

**Special Provisions  
Indianapolis International Airport**

SPECIAL PROVISIONS

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### **SP-1 M-102 MAINTENANCE OF TRAFFIC:**

*Section 102-2 METHOD OF MEASUREMENT is revised to read as follows:*

“The items of Maintenance of Traffic will not be measured for payment.”

*Section 102-3 BASIS OF PAYMENT is revised to read as follows:*

“Payment for Maintenance of Traffic will not be made separately, but will be considered incidental to other items of work.”

### **SP-2 M-103 CONSTRUCTION ENGINEERING:**

*Section 103-3.1 METHOD OF MEASUREMENT is revised to read as follows:*

“The items of Construction Engineering will not be measured for payment.”

*Section 103-4.1 BASIS OF PAYMENT is revised to read as follows:*

“Payment for Construction Engineering will not be made separately, but will be considered incidental to other items of work.”

### **SP-3 M-104 PROJECT SECURITY**

*Section 104-2.1 METHOD OF MEASUREMENT is revised to read as follows:*

“The items of Project Security will not be measured for payment.”

*Section 104-3.1 BASIS OF PAYMENT is revised to read as follows:*

“Payment for Project Security will not be made separately, but will be considered incidental to other items of work.”

### **SP-4 M-105 MOBILIZATION/DEMOBILIZATION:**

*Section 105-4.1 BASIS OF PAYMENT is revised to read as follows:*

“Payment for Mobilization/Demobilization will not be made separately, but will be considered incidental to other items of work.”

### **SP-5 P-152 EXCAVATION AND EMBANKMENT**

*Section 152-3.1 METHOD OF MEASUREMENT is revised to read as follows:*

“The items of Excavation and Embankment will not be measured for payment.”

*Section 152-4.1 BASIS OF PAYMENT is revised to read as follows:*

“For Unclassified Excavation, payment shall be made at the contract unit price per lump sum. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.”

### **SP-6 P-156 TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION, AND SILTATION CONTROL: Section 156-5.1 BASIS OF PAYMENT is revised to read as follows:**

No direct payment will be made for this item. The performance of this work shall not be paid for directly but shall be considered as a subsidiary obligation of the Contractor covered under other contract items.

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### **SP-7 T-904 SODDING**

*Section 904-3.1 METHOD OF MEASUREMENT is revised to read as follows:*

“The items of Sodding will not be measured for payment.”

*Section 904-4.1 BASIS OF PAYMENT is revised to read as follows:*

“This item will be paid for on the basis of the contract unit price per lump sum for sodding, which price shall be full compensation for all labor, equipment, material, staking, and incidentals necessary to satisfactorily complete the items as specified.”

**SP-8 T-905 TOPSOILING:** Topsoil necessary for this project as stated on the plans is available on site, in an area to be determined. Coordination with the Owner and Construction Manager is required to determine location and coordinate haul routes between the available topsoil and the work site. Topsoiling performed is to be in accordance with the requirements of the Technical Provision T-905 Topsoiling.

**SP-9 STATE OF INDIANA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS:** It is the intent that the construction and materials for certain items as designated on the plan sheets conform to the State of Indiana Department of Transportation Standard Specifications. Therefore, unless stated otherwise, the most recent State of Indiana Department of Transportation Standard Specifications shall apply to the specified INDOT Items within the Contract Documents.

If there is a conflict between the Indiana Department of Transportation Standard Specifications and the contents of the General Provisions and Special Provisions of these specifications, these specifications shall govern.

Deviations from the requirements of the INDOT Standard Specifications are as follows:

a. **Definition of Terms**

1. Department shall mean the Engineer or Owner’s representative
2. Commissioner shall mean Engineer
3. Engineer shall mean the designated representative of the Owner
4. Laboratory shall mean the Engineer or the Owner’s designated testing firm
5. Owner shall mean Indianapolis Airport Authority
6. Division of Materials and Tests shall mean the Engineer
7. State shall mean the Owner

**SP-10 CONSTRUCTION SIGNS:** This work shall consist of furnishing, placing, and maintaining signs, barricades and other traffic control devices at the construction in accordance with these specifications and in reasonably close conformance with the plans or as approved by the Engineer.

These devices shall be maintained continuously by the Contractor to insure conformance to the plans and to protect the public.

Construction signs shall be those detailed in the plans or as set out in the Indiana Manual on Uniform Traffic Control Devices. The item includes the posts which support the sign and all necessary hardware.

Sign posts shall be located and constructed to hold signs in a proper position to resist swaying, turning or displacement, and at the same time constitute the least possible hazard to motorists.

No direct payment will be made for this item; however, the cost will be included in the price of other work items.

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**SP-11 UNDISTRIBUTED QUANTITIES:** The Itemized Proposal contains work items that are identified as Undistributed. It is the Owner's intent to use these line items for payment of work that is to be performed in areas as directed in the field during construction. The proposed quantities for these items in the Itemized Proposal have been estimated during the design phase. Coordination of work limits and specific locations with the Owner, Engineer and Inspector is required prior to work commencing on these items. The Contractor shall bid these items accordingly.

**SP-12 FABRIC DROP INLET PROTECTION:** The work shall consist of the placement and maintenance of Fabric Drop Inlet Protection or Fabric End Section Protection as indicated in the Plans or as directed by the Owner. The fabric shall meet the requirements of Silt Fence - Type A as specified in T-908.

The amount to be paid for shall be the number of units installed, maintained, and accepted. Payment shall be made at the contract unit price per each. The price shall be full compensation for materials, labor, equipment, tools, and incidentals necessary to complete this item:

Payment will be made under:

Item SP-12	Fabric Drop Inlet Protection -- per each
Item SP-12	Fabric End Section Protection -- per each

**SP-13 REPLACE MANHOLE CASTING:** This work shall consist of the replacement of a manhole casting for existing manhole structures as indicated in the plans. The existing casting shall be removed and turned over to Airport Maintenance to be coordinated through the Construction Manager. The Contractor shall provide and install a new casting per the plans.

Payment will be made at the contract unit price per each for replace manhole casting. The prices shall be full compensation for furnishing all materials, labor, and equipment necessary to complete the work.

Payment will be made under:

Item SP-13	Replace Manhole Casting -- per each
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INDIANAPOLIS AIRPORT AUTHORITY

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## **M-102 MAINTENANCE OF TRAFFIC**

102-1 GENERAL REQUIREMENTS The Contractor shall erect and maintain all traffic control devices signs, barricades, etc., as indicated on the plans and in the special provisions.

Unless specified otherwise, the following standards for traffic control will be applicable:

1. Manual of Uniform Traffic Control Devices for Streets and Highways, latest edition.
2. FAA AC 150/5370-2C, latest edition.
3. The Contractor shall phase his operations as indicated on the plans and in the special provisions.
4. The number and placement of standard or modified Type II barricades may be altered as determined by the Engineer at no additional cost to the Authority.

102-2 METHOD OF MEASUREMENT The items of Maintenance of Traffic will be measured for payment per month or fraction thereof based on a 30-day month.

102-3 BASIS OF PAYMENT Payment for Maintenance of Traffic will be at the contract unit price for which payment shall be full compensation for furnishing all labor, equipment and materials necessary to complete the item.

Payment will be made under:

Item No.      M-102 Maintenance of Traffic -- per month

END OF SECTION



## **M-103 CONSTRUCTION ENGINEERING**

103-1.1 DESCRIPTION The Contractor shall perform the construction engineering, including construction layout. All construction engineering and layout field operations shall utilize the project grid coordinate system and the horizontal/vertical control monuments as shown on the Midfield Survey Control Plan for this project. This control data shall be utilized for staking all grades, drainage structures, slopes, project limits, and any other stakes required for line and grade control. The Contractor shall protect the midfield control monuments during construction activities unless otherwise noted. Any damage to the existing control documents shall be the responsibility of the contractor. If disturbed or damaged, the control monuments shall be replaced in-kind. The horizontal and vertical control shall be re-established by a licensed Land Surveyor. Filed data and documentation shall be given to the Engineer for review.

103-2.1 CONSTRUCTION The Contractor shall furnish all stakes, templates, straightedges, and other devices necessary for checking, marking and maintaining points, lines, and grades. Field notes shall be kept in either standard field notebooks in a clear, orderly and neat manner or delivered in an electronic format that is consistent with standard engineering/surveying practices. The field data will become the Property the Airport Authority upon completion of the work. The engineer or other personnel may inspect the field books, or electronic files, at any time during the project.

103-2.2 All grade stakes and finish "blue top" hubs shall be placed at a maximum spacing of twenty-five (25) feet unless an alternate spacing is approved by the Engineer. If automatic slope controlled equipment is NOT used to fine grade the subgrade then "blue tops" or grade stakes shall be placed on the centerline of crowned pavement sections.

Staking for grade of non-paved areas shall be sufficient to meet the requirements of, Section 152-2.9 Tolerances; however, in no case shall the spacing between adjacent stakes exceed 100 feet.

103-2.3 When staking culverts, the Contractor shall perform the necessary checking to establish the proper location and grade to fit best the conditions on the site. The Contractor will not be responsible to verify that the culvert is of adequate opening.

103-2.4 The Engineer or Owner's representative will make all measurements and surveys that involve final acceptance as to finished grades. The Engineer may also check the accuracy of the Construction Engineering layout or the final result of construction accuracy. All acceptance inspection and testing will be the responsibility of the Airport Authority.

103-2.5 The supervision of the Contractor's construction Engineering personnel shall be the responsibility of the Contractor, and any errors resulting from the operations of such personnel shall be corrected at the expense of the Contractor and at no additional cost to the Authority.

103-3.1 METHOD OF MEASUREMENT. Construction Engineering, as specified herein, shall be measured as a lump sum item.

103-4.1 BASIS OF PAYMENT. Construction Engineering shall be paid for based upon the approximate amount of this work actually completed, but in no case shall more than 30% of this item be paid on the first progress payment. This work shall include furnishing all necessary personnel, equipment, and supplies to accomplish the work. Payment will be made under:

Item No. M-103 Construction Engineering -- per lump sum

END OF SECTION



## **M-104 PROJECT SECURITY**

104-1.1 DESCRIPTION. The Contractor shall provide all facilities and personnel to provide security for the project as required by the special provisions. All movements into the project site shall be controlled by a uniformed security guard who shall be employed by the Contractor. The security guard shall be present at all times when a security gate is open while work is being done. Minimum requirements of a security guard shall be to check the identification of each person wanting access through the gate against a list, provided by the Contractor, of people working on the project needing access through the gate. This list will be supplied and updated by the Contractor's Project Superintendent only. Denial of access shall be given to any individual who is not on the Contractor's list. The Airport Authority shall designate specific companies of which employees may obtain access through the gate with proper identification. When an escort is required, the escort's vehicle must be covered under the contractor's umbrella insurance policy.

Any fines levied on the Authority or Airport Tenant resulting from inadequate security operations by the Contractor shall be deducted from the Contractor's progress payments.

SEE GENERAL PROVISION 70-23 SECURITY, FOR ADDITIONAL REQUIREMENTS.

104-2.1 METHOD OF MEASUREMENT. Project security shall be measured by the month or fraction thereof from one progress payment to the next for the period that project security is required by the Engineer.

104-3.1 BASIS OF PAYMENT. Project security shall be paid for at the contract unit price, per month or fraction thereof based on a 30 day month, which shall be full compensation for all materials, equipment, labor, transportation, operations, and other items incidental to and necessary for completion of this item.

Payment will be made under:

Item No.     M-104 Project Security -- per month

END OF SECTION



## **M-105 MOBILIZATION/DEMOBILIZATION**

105-1.1 DESCRIPTION. Mobilization and Demobilization shall consist of all work necessary for the movement of personnel and equipment to and from the project site and for the establishment and removal of all Contractor's field offices, buildings, and other facilities necessary to the performance of the work, such as clean up and restoration of staging, waste or borrow areas.

105-2.1 LIMITATIONS. For the purpose of payment, the mobilization portion of this item will be limited to five percent (5%) of the original total contract price. The remainder of the item will be considered demobilization.

The first progress estimate may include payment for a portion of this item limited to either fifty percent (50%) of the item amount or five percent (5%) of the original total contract amount, whichever is less. Prior to submission of this item for consideration of initial approval, the Contractor must have the Engineer's field office and initial construction machinery on site.

The balance of the item cost will be paid with the final progress payment.

105-3.1 METHOD OF MEASUREMENT. No measurement will be made.

105-4.1 BASIS OF PAYMENT. This work will be paid for at the contract lump sum price for "Mobilization and Demobilization", which price shall include materials, equipment, tools, labor, transportation, operations and all work incidental thereto.

Payment will be made under:

Item No. M-105 Mobilization/Demobilization --per lump sum

END OF SECTION



## **P-152 EXCAVATION AND EMBANKMENT**

152-1.1 DESCRIPTION. This item covers excavation, disposal, placement, and compaction of materials within the limits of the work required to construct runway safety areas, runways, taxiways, aprons, and intermediate as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

152-1.2 CLASSIFICATION. All material excavated shall be classified as defined below:

Unclassified Excavation shall consist of the excavation, embankment, disposal of all material encountered on site regardless of its nature, and shall include: cohesive and non-cohesive soils, rock, peat, foundations, concrete slabs, septic tanks, stumps, etc.

Unclassified excavation may be required outside of the project limits for borrow material. If unclassified excavation for borrow is required, borrow areas on airport property will be designated on the plans. Borrow material required from off airport property will be paid under "Borrow Excavation".

SEE SECTION 152-2.3 FOR "BORROW EXCAVATION"

All excavated material unsuitable for use in construction of embankment shall be wasted and will be paid for at the unit price of unclassified excavation.

152-2.1 CONSTRUCTION METHODS - GENERAL. The suitability of material to be placed in embankments shall be subject to approval by the Engineer. All unsuitable material shall be disposed of in waste areas shown on the plans. All waste areas shall be graded to allow positive drainage of the area and of adjacent areas. The surface elevation of waste areas shall not extend above the surface elevation of adjacent usable areas of the airport, unless specified on the plans or approved by the Engineer.

When the Contractor's excavating operations encounter artifacts of historical or archeological significance, the operations shall be temporarily discontinued. At the direction of the Engineer, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work. Those areas outside of the pavement areas in which the top layer of soil material has become compacted, by hauling or other activities of the Contractor, shall be scarified and disked to a depth of 4 inches, in order to loosen and pulverize the soil.

If it is necessary to interrupt existing surface drainage, sewers or underdrains, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the Engineer, who shall arrange for their removal, if necessary. The Contractor shall, at his/her own expense, satisfactorily repair or pay the cost of all damage to such facilities or structures which may result from any of the Contractor's operations during the period of the contract.

152-2.2 EXCAVATION. The excavation shall not be started until the work has been staked out by the Contractor. All suitable excavated material shall be used in the formation of embankment, subgrade, or for other purposes shown on the plans. All unsuitable material shall be either used on embankment slopes or disposed of as shown on the plans.

When the volume of the excavation exceeds that required to construct the embankments to the grades indicated, the excess shall be disposed of as directed. When the volume of excavation is not sufficient for constructing the fill to the grades indicated, the deficiency shall be obtained from borrow areas.

The grade shall be maintained so that the surface is well drained at all times. When necessary, temporary drains and drainage ditches shall be installed to intercept or divert surface water which may affect the work.

- 1) Selective Grading

## P-152 EXCAVATION AND EMBANKMENT

- a) When selective grading is indicated on the plans, the more suitable material, as designated by the Engineer, shall be used in constructing the embankment and in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final locations, it shall be stockpiled in approved areas.
- 2) Undercutting
  - a) Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for runway safety areas, subgrades, roads, shoulders, or any areas intended for turfing, shall be excavated to a minimum depth of 12 inches, or to the depth specified by the Engineer, below the subgrade. Muck peat matted roots, or other yielding material, unsatisfactory for subgrade foundations, shall be removed to the depth specified. Unsuitable materials shall be disposed of at locations shown on the plans.
  - b) This excavated material shall be paid for at the contract unit price per cubic yard for unclassified excavation. The excavated area shall be refilled with suitable material, obtained from the grading operations or borrow areas and thoroughly compacted by rolling. The necessary refilling will constitute a part of the embankment.
- 3) Overbreak
  - a) Overbreak, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the Engineer. The Engineer shall determine if the displacement of such material was unavoidable, and his/her decision shall be final. All overbreaks shall be graded or removed by the Contractor and disposed of as directed; however, payment will not be made for the removal and disposal of overbreak which the Engineer determines as avoidable. Unavoidable overbreak will be classified as "Unclassified Excavation".
- 4) Removal of Utilities
  - a) The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished by someone other than the Contractor, e.g., the utility unless otherwise shown on the plans. All existing foundations shall be excavated for at least 2 feet below the top of the subgrade or as indicated on the plans and the material disposed of as directed. All foundations thus excavated shall be backfilled with suitable material and compacted as specified herein.
- 5) Compaction Requirements
  - a) The subgrade under areas to be paved shall be compacted to a depth of 6 inches, to a density of not less than 95% of the maximum density as determined by ASTM D1557.

**TABLE 152-1 SUBGRADE COMPACTION REQUIREMENTS FOR FLEXIBLE PAVEMENTS**

Design Aircraft	Gross Wt. LBS	DEPTH OF COMPACTION - INCHES							
		NON-COHESIVE SOILS				COHESIVE SOILS			
		100%	95%	90%	80%	95%	90%	85%	80%
Single Wheel	30,000	8	8-18	18-32	32-44	6	6-9	9-12	12-17
	50,000	10	10-24	24-36	36-48	6	6-9	9-16	16-20
	75,000	12	12-30	30-40	40-52	6	6-12	12-19	19-25
Dual Wheel, Incl. C-130	50,000	12	12-28	28-38	38-50	6	6-10	10-17	17-22
	100,000	17	17-30	30-42	42-55	6	6-12	12-19	19-25
	150,000	19	19-32	32-46	46-60	7	7-14	14-21	21-28
	200,000	21	21-37	37-53	53-69	9	8-16	16-24	24-31
Dual Tandem Incl. 676 A300	100,000	14	14-26	26-38	38-49	6	6-10	10-17	17-22
	200,000	17	17-30	30-43	43-56	6	6-12	12-18	18-26

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	300,000	20	20-34	34-48	48-63	7	7-14	14-22	22-29
	400,000	23	23-41	41-59	59-76	9	9-18	18-27	27-36
DC-10, L1011, 747	400,000	21	21-36	36-55	55-70	8	8-15	15-20	20-28
	600,000	23	23-41	41-59	59-76	9	9-18	18-27	27-36
	800,000	23	23-41	41-59	59-76	9	9-18	18-27	27-36

**TABLE 152.2 SUBGRADE COMPACTION REQUIREMENTS FOR RIGID PAVEMENTS**

	DEPTH OF COMPACTION - INCHES		
	NON-COHESIVE SOILS		COHESIVE SOILS
	100	95	90
Subgrade in Cut	6"	6-18"	6"
Subgrade in Fill	6"	6"-Bottom Fill	Depth of Fill

**Notes:**

The term flexible pavement, as used in Table 152-1, applies only to those pavements of which the finish surface and other stabilized components of the pavement section are constructed of bituminous materials. The term flexible pavement does not include bituminous materials used as a stabilized base course for rigid pavements.

The design aircraft category and gross weight shall be as specified in the Special Provisions.

Payment for suitable materials removed, manipulated, and replaced in order to obtain the required depth of density will be paid for as "Unclassified Excavation", except as noted in Section 152-2.2A and 2.2B.

The in-place field density shall be determined in accordance with ASTM D1556 or ASTM D2167. Stones or rock fragments larger than 4 inches in their greatest dimension will not be permitted in the top 6 inches of the subgrade. The finished grading operations, conforming to the typical cross section, shall be completed and maintained at least 1,000 feet ahead of the paving operations or as directed by the Engineer.

In cuts, all loose or protruding rocks on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope. All cut-and-fill slopes shall be uniformly dressed to the slope, cross section, and alignment shown on the plans or as directed by the Engineer.

**152-2.2A UNCLASSIFIED EXCAVATION FOR SPECIAL SUBGRADE TREATMENT** In cut areas, as shown on the plans, where it is determined by the Engineer that soft and yielding soil conditions below the 8 inch subgrade thickness will prevent the Contractor from obtaining the required subgrade density; then the Engineer may order the soft and yielding soils to be removed, disked, dried, or otherwise manipulated, replaced and recompacted per Section 152-2.6. The removal, replacement and recompaction of the top 8 inches below subgrade elevation necessary to treat the underlying material shall be included for measurement and payment as a part of the item for unclassified excavation for special subgrade treatment.

The removal and replacement of fill embankment for the treatment of underlying soft and yielding soils **WILL NOT** be considered for payment.

**152-2.2B AGGREGATE FOR SPECIAL SUBGRADE TREATMENT (UNDISTRIBUTED)**

This work shall consist of the placement of limestone aggregate in the excavation left from the removal of unsuitable subgrade material. The limits and depth of excavation of unsuitable subgrade and placement of limestone aggregate will be directed by the Engineer.

## **P-152 EXCAVATION AND EMBANKMENT**

Limestone aggregates shall be size No. 53, No. 2, or No. 8, as selected by the Engineer, meeting the requirements of the Indiana Department of Highways Standard Specification Section 904-02.

Upon completion of the excavation of unsuitable subgrade material, the bottom of the excavated area shall be compacted as directed by the Engineer. After compaction of the bottom of the excavation, the aggregate shall be placed in lifts Not-to-Exceed 8" in depth and compacted in accordance with this section. Both the lift thickness and compaction requirements may be altered as directed by the Engineer.

Aggregate for special subgrade treatment will be measured by the ton accepted in place and shall include all necessary work for backfilling of areas excavated of unsuitable material. Aggregates shall meet the requirements of Class A or B as shown in Indiana Department of Highways Standard Specification Section 904.02.

The quantity of excavation displaced for the placement of Aggregate for Subgrade Treatment shall be included in the contract unit price of Aggregate for Subgrade Treatment per ton. The quantity of excavation required and not displaced by the item Aggregate for Subgrade Treatment shall be considered under Section 152-2.1A Unclassified Excavation for Special Subgrade Treatment.

Removal of unsuitable material will be paid for as unclassified excavation. The removal and replacement of the top 8" of subgrade shall be considered for payment as a part of either 152-2.2A Unclassified Excavation for Special Subgrade Treatment or 152-2.2B aggregate for Subgrade Treatment, whichever is less.

The Engineer shall determine what materials are unsuitable. Soils with excessive moisture WILL NOT be classified as unsuitable, if in the opinion of the Engineer, drying of the soil would make acceptable embankment and/or subgrade, (see Section P-152-2.2A).

152-2.3 BORROW EXCAVATION. Borrow areas on airport property will be paid as unclassified excavation under Section 152-1.2, and will not be considered Borrow Excavation as defined under this section (152-2.3).

Borrow Excavation shall consist of approved material required for the construction of embankments or for other portions of the work and shall be obtained from approved locations and sources off of airport property. Borrow excavation shall be made only at approved locations and

within the horizontal and vertical limits as staked or as directed. Borrow material shall be free of substances that will form putrescent or deleterious deposits, or produce toxic concentrations or combinations that may be harmful to human, animal, plant or aquatic life, or otherwise impair the designated uses of the stream or area.

Unless otherwise designated in the contract, the Contractor shall make his own arrangements for obtaining borrow and shall pay all costs involved. Borrow, as designated herein, shall not include material excavated on airport property.

The Contractor shall notify the Engineer sufficiently in advance of opening any borrow areas so that cross section elevations and measurements of the ground surface after stripping may be taken and the borrow material can be tested before being used. Sufficient time for testing the borrow shall be allowed.

Borrow pits within 100 feet of the nearest airport property line shall be left with uniform 4:1 back-slopes and shall be excavated no deeper than 2 feet below the finished surface elevation of the adjacent grade, unless written permission is obtained for a greater depth. If this permission is granted, the pits shall be left with uniform 15:1 back-slopes, beginning no closer than 100 feet from the nearest airport property line. Any other slope conditions shall be as approved.

Before borrow or disposal operations are begun, plans for the control of drainage water shall include measures to keep sediment from entering streams. Diversion channels, dikes, and sediment traps may be used for this purpose. Good top soil from the borrow pit area shall be saved for use in restoring the excavated area, or similar material from

## **P-152 EXCAVATION AND EMBANKMENT**

another source may be substituted. Final restoration of borrow or waste disposal areas shall include grading, seeding, and/or other necessary treatments that will blend the area into the surrounding landscape. Restored areas within 1,000 feet of the nearest airport property line shall be well drained. Areas beyond 1,000 feet shall be drained unless the landowner desires other treatment of the borrow pit area. No payment will be made for restoring areas as set out herein, the cost thereof to be included in the contract amount for borrow. In any case, drainage, location, or use of the pit shall comply with existing laws, regulation, and ordinances. Under no conditions shall borrow sites detract from the appearance of the natural topographical features nor increase the potential hazard to a vehicle or aircraft.

If granulated popcorn slag, dunes sand, or other granular material which is not suitable for the growth of vegetation is used, such material shall not be placed within 12 inches of the required finished surfaces of shoulders and fill slopes. Additional material required to complete the embankment, such as sandy loam, sandy clay loam, clay loam, clay, or other materials suitable for the growth of vegetation and free from clods, debris, and stones, shall be furnished at the contract price for borrow excavation.

**152-2.4 DRAINAGE EXCAVATION.** Drainage excavation shall consist of excavating for drainage ditches such as intercepting, inlet or outlet, for temporary levee construction, or any other type as designed or as shown on the plans. The work shall be performed in the proper sequence with the other construction. All satisfactory material shall be placed in fills; unsuitable material shall be placed in waste areas or as directed. Intercepting ditches shall be constructed prior to the starting of adjacent excavation operations. All necessary work shall be performed to secure a finish true to line, elevation, and cross section. The Contractor shall maintain ditches constructed on the project to the required cross section and shall keep them free of debris or obstructions until the project is accepted.

Drainage excavation shall be paid for at the contract unit price for unclassified excavation.

**152-2.5 PREPARATION OF EMBANKMENT AREA.** Where an embankment is to be constructed to a height of 4 feet or less, all sod, topsoil and vegetable matter shall be removed from the surface upon which the embankment is to be placed, and the cleared surface shall be completely broken up by plowing or scarifying to a minimum depth of 6 inches. This area shall then be compacted as indicated in paragraph 2.6. When the height of fill is greater than 4 feet, sod not required to be removed shall be thoroughly disked and recompact to the density of the surrounding ground before construction of embankment. All sod and topsoil shall be stripped from all areas that will be beneath pavement. The depth of stripping of top soil shall be as indicated on the plans or special provisions.

Where embankments are to be placed on natural slopes steeper than 3 to 1, horizontal benches shall be constructed as shown on the plans. No direct payment shall be made for the work required for preparation of embankment areas.

**152-2.6 FORMATION OF EMBANKMENTS.** Embankments shall be formed in successive horizontal layers of not more than 8 inches in loose depth for the full width of the cross section, unless otherwise approved by the Engineer.

The grading operations shall be conducted and the various soil strata shall be placed to produce a soil structure as shown on the typical cross section or as directed. Materials such as brush, hedge, roots, stumps, grass, and other organic matter shall not be incorporated or buried in the embankment.

Operations on earthwork shall be suspended at anytime when satisfactory results cannot be obtained because of rain, freezing, or other unsatisfactory factory conditions of the field. The Contractor shall drag, blade, or slope the embankment to provide proper surface drainage.

The material in the layer shall be within +/- 2% of optimum moisture content before rolling to obtain the prescribed compaction. In order to achieve a uniform moisture content throughout the layer, wetting or drying of the material and manipulation shall be required when necessary. Should the material be too wet to permit proper compaction or rolling, all work on all of the affected portions of the embankment shall be delayed until the material has dried to the

## **P-152 EXCAVATION AND EMBANKMENT**

required moisture content. Sprinkling of the dry material to obtain the proper moisture content shall be done with approved equipment that will sufficiently distribute the water. Sufficient equipment to furnish the required water shall be available at all times. Samples of all embankment materials for testing, both before and after placement and compaction, will be taken. Based on these tests, the Contractor shall make the necessary corrections and adjustments in methods, materials, or moisture content in order to achieve the correct embankment density.

Rolling operations shall be continued until the embankment outside of paved areas is compacted to not less than 90% of maximum dry density for cohesive soils and 95% of maximum dry density for non-cohesive soils, as determined by ASTM D1557. Under all areas to be paved, the embankments shall be compacted to a density of not less than 95% of the maximum dry density for cohesive soils and 100% of the maximum dry density for non-cohesive soils, as determined by ASTM D1557. Proof rolling will be used to determine the final acceptability of all compacted materials, within the limits of all paved areas. Proof rolling shall be accomplished with a tri-axle dump truck loaded with 20 tons of payload. Copies of weight tickets shall be provided by the contractor.

On all areas outside of the pavement areas, no compaction will be required on the top 4 inches.

The in-place field density shall be determined in accordance with ASTM D1556 or ASTM D2167. Other approved types of field density tests may be used for control purposes after density values corresponding to those obtained by either of the methods set out above have been established.

Compaction areas shall be kept separate, and no layer shall be covered by another until the proper density is obtained.

During construction of the embankment, the Contractor shall route his equipment at all times, both when loaded and when empty, over the layers as they are placed and shall distribute the travel evenly over the entire width of the embankment. The equipment shall be operated in such a manner that hardpan, cemented gravel, clay, or other chunky soil material will be broken up into small particles and become incorporated with the other material in the layer.

In the construction of embankments, layer placement shall begin in the deepest portion of the fill; as placement progresses, layers shall be constructed approximately parallel to the finished pavement grade line.

When rock and other embankment material are excavated at approximately the same time, the rock shall be incorporated under the future paved areas. Stones or fragmentary rock larger than 4 inches in their greatest dimensions will not be allowed in the top 6 inches of the subgrade. Rock fill shall be brought up in layers as specified or as directed, and every effort shall be exerted to fill the voids with the finer material to form a dense, compact mass. Rock or boulders shall not be disposed of outside of the excavation or embankment areas, except at places and in the manner designated by the Engineer.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in layers of the prescribed thickness without crushing, pulverizing, or further breaking down the pieces, such material may be placed in the embankment as directed in layers not exceeding 2 feet in thickness. Each layer shall be leveled and smoothed with suitable leveling equipment and by distribution of spalls and finer fragments of rock. These type lifts shall not be constructed above an elevation 4 feet below the finished subgrade. Density requirements will not apply to portions of embankments constructed of materials which cannot be tested in accordance with specified methods.

Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material.

There will be no separate measurement or payment for compacted embankment; and all costs incidental to placing in layers, compacting, discing, watering, mixing, sloping, and other necessary operations for the construction of embankments will be included in the contract price for unclassified excavation.

152-2.7 FINISHING AND PROTECTION OF SUBGRADE. After the subgrade has been substantially completed, the full width shall be conditioned by removing any soft or other unstable material which will not

## **P-152 EXCAVATION AND EMBANKMENT**

compact properly. The resulting areas and all other low areas, holes, and depressions shall be brought to grade with suitable select material. Scarifying, blading, rolling, and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans.

Grading of the subgrade shall be performed so that it will drain readily. The Contractor shall take all precautions necessary to protect the subgrade from damage. He/she shall limit hauling over the finishing subgrade to that which is essential for construction purposes.

All ruts or rough places that develop in a completed subgrade shall be smoothed and recompacted.

No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been approved by the Engineer.

152-2.8 HAUL. All hauling will be considered a necessary and incidental part of the work. Its cost shall be considered by the Contractor and included in the contract unit price for the pay items of work involved. No payment will be made separately or directly for hauling on any part of the work.

All haul routes for any materials or equipment entering or leaving the project site shall be approved by the Airport Authority, prior to beginning hauling activities. Unless a specific haul route is identified on the plans, or in the special provisions, the contractor shall submit a haul route plan for review.

152-2.9 TOLERANCES. In those areas upon which a subbase or base course is to be placed, the top of the subgrade shall be of such smoothness that, when tested with a 16-foot straightedge applied parallel and at right angles to the centerline, it shall not show any deviation in excess of 1/2 inch, or shall not be more than 0.05 foot from true grade as established by grade hubs or pins. Any deviation in excess of these amounts shall be corrected by loosening, adding, or removing materials, reshaping, and recompacting by sprinkling and rolling.

Unless noted otherwise in the special provisions or plans, those areas to be seeded, sodded or treated for erosion protection shall be graded to within 0.2 feet of planned elevation. Graded areas shall be free of depressions which would pond water. Any area found to be having standing/ponded water shall be filled, regraded and reseeded at the Contractor's expense.

152-2.10 TOPSOIL. When topsoil is specified or required, as shown on the plans or under Item T-905, it shall be salvaged from stripping or other grading operations. The topsoil shall meet the requirements of Item T-905. If, at the time of excavation or stripping, the topsoil cannot be placed in its proper and final section of finished construction, the material shall be stockpiled at approved locations.

Upon completion of grading operations as specified, stockpiled topsoil shall be handled and placed as directed, or as required in Item T-905.

No direct payment will be made for topsoil as such under Item P-152. The quantity removed and placed or stockpiled shall be paid for at the contract unit price per cubic yard for Unclassified Excavation.

152-3.1 METHOD OF MEASUREMENT. The quantity of excavation to be paid for shall be the number of cubic yards measured in its original position.

Measurement shall not include the quantity of material excavated without authorization beyond normal slope lines, or the quantity of material used for purposes other than those directed.

152-4.1 BASIS OF PAYMENT. For Unclassified Excavation, payment shall be made at the contract unit price per cubic yard or on a lump sum basis. This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

## **P-152 EXCAVATION AND EMBANKMENT**

- Item No. P-152 Unclassified Excavation --per cubic yard or lump sum.
- Item No. P-152 Borrow Excavation -- per cubic yard
- Item No. P-152 Unclassified Excavation For Special Subgrade Treatment Undistributed) -- per cubic yard
- Item No. P-152 Aggregate For Special Subgrade Treatment (Undistributed) - per ton

### **TESTING REQUIREMENTS**

- ASTM D698 Tests for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 pound (2.5 kg) Rammer and 12-inch (304.8 mm) Drop
- ASTM D1556 Test for Density of Soil In-Place by the Sand Cone Method
- ASTM D1557 Tests for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures; Using 10-pound, (4.5 kg) Rammer and 18-inch (457 mm) Drop
- ASTM D2167 Test for Density of Soil In-Place by the Rubber Balloon Method

**END OF SECTION**

**P-153 Watering**

**P-153 WATERING**

153-1.1 DESCRIPTION. This item shall consist of furnishing and applying water required in the compaction of embankments, subgrades, subbases, base courses, and for other purposes in accordance with the requirements of these specifications or as directed by the Engineer.

Watering will be ordered to be applied to haul roads, excavation, embankment, borrow and staging areas when, in the opinion of the Engineer, airborne dust is excessive.

153-2.1 CONSTRUCTION METHODS. Water, when required, shall be applied at the locations, in the amounts, and during the hours, including nights, as directed by the Engineer. An adequate water supply shall be provided by the Contractor. The equipment used for watering shall be of ample capacity and of such design as to assure uniform application of water in the amounts directed by the Engineer. Failure to control airborne dust as directed by the Engineer will be cause for suspension of the work.

153-3.1 METHOD OF MEASUREMENT. No measurement will be made of this item.

153-4.1 BASIS OF PAYMENT. No direct payment will be made for this item. The performance of this work shall not be paid for directly but shall be considered as a subsidiary obligation of the Contractor covered under other contract items.

END OF SECTION



**P-156 TEMPORARY AIR AND WATER POLLUTION,  
SOIL EROSION AND SILTATION CONTROL**

156-1.1 DESCRIPTION. This item shall consist of temporary control measures as shown on the plans or as ordered by the Engineer during the life of a contract to control water pollution, soil erosion, and siltation through the use of berms, dikes, dams, sediment basins, fiber mats, gravel, mulches, grasses, slope drains, and other erosion control devices or methods.

The temporary erosion control measures contained herein shall be coordinated with the permanent erosion control measures specified as part of this contract to the extent practical to assure economical, effective, and continuous erosion control throughout the construction period.

Temporary control may include work outside the construction limits such as borrow pit operations, equipment, and material storage sites, waste areas, and temporary plant sites.

156-2.1 GRASS. Grass which will not compete with the grasses sown later for permanent cover shall be a quick-growing species (such as ryegrass, Italian ryegrass, or cereal grasses) suitable to the area providing a temporary cover.

156-2.2 MULCHES. Mulches may be hay, straw, fiber mats, netting, bark, wood chips, or other suitable material reasonably clean and free of noxious weeds and deleterious materials. All ground cover shall be held secure to prevent blowing by wind, jet blast, etc.

156-2.3 FERTILIZER. Fertilizer shall be a standard commercial grade and shall conform to all federal and state regulations and to the standards of the Association of Official Agriculture Chemists.

156-2.4 SLOPE DRAINS. Slope drains may be constructed of pipe, fiber mats, rubber, portland cement concrete, bituminous concrete, or other materials that will adequately control erosion.

156-2.5 OTHER. All other materials shall meet commercial grade standards and shall be approved by the Engineer before being incorporated into the project (see Section 908-2.1, for erosion control and silt fence materials).

156-3.1 CONSTRUCTION REQUIREMENTS - GENERAL. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

All erosion control measures shall meet the design criteria, standards and specifications for erosion control measures established in the 'INDIANA HANDBOOK FOR EROSION CONTROL IN DEVELOPING AREAS' from the Division of Soil Conservation, Indiana Department of Natural Resources and the 'FIELD OFFICE TECHNICAL GUIDE' from the soil conservation service.

Erosion control measures include but are not limited by:

- No storm water shall be discharged from the site in a manner causing erosion in the receiving channel at the point of discharge.
- Sediment being tracked from the site onto roadways shall be minimized.
- All on-site storm drain inlets shall be protected against sedimentation with filter fabric or equivalent barriers meeting accepted design criteria, standards and specifications for that purpose.
- Roadways shall be kept cleared of accumulated sediment. Bulk clearing of accumulated sediment shall not include flushing the area with water.

The Engineer shall be responsible for assuring compliance to the extent that construction practices, construction operations, and construction work are involved.

INSPECTION OF EROSION CONTROL MEASURES: All erosion control measures outlined in the plans and specifications shall be subject to the following additional requirements.

**P-156 TEMPORARY AIR AND WATER POLLUTION,  
SOIL EROSION AND SILTATION CONTROL**

- a. Inspection: All erosion and sediment control measures as specified in the erosion control plan shall be inspected by the Contractor as follows:
1. An inspection of erosion control measures in place shall be made at least once every seven (7) days.
  2. All erosion control measures in place shall be inspected within 24 hours after any storm event greater than 0.5 inches of rain per 24-hour period.
  3. Qualified personnel shall conduct a weekly inspection of the construction site to identify areas contributing to storm water discharges associated with construction activity.
  4. Disturbed areas, material storage and equipment storage areas that are exposed to precipitation shall be inspected on a regular basis for evidence of, or the potential for, pollutants entering the drainage system.
  5. Storm water discharge locations shall be inspected to determine if erosion control measures are effective in preventing significant impacts to receiving waters.
  6. Erosion control devices installed as specified shall be observed to ensure that they are operating properly.
  7. Haul routes and construction entrances to work areas shall be periodically inspected for evidence of off-site vehicle tracking of mud and dirt.
  8. The Contractor's staging area shall be inspected to ensure that solid and liquid wastes are being properly disposed of and not allowed to be discharged into storm water runoff.

- b. Inspection Reports: A report shall be completed summarizing the results of each inspection. The report shall include the name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of the erosion control plan and a certification that the facility is in compliance with the plan and identify any incidents of non-compliance.

The attached inspection report form shall be used to record information obtained from field investigations of the erosion control measures. The record and certification shall be signed in accordance with the signatory requirements of the permit.

Inspection reports shall be maintained by the Contractor for two (2) years following IAA Board approval of final payment.

Copies of the reports shall be submitted to the Engineer with each invoice.

- c. Maintenance: All erosion control measures shall be maintained throughout the project and until such time as the disturbed areas have been completely stabilized or other provisions have altered the need for these measures.

The Contractor shall:

1. Replace mulch materials to their original level when the level has been substantially reduced due to decomposition of the organic mulches and displacement or disappearance of both the organic and inorganic mulches.
2. Remove rubbish and channel obstructions from bare and vegetated channels within the project limits. The Contractor shall repair damage from scour or bank failure, rodent holes and breaching of diversion structures. Excessive wear, movement or failure of erosion control blankets shall be repaired immediately. Deposits of sediment shall be removed from the channel.

**P-156 TEMPORARY AIR AND WATER POLLUTION,  
SOIL EROSION AND SILTATION CONTROL**

3. Repair any damage to silt fence barriers immediately and monitor barriers daily during prolonged rainfall.
4. Repair or replace any silt fence fabric which has decomposed or become ineffective prior to its expected usable life.
5. Remove sediment deposits after each storm event. Sediment must be removed when deposits reach approximately half the height of the silt fence barrier.
6. Till and smooth to conform with the existing grade and reseed any sediment deposits remaining in place after the silt fence barrier is no longer required.
7. Maintain the construction entrances in a condition which will prevent tracking or flowing of sediment onto roads. This could require periodic top dressing with additional surface materials as conditions demand. Repair and clean out any features used to trap sediment and remove all sediment spilled, dropped, washed or tracked on road and return to the point of likely origin.
8. All temporary erosion and sediment control practices shall be removed and disposed of within thirty (30) days after final site stabilization is achieved or after the temporary practices are no longer needed. Trapped sediment shall be permanently stabilized to prevent further erosion.

**P-156 TEMPORARY AIR AND WATER POLLUTION,  
SOIL EROSION AND SILTATION CONTROL**

INDIANAPOLIS AIRPORT AUTHORITY  
EROSION CONTROL PLAN  
INSPECTION REPORT

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Firm: \_\_\_\_\_

Title: \_\_\_\_\_

Rain Event - 24-hour total \_\_\_\_\_ as reported by \_\_\_\_\_

Observations: \_\_\_\_\_  
\_\_\_\_\_

Erosion and sediment control measures are/are not in compliance with the Erosion Control Plan.

Action needed: \_\_\_\_\_  
\_\_\_\_\_

The following erosion and sediment control measures would increase the efficiency of the Erosion Control Plan: \_\_  
\_\_\_\_\_  
\_\_\_\_\_

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Inspector's Signature \_\_\_\_\_

Authorized Representative Signature \_\_\_\_\_

Owner/Agent

## **P-156 TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION AND SILTATION CONTROL**

156-3.2 SCHEDULE. Prior to the start of construction, the Contractor shall submit schedules for accomplishment of temporary and permanent erosion control work, as are applicable for clearing and grubbing, grading, construction, paving, and structures at watercourses. The Contractor shall also submit a proposed method of erosion, dust control on haul roads, and borrow pits and a plan for disposal of waste materials. Work shall not be started until the erosion control schedules and methods of operations for the applicable construction have been accepted by the Engineer.

156-3.3 AUTHORITY OF ENGINEER. The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, to limit the surface area of erodible earth material exposed to excavation, borrow, and fill operations, and to direct the Contractor to provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent streams or other watercourses, lakes, ponds, or other areas of water impoundment.

156-3.4 CONSTRUCTION DETAILS. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the accepted schedule. Except where future construction operations will damage slopes, the Contractor shall perform the permanent seeding and mulching and other specified slope protection work in stages as soon as substantial areas of exposed slopes can be made available. Temporary erosion and pollution control measures will be used to correct conditions that develop during construction that were not foreseen during the design state; that are needed prior to installation of permanent control features; or that are needed temporarily to control erosion that develops during normal construction practices but are not associated with permanent control features on the project.

Where erosion is likely to be a problem, clearing and grubbing operations should be scheduled and performed so that grading operations and permanent erosion control features can follow immediately thereafter if the project conditions permit; otherwise, temporary erosion control measures may be required between successive construction stages.

The Engineer will limit the area of clearing and grubbing, excavation, borrow, and embankment operations in progress, commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent control measures current in accordance with the accepted schedule. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified.

In the event that temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as part of the work as

scheduled or are ordered by the Engineer, such work shall be performed by the Contractor at his/her own expense.

Failure of the Contractor to provide temporary erosion and pollution control measures as identified in the approved schedule, or required by the contractor's negligence, will be considered noncompliance of the contract.

The Engineer may increase or decrease the area of erodible earth material to be exposed at one time as determined by analysis of project conditions.

The erosion control features installed by the Contractor shall be acceptably maintained by the Contractor during the construction period. Whenever construction equipment must cross watercourses at frequent intervals, and such crossings will adversely affect the sediment levels, temporary structures shall be provided.

Pollutants such as fuels, lubricants, bitumen, raw sewage, wash water from concrete mixing operations, and other harmful materials shall not be discharged into or near rivers, streams, and impoundments or into natural or man-made channels leading thereto.

**P-156 TEMPORARY AIR AND WATER POLLUTION,  
SOIL EROSION AND SILTATION CONTROL**

156-4.1 METHOD OF MEASUREMENT. Control work performed for protection of construction areas including areas within construction limits, such as borrow and waste areas, haul roads, equipment and material storage sites, and temporary plant sites, will not be measured and paid for directly but shall be considered as a subsidiary obligation of the Contractor with costs included in the contract prices bid for the items to which they apply.

156-5.1 BASIS OF PAYMENT. No direct payment will be made for this item; however, individual erosion/siltation control items are paid under the T-901 through T-908 specifications.

END OF SECTION

## **T-904 SODDING**

904-1.1 DESCRIPTION. This item shall consist of furnishing, hauling, and placing approved live sod on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the Engineer.

904-2.1 MATERIALS. All materials as noted shall be in accordance with section 621 of the Indiana Department of Transportation Standard Specifications most current edition and revisions.

- a) Sod
- b) Fertilizer
- c) Water

904-2.2 SOIL FOR REPAIRS. The soil for fill and topsoiling of areas to be repaired shall conform to the requirements of 901.2.3.

904-3.1 CONSTRUCTION METHODS - GENERAL. Areas to be sodded shall be shown on the plans.

Suitable equipment necessary for proper preparation of the ground surface and for the handling and placing of all required materials shall be on hand, in good condition, and shall be approved by the Engineer before the various operations are started. The Contractor shall demonstrate to the Engineer before starting the various operations that the application of required materials will be made at the specified rates.

904-3.2 PREPARING THE GROUND SURFACE. After grading of areas has been completed and before applying fertilizer and limestone, areas to be sodded shall be raked or otherwise cleared of stones larger than two inches in any diameter, sticks, stumps, and other debris which might interfere with sodding, growth of grasses, or subsequent maintenance of grass-covered areas. If any damage by erosion or other causes occurs after grading of areas and before beginning the application of fertilizer and ground limestone, the Contractor shall repair such damage. This may include filling gullies, smoothing irregularities, and repairing other incidental damage.

904-3.3 APPLYING FERTILIZER AND GROUND LIMESTONE. Following ground surface preparation, fertilizer shall be uniformly spread at a rate which will provide not less than the minimum quantity of each fertilizer ingredient, as stated in T901. If use of ground limestone is required, it shall then be spread at a rate which will provide not less than the minimum quantity stated in T901. These materials shall be incorporated into the soil to a depth of not less than 2 inches by discing, raking, or other methods acceptable to the Engineer. Any stones larger than 2 inches in any diameter, large clods, roots, and other litter brought to the surface by this operation shall be removed.

904-3.4 OBTAINING AND DELIVERING SOD. After inspection and approval of the source of sod by the Engineer, the sod shall be cut with approved sod cutters to such a thickness that after it has been transported and placed on the prepared bed, but before it has been compacted, it shall have a uniform thickness of not less than 2 inches. Sod sections or strips shall be cut in uniform widths, not less than 10 inches, and in lengths of not less than 18 inches, but of such length as may be readily lifted without breaking, tearing, or loss of soil. Where strips are required, the sod must be rolled without damage with the grass folded inside. The Contractor may be required to mow high grass before cutting sod.

The sod shall be transplanted within 24 hours from the time it is stripped, unless circumstances beyond the Contractor's control make storing necessary. In such cases, sod shall be stacked, kept moist, and protected from exposure to the air and sun and shall be kept from freezing. Sod shall be cut and moved only when the soil moisture conditions are such that favorable results can be expected. Where the soil is too dry, permission to cut sod may be granted only after it has been watered sufficiently to moisten the soil to the depth the sod is to be cut.

904-3.5 LAYING SOD. Sodding shall be performed only during the seasons when satisfactory results can be expected. Frozen sod shall not be used and sod shall not be placed upon frozen soil. Sod may be transplanted

## **T-904 SODDING**

during periods of drought with the approval of the Engineer, provided the sod bed is watered to moisten the soil to a depth of at least 4 inches immediately prior to laying the sod.

The sod shall be moist and shall be placed on a moist earth bed. Pitchforks shall not be used to handle sod, and dumping from vehicles shall not be permitted. The sod shall be carefully placed by hand, edge to edge, and with staggered joints, in rows at right angles to the slopes, commencing at the base of the area to be sodded and working upward. The sod shall immediately be pressed firmly into contact with the sod bed by tamping or rolling with approved equipment to provide a true and even surface and insure knitting, without displacement, of the sod or deformation of the surfaces of sodded areas. Where the sod may be displaced during sodding operations, the workmen when replacing it shall work from ladders or treaded planks to prevent further displacement. Screened soil of good quality shall be used to fill all cracks between sods. The quantity of the fill soil shall not cause smothering of the grass. Where the grades are such that the flow of water will be from paved surfaces across sodded areas, the surface of the soil in the sod after compaction shall be set approximately 1 inch below the pavement edge. Where the flow will be over the sodded areas and onto the paved surfaces around manholes and inlets, the surface of the soil in the sod after compaction shall be placed flush with pavement edges.

On slopes steeper than 1 vertical to 3 horizontal and in V-shaped or flat-bottomed ditches or gutters, the sod shall be pegged with wooden pegs not less than 12 inches in length and have a cross-sectional area of not less than 3/4 square inch. The pegs shall be driven flush with the surface of the sod.

In all sod areas sustaining aircraft blast, sod shall be pegged or pinned.

Adjacent to curbs, sidewalks or other vertical edges the soil shall be notched to a depth sufficient to prevent the roots of the sod from being exposed. Along paved side ditches, inlets, structures or gutters, the sod shall be lapped over the edge of the item.

904-3.6 WATERING. Adequate water and watering equipment must be on hand before sodding begins, and sod shall be kept moist until it has become established and its continued growth assured. In all cases, watering shall be done in a manner which will avoid erosion from the application of excessive quantities and will avoid damage to the finished surface.

### 904-3.7 ESTABLISHING TURF

- a) General. The Contractor shall provide general care for the sodded areas as soon as the sod has been laid and shall continue until final inspection and acceptance of the work.
- b) Protection. All sodded areas shall be protected against traffic or other use by warning signs or barricades approved by the Engineer.
- c) Mowing. The Contractor shall mow the sodded areas with approved mowing equipment, depending upon climatic and growth conditions and the needs for mowing specific areas.
- d) In the event that weeds or other undesirable vegetation are permitted to grow to such an extent that, either cut or uncut, they threaten to smother the sodded species, they shall be mowed and the clippings raked and removed from the area.

904-3.8 REPAIRING. When the surface has become gullied or otherwise damaged during the period covered by this contract, the affected areas shall be repaired to re-establish the grade and the condition of the soil, as directed by the Engineer, and shall then be re-sodded as specified in 904-3.5.

The Contractor shall not be responsible for damage to any sodded area resulting from public traffic after final acceptance of the project.

904-3.9 GUARANTEE. The Contractor shall guarantee work covered by this specification to the extent that all sod shall be firmly rooted and that the entire sodded area shall be uniform in color and quality and shall be reasonable free of weeds, disease, or other visible imperfections at acceptance and for a period of 1 year from

**T-904 SODDING**

final acceptance. Sod determined unacceptable by the Engineer shall be replaced by the Contractor without additional payment.

904-4.1 METHOD OF MEASUREMENT. This item shall be measured on the basis of the area in square yards of the surface covered with sod and accepted.

904-5.1 BASIS OF PAYMENT. This item will be paid for on the basis of the contract unit price per square yard for sodding, which price shall be full compensation for all labor, equipment, material, staking, and incidentals necessary to satisfactorily complete the items as specified.

Payment will be made under:

Item No. \_\_\_\_\_ T-904 Sodding -- per square yard

**TESTING AND MATERIAL REQUIREMENTS**

Test and short title                      Material and short title

None    None

END OF SECTION



## T-905 TOPSOILING

905-1.1 DESCRIPTION. This item shall consist of preparing the ground surface for topsoil application, removing topsoil from areas to be stripped on the site, or from approved sources off the site, and placing and spreading the topsoil on prepared areas in accordance with this specification at the locations shown on the plans.

905-2.1 MATERIALS - TOPSOIL. Topsoil shall be the surface layer of soil with no admixture of refuse or any material toxic to plant growth, and it shall be reasonably free from subsoil and stumps, roots, brush stones (2 inches or more in diameter), clay lumps, or similar objects. Brush and other vegetation which will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sods and herbaceous growth such as grass and weeds are not to be removed but shall be thoroughly broken up and intermixed with the soil during handling operations. The topsoil or soil mixture, unless otherwise specified or approved, shall have a pH range of approximately 5.5 pH to 7.6 pH, when tested in accordance with the methods of testing of the Association of Official Agricultural Chemists in effect on the date of invitation of bids. The organic content shall be not less than 5% nor more than 20% as determined by the wet-combustion method (chromic acid reduction). There shall be not less than 20% nor more than 80% of the material passing the 200-mesh sieve as determined by the wash test in accordance with AASHTO 11.

**Natural topsoil may be amended by the Contractor with approved materials and methods to meet the above specifications.**

905-2.2 INSPECTION AND TESTS. Within 10 days following acceptance of the bid, the Engineer shall be notified of the source of topsoil to be furnished by the Contractor. The topsoil shall be inspected to determine if the selected soil meets the requirements specified and to determine the depth to which stripping will be permitted. At this time, the Contractor may be required to take representative soil samples from several locations within the area under consideration and to the proposed stripping depths for testing purposes as specified in 905-2.1.

905-3.1 CONSTRUCTION METHODS - GENERAL. Areas to be topsoiled shall be areas requiring seeding and borrow areas, if used. If topsoil is available on the site, the location areas to be stripped of topsoil and the stripping depths shall be shown on the plans.

Suitable equipment necessary for proper preparation and treatment of the ground surface, stripping of topsoil and for the handling and placing of all required materials shall be on hand, in good condition, and approved by the Engineer before the various operations are started.

905-3.2 PREPARING THE GROUND SURFACE. Immediately prior to dumping and spreading the topsoil on any area, the surface shall be loosened by discs or spike-tooth harrows, or by other means approved by the Engineer, to a minimum depth of 2 inches to facilitate bonding of the topsoil to the covered subgrade soil. The surface of the area to be topsoiled shall be cleared of all stones larger than 2 inches in any diameter and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting. Limited areas, as shown on the plans, which are too compact to respond to these operations, shall receive special scarification.

Grades on the area to be topsoiled shall be maintained in a true and even condition.

905-3.3 OBTAINING TOPSOIL. Prior to the stripping of topsoil from designated areas any vegetation, briars, stumps, large roots, rubbish, or stones found on such areas which may interfere with subsequent operations shall be removed using methods approved by the Engineer. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means, shall be removed.

When suitable topsoil is available on the site, the Contractor shall remove this material from the designated areas and to the depth as directed by the Engineer. The topsoil shall be spread on areas already tilled and smooth-graded, or stockpiled in areas approved by the Engineer. The sites of all stockpiles and areas adjacent thereto which have been disturbed by the Contractor shall be graded if required and put into a condition acceptable for seeding.

## T-905 TOPSOILING

When suitable topsoil is secured off the airport site, the Contractor shall locate and obtain the supply, subject to the approval of the Engineer. The Contractor shall notify the Engineer sufficiently in advance of operations in order that necessary measurements and tests can be made. The Contractor shall remove the topsoil from approved areas and to the depth as directed. The topsoil shall be hauled to the site of the work and placed for spreading, or spread as required. Any topsoil hauled to the site of the work and stockpiled shall be re-handled and placed without additional compensation.

905-3.4 PLACING TOPSOIL. The topsoil shall be evenly spread on the prepared areas to a uniform minimum depth of 4 inches after compaction, unless otherwise shown on the plans. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. Spreading shall be carried on so that turfing operations can proceed with a minimum of soil preparation or tilling.

After spreading, any large, stiff clods and hard lumps shall be broken with a pulverizer or by other effective means, and all stones or rocks (2 inches or more in diameter), roots, litter, or any foreign matter shall be raked up and disposed of by the Contractor. After spreading is completed, the topsoil shall be satisfactorily compacted by rolling with a cultipacker or by other means approved by the Engineer. The compacted topsoil surface shall conform to the required lines, grades, and cross sections. Any topsoil or other dirt falling upon pavements as a result of hauling of topsoil shall be promptly removed.

905-4.1 METHOD OF MEASUREMENT. The yardage of topsoil will not be considered as a quantity measured separately, but shall be a part of Item P-152, Excavation.

905-5.1 BASIS OF PAYMENT. Payment will be made part of Item P-152 Excavation.

### TESTING AND MATERIAL REQUIREMENTS

Test and short title	Material and short title
AASHTO T 11 - Gradation	None

END OF SECTION

## Section 70-23 Security

70-23 SECURITY. The Contractor assures that no action by his operation will cause a safety and/or security violation of the Airports Operation Manual or Federal Aviation Administration regulations. Any fines and/or penalty costs incurred as a result of the Contractor's failure to comply with Airport or FAA regulations shall be the sole responsibility of the Contractor.

Any employee of a contractor or subcontractor who may be a risk to public safety as determined by the Airport Authority will be prohibited from entering a secured area.

Contractor shall provide all equipment and vehicle markings and barricades as required per FAA Advisory Circular 150/5370-2E, "Operations Safety on Airports During Construction." Each vehicle/piece of equipment operating within the secured area shall have the contractor's name prominently displayed on each side of the vehicle/piece of equipment and shall display an orange/white checkered flag or flashing yellow light.

- A. Operational areas for aircraft shall be maintained at all times. IAA shall coordinate the locations of these areas with the airlines.
- B. When notified by IAA the contractor shall provide an escort for Union Representatives requesting access to any project located within airport security-controlled areas. for the conduct of official union business.. Union representatives must be escorted at all times they are within security- controlled areas.

Contractor shall be responsible for completing daily Secure Area Access Control and Secure Area Vehicle Control Rosters listing all personnel and vehicles that will be operating on the project for that day. The list will then be delivered, by fax, to the Airport Access Control Manager (487-5078) prior to the start of each workday. A copy of this list will then be forwarded to Gate Security Personnel where it will be used as the approval list for that day. Approval lists are valid only for the workday on which they were signed and as such will expire at the end of that same workday. (Note: Weekly lists may be authorized, on an as needed basis, at the discretion of the Access Control Manager).

Contractor must provide sufficient, Airport authorized, security personnel at appropriate locations to ensure that the security of the AOA is maintained at all times.

Contractors on-site in security-controlled areas (AOA or SIDA) must be escorted to and from the jobsite by airport approved escort personnel. At no time shall Contractor personnel proceed unescorted into a security-controlled area. Appropriate security supervision must accompany the Contractor personnel at all times Contractor is in the AOA or SIDA to assure that security is not compromised and proper airside security procedures are followed. This may include the provision of "Flagpersons" at designated locations where vehicular traffic crosses active movement areas (Taxiways). When required, these "Flagpersons" as well as the Flagperson's escort drivers must confirm, by personnel observation, that no aircraft is approaching their position when given clearance to cross the movement area. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time. One Escort may move a maximum of two vehicles at a time through the AOA.

**Section 70**  
**Legal Relations and Responsibility to the Public**

Additional on-site supervision within designated work limits located inside security-controlled areas (AOA or SIDA) may require the use of approved "Crew Guards". When indicated, these Crew Guards will be responsible to provide full-time visual surveillance of all contractor or subcontractor personnel. When required, the ratio of Construction Personnel to Crew Guards shall not exceed 6:1. In addition, if a worker within the designated work limits needs to leave for any reason they must be escorted out of the area by an approved escort. In the event a Crew Guard is also approved as an Escort he may lead the individual out of the area only if the required number of Crew Guards remains available within the work limits. NOTE: Workers cannot be left with "Flagpersons" as they are to be dedicated exclusively to the safe passage of vehicular traffic across active movement areas. All Crew Guards, Flagpersons and Escorts are to be supplied by the Contractor.

Throughout the project, the perimeter of the airfield must be secured at all times in accordance with FAA standards. During periods of non-work, in the case that the integrity of the secure perimeter fence is compromised, i.e. does not comply with FAR standards (concrete secured posts, 6' minimum fabric height, top-rail, and barbed wire); the Contractor must erect a sufficient physical barrier, fabric, wire, or other adequate barrier to restrict access to the compromised area and supply appropriate on-site security personnel to prevent unauthorized entry into secured areas. Failure to comply with airfield security regulations shall result in TSA levied fines being levied, payment of which will be the responsibility of the Contractor.

Access to the job site by all Contractor and subcontractor personnel will be restricted to those gates identified in the documents. Only those gates identified will be used for construction related access to security-controlled areas.

The following companies are approved to provide this service at Indianapolis International Airport:

<i>Protection Plus</i>	<i>White Security</i>	<i>Aviation Security Company</i>
<i>2345 S. Lynhurst Drive</i>	<i>8146 McFarland Road</i>	<i>4264 Hadleigh Drive</i>
<i>Indianapolis, IN 46241</i>	<i>Indianapolis, IN 46227</i>	<i>Indianapolis, IN 46241</i>
<i>317-244-7569</i>	<i>317-882-7195</i>	<i>317-856-5533</i>

Any employee of a contractor or subcontractor who may be a risk to public safety as determined by the Airport Authority or the Construction Manager will be prohibited from entering the Site.

**Section 70**  
**Legal Relations and Responsibility to the Public**

**Access Control Procedures**  
**(Airfield Construction Projects)**  
**Revised March 2006**

- 1) **All vehicles will be stopped** at the access gate prior to being granted access into any restricted area or SIDA (*Including marked Airport vehicles*). Every vehicle will be required to have:
  - Company Logo or other form of Company identification prominently visible on the vehicle
  - Yellow flashing light is displayed on vehicle such that it is visible for 360° or vehicle has an Orange and White checkered flag prominently displayed
  - Airport vehicles may have strobe lights at all four corners of vehicle instead of yellow light or flag
  - Valid vehicle identification tag matching daily Vehicle Control Roster (Contractor vehicles)
  - Correct color placard as specified on daily Access Control Roster (Issued when accessing the AOA for the first time of the day) – (If required for project)
  - Number on placard matches number listed for that vehicle on daily Vehicle Control Roster – (If required for project)
- 2) **All individuals will be stopped prior to entering airfield** to ensure the following: (Physical contact must be made of ALL ID's)
  - **Contractors**
    - Name and picture on Drivers License or Government ID matches name on daily Access Control Roster and person presenting ID
    - Last four digits of Drivers License match those listed on daily Access Control Roster
  - **Airport Personnel**
    - Picture on Airport ID matches person presenting ID
    - Name listed on ID is not on latest "Stop list"
  - **Passengers in Airport Vehicles**
    - Airport personnel identification shall be validated as above
    - Non-airport personnel will be required to present valid Operators License or other valid government issued picture identification
    - Gate guards shall maintain a list of all non-airport employees escorted by or accompanying airport employees. List must include the following:
      - a. Individuals name
      - b. Type of identification media presented and ID number
      - c. Name of airport personnel providing escort
      - d. Vehicle number in which the individual is traveling (if applicable)
  - **Escort Personnel**
    - Picture on Airport ID matches person presenting ID
    - Name and last four digits of Drivers License match those listed on daily Access Control Roster
    - Name listed on ID is not on latest "Stop list"
- 3) **Emergencies**
  - If an unauthorized person should gain access, the Airport Control Center should be contacted **IMMEDIATELY @ 487-5093**
  - In the event a person attempts to gain improper access the person should be denied access and the Airport Control Center notified immediately @ 487-5093.
  - ALL emergencies of any type should be immediately reported to the Airport Control Center @ 487-5093.

**END OF SECTION**



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

# Advisory Circular

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**Subject:** OPERATIONAL SAFETY ON  
AIRPORTS DURING CONSTRUCTION

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**Date:** 1/17/03

**AC No:** 150/5370-2E

**Initiated by:** AAS-300

**Change:**

## 1. THE PURPOSE OF THIS ADVISORY CIRCULAR (AC).

Aviation safety is the primary consideration at airports, especially during construction. This AC sets forth guidelines for operational safety on airports during construction. It contains major changes to the following areas: "Runway Safety Area," paragraph 3-2; "Taxiway Safety Areas/Object-Free Areas," paragraph 3-3; "Overview," paragraph 3-4; "Marking Guidelines for Temporary Threshold," paragraph 3-5; and "Hazard Marking and Lighting," paragraph 3-9.

## 2. WHAT THIS AC CANCELS.

This AC cancels AC 150/5370-2D, *Operational Safety on Airports During Construction*, dated May 31, 2002.

## 3. READING MATERIAL RELATED TO THIS AC.

Appendix 1 contains a list of reading materials on airport construction, design, and potential safety hazards during construction, as well as instructions for ordering these documents. Many of them, including this AC, are available on the Federal Aviation Administration (FAA) Web site.

## 4. WHO THIS AC AFFECTS.

DAVID L. BENNETT

Director, Office of Airport Safety and Standards

This AC assists airport operators in complying with 14 Code of Federal Regulations (CFR), part 139, Certification and Operation: Land Airports Serving Certain Air Carriers, and with the requirements of airport construction projects receiving funds under the Airport Improvement Program or from the Passenger Facility Charge Program. While the FAA does not require noncertificated airports without grant agreements to adhere to these guidelines, we recommend that they do so as it will help these airports maintain a desirable level of operational safety during construction.

## 5. ADDITIONAL BACKGROUND INFORMATION.

**Appendix 2 contains definitions of terms used in this AC. Appendix 3 provides airport operators with boilerplate format and language for developing a safety plan for an airport construction project. Appendix 4 is a sample Notice to Airmen form.**

## 6. HAZARD LIGHTING IMPLEMENTATION TIME LINE.

Supplemental hazard lighting must be red in color by October 1, 2004. See paragraph 3-9 for more information.

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## **CHAPTER 1. GENERAL SAFETY REQUIREMENTS AND RESPONSIBILITIES**

### **1-1. OVERVIEW.**

Hazardous practices and marginal conditions created by construction activities can decrease or jeopardize operational safety on airports. To minimize disruption of normal aircraft operations and to avoid situations that compromise the airport's operational safety, the airport operator must carefully plan, schedule, and coordinate construction activities. While the guidance in this AC is primarily used for construction operations, some of the methods and procedures described may also enhance day-to-day maintenance operations.

### **1-2. WHO IS RESPONSIBLE FOR SAFETY DURING CONSTRUCTION.**

An airport operator has overall responsibility for construction activities on an airport. This includes the predesign, design, preconstruction, construction, and inspection phases. Additional information on these responsibilities can be found throughout this AC.

#### **a. Airport operator's responsibilities—**

- (1) Develop internally or approve a construction safety plan developed by an outside consultant/contractor that complies with the safety guidelines in Chapter 2, "Safety Plans," and Appendix 3, "Airport Construction Safety Planning Guide," of this AC.
- (2) Require contractors to submit plans indicating how they intend to comply with the safety requirements of the project.
- (3) Convene a meeting with the construction contractor, consultant, airport employees, and, if appropriate, tenant sponsor to review and discuss project safety before beginning construction activity.
- (4) Ensure contact information is accurate for each representative/point of contact identified in the safety plan.
- (5) Hold weekly or, if necessary, daily safety meetings to coordinate activities.
- (6) Notify users, especially aircraft rescue and fire fighting (ARFF) personnel, of construction activity and conditions that may adversely affect the operational safety of the airport via Notices to Airmen (NOTAMs) or other methods, as appropriate. Convene a meeting for review and discussion if necessary.

(7) Ensure that construction personnel know of any applicable airport procedures and of changes to those procedures that may affect their work.

(8) Ensure that construction contractors and subcontractors undergo training required by the safety plan.

(9) Develop and/or coordinate a construction vehicle plan with airport tenants, the airport traffic control tower (ATCT), and construction contractors. Include the vehicle plan in the safety plan. See Chapter 2, section 2, of this AC for additional information.

(10) Ensure tenants and contractors comply with standards and procedures for vehicle lighting, marking, access, operation, and communication.

(11) At certificated airports, ensure that each tenant's construction safety plan is consistent with 14 CFR part 139, Certification and Operations: Land Airports Serving Certain Air Carriers.

(12) Conduct frequent inspections to ensure construction contractors and tenants comply with the safety plan and that altered construction activities do not create potential safety hazards.

(13) Resolve safety deficiencies immediately.

(14) Ensure construction access complies with the security requirements of 49 CFR part 1542, Airport Security.

(15) Notify appropriate parties when conditions exist that invoke provisions of the safety plan (e.g., implementation of low-visibility operations).

#### **b. Construction contractor's responsibilities—**

- (1) Submit plans to the airport operator on how to comply with the safety requirements of the project.
- (2) Have available a copy of the project safety plan.
- (3) Comply with the safety plan associated with the construction project and ensure that construction personnel are familiar with safety procedures and regulations on the airport.
- (4) Provide a point of contact who will coordinate an immediate response to correct any construction-related activity that may adversely affect the operational safety of the airport.
- (5) Provide a safety officer/construction inspector familiar with airport safety to monitor construction activities.
- (6) Restrict movement of construction vehicles to construction areas by flagging and barricading, erecting temporary fencing, or providing escorts, as appropriate.

(7) Ensure that no construction employees, employees of subcontractors or suppliers, or other persons enter any part of the air operations areas (AOAs) from the construction site unless authorized.

**c. Tenant’s responsibilities if planning construction activities on leased property—**

(1) Develop a safety plan, and submit it to the airport operator for approval prior to issuance of a Notice to Proceed.

(2) Provide a point of contact who will coordinate an immediate response to correct any

construction-related activity that may adversely affect the operational safety of the airport.

(3) Ensure that no tenant or construction employees, employees of subcontractors or suppliers, or any other persons enter any part of the AOA from the construction site unless authorized.

(4) Restrict movement of construction vehicles to construction areas by flagging and barricading or erecting temporary fencing.

## **CHAPTER 2. SAFETY PLANS**

### **Section 1. Basic Safety Plan Considerations**

#### **2-1. OVERVIEW.**

Airport operators should coordinate safety issues with the air carriers, FAA Airway Facilities, and other airport tenants before the design phase of the project. The airport operator should identify project safety concerns, requirements, and impacts before making arrangements with contractors and other personnel to perform work on an airport. These safety concerns will serve as the foundation for the construction safety plan and help maintain a high level of aviation safety during the project. The airport operator should determine the level of complexity of the safety plan that is necessary for each construction project and its phases. The safety plan may be detailed in the specifications included in the invitation for bids, or the invitation for bid may specify that the contractor develop the safety plan and the airport operator approve it. In the latter case, the invitation for bid should contain sufficient information to allow the contractor to develop and determine the costs associated with the safety plan. In either case, safety plan costs should be incorporated into the total cost of the project. The airport operator has final approval authority and responsibility for all safety plans. Coordination will vary from formal predesign conferences to informal contacts throughout the duration of the construction project. Details of a specified safety plan, or requirements for a contractor-developed safety plan, should be discussed at the predesign and preconstruction conferences and should include the following, as appropriate:

- a.** Actions necessary before starting construction, including defining and assigning responsibilities.
- b.** Basic responsibilities and procedures for disseminating instructions about airport procedures to the contractor's personnel.
- c.** Means of separating construction areas from aeronautical-use areas.

- d.** Navigational aid (NAVAID) requirements and weather.
- e.** Marking and lighting plan illustrations.
- f.** Methods of coordinating significant changes in airport operations with all the appropriate parties.

**2-2. SAFETY PLAN CHECKLIST.**

To the extent applicable, the safety plan should address the following:

- a. Scope of work to be performed, including proposed duration of work.
- b. Runway and taxiway marking and lighting.
- c. Procedures for protecting all runway and taxiway safety areas, obstacle-free zones (OFZs), object-free areas (OFAs), and threshold citing criteria outlined in AC 150/5300-13, *Airport Design*, and as described in this AC. This includes limitations on equipment height and stockpiled material.
- d. Areas and operations affected by the construction activity, including possible safety problems.
- e. NAVAIDs that could be affected, especially critical area boundaries.
- f. Methods of separating vehicle and pedestrian construction traffic from the airport movement areas. This may include fencing off construction areas to keep equipment operators in restricted areas in which they are authorized to operate. Fencing, or some other form of restrictive barrier, is an operational necessity in some cases.
- g. Procedures and equipment, such as barricades (identify type), to delineate closed construction areas from the airport operational areas, as necessary.
- h. Limitations on construction.
- i. Required compliance of contractor personnel with all airport safety and security measures.
- j. Location of stockpiled construction materials, construction site parking, and access and haul roads.
- k. Radio communications.
- l. Vehicle identification.
- m. Trenches and excavations and cover requirements.
- n. Procedures for notifying ARFF personnel if water lines or fire hydrants must be deactivated or if emergency access routes must be rerouted or blocked.
- o. Emergency notification procedures for medical and police response.
- p. Use of temporary visual aids.
- q. Wildlife management.
- r. Foreign object debris (FOD) control provisions.
- s. Hazardous materials (HAZMAT) management.
- t. NOTAM issuance.
- u. Inspection requirements.
- v. Procedures for locating and protecting existing underground utilities, cables, wires, pipelines, and other underground facilities in excavation areas.
- w. Procedures for contacting responsible representatives/points of contact for all involved parties. This should include off-duty contact information so an immediate response may be coordinated to correct any construction-related activity that could adversely affect the operational safety of the airport. Particular care should be taken to ensure that appropriate Airways Facilities personnel are identified in the event that an unanticipated utility outage or cable cut occurs that impacts FAA NAVAIDs.
- x. Vehicle operator training.
- y. Penalty provisions for noncompliance with airport rules and regulations and the safety plan (e.g., if a vehicle is involved in a runway incursion).
- z. Any special conditions that affect the operation of the airport and will require a portion of the safety plan to be activated (e.g., low-visibility operations, snow removal).

## **Section 2. Safety and Security Measures**

**2-3. OVERVIEW.**

Airport operators are responsible for closely monitoring tenant and construction contractor activity during the construction project to ensure continual compliance with all safety and security requirements. Airports subject to 49 CFR part 1542, Airport Security, must meet

standards for access control, movement of ground vehicles, and identification of construction contractor and tenant personnel. In addition, airport operators should use safety program standards, as described in Chapter 3 of this AC, to develop specific safety measures to which tenants and construction contractors must

adhere throughout the duration of construction activities.

General safety provisions are contained in AC 150/5370-10, *Standards for Specifying Construction of Airports*, paragraphs 40-05, “Maintenance of Traffic”; 70-08, “Barricades, Warning Signs, and Hazard Markings”; and 80-04, “Limitation of Operations.” At any time during construction, aircraft operations, weather, security, or local airport rules may dictate more stringent safety measures. The airport operator should ensure that both general and specific safety requirements are coordinated with airport tenants and ATCT personnel. The airport operator should also include these parties in the coordination of all bid documents, construction plans, and specifications for on-airport construction projects.

#### **2-4. VEHICLE OPERATION AND MARKING AND PEDESTRIAN CONTROL.**

Vehicle and pedestrian access routes for airport construction projects must be controlled to prevent inadvertent or unauthorized entry of persons, vehicles, or animals onto the AOA. This includes aircraft movement and nonmovement areas. The airport operator should develop and coordinate a construction vehicle plan with airport tenants, contractors, and the ATCT. The safety plan or invitation for bid should include specific vehicle and pedestrian requirements.

The vehicle plan should contain the following items:

- a. Airport operator’s rules and regulations for vehicle marking, lighting, and operation.
- b. Requirements for marking and identifying vehicles in accordance with AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*.
- c. Description of proper vehicle operations on movement and nonmovement areas under normal, lost communications, and emergency conditions.
- d. Penalties for noncompliance with driving rules and regulations.
- e. Training requirements for vehicle drivers to ensure compliance with the airport operator’s vehicle rules and regulations.

f. Provisions for radio communication training for construction contractor personnel engaged in construction activities around aircraft movement areas. Some drivers, such as construction drivers under escort, may not require this training.

g. Escort procedures for construction vehicles requiring access to aircraft movement areas. A vehicle in the movement area must have a working aviation-band, two-way radio unless it is under escort. Vehicles can be in closed areas without a radio if the closed area is properly marked and lighted to prevent incursions and a NOTAM regarding the closure is issued.

h. Monitoring procedures to ensure that vehicle drivers are in compliance with the construction vehicle plan.

i. Procedures for, if appropriate, personnel to control access through gates and fencing or across aircraft movement areas.

#### **2-5. CONSTRUCTION EMPLOYEE PARKING AREAS.**

Designate in advance vehicle parking areas for contractor employees to prevent any unauthorized entry of persons or vehicles onto the airport movement area. These areas should provide reasonable contractor employee access to the job site.

#### **2-6. CONSTRUCTION VEHICLE EQUIPMENT PARKING.**

Construction employees must park and service all construction vehicles in an area designated by the airport operator outside the runway safety areas and OFZs and never on a closed taxiway or runway. Employees should also park construction vehicles outside the OFA when not in use by construction personnel (e.g., overnight, on weekends, or during other periods when construction is not active). Parking areas must not obstruct the clear line of sight by the ATCT to any taxiways or runways under air traffic control nor obstruct any runway visual aids, signs, or navigational aids. The FAA must also study those areas to determine effects on 14 CFR part 77, *Objects Affecting Navigable Airspace*, surfaces (see paragraph 2-13 for further information).

**2-7. RADIO COMMUNICATION TRAINING.**

The airport operator must ensure that tenant and construction contractor personnel engaged in activities involving unescorted operation on aircraft movement areas observe the proper procedures for communications, including using appropriate radio frequencies at airports with and without ATCTs. Training of contractors on proper communication procedures is essential for maintaining airport operational safety.

When operating vehicles on or near open runways or taxiways, construction personnel must understand the critical importance of maintaining radio contact with airport operations, ATCT, or the Common Traffic Advisory Frequency, which may include UNICOM, MULTICOM, or one of the FAA Flight Service Stations (FSS), as directed by airport management.

Vehicular traffic crossing active movement areas must be controlled either by two-way radio with the ATCT, escort, flagman, signal light, or other means appropriate for the particular airport. Vehicle drivers must confirm by personal observation that no aircraft is approaching their position when given clearance to cross a runway. In addition, it is the responsibility of the escort vehicle driver to verify the movement/position of all escorted vehicles at any given time.

Even though radio communication is maintained, escort vehicle drivers must also

familiarize themselves with ATCT light gun signals in the event of radio failure (see the FAA safety placard “Ground Vehicle Guide to Airport Signs and Markings”). This safety placard may be ordered through the Runway Safety Program Web site at <http://www.faarsp.org> or obtained from the Regional Airports Division Office.

**2-8. FENCING AND GATES.**

Airport operators and contractors must take care to maintain a high level of safety and security during construction when access points are created in the security fencing to permit the passage of construction vehicles or personnel. Temporary gates should be equipped so they can be securely closed and locked to prevent access by animals and people (especially minors). Procedures should be in place to ensure that only authorized persons and vehicles have access to the AOA and to prohibit “piggybacking” behind another person or vehicle. The Department of Transportation (DOT) document DOT/FAA/AR-00/52, *Recommended Security Guidelines for Airport Planning and Construction*, provides more specific information on fencing. A copy of this document can be obtained from the Airport Consultants Council, Airports Council International, or American Association of Airport Executives.

**Section 3. Notification of Construction Activities****2-9. GENERAL.**

In order to maintain the desired levels of operational safety on airports during construction activities, the safety plan should contain the notification actions described below.

**2-10. ENSURING PROMPT NOTIFICATIONS.**

The airport operator should establish and follow procedures for the immediate notification of airport users and the FAA of any conditions adversely affecting the operational safety of an airport.

**2-11. NOTICES TO AIRMEN (NOTAMS).**

The airport operator must provide information on closed or hazardous conditions on airport movement areas to the FSS so it can issue a NOTAM. The airport operator must coordinate the issuance, maintenance, and cancellation of NOTAMs about airport conditions resulting from construction activities with tenants and the local air traffic facility (control tower, approach control, or air traffic control center. Refer to AC 150/5200-28, *Notices to Airmen (NOTAMS) for Airport Operators*, and Appendix 4 in this AC for a sample NOTAM form. Only the FAA

may issue or cancel NOTAMs on shutdown or irregular operation of FAA-owned facilities. Only the airport operator or an authorized representative may issue or cancel NOTAMs on airport conditions. (The airport owner/operator is the only entity that can close or open a runway.) The airport operator must file and maintain this list of authorized representatives with the FSS. Any person having reason to believe that a NOTAM is missing, incomplete, or inaccurate must notify the airport operator.

#### **2-12. AIRCRAFT RESCUE AND FIRE FIGHTING (ARFF) NOTIFICATION.**

The safety plan must provide procedures for notifying ARFF personnel, mutual aid providers, and other emergency services if construction requires shutting off or otherwise disrupting any water line or fire hydrant on the airport or adjoining areas and if contractors work with hazardous material on the airfield. Notification procedures must also be developed for notifying ARFF and all other emergency personnel when the work performed will close or affect any emergency routes. Likewise, the procedures must address appropriate notifications when services are restored.

#### **2-13. NOTIFICATION TO THE FAA.**

For certain airport projects, 14 CFR part 77 requires notification to the FAA. In addition to applications made for Federally funded construction, 14 CFR part 157, Notice of Construction, Alteration, Activation, and Deactivation of Airports, requires that the airport operator notify the FAA in writing whenever a non-Federally funded project involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport. Notification involves submitting FAA Form 7480-1, Notice of Landing Area Proposal, to the nearest FAA Regional Airports Division Office or Airports District Office.

Also, any person proposing any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR part 77 must notify the FAA. This includes construction equipment and proposed parking areas for this equipment (i.e., cranes, graders, etc.). FAA Form 7460-1, Notice of Proposed Construction or Alteration, can be used for this purpose and submitted to the FAA Regional Airports Division Office or Airports District Office. (See AC 70/7460-2, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace.*)

If construction operations require a shutdown of an airport owned NAVAID from service for more than 24 hours or in excess of 4 hours daily on consecutive days, we recommend a 45-day minimum notice prior to facility shutdown. Coordinate work for a FAA owned NAVAID shutdown with the local FAA Airways Facilities Office. In addition, procedures that address unanticipated utility outages and cable cuts that could impact FAA NAVAIDs must be addressed.

#### **2-14. WORK SCHEDULING AND ACCOMPLISHMENT.**

Airport operators—or tenants having construction on their leased properties—should use predesign, prebid, and preconstruction conferences to introduce the subject of airport operational safety during construction (see AC 150/5300-9, *Predesign, Prebid, and Preconstruction Conferences for Airport Grant Projects*). The airport operator, tenants, and construction contractors should integrate operational safety requirements into their planning and work schedules as early as practical. Operational safety should be a standing agenda item for discussion during progress meetings throughout the project. The contractor and airport operator should carry out onsite inspections throughout the project and immediately remedy any deficiencies, whether caused by negligence, oversight, or project scope change.

## **CHAPTER 3. SAFETY STANDARDS AND GUIDELINES**

### **Section 1. Runway and Taxiway Safety Areas, Obstacle-Free Zones, and Object-Free Areas**

#### **3-1. OVERVIEW.**

Airport operators must use these safety guidelines when preparing plans and specifications for construction activities in areas that may interfere with aircraft operations. The safety plan should recognize and address these standards for each airport construction project. However, the safety plan must reflect the specific needs of a particular project, and for this reason, these safety guidelines should not be incorporated verbatim into project specifications. For additional guidance on meeting safety and security requirements, refer to the planning guide template included in Appendix 3 of this AC.

#### **3-2. RUNWAY SAFETY AREA (RSA)/ OBSTACLE-FREE ZONE (OFZ).**

A runway safety area is the defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway (see AC 150/5300-13, *Airport Design*). Construction activities within the standard RSA are subject to the following conditions:

##### **a. Runway edges.**

(1) No construction may occur closer than 200 feet (60m) from the runway centerline unless the runway is closed or restricted to aircraft operations, requiring an RSA that is equal to the RSA width available during construction, or 400 feet, whichever is less (see AC 150/5300-13, Tables 3-1 through 3-3).

(2) Personnel, material, and/or equipment must not penetrate the OFZ, as defined in AC 150/5300-13.

(3) The airport operator must coordinate the construction activity in the RSA as permitted above with the ATCT and the FAA Regional Airports Division Office or

appropriate Airports District Office and issue a local NOTAM.

##### **b. Runway ends.**

(1) An RSA must be maintained of such dimensions that it extends beyond the end of the runway a distance equal to that which existed before construction activity, unless the runway is closed or restricted to aircraft operations for which the reduced RSA is adequate (see AC 150/5300-13). The temporary use of declared distances and/or partial runway closures may help provide the necessary RSA.

In addition, all personnel, materials, and/or equipment must remain clear of the applicable threshold siting surfaces, as defined in Appendix 2, "Threshold Siting Requirements," of AC 150/5300-13.<sup>1</sup> Consult with the appropriate FAA Regional Airports Division Office or Airports District Office to determine the appropriate approach surface required.

(2) Personnel, material, and/or equipment must not penetrate the OFZ, as defined in AC 150/5300-13.

(3) The safety plan must provide procedures for ensuring adequate distance for blast protection, if required by operational considerations.

(4) The airport operator must coordinate construction activity in this portion of the RSA with the ATCT and the FAA Regional Airports Division Office or appropriate Airports District Office and issue a local NOTAM.

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<sup>1</sup>If a full safety area cannot be obtained through declared distances and partial closures, or other methods such as alternate runway use, construction activity may operate in the RSA as long as conditions cited in paragraph 3-1b(2) thru (4) are met. In addition, various surfaces outlined in AC 150/5300-13 and Terminal Instrument Procedures (TERPS) must be protected through an aeronautical study.

### c. Excavations.

(1) Construction contractors must prominently mark open trenches and excavations at the construction site with red or orange flags, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness.

(2) Open trenches or excavations are not permitted within 200 feet (60m) of the runway centerline and at least the existing RSA distance from the runway threshold while the runway is open. If the runway must be opened before excavations are backfilled, cover the excavations appropriately. Coverings for open trenches or excavations must be of sufficient strength to support the weight of the heaviest aircraft operating on the runway.

### 3-3. TAXIWAY SAFETY AREAS/OBJECT-FREE AREAS.

a. Unrestricted construction activity is permissible adjacent to taxiways when the taxiway is restricted to aircraft such that the available taxiway safety area is equal to at least ½ of the widest wingspan of the aircraft expected to use the taxiway and the available taxiway object-free area is equal to at least .7 times the widest wingspan plus 10 feet. (See AC 150/5300-13 for guidance on taxiway safety and object-free areas.)

Construction activity may be accomplished closer to a taxiway, subject to the following restrictions:

- (1) The activity is first coordinated with the airport operator.
- (2) Appropriate NOTAMs are issued.
- (3) Marking and lighting meeting the provisions of paragraph 3-9 are implemented.
- (4) Adequate clearance is maintained between equipment and materials and any part of an aircraft. If such clearance can only be maintained if an aircraft does not have full use of the entire taxiway width (with its main landing gear at the edge of the pavement), then it will be necessary to move personnel and equipment for each passing aircraft. In these situations, flag persons will be used to direct construction equipment, and wing walkers may be necessary to guide aircraft. Wing walkers should be airline/aviation personnel rather than construction workers.

b. Construction contractors must prominently mark open trenches and excavations at the construction site, as approved by the airport operator, and light them with red lights during hours of restricted visibility or darkness

c. Excavations and open trenches may be permitted up to the edge of a structural taxiway and apron pavement provided the dropoff is marked and lighted per paragraph 3-9, "Hazard Marking and Lighting."

## Section 2. Temporary Runway Thresholds

### 3-4. OVERVIEW.

Construction activity in a runway approach area may result in the need to partially close a runway or displace the existing runway threshold. In either case, locate the threshold in accordance with Appendix 2 of AC 150/5300-13, *Airport Design*. Objects that do not penetrate these surfaces may still be obstructions to air navigation and may affect standard instrument approach procedures. Coordinate these objects with the FAA's Regional Airports Office or appropriate Airports District Office, as necessary. Refer to the current edition of AC 150/5300-13 for guidance on threshold siting requirements. The partial

runway closure, the displacement of the runway threshold, as well as closures of the complete runway and other portions of the movement area also requires coordination with appropriate ATCT personnel and airport users.

#### **Caution regarding partial runway closures:**

When filing a NOTAM for a partial runway closure, clearly state to FSS personnel that the portion of pavement located prior to the threshold is not available for landing and departing traffic. In this case, the threshold has been moved for both landing and takeoff purposes (this is different than a displaced threshold).

Example NOTAM: "North 1,000 feet of Runway 18/36 is closed; 7,000 feet remain

available on Runway 18 and Runway 36 for arrivals and departures.” There may be situations where the portion of closed runway is available for taxiing only. If so, the NOTAM must reflect this condition.

**Caution regarding displaced thresholds:**

Implementation of a displaced threshold affects runway length available for aircraft landing over the displacement. Depending on the reason for the displacement (to provide obstruction clearance or RSA), such a displacement may also require an adjustment in the landing distance available and accelerate-stop distance available in the opposite direction. If project scope includes personnel, equipment, excavation, etc. within the RSA of any usable runway end, we do not recommend a displaced threshold unless arrivals and departures toward the construction activity are prohibited. Instead, implement a partial closure.

**3-5. MARKING GUIDELINES FOR TEMPORARY THRESHOLD.**

Ensure that markings for temporary displaced thresholds are clearly visible to pilots approaching the airport to land. When construction personnel and equipment are located close to any threshold, a temporary visual NAVAID, such as runway end identifier lights (REIL), may be required (even on unlighted runways) to define the new beginning of the runway clearly. A visual vertical guidance device, such as a visual approach slope indicator (VASI), pulse light approach slope indicator (PLASI), or precision approach path indicator (PAPI), may be necessary to assure landing clearance over personnel, vehicles, equipment, and/or above-grade stockpiled materials. If such devices are installed, ensure an appropriate descriptive NOTAM is issued to inform pilots of these conditions. The current edition of AC 150/5340-1, *Standards for Airport Markings*, describes standard marking colors and layouts. In addition, we recommend that a temporary runway threshold be marked using the following guidelines:

a. Airport markings must be clearly visible to pilots; not misleading, confusing, or deceptive; secured in

place to prevent movement by prop wash, jet blast, wing vortices, or other wind currents; and constructed of materials that would minimize damage to an aircraft in the event of inadvertent contact.

(1) Pavement markings for temporary closed portions of the runway should consist of yellow chevrons to identify pavement areas that are unsuitable for takeoff/landing (see AC 150/5340-1). If unable to paint the markings on the pavement, construct them from any of the following materials: double-layered painted snow fence, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and secured to prevent movement by prop wash, jet blast, or other wind currents.

(2) It may be necessary to remove or cover runway markings, such as runway designation markings and aiming point markings, depending on the length of construction and type of activity at the airport.

(3) When threshold markings are needed to identify the temporary beginning of the runway that is available for landing, use a white threshold bar of the dimensions specified in AC 150/5340-1.

(4) If temporary outboard elevated or flush threshold bars are used, locate them outside of the runway pavement surface, one on each side of the runway. They should be at least 10 feet (3m) in width and extend outboard from each side of the runway so they are clearly visible to landing and departing aircraft. These threshold bars are white. If the white threshold bars are not discernable on grass or snow, apply a black background with appropriate material over the ground to ensure the markings are clearly visible.

(5) A temporary threshold may also be marked with the use of retroreflective, elevated markers. One side of such markers is green to denote the approach end of the runway; the side that is seen by pilots on rollout is red. See AC 150/5345-39, *FAA Specification L-853, Runway and Taxiway Retroreflective Markers*.

(6) At 14 CFR part 139 certificated airports, temporary elevated threshold markers must be mounted with a frangible fitting (see 14 CFR part 139.309). However, at noncertificated airports, the temporary elevated threshold markings may either be mounted with a frangible fitting or be flexible. See AC 150/5345-39.

b. The application rate of the paint to mark a short-term temporary runway threshold may deviate from the standard (see Item P-620, “Runway and Taxiway Painting,” in AC 150/5370-10, *Standards for Specifying Construction of Airports*), but the dimensions must meet the existing standards, unless coordinated with the appropriate offices.

c. When a runway is partially closed, the distance remaining signs for aircraft landing in the opposite

direction should be covered or removed during the construction.

### **3-6. LIGHTING GUIDELINES FOR TEMPORARY THRESHOLD.**

A temporary runway threshold must be lighted if the runway is lighted and it is the intended threshold for night landings or instrument meteorological conditions. We recommend that temporary threshold lights and related visual NAVAIDs be installed outboard of the edges of the full-strength pavement with bases at grade level or as low as possible, but not to exceed 3 inches (7.6cm) above ground. When any portion of a base is above grade, place properly compacted fill around the base to minimize the rate of gradient change so aircraft can, in an emergency, cross at normal landing or takeoff speeds without incurring significant damage (see AC 150/5370-10). We recommend that the following be observed when using temporary runway threshold lighting:

**a.** Maintain threshold and edge lighting color and spacing standards as described in AC 150/5340-24, *Runway and Taxiway Edge Lighting System*. Battery-powered, solar, or portable lights that meet the criteria in AC 150/5345-50, *Specification for Portable Runway Lights*, may be used. These systems are intended primarily for visual flight rules (VFR) aircraft operation but may be used for instrument flight rules (IFR) aircraft operations, upon individual approval from the Flight

## **Section 3. Other Construction Marking and Lighting Activities**

### **3-7. OVERVIEW.**

Ensure that construction areas, including closed runways, are clearly and visibly separated from movement areas and that hazards, facilities, cables, and power lines are identified prominently for construction contractors. Throughout the duration of the construction project, verify that these areas remain clearly marked and visible at all times and that marking and lighting aids remain in place and operational. Routine inspections must be made of temporary construction lighting, especially battery-powered lighting since weather conditions can limit battery life.

Standards Division of the applicable FAA Regional Office.

**b.** When the runway has been partially closed, disconnect edge and threshold lights with associated isolation transformers on that part of the runway at and behind the threshold (i.e., the portion of the runway that is closed). Alternately, cover the light fixture in such a way as to prevent light leakage. Avoid removing the lamp from energized fixtures because an excessive number of isolation transformers with open secondaries may damage the regulators and/or increase the current above its normal value.

**c.** Secure, identify, and place any temporary exposed wiring in conduit to prevent electrocution and fire ignition sources.

**d.** Reconfigure yellow lenses (caution zone), as necessary. If the runway has centerline lights, reconfigure the red lenses, as necessary, or place the centerline lights out of service.

**e.** Relocate the visual glide slope indicator (VGSI), such as VASI and PAPI; other airport lights, such as REIL; and approach lights to identify the temporary threshold. Another option is to disable the VGSI or any equipment that would give misleading indications to pilots as to the new threshold location. Installation of temporary visual aids may be necessary to provide adequate guidance to pilots on approach to the affected runway. If the FAA owns and operates the VGSI, coordinate its installation or disabling with the local Airway Facilities Systems Management Office.

**f.** Issue a NOTAM to inform pilots of temporary lighting conditions.

### **3-8. CLOSED RUNWAY AND TAXIWAY MARKING AND LIGHTING.**

Closed runway markings consist of a yellow "X" in compliance with the standards of AC 150/5340-1, *Standards for Airport Markings*. A very effective and preferable visual aid to depict temporary closure is the lighted "X" signal placed on or near the runway designation numbers. This device is much more discernible to approaching aircraft than the other materials described. If the lighted "X" is not available, construct the marking of any of the following materials: double-layered painted snow fence, colored plastic, painted sheets of plywood, or similar materials. They must be properly configured and secured to prevent movement by

prop wash, jet blast, or other wind currents. In addition, the airport operator may install barricades, traffic cones, activate stop bars, or other acceptable visual devices at major entrances to the runways to prevent aircraft from entering a closed portion of runway. The placement of even a single reflective barricade with a “do not enter” sign on a taxiway centerline can prevent an aircraft from continuing onto a closed runway. If the taxiway must remain open for aircraft crossings, barricades or markings, as described above or in paragraph 3-9, should be placed on the runway.

**a. Permanently closed runways.**

For runways and taxiways that have been permanently closed, disconnect the lighting circuits. For runways, obliterate the threshold marking, runway designation marking, and touchdown zone markings, and place “X’s” at each end and at 1,000-foot (300-m) intervals. For taxiways, place an “X” at the entrance of the closed taxiway.

**b. Temporarily closed runway and taxiways.**

For runways that have been temporarily closed, place an “X” at the each end of the runway. With taxiways, place an “X” at the entrance of the closed taxiway.

**c. Temporarily closed airport.**

When the airport is closed temporarily, mark the runways as closed and turn off the airport beacon.

**d. Permanently closed airports**

When the airport is closed permanently, mark the runways as permanently closed, disconnect the airport beacon, and place an “X” in the segmented circle or at a central location if no segmented circle exists.

**3-9. HAZARD MARKING AND LIGHTING.**

Provide prominent, comprehensible warning indicators for any area affected by construction that is normally accessible to aircraft, personnel, or vehicles. Using appropriate hazard marking and lighting may prevent damage, injury, traffic delays, and/or facility closures. Hazard marking

and lighting must restrict access and make specific hazards obvious to pilots, vehicle drivers, and other personnel. Barricades, traffic cones (weighted or sturdily attached to the surface), or flashers are acceptable methods used to identify and define the limits of construction and hazardous areas on airports.

Provide temporary hazard marking and lighting to prevent aircraft from taxiing onto a closed runway for takeoff and to identify open manholes, small areas under repair, stockpiled material, and waste areas. Also consider less obvious construction-related hazards and include markings to identify FAA, airport, and National Weather Service facilities cables and power lines; instrument landing system (ILS) critical areas; airport surfaces, such as RSA, OFA, and OFZ; and other sensitive areas to make it easier for contractor personnel to avoid these areas.

The construction specifications must include a provision requiring the contractor to have a person on call 24 hours a day for emergency maintenance of airport hazard lighting and barricades. The contractor must file the contact person’s information with the airport.

**a. Nonmovement areas.**

Indicate construction locations on nonmovement areas in which no part of an aircraft may enter by using barricades that are marked with diagonal, alternating orange and white stripes. Barricades may be supplemented with alternating orange and white flags at least 20 by 20 inches (50 by 50 cm) square and made and installed so they are always in an extended position, properly oriented, and securely fastened to eliminate jet engine ingestion. Such barricades may be many different shapes and made from various materials, including railroad ties, sawhorses, jersey barriers, or barrels. During reduced visibility or night hours, supplement the barricades with red lights, either flashing or steady-burning, which should meet the luminance requirements of the State Highway Department (yellow lights are not acceptable after October 1, 2004). The intensity of the lights and spacing for barricade flags and lights must adequately and without ambiguity delineate the hazardous area.

**b. Movement areas.**

Use orange traffic cones; red lights, either flashing or steady-burning, which should meet the luminance requirements of the State Highway Department (yellow lights are not acceptable after October 1, 2004); collapsible barricades marked with diagonal, alternating orange and white stripes; and/or signs to separate all construction/maintenance areas from the movement area. All barricades, temporary markers, and other objects placed and left in safety areas associated with any open runway, taxiway, or taxilane must be as low as possible to the ground; of low mass; easily collapsible upon contact with an aircraft or any of its components; and weighted or sturdily attached to the surface to prevent displacement from prop wash, jet blast, wing vortex, or other surface wind currents. If affixed to the surface, they must be frangible at grade level or as low as possible, but not to exceed 3 inches (7.6cm) above the ground. Do not use nonfrangible hazard markings, such as concrete barriers and/or metal-drum-type barricades, in aircraft movement areas. Do not use railroad ties on runways.

Use highly reflective barriers with flashing or steady-burning red lights to barricade taxiways leading to closed runways. Evaluate all operating factors when determining how to mark temporary closures that can last from 10 to 15 minutes to a much longer period of time. However, we strongly recommend that, even for closures of relatively short duration, major taxiway/runway intersections be identified with barricades spaced no greater than 20 feet (6m) apart. Mark the barricades with a flashing or steady-burning red light. At a minimum, use a single barricade placed on the taxiway centerline.

**3-10. CONSTRUCTION NEAR NAVIGATIONAL AIDS (NAVAIDS).**

Construction activities, materials/equipment storage, and vehicle parking near electronic NAVAIDS require special consideration since they may interfere with signals essential to air navigation. Evaluate the effect of construction activity and the required distance and direction from the NAVAID for each construction project. Pay particular attention to stockpiling

material, as well as to movement and parking of equipment that may interfere with line of sight from the ATCT or with electronic emissions. Interference from construction may require NAVAID shutdown or adjustment of instrument approach minimums for IFR. This condition requires that a NOTAM be filed. Construction activities and materials/equipment storage near a NAVAID may also obstruct access to the equipment and instruments for maintenance. Before commencing construction activity, parking vehicles, or storing construction equipment and materials near a NAVAID, consult with the nearest FAA Airway Facilities Office.

**3-11. CONSTRUCTION SITE ACCESS AND HAUL ROADS.**

Determine the construction contractor's access to the construction sites and haul roads. Do not permit the construction contractor to use any access or haul roads other than those approved. Construction contractors must submit specific proposed routes associated with construction activities to the airport operator for evaluation and approval as part of the safety plan before beginning construction activities. These proposed routes must also provide specifications to prevent inadvertent entry to movement areas. Pay special attention to ensure that ARFF right of way on access and haul roads is not impeded at any time and that construction traffic on haul roads does not interfere with NAVAIDs or approach surfaces of operational runways.

**3-12. CONSTRUCTION MATERIAL STOCKPILING.**

Stockpiled materials and equipment storage are not permitted within the RSA and OFZ of an operational runway. The airport operator must ensure that stockpiled materials and equipment adjacent to these areas are prominently marked and lighted during hours of restricted visibility or darkness. This includes determining and verifying that materials are stored at an approved location to prevent foreign object damage and attraction of wildlife.

### 3-13. OTHER LIMITATIONS ON CONSTRUCTION.

Contractors may not use open-flame welding or torches unless adequate fire safety precautions are provided and the airport operator has approved their use. Under no circumstances should flare pots be used within the AOA at any time. The use of electrical blasting caps must not be permitted on or within 1,000 feet (300m) of the airport property (see AC 150/5370-10, *Standards for Specifying Construction of Airports*).

### 3-14. FOREIGN OBJECT DEBRIS (FOD) MANAGEMENT.

Waste and loose materials, commonly referred to as FOD, are capable of causing damage to aircraft landing gears, propellers, and jet engines. Construction contractors must not leave or place FOD on or near active aircraft movement areas. Materials tracked onto these areas must be continuously removed during the construction project. We also recommend that airport operators and construction contractors carefully control and continuously remove waste or loose materials that might attract wildlife.

## Section 4. Safety Hazards and Impacts

### 3-15. OVERVIEW.

The situations identified below are potentially hazardous conditions that may occur during airport construction projects. Safety area encroachments, unauthorized and improper ground vehicle operations, and unmarked or uncovered holes and trenches near aircraft operating surfaces pose the most prevalent threats to airport operational safety during airport construction projects. Airport operators and contractors should consider the following when performing inspections of construction activity:

- a. Excavation adjacent to runways, taxiways, and aprons.
- b. Mounds of earth, construction materials, temporary structures, and other obstacles near any open runway, taxiway, or taxilane; in the related object-free area and aircraft approach or departure areas/zones; or obstructing any sign or marking.
- c. Runway resurfacing projects resulting in lips exceeding 3 inches (7.6cm) from pavement edges and ends.
- d. Heavy equipment (stationary or mobile) operating or idle near AOAs, in runway approaches and departures areas, or in OFZs.
- e. Equipment or material near NAVAIDs that may degrade or impair radiated signals and/or the monitoring of navigational and visual aids. Unauthorized or improper vehicle operations in localizer or glide slope critical areas, resulting in electronic interference and/or facility shutdown.
- f. Tall and especially relatively low-visibility units (i.e., equipment with slim profiles)—cranes, drills, and

similar objects—located in critical areas, such as OFZs and approach zones.

- g. Improperly positioned or malfunctioning lights or unlighted airport hazards, such as holes or excavations, on any apron, open taxiway, or open taxilane or in a related safety, approach, or departure area.
- h. Obstacles, loose pavement, trash, and other debris on or near AOAs. Construction debris (gravel, sand, mud, paving materials, etc.) on airport pavements may result in aircraft propeller, turbine engine, or tire damage. Also, loose materials may blow about, potentially causing personal injury or equipment damage.
- i. Inappropriate or poorly maintained fencing during construction intended to deter human and animal intrusions into the AOA. Fencing and other markings that are inadequate to separate construction areas from open AOAs create aviation hazards.
- j. Improper or inadequate marking or lighting of runways (especially thresholds that have been displaced or runways that have been closed) and taxiways that could cause pilot confusion and provide a potential for a runway incursion. Inadequate or improper methods of marking, barricading, and lighting of temporarily closed portions of AOAs create aviation hazards.
- k. Wildlife attractants—such as trash (food scraps not collected from construction personnel activity), grass seeds, or ponded water—on or near airports.
- l. Obliterated or faded markings on active operational areas.
- m. Misleading or malfunctioning obstruction lights. Unlighted or unmarked obstructions in the approach to any open runway pose aviation hazards.

**n.** Failure to issue, update, or cancel NOTAMs about airport or runway closures or other construction-related airport conditions.

**o.** Failure to mark and identify utilities or power cables. Damage to utilities and power cables during construction activity can result in the loss of runway/taxiway lighting; loss of navigational, visual, or approach aids; disruption of weather reporting services; and/or loss of communications.

**p.** Restrictions on ARFF access from fire stations to the runway-taxiway system or airport buildings.

**q.** Lack of radio communications with construction vehicles in airport movement areas.

**r.** Objects, regardless of whether they are marked or flagged, or activities anywhere on or near an airport that could be distracting, confusing, or alarming to pilots during aircraft operations.

**s.** Water, snow, dirt, debris, or other contaminants that temporarily obscure or derogate the visibility of runway/taxiway marking, lighting, and pavement edges. Any condition or factor that obscures or diminishes the visibility of areas under construction.

**t.** Spillage from vehicles (gasoline, diesel fuel, oil, etc.) on active pavement areas, such as runways, taxiways, ramps, and airport roadways.

**u.** Failure to maintain drainage system integrity during construction (e.g., no temporary drainage provided when working on a drainage system).

**v.** Failure to provide for proper electrical lockout and tagging procedures. At larger airports with multiple maintenance shifts/workers, construction contractors should make provisions for coordinating work on circuits.

**w.** Failure to control dust. Consider limiting the amount of area from which the contractor is allowed to strip turf.

**x.** Exposed wiring that creates an electrocution or fire ignition hazard. Identify and secure wiring, and place it in conduit or bury it.

**y.** Site burning, which can cause possible obscuration.

**z.** Construction work taking place outside of designated work areas and out of phase.

## **APPENDIX 1. RELATED READING MATERIAL**

**1.** Obtain the latest version of the following free publications from the FAA on its Web site at <http://www.faa.gov/arp/>. In addition, these ACs are available by contacting the U.S. Department of Transportation, Subsequent Distribution Office, SVC-121.23, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785.

**a.** AC 150/5200-28, *Notices to Airmen (NOTAM) for Airport Operators*. Provides guidance for the use of the NOTAM System in airport reporting.

**b.** AC 150/5200-30, *Airport Winter Safety and Operations*. Provides guidance to airport owners/operators on the development of an acceptable airport snow and ice control program and on appropriate field condition reporting procedures.

**c.** AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports*. Provides guidance on locating certain land uses having the potential to attract hazardous wildlife to public-use airports.

**d.** AC 150/5210-5, *Painting, Marking, and Lighting of Vehicles Used on an Airport*. Provides guidance, specifications, and standards for painting, marking, and lighting vehicles operating in the airport air operations areas.

**e.** AC 150/5220-4, *Water Supply Systems for Aircraft Fire and Rescue Protection*. Provides guidance for the selection of a water source and standards for the design of a distribution system to support aircraft rescue and fire fighting service operations on airports.

**f.** AC 150/5340-1, *Standards for Airport Markings*. Contains FAA standards for markings used on airport runways, taxiways, and aprons.

**g.** AC 150/5340-14B, *Economy Approach Lighting Aids*. Describes standards for the design, selection, siting, and maintenance of economy approach lighting aids.

**h.** AC 150/5340-18, *Standards for Airport Sign Systems*. Contains FAA standards for the siting and installation of signs on airport runways and taxiways.

**i.** AC 150/5345-28, *Precision Approach Path Indicator (PAPI) Systems*. Contains the FAA standards for PAPI systems, which provide pilots with visual glide slope guidance during approach for landing.

**j.** AC 150/5380-5, *Debris Hazards at Civil Airports*. Discusses problems at airports, gives information on foreign objects, and explains how to eliminate such objects from operational areas.

**k.** AC 70/7460-2, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace*. Provides information to persons proposing to erect or alter an object that may affect navigable airspace and explains the need to notify the FAA before construction begins and the FAA's response to those notices, as required by 14 CFR part 77.

**2.** Obtain copies of the following publications from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Send a check or money order made payable to the Superintendent of Documents in the amount stated with your request. The Government Printing Office does not accept C.O.D. orders. In addition, the FAA makes these ACs available at no charge on the Web site at <http://www.faa.gov/arp/>.

**a.** AC 150/5300-13, *Airport Design*. Contains FAA standards and recommendations for airport design, establishes approach visibility minimums as an airport design parameter, and contains the object-free area and the obstacle free-zone criteria. (\$26. Supt. Docs.) SN050-007-01208-0.

**b.** AC 150/5370-10, *Standards for Specifying Construction of Airports*. Provides standards for construction of airports. Items covered include earthwork, drainage, paving, turfing, lighting, and incidental construction. (\$18. Supt. Docs.) SN050-007-0821-0.

## **APPENDIX 2. DEFINITIONS OF TERMS USED IN THE AC**

- 1. AIR OPERATIONS AREA (AOA).** Any area of the airport used or intended to be used for the landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runways, taxiways, or aprons.
- 2. CONSTRUCTION.** The presence and movement of construction-related personnel, equipment, and materials in any location that could infringe upon the movement of aircraft.
- 3. CERTIFICATED AIRPORT.** An airport that has been issued an Airport Operating Certificate by the FAA under the authority of 14 CFR part 139, Certification and Operation: Land Airports Serving Certain Air Carriers, or its subsequent revisions.
- 4. FAA FORM 7460-1, NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION.** The form submitted to the FAA Regional Air Traffic or Airports Division Office as formal written notification of any kind of construction or alteration of objects that affect navigable airspace, as defined in 14 CFR part 77, Objects Affecting Navigable Airspace (see AC 70/7460-2, *Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace*, found at <http://www.faa.gov/arp/>).
- 5. FAA FORM 7480-1, NOTICE OF LANDING AREA PROPOSAL.** Form submitted to the FAA Airports Regional Division Office or Airports District Office as formal written notification whenever a project without an airport layout plan on file with the FAA involves the construction of a new airport; the construction, realigning, altering, activating, or abandoning of a runway, landing strip, or associated taxiway; or the deactivation or abandoning of an entire airport (found at <http://www.faa.gov/arp/>).
- 6. MOVEMENT AREA.** The runways, taxiways, and other areas of an airport that are used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and aircraft parking areas (reference 14 CFR part 139).
- 7. OBSTRUCTION.** Any object/obstacle exceeding the obstruction standards specified by 14 CFR part 77, subpart C.
- 8. OBJECT-FREE AREA (OFA).** An area on the ground centered on the runway, taxiway, or taxilane centerline provided to enhance safety of aircraft operations by having the area free of objects except for those objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes (see AC 150/5300-13, *Airport Design*, for additional guidance on OFA standards and wingtip clearance criteria).
- 9. OBSTACLE-FREE ZONE (OFZ).** The airspace below 150 feet (45m) above the established airport elevation and along the runway and extended runway centerline that is required to be clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function, in order to provide clearance protection for aircraft landing or taking off from the runway and for missed approaches (refer to AC 150/5300-13 for guidance on OFZs).
- 10. RUNWAY SAFETY AREA (RSA).** A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway, in accordance with AC 150/5300-13.
- 11. TAXIWAY SAFETY AREA.** A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway, in accordance with AC 150/5300-13.
- 12. THRESHOLD.** The beginning of that portion of the runway available for landing. In some instances, the landing threshold may be displaced.
- 13. DISPLACED THRESHOLD.** The portion of pavement behind a displaced threshold that may be available for takeoffs in either direction or landing from the opposite direction.
- 14. VISUAL GLIDE SLOPE INDICATOR (VGSI).** This device provides a visual glide slope indicator to landing pilots. These systems include precision approach path indicators (PAPIs), visual approach slope indicators (VASIs), and pulse light approach slope indicators (PLASIs).

## **APPENDIX 3. AIRPORT CONSTRUCTION SAFETY PLANNING GUIDE**

### **Aviation Safety Requirements During Construction**

**PURPOSE.** *This appendix provides airport operators with boilerplate format and language for developing a safety plan for an airport construction project. Adapt this appendix, as applicable, to specific conditions found on the airport for which the plan is being developed. Consider including a copy of this safety plan in the construction drawings for easy access by contractor personnel. Plans should contain the following:*

#### **GENERAL SAFETY REQUIREMENTS.**

Throughout the construction project, the following safety and operational practices should be observed:

- Operational safety should be a standing agenda item during progress meetings throughout the construction project.
- The contractor and airport operator must perform onsite inspections throughout the project, with immediate remedy of any deficiencies, whether caused by negligence, oversight, or project scope change.
- Airport runways and taxiways should remain in use by aircraft to the maximum extent possible.
- Aircraft use of areas near the contractor's work should be controlled to minimize disturbance to the contractor's operation.
- Contractor, subcontractor, and supplier employees or any unauthorized persons must be restricted from entering an airport area that would be hazardous.
- Construction that is within the safety area of an active runway, taxiway, or apron that is performed under normal operational conditions must be performed when the runway, taxiway, or apron is closed or use-restricted and

initiated only with prior permission from the airport operator.

- The contracting officer, airport operator, or other designated airport representative may order the contractor to suspend operations; move personnel, equipment, and materials to a safe location; and stand by until aircraft use is completed.

#### **CONSTRUCTION MAINTENANCE AND FACILITIES MAINTENANCE.**

Before beginning any construction activity, the contractor must, through the airport operator, give notice [using the Notice to Airmen (NOTAM) System] of proposed location, time, and date of commencement of construction. Upon completion of work and return of all such areas to standard conditions, the contractor must, through the airport operator, verify the cancellation of all notices issued via the NOTAM System. Throughout the duration of the construction project, the contractor must—

- a. Be aware of and understand the safety problems and hazards described in AC 150/5370-2, *Operational Safety on Airports During Construction*.
- b. Conduct activities so as not to violate any safety standards contained in AC 150/5370-2 or any of the references therein.
- c. Inspect all construction and storage areas as often as necessary to be aware of conditions.
- d. Promptly take all actions necessary to prevent or remedy any unsafe or potentially unsafe conditions as soon as they are discovered.

#### **APPROACH CLEARANCE TO RUNWAYS.**

Runway thresholds must provide an unobstructed approach surface over equipment and materials. (Refer to Appendix 2 in AC 150/5300-13, *Airport Design*, for guidance in this area.)

#### **RUNWAY AND TAXIWAY SAFETY AREA (RSA AND TSA).**

Limit construction to outside of the approved RSA, as shown on the approved airport layout plan—unless the runway is closed or restricted to aircraft operations,

requiring a lesser standard RSA that is equal to the RSA available during construction (see AC 150/5370-2 for exceptions). Construction activity within the TSA is permissible when the taxiway is open to aircraft traffic if adequate wingtip clearance exists between the aircraft and equipment/material; evacuations, trenches, or other conditions are conspicuously marked and lighted; and local NOTAMs are in effect for the activity (see AC 150/5300-13 for wingtip clearance requirements). The NOTAM should state that, “personnel and equipment are working adjacent to Taxiway\_\_\_\_\_.”

**a. Procedures for protecting runway edges.**

- **Limit construction to no closer than 200 feet (60m) from the runway centerline—unless the runway is closed or restricted to aircraft operations, requiring a**

**lesser standard RSA that is equal to the RSA available during construction.**

- Prevent personnel, material, and/or equipment, as defined in AC 150/5300-13, Paragraph 306, “Obstacle Free Zone (OFZ),” from penetrating the OFZ.
- **Coordinate construction activity with the Airport Traffic Control Tower (ATCT) and FAA Regional Airports Division Office or Airports District Office, and through the airport operator, issue an appropriate NOTAM.**

*Complete the following chart to determine the area that must be protected along the runway edges:*

Runway	Aircraft Approach Category* A, B, C, or D	Airplane Design Group* I, II, III, or IV	RSA Width in Feet Divided by 2*
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

**\*See AC 150/5300-13, *Airport Design*, to complete the chart for a specific runway.**

**b. Procedures for protecting runway ends.**

- Maintain the RSA from the runway threshold to a point at least the distance from the runway threshold as existed before construction activity—unless the runway is closed or restricted to aircraft operations, requiring an RSA that is equal to the RSA length available during construction in accordance with AC 150/5300-13. This may involve the use of declared distances and partial runway closures (see AC 150/5370-2 for exceptions).

- Ensure all personnel, materials, and/or equipment are clear of the applicable threshold siting criteria surface, as defined in Appendix 2, “Threshold Siting Requirements,” of AC 150/5300-13.
- Prevent personnel, material, and/or equipment, as defined in AC 150/5300-13, from penetrating the obstacle-free zone.
- Ensure adequate distance for blast protection is provided, as needed.
- Coordinate construction activity with the ATCT and FAA Regional Airports

Division Office or Airports District Office, and through the airport operator, issue an appropriate NOTAM.

- Provide a drawing showing the profile of the appropriate surfaces of each runway end where construction will take place. Where operations by turbojet aircraft are

anticipated, review takeoff procedures and jet blast characteristics of aircraft and incorporate safety measures for construction workers in the contract documents.

*Complete the following chart to determine the area that must be protected before the runway threshold:*

Runway End Number	Airplane Design Group* I, II, III, or IV	Aircraft Approach Category* A, B, C, or D	Minimum Safety Area Prior to the Threshold*	Minimum Unobstructed Approach Slope
_____	_____	_____	_____ : FEET	_____ : 1 to (threshold)
_____	_____	_____	_____ : FEET	_____ : 1 to (threshold)
_____	_____	_____	_____ : FEET	_____ : 1 to (threshold)
_____	_____	_____	_____ : FEET	_____ : 1 to (threshold)

\*See AC 150/5300-13, *Airport Design*, to complete the chart for a specific runway.

**MARKING AND LIGHTING FOR TEMPORARY THRESHOLDS.**

Marking and lighting for a temporary threshold is \_\_\_/is not \_\_\_ required. The airport owner or contractor, as specified in the contract, will furnish and maintain markings for temporary thresholds. Precision approach path indicators (PAPIs) or runway end identification lights (REIL) are \_\_\_/are not \_\_\_ required. The airport owner or contractor, as specified in the contract, will furnish and install all temporary lighting. Include appropriate items per AC 150/5370-2, Chapter 3, "Safety Standards and Guidelines." *If marking and lighting for the temporary threshold is not required, delete this section of the safety plan. If visual aids and/or markings are necessary, provide details. (Include applicable 14 CFR part 77 surfaces in the contract documents.)*

**CLOSED RUNWAY MARKINGS AND LIGHTING.**

The following must be specified for closed runways. Closed runway marking are \_\_\_/are not \_\_\_ required. Closed runway

markings will be as shown on the plans \_\_\_/as furnished by the airport owner \_\_\_/other \_\_\_ (specify). Barricades, flagging, and flashers are \_\_\_/are not \_\_\_ required at Taxiway \_\_\_ and Runway \_\_\_ and will be supplied by the airport \_\_\_/other \_\_\_ (specify).

**HAZARDOUS AREA MARKING AND LIGHTING.**

Hazardous areas on the movement area will be marked with barricades, traffic cones, flags, or flashers (specify). These markings restrict access and make hazards obvious to aircraft, personnel, and vehicles. During periods of low visibility and at night, identify hazardous areas with red flashing or steady-burning lights (specify). The hazardous area marking and lighting will be supplied by the airport operator/contractor, as specified in the contract, and will be depicted on the plans.

**TEMPORARY LIGHTING AND MARKING.**

Airport markings, lighting, and/or signs will be altered in the following manner (specify)

during the period from \_\_\_\_\_ to \_\_\_\_\_. The alterations are depicted on the plans.

#### VEHICLE OPERATION MARKING AND CONTROL.

**Include the following provisions in the construction contract, and address them in the safety plans:**

When any vehicle, other than one that has prior approval from the airport operator, must travel over any portion of an aircraft movement area, it will be escorted and properly identified. To operate in those areas during daylight hours, the vehicle must have a flag or beacon attached to it. Any vehicle operating on the movement areas during hours of darkness or reduced visibility must be equipped with a flashing dome-type light, the color of which is in accordance with local or state codes.

It may be desirable to clearly identify the vehicles for control purposes by either assigned initials or numbers that are prominently displayed on each side of the vehicle. The identification symbols should be at minimum 8-inch (20-cm) block-type characters of a contrasting color and easy to read. They may be applied either by using tape or a water-soluble paint to facilitate removal. Magnetic signs are also acceptable. In addition, vehicles must display identification media, as specified in the approved security plan. *(This section should be revised to conform to the airport operator's requirements.)*

Employee parking shall be \_\_\_\_\_ (specify location), as designated by the airport manager \_\_\_\_\_/project engineer \_\_\_\_\_/other \_\_\_\_\_ (specify).

Access to the job site shall be via \_\_\_\_\_ (specify route), as shown on the plans \_\_\_\_\_/designated by the engineer \_\_\_\_\_/designated by the superintendent \_\_\_\_\_/designated by the airport manager \_\_\_\_\_/other \_\_\_\_\_ (specify).

At 14 CFR part 139 certificated and towered airports, all vehicle operators having access to the movement area must be familiar with airport procedures for the operation of ground vehicles and the consequences of noncompliance.

If the airport is certificated and/or has a security plan, the airport operator should check for guidance on the additional identification and control of construction equipment.

#### NAVIGATIONAL AIDS.

**The contractor must not conduct any construction activity within navigational aid restricted areas without prior approval from the local FAA Airway Facilities sector representative. Navigational aids include instrument landing system components and very high-frequency omnidirectional range, airport surveillance radar. Such restricted areas are depicted on construction plans.**

#### LIMITATIONS ON CONSTRUCTION.

**Additional limitations on construction include—**

- a. Prohibiting open-flame welding or torch cutting operations unless adequate fire safety precautions are provided and these operations have been authorized by the airport operator *(as tailored to conform to local requirements and restrictions)*.
- b. Prominently marking open trenches, excavations, and stockpiled materials at the construction and lighting these obstacles during hours of restricted visibility and darkness.
- c. Marking and lighting closed, deceptive, and hazardous areas on airports, as appropriate.
- d. Constraining stockpiled material to prevent its movement as a result of the maximum anticipated aircraft blast and forecast wind conditions.

#### RADIO COMMUNICATIONS.

**Vehicular traffic located in or crossing an active movement area must have a working two-way radio in contact with the control tower or be escorted by a person in radio contact with the tower. The driver, through personal observation, should confirm that no aircraft is approaching the vehicle position. Construction personnel may operate in a movement area without two-way radio communication provided a NOTAM is issued closing the area and the area is properly marked to prevent incursions. Two-way radio communications are \_\_\_/are not\_\_\_required between contractors and the Airport Traffic Control Tower\_\_\_/FAA Flight Service Station\_\_\_/Airport**

**Aeronautical Advisory Stations (UNICOM/CTAF)\_\_\_\_\_.** Radio contact is \_\_\_\_\_/is not\_\_\_\_\_ required between the hours of \_\_\_\_\_and \_\_\_\_\_. Continuous monitoring is required \_\_\_\_\_/or is required only when equipment movement is necessary in certain areas\_\_\_\_\_. *(This section may be*

*tailored to suit the specific vehicle and safety requirements of the airport sponsor.)*

**DEBRIS.**

**Waste and loose material must not be placed in active movement areas. Materials tracked onto these areas must be removed continuously during the work project.**

**APPENDIX 4. SAMPLE NOTAM**

\_\_\_\_\_ **AIRPORT**

**FAA NOTAM #** \_\_\_\_\_

**DATE:**

**AIRPORT I.D. #** \_\_\_\_\_

**TIME:**

**NOTAM TEXT:**

**NOTIFICATON:**

##### TOWER	_____	_____	_____	_____
	PHONE #	INITIALS	TIME	CALLED IN BY

##### FSS	_____	_____	_____	_____
	PHONE #	INITIALS	TIME	CALLED IN BY

AIRLINES

_____	_____
_____	_____
_____	_____

**CANCELLED:  
NOTIFICATON:**

##### TOWER	_____	_____	_____	_____
	PHONE #	INITIALS	TIME	CALLED IN BY

##### FSS	_____	_____	_____	_____
	PHONE #	INITIALS	TIME	CALLED IN BY

AIRLINES

_____	_____
_____	_____
_____	_____