas, Storage and Use
- ◆ NFPA 70 - National Electrical Code
- ◆ FAA Advisory AC150-5220-17A
- ◆ NFPA 1402 - Guide to Building Fire Service Training Centers
- ◆ NFPA 1403 - Standard on Live Fire Training Evolutions

## **4.0 TRAINING EQUIPMENT DESIGN**

### **4.1 Materials**

Materials shall be appropriate for their intended use, and shall withstand the training environment, including heat, thermal shock and the physical forces of extinguishing agent application. Selected materials shall not produce any harmful toxic effects.

Fire generation equipment subjected to excessive heat or flames shall use corrosion-resistant materials that will repeatedly withstand the rapid heating from the flames, rapid cooling from the applied agents and the forces of applied extinguishing agents.

### **4.2 Burn Area Design**

#### **4.2.1 Burn Area**

The Fuel Spill Burn Area (FSBA) shall cover the existing 125' diameter sphere.

The FSBA surface shall be realistic in appearance with no trip hazards, and shall support the weight of training personnel. The fuel spill burn area shall be enclosed in the existing burn pit. The fire training system supplier shall be responsible for the design, procurement and installation of all new trainer equipment components. Water will be utilized to provide and improved propane diffusion material and will be supplied by the owner. The upgraded trainer shall be capable of handling the application of high-pressure flow lines to the fuel spill surface with no negative effects. The FST shall operate in either full or partial engulfment modes to simulate varying aircraft incidents, and quantity of spilled fuel. The upgrade will eliminate the requirements for maintenance leveling of a graveled surface.

The use of water as diffusion material will allow for faster main flame shutdown times, as fuel will reach the surface area more rapidly. The trainer shall provide increased realism during foam training. Thicker, more robust burner elements will allow for increased life expectancy. The modification will include integral burner supports. Automatic water fill controls will simply start-up processed and built-in interlocks will ensure that the system is not run dry, thus eliminating any concerns of mockup warping or poor propane diffusion. The trainer will feature a built in water overflow curbing. The new design will allow for visual inspection of sub-surface elements and components.

The trainer will also feature several built-in cold climate features and a winterization shutdown software procedure and freezing temperature alerts. The trainer will feature self-purging burner elements and supply lines.

(Clarification: The operator will initiate the pit fill with water via the PC. The system will automatically fill and maintain a fill level via electronic min and max level float switches and solenoid controlled water supply valves. We've chosen to keep the fill function automatic since proper operation of the system requires a certain min fill level.

The four drains will be manually controlled valves. They will be manually closed prior to pit fill, and manually opened to drain the pit. We've chosen to make this function manual, in the interest of cost savings, as it is a less frequent task.)

#### **4.2.2 Mockup**

The existing Aircraft mockup will be utilized and shall remain located in center of the burn area, properly supported on the existing concrete footings.

### **5.0 TRAINING FIRE CONTROL COMPONENTS**

#### **5.1 Fire Generation**

The fire generation system shall utilize propane as fuel and shall produce flames in the burn area. The flames shall spread across the burn area under the control of the trainer's control system. For safety, the flames shall not be affected by the application of extinguishing agents, but shall extinguish only when the control system cuts-off the propane supply.

##### **5.1.1 Flame Appearance**

The fire generation equipment shall be designed to produce dense, yellow-orange flames characteristic of high carbon content burns. Propane consumption rates required to achieve realist flame appearance shall be the responsibility of the device fire training system supplier. However, it is anticipated that the fuel consumption rate of final design will not exceed 800 gallons per minute of liquid propane. The fire training system supplier shall be held responsible for correcting any problems with design should the measured consumption rate exceed this rate.

##### **5.1.2 Fire Generation Equipment**

The fire generation equipment shall be designed, fabricated, and installed in accordance with the guidelines of NFPA, 54, NFPA 58 and the specific safety requirements of Section 7.0. The design, fabrication, and installation of the fire generation equipment shall minimize safety hazards to personnel within the trainer. All burn area equipment necessary for generation and control of the fire shall be temperature resistant, weatherproof, and watertight as necessary to function in the Fuel Spill Fire environment. The equipment shall be shielded as necessary to protect it from extinguishing agents that could be directed toward the equipment from the trainer. All functional equipment shall be accessible for maintenance.

##### **5.1.3 Fire Resolution**

The FSBA shall be comprised of 78 fire zones, designed to provide a continuous flame appearance. Propane flow to the fire zones shall be controlled to provide flames that spread and recede with the same appearance as burning jet fuel. Fires shall be ignited and spread from one of four existing pilot systems.

##### **5.1.4 Pilot Flame Monitoring**

Main flames shall be ignited by an inextinguishable pilot system. Each pilot shall be monitored with a self-checking pilot flame monitor. On loss of pilot all propane flow to the portion of the fire ignited by the particular pilot shall stop immediately, unless that portion of the FSBA has already been confirmed to have been ignited. A corresponding message shall be displayed on the operator station display terminal.

##### **5.1.5 Main Flame Monitoring**

Provision shall be made to confirm the presence of the main flames at each selected burn zone prior to flames spreading to adjacent selected zone(s).

### 5.1.6 Flame Height

Flame height shall be proportional to the surface area of the fire area.

### 5.1.7 Flame Spread

Flame spread shall be selectable by the operator.

### 5.1.8 Reflash

The burn area shall be provided with a minimum of four designated reflash areas. Flames shall be generated in these areas only when initiated by the operator. Reflash area coverage shall be limited to one fire zone, in order to minimize hazardous exposure of trainees to these flames.

## 5.2 Extinguishing Agent Detection

Multiple extinguishing agent sensors shall be located in each fire zone of the trainer and shall detect the application of water and surrogate AFFF (commercial liquid detergent concentrate) when applied to the training fire using hand lines or truck turret nozzles. Response of the agent detection system shall be fast enough to permit the trainer's control system to reduce propane flow and extinguish the training fire at a rate consistent with actual extinguishment of jet fuel spill fire. The sensors will protrude above the burn pit's waterline, but will be guarded and ramped to prevent damage.

(Clarification: The system extinguishment will operate on the same principle as it does now. Thermocouples will measure proper application to each fire zone. During the Acceptance Test Procedure trials with handline and turret agent application, Chicago will have the opportunity to witness and comment on the system response. Kidde can fine-tune the performance at that time based on Chicago's input.

The grating system is intended to be fully submerged in water (nominally 1/2" deep). The 78 burn zone thermocouple sensors will protrude above the water surface. Each thermocouple will be protected by a circular (conical) guards approx 8-inches in diameter. These guards will also protrude above the water surface and will be ramped so they are not trip hazards. The guards will be visible when the system is not in operation. During burns however, the guards will be less obvious as the bubbling water surface and the fire itself will mask them.)

## 6.0 TRAINER FIRE OPERATION

The following definitions are provided to assist in understanding the terms and parameters referred to in this section.

TERM or PARAMETER	DEFINITION
<b>Parameter</b>	A parameter is a variable that affects how the computer will generate flames and/or and how it will react to the extinguishing agent applied to the fire.

TERM or PARAMETER	DEFINITION
<b>Scenario</b>	A scenario defines how the computer will generate flames and how it will react to applied extinguishing agent. The scenario consists of a set of fire zones along with a set of parameters (flame spread, agent type, extinguish difficulty, etc.) that form a training session.
<b>Active Zones</b>	Defines all the location(s) where flames will appear.
<b>Start Points</b>	Defines the location(s) where flames will start.
<b>Reflash Zones</b>	Defines the location(s) where reflash can be programmed.
<b>Initial Spread Rate Parameter</b>	Defines how fast the flames can spread from a start point to the full selected engulfment once flame presence has been confirmed at each fire zone.
<b>Extinguishment Difficulty Parameter</b>	Defines how difficult the fire will be to extinguish.
<b>Agent Type Parameter</b>	Defines type of extinguishing agent to be simulated for the scenario. This parameter affects how a fire will react when extinguishing agent (typically water) is applied.
<b>Respread Rate Parameter</b>	Defines the amount of time required for the fire to respread.
<b>Respread Delay Parameter</b>	Defines the time delay interval between cessation of agent application and the respread of flames.
<b>Respread Mode</b>	Defines if the fire can respread if all zones are not extinguished.
<b>Reflash Enable Window</b>	Defines the time available for the operator to activate reflash fire zones.
<b>Advanced Parameter</b>	Defines if the Wall of Flame mode is active and the direction in which the effect is visible.

The trainer system shall permit the operator to define, name, record, and recall an unlimited number of training scenarios for each of the fireplaces in the trainer.

### 5.3 Fuel Spill Fire Operation

The Fuel Spill Trainer shall be designed for safe operation under the control of the operator using the color display terminal and keyboard at the operators' station. The operator shall be able to stop any exercise immediately should the need arise.

The Fuel Spill Trainer shall be designed to provide training in control and extinguishment of large area fuel spill fires that occur as the result of aircraft incidents. The fire shall burn within the boundary of the selected burn area size and fire zones of the Fuel Spill Trainer burn area pit. A mockup shall be installed in the center of the burn area.

When the operator initiates the PILOT mode all selected pilots shall be energized and confirmed.

When the operator initiates Main Flame mode, the fire shall begin at the zones located at the selected pilots and after confirmation by the system spread to all selected zones in accordance with the preset parameters. The fire shall respond to the application of water, or surrogate AFFF extinguishing agent. The fire shall extinguish under computer control according to the application of extinguishing agent. Agent must be applied to the entire fire (all active zones) for the fire to completely extinguish. If agent application is stopped before extinguishment, fire can respread (if enabled by the operator in the parameter setup) to extinguished zones originally selected. For safety, any segment that has fully extinguished shall not reflash. Reflash fires shall be available at predetermined locations within the Fuel Spill Trainer and initiated only on command of the operator.

Under agent application, maximum burn time shall not exceed 4 minutes; if no agent is applied to the Fuel Spill Trainer within 2 minutes, the training exercise shall terminate.

Parameters of operation selectable by the operator shall be:

Parameters	Range
• Active Zones	Any 1 or a combination of 78 zones
• Start Positions	Any 1 or a combination of the zones immediately adjacent to the 4 pilots.
• Reflash Zones	Limited to the 1 active zone adjacent to each active pilot.
• Initial Spread Rate	0.5, 1.0, 1.5, 2.0 ft/sec
• Extinguishment Difficulty	LEVEL 1 thru LEVEL 4
• Agent Type	AFFF, FFFP, FPF, PF
• Respread Rate	0.5, 1.0, 1.5 ft/sec
• Respread Delay	0 to 20 seconds
• Respread Mode	Enabled, Disabled
• Reflash Enable Window	0 to 60 seconds
• Advanced Parameters	Wall of Flame: OFF Attack From: Forward, Aft, Rescue, Non-Rescue
• Ambient Temperature Alert	Advises operator of freezing weather conditions
• Winterization Mode	Prepares system for freezing weather conditions



## 6.0 CONTROL SYSTEM DESIGN

Fuel Spill Trainer operation shall be computer-controlled. The control system shall utilize a Microsoft Windows®-based operating system to control trainer operation, monitor trainer safety systems, log trainer activity, and perform trainer diagnostic testing. The operating system shall utilize menu-driven, color-graphic displays, with recognizable icons to simplify operation and help guide the operator through the training scenarios. The control system shall be programmed with the characteristics of the fires to provide a realistic simulation of the fire and its response to extinguishment.

(Clarification: The fire control parameters will be consistent with those found currently on the current system.)

### 6.1 Software

The trainer's digital computer system Windows-based software programs shall include the following capabilities:

- ◆ Real-time control and processing programs to perform all fire simulation control and operator interface processing functions.
- ◆ Diagnostic programs to check the operation of the computer system and peripheral equipment.
- ◆ Report generation system to provide logs of trainer activity and system messages in a variety of formats.
- ◆ System daily readiness check program. The operation of all fires shall be inhibited until a system daily readiness check has been completed on all safety related systems.
- ◆ Operating system software commercially available for the selected computer.
- ◆ Integration with the operating system's built-in security system to determine whether a logged operator has sufficient authority to perform administrative functions within the trainer interface.

### 6.2 Operator Station

The Fuel Spill Fire Trainer shall be controlled by the existing dedicated operator's station. Updated software will be installed and tested using the existing operator station hardware.

#### Operating Screens

The trainer shall be operated using the color graphics display terminal, keyboard, and pointing device. The following screens shall be provided:

Fire training screen: The fire-training screen shall be a graphical representation of the burn area and all fire zones and shall display all of the parameters and graphics necessary to setup and operate the fuel spill fires. During fire operation, fire scenario conditions shall be displayed on the fire training screen. The fire training screen shall include indication of the fireplace enable/disable status, indication of pilot/main flame status, extinguishment agent application, actual burn time, effective extinguishment application time, and total scenario time. The status of the fuel spill fire zones shall be displayed using a color-coded graphical display. Various colors shall display status of selected active zones, confirmed fire zones, agent detection, and extinguished zones.

A parameter setup window shall also display all fixed and selectable parameters of the fire, including the valid range of selectable parameters. Input of invalid parameters shall be rejected.

Operation of a fire shall be inhibited until all selectable parameters are valid. The fire shall function as programmed on instructor/operator command.

A diagnostics menu shall offer a selection of tests that automatically test all major trainer system components. These shall include agent detectors, pilot diagnostics, and valve diagnostics. The menu shall also include a daily operational readiness test (D.O.R.T.) to confirm operation of the entire system prior to the start of daily training.

D.O.R.T. Screen: The D.O.R.T screen shall provide all of the relevant information to indicate that the system is ready for training. This shall include at a minimum, the status of all pilots and a listing of any system messages that may have occurred.

Pilot Diagnostics Screen: This screen shall allow the operator to test any or all system pilots individually or together. Main flame shall be disabled while in this mode.

Valve Diagnostics Screen: This screen shall allow the operator to test any fire zone valve individually or together. All flames are disabled during this mode.

Agent Diagnostics Screen: This screen allows each fire zone agent sensor to be monitored.

### **6.3 Trainer Diagnostics**

The control system shall include comprehensive diagnostic testing capabilities, with detailed on-screen instructions to assist system operator and maintenance personnel in clearly identifying and resolving system malfunctions. The diagnostics shall, upon operator command, provide for automatic testing of all system pilots, extinguishing agent sensors, and individual zone valves. In addition, diagnostic testing shall be capable of performing a comprehensive Daily Operational Readiness Test (DORT) to provide complete confidence that the system is ready to safely conduct training.

All system PC, PLC, and I/O communications shall be continuously self-monitored and the diagnostics system shall provide immediate notification of all fatal errors. Should the control system fail to execute the software, all outputs shall be turned off and the trainer shall be shut down. All system events and malfunctions shall be displayed on the screen, and shall also be recorded in an existing database with time/date of the occurrence. This information shall be capable of being printed as a report.

### **6.4 Report Generation**

The Report Generation system shall be capable of tracking and collecting student/training crew scenario information into a database. The Report Generation system shall be capable of storing student identification, type of training conducted, assigned position for each crew member, training scenarios performed, and training dates for each student. In addition to storing training records, the Report Generation system shall log all system events. This log shall be capable of supporting maintenance of the trainer, as well as providing an historical record of the trainer activities.

The Report Generation system shall permit the operator to define, name, record, and recall an unlimited number of training scenarios. It shall permit the operator to enter the following data for each student: Name, Organization, and Identifying Number (such as employee number or social security number). The system shall enable the operator to plan the curriculum for the entire training day by assigning each student to the current day's active crew and also assign each student to a position for each training scenario (lead nozzleman, backup nozzleman, etc.).

If there is or will be a Report Generation system for a Specialized Aircraft Fire Trainer (SAFT) at this site, the data and information collected by the Report Generation system shall be capable

of being shared and combined on a central database with the data and information collected from the Fuel Spill Fire Trainer.

## **7.0 SAFETY**

The trainer shall be designed to minimize safety of hazards to personnel. Safety conditions shall be displayed on the operator's station display terminal.

The system fire training system supplier will be required to submit a safety analysis report, prepared by an independent engineering consulting firm, which supports the design and performance of a functionally equivalent system. The report shall include:

- ◆ A description of the process by which the safety analysis to the system was conducted.
- ◆ The analysis of the potential operational hazards of the system and the specific design features that address these hazards.
- ◆ A fault tree analysis of system catastrophic and critical failures that illustrates the probability of occurrence within the following limits:
  - ◇ Catastrophic - less than 1 in 1,000,000 for 3000 hours of operation.
  - ◇ Critical - less than 1 in 100,000 for 3000 hours of operation.
- ◆ A system safety design checklist that supported the confirmation of the system safety design goals.
- ◆ A summary of all system test and analysis events that lead to the final system design, test and acceptance.

Catastrophic and critical failures shall be as defined in United States specification MIL-STD-882B or equivalent. The definitions therein are catastrophic failures are those which result in death to personnel or total loss of system and critical failures are those which result in severe injury to personnel, severe occupational illness or major system damage.

### **7.1 Emergency Shutdown Switches**

Existing emergency shutdown push-button switches at the operator's station will be used. All switches shall be clearly visible and guarded against accidental activation. Pushing any switch shall immediately shut off propane flow to the trainer, and shall result in an "Emergency Shutdown" message, including the switch's location, overriding the display terminal's operation screen. After reset of the emergency shutdown switch, 30 second timer shall start after which trainer operation will again be available. Manual emergency shutdown shall be independent of computer operation.

### **7.2 Propane Detection**

The existing propane detection system shall operate 24 hours per day in the "Standby" mode on the power control panel. The propane detection system shall operate independently of the trainer's computer system.

Propane detection sensors shall be located in all enclosures or equipment rooms that house propane piping and control components, and wherever propane could accumulate.

If propane concentrations reach 10% of the least explosive limit (LEL) at any sensor location, all propane flow to the trainer shall be stopped and a "Propane Shutdown" message, including the sensor location, shall override the display terminal's operation screen.

To announce the excess propane level, an alarm shall sound in the control room and an indication of a propane hazard shall appear at the control console. In addition, the propane supply shall be interrupted until the propane concentration is below the shutdown set point. Failure of the propane sensing hardware shall be indicated automatically on the control console and such failures shall shutdown the training fire.

### **7.3 Pilot Monitoring**

Safety considerations demand that the flames from each pilot burner, once ignited, be inextinguishable and remain lit until turned off by the control system. This is necessary to prevent potentially hazardous accumulations of propane gas from forming within the trainer. Accordingly, active monitoring of the flames from each pilot burner in the trainer shall be provided by a self-checking flame safeguard control system. If pilot ignition is not achieved during a fireplace ignition sequence, the system shall shut off the flow of pilot gas and the instructor/operator shall be alerted to the type and location of the malfunction. If a pilot flame should be extinguished for any reason during a training scenario, the system shall immediately shut off all gas flow to the pilot and main burners, and the instructor/operator shall be alerted to the type and location of the malfunction. In addition, because of the critical safety function of this flame safeguard control system, the system itself shall be provided with a self-checking circuit that shall verify correct operation of the control module. If correct operation is not verified during the self-checking sequence, the control unit shall automatically de-energize the pilot gas valve and notify the operator of the type and location of the failure.

### **7.4 Fail Safe Supply Valves**

Propane supply valves shall close automatically on loss of electrical power. Propane supply valves identified as safety critical during analysis shall have proof of closure capability to provide valve position feedback to the control system. Any such valve shall be monitored by the control system. The user shall be notified of situations where the valve is not at the commanded state. Appropriate measures shall be taken by the control system to ensure safe trainer operation. This may include, but is not limited to, inhibiting operation of the entire trainer or a portion thereof.

### **7.5 Hardware Malfunction**

Hardware malfunction of any safety device shall be displayed on the operator's station display terminal and shall shut down trainer operation.

### **7.6 Temperature Monitoring**

Temperature sensors shall be installed in each of the equipment bunkers. Should the temperature reach 175°F, an automatic trainer shutdown shall occur, a high temperature hazard shall be displayed at the control console, and the cooling water system shall start automatically at full capacity.

## **8.0 DEVICE ACCEPTANCE CRITERIA**

The trainer equipment fire training system supplier shall demonstrate the installed fire training simulator system prior to Owner acceptance. The trainer equipment fire training system supplier shall develop and furnish the Owner with a device acceptance test procedure that describes specific tests to be accomplished in order to meet the objectives of paragraphs 9.1 and 9.2.

### **8.1 Functional Tests**

Functional tests shall be conducted to ensure that the installed device and all subsystems and components meet the criteria described herein. Testing shall encompass fire generation and extinguishment response, smoke generation control and indicating system, and all related equipment.

### **8.2 Safety Systems Test**

Testing to demonstrate that the installed device provides an acceptance level of safety to the Owner shall be required. Complete testing of the emergency stop and propane detection systems shall be accomplished. The capability of systems required to be redundant shall be demonstrated through the simulated failure of subsystems and/or components.

## **9.0 DOCUMENTATION AND TRAINING**

The training equipment fire training system supplier shall provide documentation and training in accordance with the contract documents

### **9.1 Operation And Maintenance Manual**

A complete Operation and Maintenance Manual that is prepared in an easy to understand format will be supplied. Graphics will include line images and high quality photographic images to support the text. The required minimum content shall consist of the items listed below:

- ◆ Description
- ◆ Controls and Indicators
- ◆ Operating Screens
- ◆ Operating Procedures
- ◆ Preventive Maintenance
- ◆ Troubleshooting
- ◆ Corrective Maintenance
- ◆ Alignments and Adjustments
- ◆ Parts Lists
- ◆ Interconnect Diagrams

### **9.2 Training Material**

Training materials will be supplied that include; a training course outline, view graphs, and copies of the Operation and Maintenance Manual to be used by the students during the training course.

### **9.3 Training Course**

The trainer equipment fire training system supplier shall provide 3 days of training for Owner personnel. The course shall be based on the trainer equipment fire training system suppliers training materials and shall include operation and maintenance. The training course will be given within 30 days following training device testing and acceptance and will start on a date set by the owner.

### **9.4 Acceptance Test Procedure**

An Acceptance Test Procedure shall be submitted to the Owner for review and approval. This Acceptance Test Procedure shall include sections for trainer examination, detailed functional tests, and performance tests. The trainer equipment fire training system supplier shall implement a formal Acceptance Test Procedure that successfully demonstrates the trainer's subsystems. In addition, the supplier shall test, demonstrate and certify all features and criteria specified. After the Acceptance Test Procedure has been performed, the completed test log shall be submitted to the Owner as a record of the examinations and tests completed.

# **SUMMARY OF WORK**

## **SECTION 01110**

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES:

1. Work under this section is subject to the requirements of the Contract Documents.
2. The Summary of Work for O'Hare Aircraft Rescue Fire Fighter Training Center, includes but is not limited to the following:
  1. Contract Description.
  2. Description of "Commissioner's Representative".
  3. Description of "Architect/Engineer".
  4. Project Identification Sign(s)

#### 1.2 CONTRACT DESCRIPTION:

1. The Work under this Contract consists of removal of existing burners and stone in burn pit; replace with new propane piping, steel grating system with supports, water bath; and all pertinent and collateral Work as shown on the Drawings and specified herein.
  1. The Project includes but is not necessarily limited to:
  2. Renovation of the current Aircraft Rescue and Fire Fighter Training Burn Pit to include removal of stone and propane piping from existing burn pit, and introduction of a new increased height curb to form a water bath for training purposes. Included within the water bath: new propane piping distribution (including thermocouples), grating and supports for fire fighter exerciser.

#### 1.3 COMMISSIONER'S REPRESENTATIVE:

1. The Commissioner's representative on this Project is Chicago Airports Resources Enterprise (CARE). All Contacts by the Contractor regarding any matter concerning the Project must be made to the Resident Engineer who will be assigned to the Project. All Contacts, inquiries, correspondence and all submittals of any type, including but not limited to schedules, shop drawings, product data and samples, must be sent exclusively to the Resident Engineer unless otherwise directed by the Resident Engineer. The only exceptions are for notices that are required in the General Conditions - Part Two of Three of the Contract, which are to be sent to the Chief Procurement Officer with copies of all such notices sent to the Commissioner.

#### 1.4 ARCHITECT/ENGINEER:

1. The Architect/Engineer on this Project is HOH Engineers, Inc. Kidde will contract with HOH to modify the existing drawing package to incorporate design details as well as produce as-built drawings.

1.5 PROJECT IDENTIFICATION SIGNS:

1. The Contractor will furnish one (1) 48" x 72" (4'-0" x 6'-0") DOA standard Project identification signs to be applied to the temporary construction partitions as described. If signs are not shown on Drawings the minimum requirements are as follows: Post will be Dense No. 1 grade - Douglas Fir, 4" x 4" x 10'-0" long, NLGA Grade. Sign will be Exterior Grade Plywood - HDO Exterior - APA designation or better; ½" minimum thickness or in sizes shown on Drawings. Locations of these signs will be as directed by the Commissioner.
2. Each sign graphic will be laminated to a plastic sheet per the Manufacturers standard process in accordance with the DOA standards.
3. Signage graphics diskette will be provided by the Department of Aviation.
4. Products of one of the following Manufactures will be acceptable:
  1. Award Graphics, Chicago, IL 60661,
  2. Dahlstrom Display, Inc., Chicago, IL 60647, or
  3. Western ReMac, Inc., Cicero, IL., 60804.

**END OF SECTION 01110**



# **QUALITY CONTROL**

## **SECTION 01450**

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES:

1. Work under this section is subject to the requirements of the Contract Documents.
2. The Contractor must establish, provide, and maintain an effective Quality Control Program that details the methods and procedures that will be taken to assure that all materials and completed construction for all Work items included under this Project, as described the Contract Documents conforming to the Contract requirements, whether manufactured by the Contractor, or procured from Subcontractors or Vendors. Although guidelines are established and certain minimum requirements are specified herein and elsewhere in the Contract technical specifications, the Contractor must assume full responsibility for accomplishing the stated purpose.
3. The intent of this section is to enable the Contractor to establish a necessary level of control prior to performing work that will:
  1. Adequately provide for the production of acceptable quality materials.
  2. Provide sufficient information to assure both the Contractor and the Commissioner that the specification requirements will be met.
  3. Allow the Contractor as much latitude as possible to develop its own standard of quality control.
4. After Award of the Contract and prior to the pre-construction meeting the Contractor must submit, to the Commissioner, it's understanding of the quality control requirements for the Awarded Project. The Contractor must be prepared to discuss and present these requirements at the pre-construction conference, its understanding of the quality control requirements.
5. The Contractor will not begin any Construction or production of materials to be incorporated into the completed Work until the Quality Control Program has been reviewed and approved by the Commissioner. No partial payment will be made for materials subject to specific quality control requirements until the Quality Control Program has been approved by the Commissioner.
6. The requirements for the Contractor's Quality Control Program contained in this section are in addition to and separate from the acceptance testing requirements stated in the technical specifications.
7. Kidde will utilize a local Mechanical Sub-Contractor, who is experienced in working at O'Hare International Airport, to administer the Quality Control program

#### 1.2 DESCRIPTION OF PROGRAM:

1. General Description - This Quality Control Program will ensure conformance to applicable specifications and plans with respect to materials, workmanship, construction, finish, and functional performance. The Quality Control Program will be effective for control of all construction work performed under this Contract and will specifically include surveillance and tests required by the technical specifications, in addition to other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of quality control.
2. Quality Control Program - The Contractor must describe the Quality Control Program in a written document, which will be reviewed by the Commissioner prior to the start of any production,

construction, or off-site fabrication. The written Quality Control Program will be submitted to the Commissioner for review at least 5 calendar days before the pre-construction conference.

3. The Quality Control Program will be organized to address, as a minimum, the following items:

1. Quality control organization,
2. Implementation process,
3. Project progress schedule,
4. Submittals schedule,
5. Inspection requirements, and
6. Quality control testing plan.
7. Documentation of quality control activities and requirements for corrective action when quality control and/or acceptance criteria are not met, including a recovery schedule.

4. The Contractor is encouraged to add any additional elements to the Quality Control Program that it deems necessary to adequately control all production and/or construction processes required by this contract.

### 1.3 QUALITY CONTROL ORGANIZATION:

1. The Contractor's Quality Control Program must be implemented by the establishment of a separate quality control organization. An organizational chart will be developed to show all quality control personnel and how these personnel integrate with other management/production and construction functions and personnel.

2. The organizational chart will identify all quality control staff by name and function, and will indicate the total staff required to implement all elements of the Quality Control Program, including inspection and testing for each item of work. If necessary, different technicians can be utilized for specific inspection and testing functions for different items of work. If an outside organization or independent testing laboratory is used for implementation of all or part of the Quality Control Program, the personnel assigned will be subject to the qualification requirements of paragraphs 1.03, C, 1, a. and 1.03, C, 1, b. The organizational chart will indicate which personnel are Contractor employees and which are provided by an outside organization.

3. The quality control organization will consist of the following minimum personnel:

1. Program Administrator - The Program Administrator must be a full-time employee of the Contractor, or a Consultant engaged by the Contractor. The Program Administrator must have proven experience in construction and quality control on a project of comparable size and scope as this Contract. Documentation of experience will be provided if requested by the Commissioner.

1. Additional qualifications for the Program Administrator must include the following requirements:

(1) A professional with proven construction experience, acceptable to the Commissioner, with a Bachelor of Science Degree in Civil, Architectural or Construction Engineering.

2. The Program Administrator must have full authority to institute any and all actions necessary for the successful implementation of the Quality Control Program to ensure compliance with the contract plans and technical

specifications. The Program Administrator must report directly to a responsible officer of the construction firm.

2. Quality Control Technicians - A sufficient number of quality control technicians necessary to adequately implement the Quality Control Program will be provided. These personnel must be either engineers, engineering technicians, or experienced craftsman with qualifications in the appropriate field and will have proven experience in their area of expertise. Documentation of experience will be provided if requested by the Commissioner.
  1. The quality control technicians will report directly to the Program Administrator and will perform the following functions:
    2. Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by Section 100-1.6.
    3. Performance of all quality control tests as required by the technical specifications and Section 100-1.7.
    4. Documentation of results of all inspections and tests.
3. Staffing Levels - The Contractor must provide sufficient qualified quality control staff to monitor each Work activity at all times. Where material is being produced in a plant for incorporation into the work, separate plant and field technicians will be provided at each plant and field placement location. The scheduling and coordinating of all inspection and testing must match the type and pace of Work activity. The Quality Control Program will state where different technicians will be required for different work elements.

#### 1.4 PROJECT PROGRESS SCHEDULE:

1. The Contractor must submit a coordinated construction schedule for all work activities. The schedule will be prepared by the CPM method, as specified in Part Two of the Specifications, Article VIII, paragraph E. The Contractor must provide a summary schedule of major activities in a Gantt chart format.

#### 1.5 SUBMITTALS SCHEDULE:

1. The Contractor must submit a detailed listing of all submittals (e.g., mix designs, material certifications, and shop drawings, samples, mock-ups, etc. required by the technical specifications. The listing can be developed in a spreadsheet format and will include:

1. Specification item number;
2. Item description;
3. Description of submittal;
4. Specification paragraph requiring submittal; and
5. Scheduled date of submittal.

#### 1.6 INSPECTION REQUIREMENTS:

1. Quality control inspection functions included in the Contractor's Quality Control Program will be organized to provide inspections by the Contractor's personnel or by an outside organization provided by the Contractor for all definable features of work, as detailed below. All such inspections will be documented by the Contractor as specified by paragraph 1.08.

2. Inspections will be performed daily to ensure continuing compliance with contract requirements until completion of the particular feature of work. These will include the following minimum requirements:

1. During plant operation for material production, quality control test results and periodic inspections will be utilized to ensure the quality of aggregates and other mix components, and to adjust and control mix proportioning to meet the approved mix design and other requirements of the technical specifications. All equipment utilized in proportioning and mixing will be inspected to ensure its proper operating condition. The Quality Control Program will detail how these and other quality control functions will be accomplished and utilized.
2. During field operations, quality control test results and periodic inspections will be utilized to ensure the quality of all materials and workmanship. All equipment utilized in placing, finishing, and compacting will be inspected to ensure its proper operating condition and to ensure that all such operations are in conformance to the technical specifications and are within the plan dimensions, lines, grades, and tolerances specified. The Program will document how these and other quality control functions will be accomplished and utilized.

#### 1.7 QUALITY CONTROL TESTING PLAN:

1. As a part of the overall Quality Control Program, the Contractor must implement a quality control testing plan, as required by the technical specifications. The testing plan will include the minimum tests and test frequencies required by each technical specification item, as well as any additional quality control tests that the Contractor deems necessary to adequately control production and/or construction processes.

2. The testing plan can be developed in a spreadsheet fashion and will, as a minimum, include the following:

1. Specification item number;
2. Item description;
3. Test type;
4. Test standard;
5. Test frequency;
6. Responsibility; and
7. Control requirements.

3. All quality control test results will be documented by the Contractor as required by paragraph 1.08.

#### 1.8 DOCUMENTATION:

1. The Contractor must maintain current quality control records of all inspections and tests performed under the Quality Control Program. These records will include factual evidence that the required inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

2. These records must cover both conforming and defective or deficient features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the Contract Documents. Legible copies of these records will be furnished to the Commissioner daily, as inspections and tests are performed. The records will cover all work placed subsequent to the previously furnished records and will be verified and signed by the Contractor's Program Administrator. All records should be organized and maintained in a binder or binders and available for inspection throughout the duration of the Project.

3. Specific Contractor quality control records required for the contract will include, but are not necessarily limited to, the following records:

1. Daily Inspection Reports - Each Contractor quality control technician must maintain a daily log of all inspections performed for both Contractor and subcontractor operations on a form acceptable to the Commissioner. These technician's daily reports will provide factual evidence that continuous quality control inspections have been performed and will, as a minimum, include the following:
  1. Technical specification item number and description;
  2. Compliance with approved submittals;
  3. Proper storage of materials and equipment;
  4. Proper operation of all equipment;
  5. Adherence to plans and technical specifications;
  6. Review of quality control tests; and
  7. Safety inspection.
2. The daily inspection reports will identify inspections conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed.
3. The daily inspection reports must be signed by the responsible quality control technician and the Program Administrator. The Commissioner will be provided at least one copy of each daily inspection report on the work day following the day of record.
4. Daily Test Reports - The Contractor will be responsible for establishing a system, which will record all quality control test results. Daily test reports will document the following information:
  1. Technical specification item number and description;
  2. Test designation;
  3. Location;
  4. Date of test;
  5. Control requirements;
  6. Test results;
  7. Causes for rejection;

8. Recommended remedial actions; and
9. Retests.
5. Test results from each day's work period will be submitted to the Commissioner prior to the start of the next day's work period. When required by the technical specifications, the Contractor must maintain statistical quality control charts. The daily test reports will be signed by the responsible quality control technician and the Program Administrator.

#### 1.9 CORRECTIVE ACTION REQUIREMENTS:

1. The Quality Control Program will indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action will include both general requirements for operation of the Quality Control Program as a whole, and for individual items of work contained in the technical specifications.
2. The Quality Control Program will detail how the results of quality control inspections and tests will be used for determining the need for corrective action and will contain clear sets of rules to gauge when a process is out of control and the type of correction to be taken to regain process control. This process will also include a recovery schedule if the corrective action impacts the project schedule.
3. When applicable or required by the technical specifications, the Contractor must establish and utilize statistical quality control charts for individual quality control tests. The requirements for corrective action will be linked to the control charts.

#### 1.10 INSPECTION BY THE COMMISSIONER:

1. All items of material and equipment will be subject to inspection by the Commissioner at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate quality control system in conformance with the requirements detailed herein and the applicable technical specifications and plans. In addition, all items of materials, equipment and work in place will be subject to inspection by the Commissioner at the site for the same purpose.
2. Inspection by the Commissioner does not relieve the Contractor of performing quality control inspections of either on-site or off-site Contractor or Subcontractor's Work.

#### 1.11 NONCOMPLIANCE:

1. The Commissioner will notify the Contractor of any noncompliance with any of the foregoing requirements. The Contractor will, after receipt of such notice, immediately take corrective action. Any notice, when delivered by the Commissioner or its authorized representative to the Contractor or its authorized representative at the site of the work, will be considered sufficient notice.
2. In cases where quality control activities do not comply with either the Contractor's Quality Control Program or the contract provisions, or where the Contractor fails to properly operate and maintain an effective Quality Control Program, as determined by the Commissioner, the Commissioner may:
  1. Order the Contractor in writing to replace ineffective or unqualified quality control personnel or Subcontractors within 24 hours after receipt of such order.
  2. Order the Contractor to stop operations until appropriate corrective actions are taken.
  3. Withhold progress payments in the event of Contractor failure to take corrective actions within the specified time.

1.12 BASIS OF PAYMENT:

1. The preparation of a Quality Control Plan and its implementation, including any corrective measures that may be required to be carried out by the Contractor to bring items of work into compliance with the requirements of the Quality Control Plan and the technical specifications will not be paid for separately but will be incidental to the various pay items of the Contract

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

**END OF SECTION 01450**

# **CUTTING AND PATCHING**

## **SECTION 01732**

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES:

1. Work under this section is subject to the requirements of the Contract Documents.
2. Furnish labor, equipment and tools required for Cutting and Patching Work as shown on the Drawings and as specified herein, including but not limited to the following:
  1. Required or necessary cutting and patching Work for a full and complete execution of the Work.
    1. Such Work as on newly completed portions of the Work, or any previously completed or existing construction.
  2. Execute cutting, fitting and patching required to complete the Work or to:
    1. Make several parts fit properly.
    2. Uncover work to provide for installation of ill-timed work.
    3. Remove any and all work not conforming to requirements of the Contract Documents and replace with work conforming to requirements of the Contract Documents.
    4. Remove samples of installed work as required for testing.
    5. Install required Work in existing construction, except as otherwise required.
3. Upon written instructions of the Commissioner:
  1. Uncover Work to provide for the Commissioner observation of covered Work.
  2. Remove samples of installed materials for testing.
  3. Remove work to provide for changes as applicable.
3. Install products and materials (furnished in other sections) as shown on the Drawings and as specified herein.
4. Do not damage or endanger any Work by cutting or altering the work or any part thereof.
5. Do not cut or alter work of the City or any separate Contractor without written consent of the Commissioner and of other such separate Contractor.

#### 1.2 RELATED WORK:

1. Division 2 - Site Work
2. Division 3 - Concrete



3. Division 7 - Thermal and Moisture Protection

4. Division 9 - Finishes

1.3 SUBMITTALS:

1. Submit a written request for consent to the Commissioner for work or operations which affect other work or the structural integrity of any portion of Project. Receive written consent of the Commissioner prior to executing any cutting, alteration or excavation. Include:

1. Identification of Project.

2. Location and description of affected work.

3. Necessity for cutting, alteration or excavation

4. Affect on the work, including progress of work and progress schedule, on property or operations of the City on existing construction or facilities, or on structural integrity of any portion of the Project.

5. Description of proposed Work. Designate the following:

1. Scope of cutting, patching or alteration.

2. Contractor and trades to execute the work.

3. Products proposed to be used.

4. Extent of refinishing to be performed.

6. Alternatives to cutting and patching or excavation.

7. Precast or Post Tensioned Concrete

1. Prepare methods statement by professional engineer licensed in Illinois which coordinates the location of tension strands and tendons, as applicable, to be cut. Outlines precautions to be taken and coordinates procedures to clear, re-anchor and cut tension strands and tendons.

8. Effect on work of the City or separate Contractor caused by such work.

9. Written permission of affected separate Contractor.

10. Designation of responsibility for cost of cutting, patching and excavating.

11. Submit written notice to the Commissioner designating date and time work associated with cutting and patching operation will be uncovered.

PART 2 - PRODUCTS

2.1 MATERIALS:

1. Meet or exceed the requirements of the Contract Documents for each product involved.

2. Replacement of removed products will match original, except as otherwise required or as approved by the Commissioner. If identical products are not available, or cannot be used, use products that match existing adjacent surfaces to fullest extent possible with regard to

visual effect subject to approval by the Commissioner. Use products for cutting and patching that will result in equal or better performance characteristics than removed products.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION:

1. Inspect existing conditions of Project, including elements subject to movement or damage. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding with the Work.
2. After uncovering Work, inspect conditions affecting installation of new products or performance of the Work.
3. Report unsatisfactory or dubious conditions to the Commissioner in writing. Do not proceed with Work until the Commissioner has provided further instructions.

#### 3.2 PREPARATION:

1. Provide shoring, bracing and support as required to assure and maintain structural integrity of Project.
2. Provide devices and methods to protect adjacent portions of Project and adjacent properties from damage.
3. Provide protection from elements for portion of Project which may be exposed by cutting and patching work. Provide dewatering to maintain spaces free from water.

#### 3.3 PERFORMANCE:

1. Perform Work required with due care. Contractor must be responsible for any damage which may be caused by such work. Perform Work in accordance with applicable requirements of the Contract Documents.
2. Cutting will be done promptly and repairs will be made as necessary to leave the entire Work in good condition, including cutting, fitting and drilling of materials as required for proper assembly, fabrication, installation and completion of the Work, and including any patching as may be necessary.
3. Execute cutting and demolition by methods which will assure safety and health, will prevent damage and movement to other Work and will provide proper surfaces to receive installation of repairs or new Work. To avoid defacement of existing finished surfaces, cut from exposed or finished side into concealed surfaces.
4. Execute fitting and adjustment of products and existing construction to provide a finished installation to comply with indicated functions, tolerances and finishes.
  1. Do not make openings larger than necessary to accommodate products to be installed or Work to be performed.
  2. Terminate cutting and demolition at existing construction to remain, leaving straight and clean break-lines, and in as good of a condition as existed prior to commencing Work, all subject to acceptance by the Commissioner.
  3. Remove existing materials as required to properly install new work or to connect new back-up construction.

5. Restore work which has been cut or removed to at least the same condition which existed prior to performing such work subject to the approval of the Commissioner. Install new products to provide completed work meeting requirements of the Contract Documents.
6. Coordinate location of patching terminations with the Commissioner to properly blend patched areas with existing construction.
7. Repair existing construction or facilities to remain in-place which has been disturbed, weakened or damaged as result of cutting and patching work, to at least same condition which existed prior to performing such work as acceptable to the Commissioner. Patch with seams which are durable and as invisible as possible.

#### 3.4 PROCEDURES:

##### 1. General

##### 1. Structural Components

1. Do not cut, drill or weld building structural components without written review of the Commissioner for each condition, except where specifically indicated. Requests for authorization will be in writing, designating specific extent and limits of work, and components proposed to be cut, drilled or welded. Work performed contrary to such consent is at risk of the Contractor, subject to replacement at no additional cost to the City. When acceptable, cut and patch structural components in a manner that will not result in reduction of load carrying capacity or in load deflection ratio. Contractor must be responsible for any damage which may be caused to existing structures or facilities.

##### 2. Fireproofing

1. Do not cut or remove fireproofing materials which protect or cover construction without written review of the Commissioner for each condition. Requests for authorization will be in writing, designating specific extent and limits of fireproofing proposed to be cut or removed. Removed fireproofing materials will be replaced meeting requirements for original installation. Fireproofing materials will protect or cover work attached to fireproofed construction as required.

##### 3. Operation and Safety Components

1. Do not cut and patch operational elements or safety related components in a manner that would result in a reduction of capacity to perform in a manner intended, including energy performance, or that would result in increased maintenance, or decreased operational life or decreased safety.

##### 4. Visual Requirements

1. Do not cut and patch work that will be exposed in completed work, in a manner that would, in opinion of the Commissioner, result in lessened aesthetic qualities. Do not cut and patch work in a manner that would result in substantial visual evidence of such cutting and patching. Remove and replace work judged by the Commissioner to be cut and patch in a visually unsatisfactory manner.

2. Adjoining Work
  1. Where cutting and patching occurs, or new and old work join, cut, remove, patch, repair and refinish, as applicable, adjacent surfaces or so much thereof as is required by involved conditions or as directed by the Commissioner, and leave with straight and clean break-lines and in as good a conditions as existed prior to commencing the work. Materials and workmanship employed in cutting and patching, unless otherwise required, will match similar original work as acceptable to the Commissioner. Cutting and patching work will be performed by various trades which normally perform respective items of work.
3. Surfaces
  1. If removal of construction exposes discolored or unfinished, or work out of alignment, such surfaces will be refinished or materials will be replaced to the satisfaction of the Commissioner as necessary to make continuous work uniform and harmonious.
  2. Finish new and adjacent surfaces as required for new work. Clean surfaces of dirt, grease, loose paint, and like substances, before refinishing.
  3. Refinish entire surfaces of areas as necessary to provide a uniform finish as required for new work and to match adjacent finishes as acceptable to the Commissioner. Extend finish restoration onto adjoining surfaces to eliminate evidence of patching and refinishing.
    1. Continuous Surfaces - Refinish to nearest intersections.
    2. Assembly - Refinish entire assembly unit.
4. Utilities
  1. Check all utilities and services, including communications, electric, water, gas and waste, affected by the Work for proper disconnection or termination. Do not proceed with work until utility shut-off and sealing is completed. If utility or service is not properly shut-off or sealed, notify the utility Owner and customer for permission. Obtain permission in writing and provide copy of written permission to the Commissioner. Then perform required shut-off or sealing work. Reroute existing utilities as required.
  2. Cut-off utility piping and electrical, communications and security conduit to be abandoned at a point so as not to interfere with subsequent work.
5. Embedded Items
  1. Do not cut metallic components, such as electrical conduits, piping and reinforcing steel, embedded in construction, such as concrete or masonry, except after metallic components are identified by the Commissioner and determined to be abandoned or not critical if cut.
  2. Do not permit fluid associated with cutting tools to migrate outside of immediate cutting area, including underside of floor construction, and causing damage or defacement. When cutting abandoned, embedded electrical conduit or piping, do not permit fluid to enter conduit or piping.

6. Concrete
  1. When areas larger than core drilled holes of concrete construction are to be removed, score periphery of area to be removed, both sides when applicable, with saw cut of 1" minimum depth prior to removing construction from removal area.
  2. Where areas of concrete construction are to be removed for passage of piping or electrical conduits, provide core drilled holes.
  3. In general, demolish concrete in small sections. When necessary to prevent collapse of any construction, install temporary shores, struts or bracing.
7. Precast and Post Tensioned Concrete
  1. No cutting and patching of precast or post tensioned concrete will be permitted without permission of the Commissioner.
  2. Proceed only when method statement has received written approval of the Commissioner. Conduct all cutting and patching of precast or post tensioned concrete in presence of the Commissioner.
8. Roof Areas - Deleted
9. Reused Items
  1. Carefully remove, store, protect, alter, clean, recondition and repair as required to place in acceptable condition, items to be re-used in the Work.
  2. Items to be re-used in the work which are damaged during performance of work, will be repaired to a condition acceptable to the Commissioner. If damaged item is determined as not repairable, replace item with a new item of equal quality as acceptable to the Commissioner at no additional cost to the City.

**END OF SECTION 01732**

# **SITE DEMOLITION**

## **SECTION 02220**

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES:

1. Work under this section is subject to the requirements of the Contract Documents.
2. Demolish selected site elements and remove those items listed as shown on the Drawings and as specified herein, including but not limited to the following:

#### 1.2 RELATED WORK:

- A. As specified in the following divisions:
  1. Division 2 - Sitework
  2. Division 15 - Mechanical
  3. Division 16 - Electrical

#### 1.3 REFERENCES:

1. The Work must conform to the applicable portions of Section 201, 501, 551, 605, 632, 737, 871, and 873 of the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, January 1, 2002, including latest revision and except as modified herein.
2. USEPA - United States Environmental Protection Agency.
3. OSHA - Occupational Safety & Health Association Requirements.

#### 1.4 SUBMITTALS:

- A. Shop Drawings
  1. Proposed dust-control measures.
  2. Proposed noise-control measures.
  3. Proposed storm water run off controls.
  4. Schedules of site demolition activities indicating the following:
    1. Detailed sequence of selective site demolition and removal Work, with starting and ending dates for each activity.
    2. Interruption of utility services.
    3. Coordination for shut-off, capping, and continuation of utility services.
    4. Detail sequence of selective site demolition and removal Work to ensure uninterrupted progress of the Department of Aviation's on-site operations.

5. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by selective demolition operations.
6. Record drawings at Project closeout.
  1. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

1.5 DELIVERY, STORAGE AND HANDLING:

A. Access and Storage Areas

1. All access routes and storage areas will be subject to the approval of the Commissioner in order to reduce interference with Airport Operations.

1.6 ENVIRONMENTAL REQUIREMENTS:

1. Protect catch basins in work area during demolition to prevent debris, soil and stone from entering the structures.
2. Stone and soil excavated as a part of this project will not be removed from the site.

1.7 SPECIAL REQUIREMENTS:

A. Pre-Demolition Meeting

1. Contractor will conduct a demolition meeting at Project site to review conditions associated with performing the selective demolition Work. Meeting will include:
  1. Review of existing conditions.
  2. Environmental conditions and coordination required for demolition activities.
2. Meeting participants will include:
  1. The Commissioner's Representative,
  2. The Field Engineer,
  3. General Contractor, and
  4. Demolition Contractor.
3. Proceed with selective demolition only when everyone concerned agrees with respect to the proposed demolition procedure.

2. Project Conditions

3. Exact extent of demolition to be done may not be fully indicated by accompanying Drawings. Contractor will determine the nature and extent of demolition that will be necessary by comparing the Drawings with the existing conditions as they stand. It is expressly understood that this Contract includes all Work of a demolition nature that may be required or necessary for the complete execution of necessary demolition and alterations, whether particularly referred to herein or not.

4. The Commissioner assumes no responsibility for actual condition of items to be demolished. Conditions existing at time of inspection for bidding purposes will be maintained insofar as practicable.

#### 1.8 DEFINITIONS:

1. Remove
  1. Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or identified to remain the Department of Aviation's property.
2. Remove and Salvage
  1. Items indicated to be removed and salvaged will remain the Department of Aviation's property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to the Department of Aviation's storage area as designated by the Commissioner.
3. Remove and Reinstall
  1. Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations as indicated and/or as directed by the Commissioner.
4. Existing to Remain
  1. Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Commissioner, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

#### 1.9 MATERIAL OWNERSHIP:

1. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Department of Aviation's property, demolished materials will become the Contractor's property and will be removed from the site with further disposition at the Contractor's option.

#### PART 2 - PRODUCTS

##### A. (NOT USED)

#### PART 3 - EXECUTION

##### 3.1 EXAMINATION:

1. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
2. When unanticipated mechanical, electrical, or structural elements that conflict with the intended function or design are encountered, investigate and measure the nature and extent of the conflict. Promptly submit a written report to the Commissioner.
3. Utility Services:
  1. Before starting demolition Work disconnect all utility piping as required back to "main" and cap, and disconnect all wire in conduit. Pay all fees or charges for



such Work and check carefully to assure that water, gas and sewer closures are tight and leakproof and that electrical lines are dead.

2. Provide temporary rerouting and connections or other equipment necessary to keep utilities in operation. Contractor will notify the Commissioner at least 48 hours in advance of any planned or required interruption in utilities service.
4. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  1. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by the Commissioner. Provide temporary services during interruptions to existing utilities, as acceptable to the Commissioner.
    1. Provide not less than seventy-two (72) hours notice to the Commissioner if shutdown of service is required during changeover.
    2. Support, protect and maintain existing utility lines.
  2. Maintain fire protection services during selective demolition.
5. Utility Requirements - Locate, identify, disconnect, and seal or cap off indicated utility services serving building to be selectively demolished.
  1. Arrange with utility companies to shut-off indicated utilities.
  2. Where utility services are required to be removed, relocated, or abandoned, provide bypass connections to maintain continuity of service to other parts of the building before proceeding with selective demolition.
  3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit after bypassing.
6. Refer to Division 15 - Mechanical and Division 16 - Electrical for shutting off, disconnecting, removing, and sealing or capping related utility services. Do not start selective demolition Work until utility disconnecting and sealing have been completed and verified in writing.

### 3.2 PREPARATION:

1. Drain, purge, or otherwise remove, collect, and legally dispose of chemicals, gases, explosives, acid, flammables, or other dangerous materials before proceeding with selective demolition operation.
2. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
  1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Commissioner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
3. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.
  1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.

2. Protect existing site improvements, and appurtenances to remain.
4. Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of building areas to be selectively demolished.
  1. Strengthen or add new supports when required during progress of selective demolition.

### 3.3 POLLUTION CONTROLS:

1. Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations.
  1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before start of selective demolition.

### 3.4 SELECTIVE SITE DEMOLITION:

1. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete work within limitations of governing regulations and as follows:
  1. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as dust and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
  2. Maintain adequate ventilation when using cutting torches.
  3. Locate selective demolition equipment throughout the structure and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  4. Dispose of demolished items and materials promptly and legally. On-site storage or sale of removed items is prohibited with the exception of excavated soil and stone, which will remain on site.
  5. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.
2. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain, using power-driven masonry saw or hand tools; do not use power-driven impact tools.
3. Break-up and remove concrete slabs on grade, unless otherwise shown to remain.

3.5 PATCHING AND REPAIRS:

1. Promptly patch and repair holes and damaged surfaces caused to the Burn Pit, other concrete or masonry.
2. Patching is specified on the drawings.
3. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
  1. Completely fill holes and depressions in existing masonry walls to remain with an approved masonry patching material, applied according to Manufacturer's printed recommendations.
4. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.
5. Patch and repair floor and wall surfaces where demolished walls or partitions extend one finished area into another. Provide a flush and even surface of uniform color and appearance
  1. Closely match texture and finish of existing adjacent surfaces.
  2. Patch with durable seams that are as invisible as possible acceptable to the Commissioner. Comply with specified tolerances.
  3. Inspect and test patched areas to demonstrate integrity of the installation, where feasible.
6. Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.6 DISPOSAL OF DEMOLISHED MATERIALS:

1. General
  1. Promptly dispose of demolished materials in a legal manner. Do not allow demolished materials to accumulate on-site. The only material currently anticipated for disposal is concrete.
2. Burning
  1. Do not burn demolished materials.
3. Disposal
  1. Transport demolished materials off City's property and legally dispose of them.

3.7 GENERAL CLEAN-UP:

1. All rubbish and debris resulting from the Work of this section must be collected, removed from the site and disposed of legally, with the exception of excess gravel and fill which will remain on site in a location to be determined by the Commissioner.
2. All work areas must be left in a broom clean condition.

**END OF SECTION 02220**

# **EARTHWORK/BUILDING**

## **SECTION 02315**

### PART 1 - GENERAL:

#### 1.1 SECTION INCLUDES:

1. Work under this section is subject to the requirements of the Contract Documents.
2. Furnish and install all Earthwork/Building Work as shown on the Drawings as specified herein, including but not limited to the following:
  1. The Work under this section includes the furnishing of all labor, materials, equipment, tools, transportation and services, to perform all the earthwork, including all general machine or hand excavating and backfilling; compacting and rough grading; sheeting, shoring and bracing; and stone fill under concrete pavements and related items as required for and incidental to the completion of the work, as indicated on the Drawings and specified herein.
  2. The Contractor shall cooperate with the Demolition Specification Section 02220 in the removal of any incidental concrete and/or masonry required to be removed for the installation of new construction.
  3. Excavating, filling and backfilling shall include but is not necessarily limited to the following:
    1. Excavating for footings, foundations walls, pits and stock piling of excavated material.
    2. Remove and dispose of concrete footings and pads encountered within the limits of the excavation for the proposed footings and/or foundations as shown on the plans or as specified herein.
    3. Provide, place and compact to required grade approved backfill material obtained from excavation or from offsite (borrow excavated material).
    4. Top of compacted sub-grade shall allow for the placement of paving, plus the compacted stone base or other type granular, base as shown or specified.
    5. Removing all subsurface obstructions as required to perform all excavating, backfilling and grading work, except utilities which will be removed or relocated as hereinafter specified.
3. Install products and materials (furnished in other sections) as shown on the Drawings as specified herein, including but not limited to the following:
  1. Concrete required for new burn pit structure and curb.

#### 1.2 QUALITY ASSURANCE:

1. Inspections and Tests:
  1. All earthwork inspection and tests specified herein, or deemed required by the Commissioner, will be conducted by a testing laboratory employed by the

Commissioner. These tests shall include analysis and determination of the quality of the earth strata at required excavation elevations, sub-grade compaction, backfilling and compaction operations, and such as indicated or required.

2. The Contractor shall give notice, to the City, of each operation at least two (2) working Days in advance to allow ample time for the Commissioner and the testing laboratory to witness inspections.
3. Maximum density and optimum moisture content of soils and aggregates shall be determined in accordance with ASTM 1557, and/or ASTM 1556.
4. Testing required because of changes in materials, methods, faulty workmanship or work which fails to meet the Contract requirements, shall be at the Contractor's expense.

#### 1.3 ENVIRONMENTAL REQUIREMENTS:

1. During earthwork activities, protect catchbasins in the area of the work site with barriers to prevent stone, sediment and debris from entering. At the conclusion of the project, clean out the catch basins and place the sediment in the stockpile area designated by the commissioner.

#### 1.4 SPECIAL REQUIREMENTS:

1. Job Conditions:
  1. Site Conditions - The Contractor will be held to have visited the site before bidding and shall examine to his satisfaction the soil, its condition and characteristics, traffic and means of access and any other features which may affect or influence the cost of the work.
  2. Bench Marks - The Contractor shall use established bench marks and other reference points. He shall replace same if they are destroyed or disturbed in any manner, due to his operations.
  3. Utilities - The Contractor shall make all necessary arrangements and provide all services required to protect any gas mains, water mains, sewer pipes, telephone and electric conduits and cables, in the way of new work and all other items of this character. He shall assume all responsibility for coordinating his work with the utility involved.
  4. The Contractor shall consult all public and utility company records, City of Chicago records, etc., to fully inform himself of the location and extend of all utilities, and existing foundation walls and basements and/or tunnels of adjacent buildings.
  5. The storage of equipment when not in use, shall be located in areas and in such a manner which will not interfere with normal conduct of erecting the new additional building on the site. Locations selected for collection of debris and/or storage of equipment or material shall be subject to approval of the commissioner and Airport Authorities having jurisdiction.
2. The Contractor shall be responsible for and shall protect existing buildings and structures on the site and adjoining properties and public thoroughfares from damage due to his operations. The Contractor shall provide all barricades, lights and other protective devices necessary to fulfill the intent of the work, including requirements of all Federal, State or Municipal laws or ordinances, and maintain same for the full period of this

operation, removing same when directed or no longer required. Excavations shall be protected at all times and maintained in good order until backfill is in place.

PART 2 - PRODUCTS:

2.1 FILLING AND BACKFILLING MATERIALS:

1. Materials, other than approved excavated material, for filling and backfilling shall conform to the following:
  1. Crushed Stone - Shall be CA-6 as specified in section 1004 of the SSRBC.
  2. Sand - Natural sand, with the following gradation: 100% passing the 1" sieve; 65-100% passing the No. 4 sieve; 40-90% passing the No. 10 sieve; 30-80% passing the No. 16 sieve; 10-50% passing the No. 50 sieve; 0-30% passing the No. 100 sieve; and 0-10% passing the No. 200 sieve.
  3. Approved Backfill Material - Shall be either excavated material specifically approved for the backfill or approved off site borrowed earth fill containing no sod, frozen material organic material or any material which, by decay or otherwise, might cause settlement; also no rock, stones, or broken concrete more than 3 inches in the largest dimension will be permitted.
  4. All materials - Shall be subject to approval by the Commissioner.

PART 3 - EXECUTION:

3.1 EXCAVATION:

1. Excavate for foundations and footings, and slabs on grade, removing all fill material down to the elevations indicated on the Drawings or to suitable soil bearing strata. In all cases the work shall rest on soil or approved fill which is capable of supporting the required loads. To this end the Contractor shall consult the commissioner and obtain approval before removing equipment.
2. Excavation shall provide sufficient space to permit erection of forms, placing of work, removal of forms, etc. and shall be left open until concrete, and any other work has been inspected and approved by the Commissioner.
3. The bottom of all excavations shall be properly leveled off. All loose materials shall be removed from excavations. All wood, timber and organic materials, that are exposed at the bottoms of all excavations shall be removed and the local depression backfilled and compacted.
4. Material that is to be excavated is assumed to be stone, gravel, earth and other materials that can be removed with a power shovel. If rock is encountered within the limits of excavation, the Contractor shall immediately notify the Commissioner and shall not proceed further until instructions are given and measurements made for the purpose of establishing volume of rock excavations. Rock is defined as any stone or boulder  $\frac{1}{2}$  cubic yards or larger in size and/or ledge rock that cannot be removed by power shovel or without the use of continuous drilling or by pneumatic hammers.
5. Any excess or unauthorized excavations shall be backfilled with crushed stone and or approved material compacted, at no additional cost to the Commissioner.
6. Where suitable soil bearings condition is not encountered at subgrades indicated for footings and foundations the Commissioner may decide that additional excavation to good

bearing soil is necessary. Such additional excavation and the required backfilling, based upon work required between indicated grades and authorized lower grades, will be paid for at an agreed upon price as provided for under "Changes in the Work" in the General Conditions.

7. Operations shall be done in such manner as to avoid hazards to persons and property and interference with the use of adjacent areas or interruption of free passage to and from such areas. Care shall be taken to prevent the spread of dust and flying particles.
8. Excavation and removal work shall be executed in a careful and orderly manner. Accumulation of rubbish will not be permitted.
9. After work is started it shall be continued to completion at a rate that will allow the balance of the work to be completed within the time specified. If extra shifts are necessary beyond regular working hours the work shall proceed with a minimum of nuisance to surrounding properties.
10. Blasting will not be permitted on the site.
11. Metal track or cleat equipment shall not be operated over existing drives, sidewalks, curbs, and other facilities on the premises. Damage to such facilities, caused by the Contractor's equipment, shall be repaired to the satisfaction of the City and at the Contractor's expense.
12. Exact extent of excavation work to be done is not fully indicated by accompanying Drawings. Determine the nature and extent of excavations that will be necessary by comparing the Drawings with the existing conditions at the site. It is expressly understood that this Contract includes all work of a excavation nature, except for utilities as herein noted, that may be required or necessary to a full and complete execution of excavating whether particularly referred to herein or not.
13. Stockpile all excess excavated material and unacceptable backfill material in an area to be determined by the Commissioner.
14. Remove and legally dispose of all concrete construction debris and rubbish and leave the site in an acceptably clean condition.

### 3.2 DRAINAGE:

1. The Contractor shall provide and maintain all required bilge pumps, suction and discharge lines, etc., and power for running same in sufficient number and capacity to keep all excavations, pits, trenches, etc., free from standing water at all times, including such times as concreting operations are in progress. Above equipment shall be maintained in good condition and operation, when so required, until excavations are backfilled.
2. Any pumping discharge into the storm sewer system shall be either by way of an approved settling basin system or through adequate screening and filtering media prior to discharge into the sewer.

### 3.3 SHEETING, SHORING, AND BRACING:

1. Furnish and erect all shoring, sheeting, bracing and other similar work as necessary to retain the banks of excavation, to prevent cave-in and displacement of adjacent ground or structures, and to protect against all dangers to passerby and/or workmen.

2. All shoring, sheeting, bracing, protection, jacks and cribbing shall conform to the requirements of the State of Illinois and Federal regulations with regard to health and safety.
3. Maintain all such protection and temporary construction in good condition and remove same when no longer needed as excavations are backfilled. Under no circumstances shall any timber work be built into any portion of the concrete work or buried in the excavation. Fill and compact all voids created by removal of sheeting, shoring, bracing or other similar work as same are removed.
4. The Contractor shall make good any damage resulting from failure of shoring, sheeting, bracing and other supports or the non-observance of these requirements.

#### 3.4 BACKFILLING:

1. Backfill promptly as work permits but not before foundation walls are adequately braced and have attained sufficient strength to withstand the backfilling and compacting stresses and any other work to be installed in the excavations is in place. Walls shall be uniformly backfilled on both sides.
2. Place approved fill and backfill material and compact in lifts to the proper elevations, as a part of this work.
3. No fill, backfill or sub-base shall be placed in standing water, on frozen ground or on surfaces which have not been tested and/or approved by the commissioner.
4. A uniform moisture content will be required throughout the layers of fill material. Wetting or drying manipulation shall be performed as required to accomplish uniformity. Suspend compaction operations when, in the commissioner's opinion, satisfactory results cannot be obtained because of rain or other unsatisfactory conditions.
5. Stone used for local backfill and fill or base under concrete slabs, shall be placed and spread in a single layer or lift not to exceed 12 inches as indicated and compacted to 95% maximum density as determined by ASTM D1557. The surface shall then be accurately graded and finished to the proper grades.

#### 3.5 CLEAN-UP:

1. On completion of the work and before acceptance by the Commissioner, thoroughly clean the areas affected, including areas outside the limits of the Contractor's work area where permission to work has been granted. Remove surplus construction material or debris resulting from the work and dispose of legally off the site.
2. Access routes to and from the site will be designated by the City and shall be kept clean of earth debris and material of any sort.
3. Burning of rubbish or debris on or near the premises will not be permitted.

**END OF SECTION 02315**



# **FROST PROTECTION COURSE**

## **SECTION 02720**

### PART 1 - GENERAL:

#### 1.1 SECTION INCLUDES:

1. Work under this section is subject to the requirements of the Contract Documents.
2. Furnish and install all granular material which will consist of a subbase course, hereinafter referred to as the Frost Protection Course, composed of granular materials constructed on a prepared subgrade or underlying course in accordance with these specifications, and in conformity with the dimensions and typical cross section shown on the plans, or as directed by the Commissioner.

#### 1.2 SUBMITTALS:

1. Submit the following
  1. Manufacturer's Certification
    1. Submit certification that products meet or exceed the specified requirements.
  2. Operation and Maintenance Manuals
    1. Provide maintenance instruction.

### PART 2 - PRODUCTS:

#### 2.1 MATERIALS:

1. The frost protection material will consist of crushed stone having a gradation of CA-11 as specified on the Drawings, conforming to the requirements of Article 1004 of the Illinois Department of Transportation's Standard Specifications for Road and Bridge Construction, Adopted January 1, 2007 (SSRBC). The material will be class B.

### PART 3 - EXECUTION

#### 3.1 GENERAL NOTES:

1. The frost protection course will be placed where designated on the plans or as directed by the Commissioner. The material will be shaped and thoroughly compacted within the tolerances specified.
2. Stabilization stone will only be placed in areas of severely adverse subgrade conditions and as directed by the Commissioner.
3. Granular subbases which, due to grain sizes or shapes, are not sufficiently stable to support without movement the construction equipment will be undercut to a depth of two (2) feet below existing grades, or as approved by the geotechnical Engineer.

4. The frost protection course and stabilization stone will be placed in accordance with the requirements of Section 311 of the Illinois Department of Transportation's Standard Specifications for Road and Bridge Construction adopted January 1, 2007, (SSRBC) for Type B except as modified herein.

### 3.2 OPERATION IN PITS:

1. All work involved in clearing and stripping pits and handling unsuitable material encountered will be performed by the Contractor at his/her expense. The frost protection and stabilization stone material will be obtained from pits or sources that have been approved by the Commissioner. The material in the pits will be excavated and handled in such a manner that a uniform and satisfactory product can be secured.

### 3.3 PREPARING UNDERLYING COURSE:

1. Before any frost protection or stabilization stone material is placed, the underlying course will be prepared and conditioned as specified. The course will be checked and accepted by the Commissioner before placing and spreading operations are started. The subgrade will be compacted in accordance with the requirements of Section 301 of the SSRBC.
2. Grade control between the edges of the pavement will be by means of grade stakes, steel pins, or forms placed in lanes parallel to the centerline of the pavement and at intervals which will permit string lines or check boards to be placed between the stakes, pins, or forms.
3. In areas where the Commissioner directs the Contractor to over-excavate below subgrade level and backfill the over-excavation with stabilization stone, the stabilization stone will be choked into the excavation level and compacted to make the subgrade firm and stable.
4. To protect the subgrade and to ensure proper drainage, the spreading of the frost protection course will begin along high side of pavements with a one-way slope.

### 3.4 MATERIALS ACCEPTANCE IN EXISTING CONDITION:

1. When the entire frost protection or stabilization stone material is secured in a uniform and satisfactory condition and contains the required moisture, such approved material may be moved directly to the spreading equipment for placing. The material may be obtained from gravel pits, stockpiles, or may be produced from a crushing and screening plant with the proper blending. The materials from these sources will meet the requirements for gradation, quality, and consistency. It is the intent of this section of the specifications to secure materials that will not require further mixing. The moisture content of the material will be that required to obtain maximum density. Any minor deficiency or excess of moisture may be corrected by surface sprinkling or by aeration. In such instances, some mixing or manipulation may be required, immediately preceding the rolling, to obtain the required moisture content. The final operation will be blading or dragging, if necessary, to obtain a smooth uniform surface true to line and grade.

### 3.5 PLANT MIXING:

1. When materials from several sources are to be blended and mixed, the material will be processed in a central or travel mixing plant. The material will be thoroughly mixed with the required amount of water. After the mixing is complete, the material will be transported to and spread on the underlying course without undue loss of the moisture content.

### 3.6 GENERAL METHODS FOR PLACING:

1. The frost protection course will be constructed in layers not less than 6 inches of compacted thickness. The material, as spread, will be of uniform gradation with no pockets of fine or

coarse materials. The frost protection course, unless otherwise permitted by the Commissioner, will not be spread more than 2,000 square yards in advance of the rolling. Any necessary sprinkling will be kept within this limit. No material will be placed in snow or on a soft, muddy, or frozen course.

2. When more than one layer is required, the construction procedure described herein will apply similarly to each layer.
3. During the placing and spreading, sufficient caution will be exercised to prevent the incorporation of subgrade, shoulder, or foreign material in the frost protection course mixture. All contaminated materials will be removed and replaced at no additional cost to the City.
4. Where geotextile fabric is required to be placed under the frost protection course, it will be placed over the subgrade in accordance with the manufacturer's recommendations. The frost protection course material will be back-dumped on the fabric in a sequence of operations beginning at the outer edges of the area with subsequent placement toward the middle. Dumping of the material directly on the fabric will only be permitted to establish an initial working platform. No vehicles or construction equipment will be allowed on the fabric prior to the placement of the frost protection course. Fabric which is damaged during installation or subsequent placement of frost protection course will be repaired or replaced by the Contractor at his own expense to the satisfaction of the Commissioner.

### 3.7 FINISHING AND COMPACTING:

1. After spreading or mixing, the material will be thoroughly compacted by rolling and sprinkling, when necessary. Sufficient rollers will be furnished to adequately handle the rate of placing and spreading of the frost protection course.
2. The field density of the compacted material will be at least 95 percent of the maximum density of laboratory specimens prepared from samples of the subbase material delivered to the job site for CA-6 material. The laboratory specimens will be compacted and tested in accordance with ASTM D 1557.
3. The course will not be rolled when the underlying course is soft or yielding or when the rolling causes undulation in the subbase. When the rolling develops irregularities that exceed  $\frac{1}{2}$  inch when tested with a 16'-0" straightedge, the irregular surface will be loosened and then refilled with the same kind of material as that used in constructing the course and again rolled as required above.
4. Along places inaccessible to rollers, the subbase material will be tamped thoroughly with mechanical or hand tampers.
5. Sprinkling during rolling, if necessary, will be in the amount and by equipment approved by the Commissioner. Water will not be added in such a manner or quantity that free water will reach the underlying layer and cause it to become soft.

### 3.8 SURFACE TEST:

1. After the course is completely compacted, the surface will be tested for smoothness and accuracy of grade and crown, - any portion found to lack the required smoothness or to fail in accuracy of grade or crown will be scarified, reshaped, recompacted, and otherwise manipulated as the Commissioner may direct until the required smoothness and accuracy are obtained. The finished surface will not be above the theoretical vertical grade and may not vary more than  $\frac{1}{2}$  inch when tested with a 16'-0" straightedge applied parallel with, and at right angles to the centerline.

3.9 THICKNESS:

1. The thickness of the completed subbase course will be determined by depth tests or cores taken at intervals so each test will represent no more than 500 square yards. When the deficiency in thickness is more than ½ inch, the Contract will correct such areas by scarifying, adding satisfactory mixture, rolling, sprinkling, reshaping, and finishing in accordance with these specifications. The Contractor must replace at his/her expense the frost protection material where borings are taken for test purposes.

3.10 PROTECTION:

1. Work on frost protection course will not be conducted during freezing temperature nor when the subgrade is wet. When the subbase material contains frozen material or when the underlying course is frozen, the construction will be stopped.

3.11 MAINTENANCE:

1. Following the final shaping of the material, the subbase will be maintained throughout its entire length by the use of standard motor graders and rollers until, in the judgement of the Commissioner, the frost protection course meets all requirements and is acceptable for the construction of the next course. The Contractor is totally responsible for the preparation, maintenance and protection of the frost protection course and no additional compensation will be considered for any reworking of the material for any reason.

**END OF SECTION 02720**

# **CONCRETE FORMS AND ACCESSORIES**

## **SECTION 03100**

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES:

1. Work under this section is subject to the requirements of the Contract Documents.
2. Furnish and install all Concrete Forms and Accessories as shown on the Drawings and as specified herein, including but not limited to the following:
  1. Wood Formwork.
  2. Bracing.
  3. Metal ties and other hardware for forms.
3. Install all items as shown on the Drawings and as specified to be furnished under other sections, including but not limited to the following:
  1. Anchor bolts.
  2. Sleeves, inserts and accessories.
  3. Templates, setting plates, and bearing plates.

#### 1.2 RELATED WORK:

1. As specified in the following divisions:
  1. Division 2 - Site Work
  2. Division 15 - Mechanical

#### 1.3 REFERENCES:

1. ACI 318 "Building Code Requirements for Reinforced Concrete", American Concrete Institute.
2. ACI SP-4 "Formwork for Concrete Formwork", American Concrete Institute.
3. ACI 347 "Recommended Practice for Concrete Formwork", American Concrete Institute.
4. Copies of the above publications will be made available by the Contractor on the job site at all times.

#### 1.4 QUALITY ASSURANCE:

1. Contractor Qualifications: Installation of concrete forms and accessories must be performed only by a qualified installer. The term qualified means experienced in performing the Work required by this section. The qualified Installer will be responsible for demonstrating to the Commissioner's satisfaction that he/she has sufficient experience in its role. The Installer must submit evidence of such qualifications upon request by the Commissioner.

2. Perform Work in accordance with the latest edition, of the appropriate divisions, of the following:
  1. ACI 315, Details of Concrete Reinforcement, as published by the American Concrete Institute.
  2. ACI Detailing Manual, (SP-66), as published by the American Concrete Institute.
  3. ACI 318, Building Code Requirements for Reinforced Concrete, as published by the American Concrete Institute.
  4. AWS D1.4 Recommended Practice for Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction, as published by the American Welding Society.
  5. CRSI, Manual of Standard Practice, as published by the Concrete Reinforcing Steel Institute.
  6. ACI 117, Standard Tolerances for Concrete Construction and Materials, as published by the American Concrete institute.
  7. CRSI, Placing Reinforcing Bars, as published by the Concrete Reinforcing Steel institute.

1.5 DELIVERY, STORAGE, AND HANDLING:

1. Materials will be stored in strict accordance with the Manufacturer's printed directions, copies of which will be furnished to the Commissioner.
2. Deliver and handle materials in such a manner as to prevent damage.
  1. All damaged or otherwise unsuitable material, when so ascertained, will be immediately removed from the job site.
3. Protect materials against damage from mechanical abuse, plaster, salts, acids, staining and other foreign matter by an approved means during transportation, storage and erection and until completion of construction work. All unsatisfactory materials will be removed from the premises, and all damaged materials replaced with new materials.
4. Access and Storage Areas
  1. All access routes and storage areas will be subject to the approval of the Commissioner in order to reduce interference with Airport Operations.

1.6 SPECIAL REQUIREMENTS:

1. Field Measurements - Before proceeding with the fabrication of the Work, the Contractor must verify all dimensions and take such measurements as are required for proper fabrication and installation of the work.
2. Coordination - Coordinate Work of this section with related Work specified in the other divisions/sections of the Contract Documents.

PART 2 - PRODUCTS

2.1 FORMWORK MATERIAL:

1. Wood Form Sheathing
  1. Finish No. 1 (Concealed Below Grade Concrete) -  $\frac{3}{4}$ " exterior plywood, B-B Concrete Form Class II, PS-1-74, or 1" (nominal) wood T & G.
  2. Finish No. 2 (Exposed Non-Architectural Concrete) - Same as for Finish No. 1.
  3. Finish No.3 (Smooth Concrete) -  $\frac{3}{4}$ " exterior type, resin coated Plywood, High Density Concrete Form Overlay, Class 1, PS-1-74.
2. Wood sheeting or lagging -- minimum 2" x 6" lumber.

2.2 FORM TIES - MATERIALS & ACCEPTABLE MANUFACTURERS:

1. Snap form ties
  1. Notched to assure break-back 1" behind the finished concrete surface and leaving no larger than a  $\frac{1}{4}$ " to  $\frac{5}{16}$ " diameter hole.
  2. Products of one of the following Manufacturers will be acceptable:
    1. Dayton Sure-Grip and Shore Co.,
    2. Richmond Screw Anchor Co., Inc., Fort Worth, TX 76118-6910
    3. Superior Concrete Accessories, Gateway Erectors, Inc.
  3. Holes remaining after removal of forms will be clean cut and without fractures, spalls, shallows, depressions, or other surface disfigurements.
2. Rod form ties
  1. Outside stud rod (she-bolt) assembly.

2.3 ACCESSORIES:

1. Sleeves, pipe supports and miscellaneous items to be built into forms will be provided to the Contractor by the trade involved, however certain items required by the pipe trades may be furnished and installed by those trades as hereinafter specified.

PART 3 - EXECUTION

3.1 INSPECTION:

1. Before commencing installation, examine substrate surfaces to determine that they are free of conditions which might be detrimental to proper and timely completion of the Work. Start of Work will indicate acceptance of the substrate.

### 3.2 FORMWORK CONSTRUCTION:

1. Construct forms accurately to dimensions and true to line, with vertical work plumb and horizontal work properly cambered.
  1. Forms will be substantial, mortar tight, braced and tied so as to maintain position and shape during placing of the reinforcing and concrete.
  2. Wavy surfaces and bulged wall or slab surfaces resulting from settlement or springing of form work will not be acceptable.
2. Forms will be designed and constructed to facilitate easy removal without damage to exposed surfaces, and to provide smooth concrete surfaces free of off-sets.
  1. Corners will be true to lines and profiled as detailed.
  2. Form joints exposed to view will be kept to a minimum and will be located symmetrically within each modular unit.
3. Forms will be of such thickness that they will remain true to shape.
  1. Use clamps, pins, and other connecting devices designed to hold the forms rigidly in place.
  2. Forms which do not present a smooth surface or line up properly will not be used.
  3. Keep forms free from rust, grease, or other foreign matter which would discolor the concrete.
  4. Concrete will have smooth clean surfaces and be free of honeycombing or rough exposed aggregate areas when forms are stripped.
4. Provide forms in sufficient quantity to permit rapid progress of the work. Clean forms after each use.
5. Before reinforcing steel is set, wood forms will be coated with an approved non-staining form oil, or wet with water (except in freezing weather). Metal forms will be coated with an approved non-staining rust preventive form oil.
  1. Stained forms will not be used.
  2. Remove oil on any reinforcement before placing concrete.
6. After forms have been placed, see that all trades have been properly notified and are given sufficient time to complete the installation of their Work.
  1. Placing of reinforcement will proceed progressively with the Work of other trades and each will arrange its working schedules so as to avoid disturbing or moving of work already installed by one trade to admit the work of another's.
  2. Each trade will be entirely responsible for the proper installation and securing of its work and each will keep its work under observation during placing of the concrete.
7. Provide recesses and openings of the proper sizes and shapes required for the installation of work requiring openings. Furnish forms of the sizes and shapes necessary, except where sleeves are specified under other sections of the specifications.



8. Provide temporary openings to facilitate cleaning and inspection immediately before depositing concrete. Thoroughly clean all forms before placing concrete.
9. All form material is subject to Commissioner's approval before construction of forms.
  1. Forms for exposed concrete may be re-used only if the surfaces have not absorbed moisture and have not splintered, warped, discolored, stained, rusted or peeled; subject to the Commissioner's approval.
10. Construction joints will occur at approved locations.
11. Provide wood sheeting or lagging for below grade formwork as required.
  1. Drive sheeting or lagging to a sufficient depth below bottom of surface formed to anchor it securely in the soil.
12. Forms will produce smooth, even surfaces of dense concrete, and clean sharp arrises at outside corners.
13. Observe forms and check for alignment and level as the work proceeds. Provide needed adjustment or additional bracing promptly.
14. Place bulkheads where end of days work requires a joint in a wall, beam or slab.
  1. Reinforcing steel will extend through the bulkhead.
  2. All joints will be keyed for one half of the member thickness unless otherwise directed.
  3. Location of bulkheads will be as approved by the Commissioner.
15. Where indicated on the drawings or details, rounded or chamfered exposed corners will be formed of  $\frac{1}{2}$ " radius or  $\frac{1}{2}$ ", 45 degree poly-vinyl chloride or neoprene extruded corner strips inserted in the forms. Splices and joints in strips will be in accordance with the Manufacturer's instructions.

### 3.3 TOLERANCES:

1. Unless otherwise shown or required the allowable tolerances in formwork will conform to ACI 347. See section L-L on drawing SC-1 for special tolerance when placing the weir portions of the concrete curb.

### 3.4 SURVEY OF FORMWORK:

1. The Contractor must employ a registered Engineer or Surveyor to check the lines and levels of the completed formwork by instrument survey, before concrete is placed, and the Contractor must make whatever corrections or adjustments to the formwork necessary to correct deviations from the specified tolerances.
2. Formwork will likewise be checked during placement of the concrete to ensure that the forms, shores, tie rods and clamps have not been knocked out of the established line, level and cross section by concrete pouring methods or equipment.

### 3.5 FORM REMOVAL:

1. Forms will remain in place long enough to allow concrete to set properly. Do not remove supporting forms or shoring until concrete has sufficient strength to carry its own weight and the loads upon it safely.

2. Forms or shoring will not be removed without the Commissioner's approval.
3. Removal of forms and shoring will be in accordance with ACI 318-71.

3.6 ACCESSORIES:

1. Accurately place and securely support items to build into forms.
2. Sleeves for pipe lines and inserts for support of pipe hangers will be furnished and installed by the respective trades involved and the Contractor must be responsible for maintaining these items plumb, in alignment and in place.

3.7 SCREEDS:

1. Set wood and metal screeds with true and straight top edges to proper elevations (approximately 8'-0" apart) for concrete slabs.

3.8 GENERAL CLEAN-UP:

1. All rubbish and debris resulting from the Work of this section must be collected, removed from the site and disposed of legally.
2. All work areas must be left in a broom clean condition.

**END OF SECTION 03100**

# **CONCRETE REINFORCEMENT**

## **SECTION 03200**

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES:

1. Work under this section is subject to the requirements of the Contract Documents.
2. Furnish and install all Concrete Reinforcement as shown on the Drawings and as specified herein, including but not limited to the following:
  1. Reinforcing bars, ties, spirals for beams, slabs, footings, foundations and columns, etc. as shown and designated on the drawings.
  2. All necessary accessories including support bars, spacers, tie wires, support accessories, etc.
3. Install all items as shown on the Drawings and as specified to be furnished under other sections, including but not limited to the following:
  1. Embedded angle in curb.
  2. Embedded pipe in curb at drain valves.

#### 1.2 RELATED WORK:

1. As specified in the following divisions:
  1. Division 5 -Metals
  2. Division 15 - Mechanical
  3. Division 16 - Electrical

#### 1.3 REFERENCES:

1. ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures", American Concrete Institute.
2. ACI 318 "Building Code Requirements for Reinforced Concrete", American Concrete Institute.

#### 1.4 SUBMITTALS:

1. Submit the following
  1. Shop Drawings
    1. Shop Drawings will be detailed in accordance with the requirements of ACI detailing manual.
      - (1) The shop drawing will include bar schedule, joint details of bars, insert locations, bending diagrams, and setting drawings, showing all openings through slabs and walls.

- (2) Fabrication and placing for all reinforcing steel, will conform with the "Manual of Standard Practice for Detailing Reinforced Concrete Structures" ACI 315, latest edition.

2. Test Reports

1. Submit test reports necessary to show compliance with the Contract Documents.

- (1) Tensile and bending tests on each bundles of steel. Furnish two (2) copies of the Manufacturer's certificates or mill tests of all reinforcing steel.

3. Manufacturer's Certification

1. Submit certification that products meet or exceed the specified requirements.

1.5 QUALITY ASSURANCE:

1. Contractor Qualifications: Installation of concrete reinforcements must be performed only by a qualified installer. The term qualified means experienced in performing the Work required by this section. The qualified Installer will be responsible for demonstrating to the Commissioner's satisfaction that he/she has sufficient experience in its role. The qualified Installer must submit evidence of such qualifications upon request by the Commissioner.
2. Perform Work in accordance with the latest edition, of the appropriate divisions, of the following:
  1. ACI 315, Details of Concrete Reinforcement, as published by the American Concrete Institute, latest edition.
  2. ACI Detailing Manual, (SP-66), as published by the American Concrete institute, latest edition.
  3. ACI 318, Building Code Requirements for Reinforced Concrete, as published by the American Concrete Institute, latest edition.
  4. AWS D1.4, Recommended Practice for Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction, as published by the American Welding Society, latest edition.
  5. CRSI, Manual of Standard Practice, as published by the Concrete Reinforcing Steel Institute, latest edition.
  6. ACI 117, Standard Tolerances for Concrete Construction and Materials, as published by the American Concrete Institute, latest edition.
  7. CRSI, Placing Reinforcing Bars, as published by the Concrete Reinforcing Steel Institute, latest edition.

1.6 DELIVERY, STORAGE AND HANDLING:

1. Materials will be stored in strict accordance with ACI 318, revised to date, and/or suppliers directions, copies of which will be furnished to the Commissioner.

2. Protect materials against damage from mechanical abuse, salts, acids, and other foreign matter by an approved means during transportation, storage, and erection until completion of construction work. All unsatisfactory materials will be removed from the premises, and all damaged materials replaced with new materials.
    1. Properly label all bars with weatherproof tags to facilitate identification.
  3. Access and Storage Areas
    1. All access routes and storage areas will be subject to the approval of the Commissioner in order to reduce interference with Airport Operations.
- 1.7 SPECIAL REQUIREMENTS:
1. Field Measurements - Before proceeding with the fabrication on the work, the Contractor must verify all dimensions and take such measurements as are required for proper fabrication and installation of the work.
  2. Coordination - Coordinate Work of this section with related Work specified in the other divisions/sections of the Contract Documents.

## PART 2 - PRODUCTS

### 2.1 MATERIALS:

1. Steel Bars will be new deformed billet steel bars, complying with ASTM A 615, grade 60.
2. Accessories
  1. Bar supports and other accessories necessary to hold bars in proper position while concrete is being placed.
    1. Bar supports for reinforcement over vapor barrier or waterproofing will have 16 gauge flat sheet metal bases for legs.
    2. Bar supports which come in contact with forms for concrete exposed to view in the finished exterior or interior structure will have plastic or plastic tipped legs.

## PART 3 - EXECUTION

### 3.1 INSPECTION:

1. Before commencing installation, examine substrate surfaces to determine that they are free of conditions which might be detrimental to proper and timely completion of the Work. Start of Work will indicate acceptance of the substrate.

### 3.2 INSTALLATION:

1. Before and after being placed, reinforcement will be thoroughly cleaned of ice, mud, loose rust, or mill scale that will destroy or reduce the bond.
2. Reinforcement will be furnished in full lengths insofar as possible. Splicing of bars will not be permitted where full lengths are indicated.
3. Vertical bars will be in single lengths, unless otherwise indicated on the drawings.

4. Splices will be well distributed and located at points as approved.
    1. Splices will not be permitted at points where the section is not sufficient to provide a minimum distance of 2" between the splice and the nearest adjacent bar or the surface of the concrete.
  5. Spliced bars will be lapped no less than shown in Chapter 7 of ACI 318, latest edition, unless otherwise indicated on the drawings.
  6. Welded wire fabric reinforcement will be lapped at least 6" or one (1) wire space, whichever is greater, at ends and edges and well wired together.
  7. Placing of reinforcement will conform to the drawings.
    1. It will be positioned accurately and securely against displacement with annealed iron ties of not less than 16 gauge or suitable clips at intersections.
    2. Reinforcement will be supported on metal chairs, spacers or metal hangers.
    3. Devices will be sufficiently rigid to hold reinforcement in proper position during construction operations and placing of concrete.
  8. Spacers and chairs will be spaced not to exceed 1'-0" for each 1/8" diameter of the rod, and in no case over 5'-0" on center. High chairs will be spaced not over 3'-0" on center and will be properly secured against overturning.
  9. Reinforcement in footings and other concrete near earth, not supported by ties or forms, will be supported at correct distance above the earth by means of metal wyes or by precast concrete blocks of the proper height.
    1. If precast concrete blocks are used, they will be pyramid or cone shaped with base area large enough to prevent overturning and with notched top or tie wires embedded in the precast concrete blocks for receiving reinforcement.
  10. Main reinforcement will be supported at the following minimum clearances, unless otherwise shown or specified.
    1. 3/4" from bottom of slabs on forms and joists.
    2. 1" from top of slabs on grade.
    3. 2" from bottom of beams.
    4. 2" for No. 6 and larger, and 1-1/2" for No. 5 and smaller, from face of formed concrete walls in contact with earth or exposed to weather.
    5. 3" above bottom and from sides of footings.
  11. Reinforcing will be approved by the Commissioner before concrete is placed.
- 3.3 GENERAL CLEAN-UP:
1. All rubbish and debris resulting from the Work of this section must be collected, removed from the site and disposed of legally.
  2. All work areas must be left in a broom clean condition.

**END OF SECTION 03200**

# **CAST-IN-PLACE CONCRETE**

## **SECTION 03300**

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES:

1. Work under this section is subject to the requirements of the Contract Documents.
2. Furnish and install all Cast-in-Place Concrete Work as shown on the Drawings and as specified herein, including but not limited to the following:
  1. All reinforced concrete work.
  2. Expansion, control and construction joints in concrete.
  3. Floor cementitious waterproofing.
  4. Slab on grade.
  5. Footings.
  6. Grouts.
  7. Curb.
  8. Existing bunker walls.
3. Install all items as shown on the Drawings and as specified to be furnished under other sections.

#### 1.2 RELATED WORK:

1. As specified in the following divisions:
  1. Division 2 - Site Work
  2. Division 5 - Metals
  3. Division 15 - Mechanical
  4. Division 16 - Electrical

#### 1.3 REFERENCES:

1. ACI 311 "Recommended Practice for Concrete inspection".
2. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete", except minimum cement content will be herein specified.
3. ACI 211.1 "Manual of Standard Practice".
4. ACI 301 "Specifications for Structural Concrete for Buildings".
5. ACI 305 "Recommended Practice for Hot Weather Concreting".

6. ACI 306 "Recommended Practice for Cold Weather Concreting".
7. ACI 318 "Building Code Requirements for Reinforced Concrete".
8. ASTM C 94 "Specifications for Ready Mixed Concrete".
9. Unless otherwise indicated, the latest edition of the specifications, will govern the Work.
10. Concrete work will comply with federal, state and local building codes; including the City of Chicago Building Code.

1.4 SUBMITTALS:

1. Submit the following
  1. Shop Drawings
    1. Shop drawings will include bar lists, joint details of bars, insert locations, bending diagrams, and setting drawings, showing all openings through slabs and walls.
    2. Fabrication and placing drawings for all reinforcing steel, conforming with the "Manual of Standard Practice for Detailing Reinforced Concrete Structures" ACI 315.
    3. Concrete Pour Schedule.
  2. Product Data
    1. Product Data
      - (1) Water stops.
      - (2) Cementitious waterproofing.
      - (3) Expansion joint filler.
      - (4) Hydraulic repair mortar.
  3. Tests Procedure
    1. The Commissioner will employ an approved Testing Laboratory which will make tests and perform inspection in accordance with these specifications, at no cost to the Contractor. The Contractor must cooperate with the Testing Laboratory in every respect.
    2. During progress of the Work, the Testing Service will mold and laboratory cure concrete cylinders in accordance with ASTM C31. Compressive strength tests will be in accordance with ASTM C39.
      - (1) One (1) set of strength tests will consist of four (4); standard cylinders of each cubic yards of concrete or fraction thereof placed in any one (1) day.
      - (2) Each class of mix will be represented by not less than a set of four (4) tests regardless of concrete quantity placed at the time.
      - (3) Two cylinders will be tested at 7 Days, two at 28 Days in accordance with ASTM C39.



- (4) Determine air content for air entrained concrete in accordance with ASTM C173 or C231.
    - (5) Two (2) Slump Tests - ASTM C143. Keep a slump cone at the site at all times.
  3. Concrete strength tests will be evaluated in accordance with ACI 214 "Recommended Practice for Evaluation of Compression Test Rules of Field Concrete". Compressive strength of concrete will conform to the following criteria:
    - (1) The average of any three (3) sets of consecutive strength tests of laboratory cured specimens for each class of concrete will exceed or equal the specified strength for that class and no individual strength test result will fall below the required strength by more than 500 psi.

(Note: In order to meet these criteria, with average quality control of production, it will be necessary that the average of all strength tests for each class of concrete exceed the specified strength by 25%.)
  4. If compressive strength tests fail to meet the above minimum requirements, concrete represented by such tests will be considered questionable and will be subjected to the following further testing at the expense of the Contractor:
    - (1) Core samples will be secured, prepared and tested in accordance with ASTM C42.
    - (2) If the core tests specified above fail to meet strength requirements or should it be impractical to take such cores the Commissioner may order load tests which will be conducted and the results evaluated in accordance with Chapter 20 of ACI 318.
    - (3) Failure of any portion of the structure to pass a load test will result in rejection of such portion and the Contractor must remove and reconstruct such condemned areas at his expense.
  5. When, in the opinion of the Commissioner, the laboratory tests are not indicative of the quality of concrete in place, additional tests of the hardened concrete may be taken. The Contractor must not bear the cost of such tests unless their results confirm that the concrete in place is deficient.
4. Test Reports
  1. The testing laboratory will submit five (5) copies of its test cylinder reports which are to include as far as applicable the following items:
    - (1) Amount and location of the pour in structure, type of the structure, date of the pour.
    - (2) Concrete design mix number and concrete design strength.
    - (3) Proportion, type, and amount of cement.
    - (4) Aggregates and admixture used.