Referenced to Nigeria Regulations

Advisory Circular

NCAA-AC-ARD006

NIGERIAN CIVIL AVIATION AUTHORITY (NCAA)

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AERODROME WORKS SAFETY PLAN (PLAN OF CONSTRUCTION OPERATIONS)

1.0 GENERAL

Nigerian Civil Aviation Authority Advisory Circulars from Aerodrome Standards Department contain information about standards, practices and procedures that the Authority has found to be an Acceptable Means of Compliance (AMC) with the associated Regulations.

An AMC is not intended to be the only means of compliance with a regulation, and consideration will be given to other methods of compliance that may be presented to the Authority.

2.0 PURPOSE

This Advisory Circular provides methods, acceptable to the Authority, for showing compliance with Plan of Construction Operations requirements of Nig. CARs Part 12 as well as explanatory and interpretative material to assist in showing compliance.

3.0 APPLICATION

The material contained in this Advisory Circular applies to the conduct of aerodrome works for which a safety plan is to be provided

4.0 REFERENCE

The Advisory Circular relates specifically to Part 12.6.14 of Nig. CARs.

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1. Method of Work Plan (MOWP)

1.1. Definition

A MOWP is a document that describes the mitigation measures that will be taken or applied during an airside construction or major renovation project. These mitigation measures can be defined, but not exclusively, as: signage, markings, markers, displaced threshold, NOTAMs, voice advisory, escort of personnel on the airside, means and lines of communication between the parties involved in the realisation of the project.

1.2. Responsibilities

A Method of Work Plan (MOWP) is a document that is to be **prepared** by the Aerodrome Operator and to be **approved** by NCAA. It is the responsibility of the Airport Manager or the person responsible for the operation of the aerodrome to designate a project coordinator who will not only prepare the MOWP but will coordinate with the stakeholders (airlines, service providers and the Contract/project manager) prior to and during the execution of the project.

1.3. The Consultation Process

It is very likely that the execution of an airside project will impact the airport users at different degrees that could vary from negligible to very significant. Depending on the scope of the project the mitigation measures could vary from a voice advisory to the closure of a runway. As an example, it may happen that, for the overlay of a single runway airport, the runway width will be reduce by 50%, i.e. instead of landing on a 60 meter wide runway, aircraft will land on a 30 meter wide runway. At some other times, the runway length could be reduced. Navigational aids as well as visual aids could be unserviceable for a certain period of time. It may mean that airlines will have to modify their regular schedule, to temporary change aircraft types, to schedule more experienced pilots etc. This requires that the consultation process shall commence a long time before the execution of the project. In some cases, consultation with the airlines and service providers should start over one year (1) ahead of time. Consultations/communications shall be conducted during:

1) planning stage of the project;
2) the pre-construction period and;
3) the construction period.

The consultation process is important not only for the airlines and service providers but also for the "to be" selected Contractor. The Contractor working conditions must be known before the tendering process is launched. The airport operating conditions could have a very significant impact on the Contractor's costs. The Contractor may impose night working hours, broken hours, waiting time while clearing the runway to allow aircraft movements etc.

It is imperative that the Airport Operator defines with the airlines and service providers the operating conditions during the realisation of the project, at a time where the Contractor is not yet selected. Airport operating conditions will be specified in the project tender documents and the Contractor will bid knowing what his working conditions will be. Obviously the process is also coordinated with the project management responsible person as this person is directly responsible for the cost and the scheduling of the project. It should be however borne in mind that ultimately the Airport Operator is assuming responsibility for the Aerodrome Certification.

The sooner the airlines and other stakeholders are consulted, the better it is. Early consultations, giving sufficient time to react, usually allow for the resolution of operational problems to the satisfaction of all parties.

2. AERODROME OPERATIONS

Under normal circumstances, the Aerodrome Operator is responsible to operate the aerodrome according to the conditions specified in the Aerodrome Manual (AM).
This Aerodrome Manual will be approved by the Nigerian Civil Aviation Authority (NCAA), and the manual is expected to incorporate all established operating conditions for the Aerodrome. Operating conditions may mean, but not exclusively:

2.1. RUNWAY:

- Runway length
- Runway width
- Runway slope
- Runway surface type
- Touchdown zone elevation
- Thresholds elevation
- Thresholds coordinates
- Runway strip width
- Graded area width
- Obstacles limitation surfaces: approach, transitional and outer surfaces
- Runway lighting system
- Approach lighting
- Visual Approach Slope Indicator System or Precision Approach Path Indicator
- Runway identification lights
- Runway end lights
- Runway centre line lights
- Runway touchdown zone light
- Runway exit lights
- Threshold marking
- Centre line marking
- Touchdown zone marking
- Runway exit marking
- Declared distances: TORA, TODA, ASDA and LDA
- Etc.

2.2. TAXIWAY:

- Taxiway type of surface
- Pavement width
- Intersection lights
- Centre line

- Markers for taxiway edge
- Centre line marking
- Holding position
- Etc.

2.3. APRON*:*

- Dimensions
- Edge lights
- Flood lights
- Aircraft stand taxi-lane
- Aircraft stand
- Passenger path lines
- Etc.

It is obvious that, when a significant maintenance project or a construction project is going to be carried out on the airside, the operating conditions of the aerodrome will be modified in one way or the other. Depending on the scope of the project, a few or many of the characteristics listed above will be modified. The aviation industry must be informed of these changes and these changes must be approved by the NCAA. Therefore, a Method of Work Plan (MOWP) shall be prepared for each non-routine maintenance project and for any construction project. Runway marking, runway crack filling, grading of graded area, replacement of bulbs on the runway lighting system do not usually require the preparation of a MOWP. In some cases, however, the issuance of a NOTAM or a voice advisory is desirable. The aerodrome operator in coordination with the Air Traffic Services is responsible and competent on this matter.

3. Control of work and safety precautions to be taken during aerodrome works

3.1 Control of works

The aerodrome operator is responsible for controlling any work in progress on the aerodrome and establishing the safety requirements and procedures. This Advisory Circular provides guidance for compliance with these responsibilities.

3.2 Routine maintenance

Persons authorised by the aerodrome operator may enter active parts of the movement area subject to clearance from an applicable aerodrome control service unit, if present. They must comply with the rules developed for the control of vehicles at that aerodrome in conducting routine tasks such as grass cutting etc..

3.3 Minor construction or maintenance work

For minor construction or maintenance work, a control system should be developed to ensure that:

(1) No work takes place on the active movement area without the knowledge of either the aerodrome operator or any applicable air traffic service unit; and

(2) Permitted times of work are strictly followed; and

(3) All individuals taking part in the work are briefed in detail on the following:

(i) Precise areas in which the work may be done;

(ii) The routes to be followed to and from the work area;

(iii) The radiotelephone or other control procedures to be used, the maintenance of a radio listening watch, and the use of look-outs;

(iv) The safety precautions to be observed; and

(v) The reporting procedure to be followed on completion of the work.

(4) At the conclusion of the work, the aerodrome operator inspects the work area to ensure that it has been left in a safe condition.

3.4 Major work

3.4.1 The aerodrome operator should establish a method of work plan (MOWP) before commencing any major construction work on the aerodrome, unless the runway is to be closed.

3.4.2 When preparing a MOWP the aerodrome operator should consult with the major aerodrome users, the aerodrome air traffic service unit (ATS), if present, and if applicable, the works contractor.

3.4.3 The work plan should address the items detailed in Appendix 1.

3.5 Management and Control of Aerodrome Works

The aerodrome operator should:

(1) Appoint a project manager to coordinate the carrying out of works at the aerodrome. The project manager should make arrangements and establish procedures for the safety of aircraft operations while the works are in progress. These arrangements and procedures should be published in the MOWP;

(2) Ensure that aerodrome works are carried out according to the MOWP for major works;

(3) Ensure NOTAM are issued to give notice of the works; and

(4) Appoint a person as a works safety officer to carry out the functions set out in Appendix 2.

3.6 Liaison

Before the commencement of any substantial work on the aerodrome:

(1) A liaison process should be established between representatives of the aerodrome operator, the applicable air traffic service unit, the major aerodrome users, and if applicable the contractor who is to do the work.

(2) It would be useful to set up a committee composed of representatives of those concerned with the works, including the contractors. This committee should have as its primary concern the identification of interface problems between the various organisations involved.

3.7 Isolation of work area

As far as practicable, working areas should be blocked off from the active movement areas by physical barriers. These barriers serve to warn pilots and to preclude work vehicles inadvertently straying onto each other's active movement areas. The barriers should be marked for day use and adequately lit for night use.

The lights of taxiways leading into working areas should be permanently off during the work period. Specification on the marking of unserviceable areas is contained in ASM – Section 5.1.4.2.

3.8 General working rules

Before work commences, agreement should be established on:

(1) The hours allowed to be worked;

(2) The authorised vehicle routes;

(3) The control of vehicles;

(4) The communication equipment to be used and the associated procedures;

(5) The permitted heights of vehicles and equipment, and the limitations to be placed on operating heights of crane jibs; and

(6) Any limitation on the use of electrical equipment to prevent interference with navigation facilities or aircraft communications.

3.9 Safety

Construction personnel should be warned, in writing, of possible hazards to personnel working on aerodromes, in particular jet-blast problems and noise. Where necessary, look-out persons should be provided and wear identifiable reflective jackets.

3.10 Paved area cleanliness

Where work is conducted on, or involves traversing paved areas, the paving should be thoroughly inspected before being opened for aircraft use. Pay particular attention to the presence of debris and the general cleanliness of the surface. Where aircraft are constantly using areas open to the construction activity, inspection should be regular to ensure that the necessary cleaning has been carried out.

3.11 Marking and lighting

Tall equipment such as crane jibs should be marked and lit at night/adverse weather conditions. If work is of prolonged duration, a constant watch should be maintained to ensure that the marking and lighting of obstacles and unserviceable areas, are serviceable. This is particularly important for marking and lighting arrangements to indicate a displaced threshold.

3.12 Effect on operating limits

The effect of tall equipment, such as crane jibs, on ILS and radar will need to be considered, in conjunction with those responsible for electronic landing aids, and steps taken to reduce interference to the minimum. Construction equipment may have adverse effects on obstacle clearance limits and should be considered when working plans are being formulated.

3.13 Work activity on or adjacent to aerodrome movement areas

The guidelines contained in Appendix 3 are for use in preparation of plans and specifications when work activities are to be conducted in areas which may interfere with aircraft operations.

3.14 Reduction of runway distances

Work activity before the end of any runway, or any stop-way, clearway or safety area will probably reduce the runway distance available for aircraft operations as the equipment used intrudes into the obstacle free surfaces. In these cases, it is essential to provide the aircraft operators with accurate revised runway declared distances and the height and location of the temporary obstructions associated with the work.

3.15 Notification of work

3.15.1 If the work restricts the availability of a runway or reduces the runway length available, advance notice should be given to the aerodrome's regular air operators. These aircraft operators plan their schedules well ahead and need sufficient time to study the effect of reduced runway distances, or restrictions on the use of the runway, on their loading and schedule of operations.

3.15.2 If the work activity is likely to restrict aircraft operations, despite the restriction having been discussed with the aerodrome's regular operators, the changed circumstances are to be notified in a NOTAM issued not less than 24 hours prior to the start of the work and preferably a week before.

3.15.3 The AIS should be provided with details of the work, including any limitations and restrictions applicable to aircraft operations, for early promulgation of an AIP supplement, giving at least 3 months notice to aircraft operators.

3.16 Safety considerations

The following is a partial list of safety considerations which will need attention during aerodrome works.
There may be others in your particular situation that will need attention:

(1) Minimum disruption of standard operating procedures for aircraft operations.

(2) Clear routes from rescue and fire-fighting stations to active aerodrome movement areas.

(3) A procedure for notification, and authority to change safety-oriented aspects of the construction plan.

(4) Initiation, currency, and cancellation of NOTAM.

(5) Suspension, or restriction, of aircraft activity on aerodrome movement areas.

(6) Runway end or threshold displacement, or both, and appropriate temporary lighting and marking.

(7) Installation and maintenance of temporary lighting and marking for closed, or diverted, aircraft routes on the aerodrome movement areas.

(8) Revised vehicular control procedures, or additional equipment and personnel.

(9) Marking and lighting of construction equipment.

(10) Parking of construction equipment and storage of material, when not in use.

(11) Designation of responsible representatives of all involved parties, and their availability.

(12) Location for construction personnel vehicle parking, and their transportation to and from the work site.

(13) Marking and lighting of construction areas and obstructions.

(14) Location of the construction offices.

(15) Location of the contractor plant.

(16) Designation of waste areas and disposal of waste.

(17) Debris cleanup responsibilities and schedule.

(18) Conspicuous identification of construction personnel and equipment.

(19) Location of haulage roads.

(20) Security control of temporary gates and relocated fences.

(21) Noise pollution.

(22) Explosives regulation and control.

(23) Dust, smoke, steam, and vapour controls.

(24) Location of utilities.

(25) Provision of temporary utilities or immediate repairs, or both, in the event of a disruption to the established utilities.

(26) Location of power and control lines for electronic visual navigation aids.

(27) Additional security measures necessary, if it is a security designated aerodrome.

(28) Marking and lighting of closed aerodrome movement areas.

(29) Phasing of work.

(30) Shutdown or protection, or both, of aerodrome electronic visual navigation aids.

(31) The need to notify the rescue and fire-fighting unit when working on water lines.

(32) Provision of traffic directors, aircraft marshallers, wing walkers, etc, as needed to assure clearance in construction areas.

3.17 Examples of hazardous and marginal conditions

Analysis of past accidents and incidents has identified many contributory hazards and conditions.
Conditions that should be watched carefully are listed below:

(1) Excavation adjacent to runways, taxiways, and aprons.

(2) Stockpiles of earth, construction material, temporary structures, and other obstacles in proximity to aerodrome movement areas and runway approach and take-off surfaces.

(3) Runway projects resulting in excessive lips greater than 25 mm for runways and 76 mm for edges between old and new surfaces at runway edges and ends.

(4) Heavy equipment operating or idle near aerodrome movement areas.

(5) Proximity of equipment or material which may degrade radiated signals from, or impair monitoring of navigation aids.

(6) Tall but relatively inconspicuous objects, such as cranes, drills, etc, in critical areas such as safety areas and runway approach and take-off surfaces.

(7) Improper or malfunctioning lights or unlighted aerodrome hazards.

(8) Holes, obstacles, loose pavement, rubbish, or other debris, on or near aerodrome movement areas.

(9) Failure to maintain barriers, such as fences, during construction to prevent unauthorised access.

(10) Improper marking or lighting of runways, taxiways, and displaced thresholds.

(11) Attractions for birds such as exposed earthworks, rubbish, grass seeding, or ponded water on or near aerodromes.

(12) Inadequate or improper methods for marking temporarily closed movement areas including improper and unsecured barricades.

(13) Obliterated markings on active movement areas.

[Safety encroachments, improper ground vehicle operations, and unmarked or uncovered holes and trenches in the vicinity of aircraft movement surfaces are the most recurring threats to safety during construction].

3.18 Inspection

Frequent inspections should be made by the aerodrome operator or a representative during critical phases of the work to ensure that the contractor is following the prescribed safety procedures and that there is an effective litter control programme.

Appendix 1 — Contents of a Method of Work Plan

A1-1 A Method of Work Plan (MOWP) shall contain at least the following information:

Description of the construction project:

Provide a full description of the planned construction project.

Stages/phases of the construction & schedules:

List the different stages of the construction activities with anticipated start and finish dates.

Types & frequency of air traffic:

List the types of aircraft and number of daily movements anticipated during the construction period.

Disruptions to air traffic:

What will be the impact on and disruptions to the air traffic as listed above.

Position and height of equipment (Relative to Runways & Taxiways):

Provide the location and maximum working height of the construction equipment or vehicles and where that equipment will be working in relationship to the taxiway or runway edges/ends. This information is required to assess the impact on Obstacle Limitation Surfaces.

Work adjacent to Runway/Taxiway:

Temporary hazards on runway strips. Which zone will you be working in, which restriction and operational conditions will apply to your project?

Markings, barriers and lighting provided:

Describe all markings, barriers and lighting to be used to indicate unserviceable areas of the aerodrome.

Displaced and/or Relocated Thresholds:

If the project will require a displaced or relocated threshold, provide an explanation as to why this is required, what percentage slope the calculations are based on, how will the new threshold be marked and lighted, what buffer is being provided for jet or prop blast consideration?

Declared distance during all phases:

Based on the above calculation what will be the revised declared distances?

Access control, vehicle operations and Escorts:

How will vehicles and equipment access the construction site, will Airport Vehicle Operator Permit be issued, are radio licenses required, will vehicles be escorted, whom will be providing the escorts?

Communications Plan (Prior to Construction & During Construction):

Every construction project requires a Communication Plan. The Plan will cover communication with the aerodrome clients/users, ATS and NCAA during all phases of the project; #1: Planning Phase, #2: Pre-construction Phase #3: Construction Phase.

Airport Ops ↔ ATS;
ATS ↔ Construction Site;
Airport Ops ↔ Construction Site;
Airport Ops ↔ Users (Stakeholders);
Airport Ops ↔ NCAA.

NOTAMs as per the NOTAM procedure manual:

Provide a draft of all anticipated NOTAMS. NOTAMs revising declared distances must be pre-approved by NCAA.

Drawing or Blueprints:

Provide any drawings required to support your Plan of Construction Operation. It is the aerodrome operator's responsibility to ensure the drawings and final product meet Aerodrome Certification requirements.

A1-2 MOWP (EXAMPLE)

Below examples of MOWPs that were prepared for different airport projects.

No template can cover all the possibilities that could arise from an airside construction project. No project is exactly similar to another. The proponent judgment shall be exercised.

The example is as follows:

The project consists in the extension of a gravel runway from 1.52kmto 1.98km in length and from 30.5m to 45.7m in width. The project also includes the installation of a new runway edge lighting system, a PAPI, a wind sock etc. The aircraft parking area is to be enlarged from approximately 5,900 square meters to 22,000 square meters. This airport is a one-runway airport. The purpose of the

project is to allow for the landing of B737-200. Prior to the extension, the airport is used by Dash-8 and Challenger 600 (jet ambulance).

METHOD OF WORK PLAN (name)
AERODROME IN USE RUNWAY (designation number)

(Name) AERODROME

APRON, RUNWAY EXPANSION

Project number:

(nnn)

METHOD OF WORK PLAN (MOWP)

AIRPORT: *(name of the aerodrome)*

PROJECT: APRON/RUNWAY EXPANSION

SCHEDULE: (dd/mm/yy)

Project originator: (Name)
(Title)
(Organisation and address)
Tel:
Fax:
E-mail:

Project contact: (Name)
(Title)
(Organisation and address)
Tel.:
Fax:
E-mail:

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Definition

Aircraft parking area:	Ref. to apron.
Airside:	Ref. to restricted area.
Apron :	Means that part of an airport, other than the manoeuvring area, intended to accommodate the loading and unloading of passengers and cargo, the refuelling, servicing, maintenance and parking of aircraft and the movement of aircraft, vehicles and pedestrians to allow execution of those functions.
ATS:	Air Traffic Services.
Consultant (the):	Representative from the owner of the project. The word Engineer is also used.
Engineer (the):	Representative from the owner of the project. The word Consultant is also used.

ETA:	Estimated Time of Arrival (related to aircraft).
"ESCORT":	In this document, means the person escorting the Contractor's vehicles on the movement area.
FOD:	Foreign Object Damage. Used to designate any foreign object that could cause damages to aircraft.
Manœuvring area:	Means that part of an aerodrome ordinarily used for the take-off and landing of aircraft and for the movement of aircraft associated with the take-off and landing, but does not include the apron.
Movement area:	Runway, Taxiway and Apron.
MOWP	Method of Work Plan. The present document.
Restricted area:	Means an area at an aerodrome that is designated by a sign as an area to which access is restricted to persons unless authorized by the airport manager.

Description of Works

1.1 Apron/Runway Expansion

The (name of the owner) owns the (name) Aerodrome. The aerodrome is operated under an operational agreement by the (name of the aerodrome operator) *through its Ministry of Aviation. The* (owner of the project) *has entered into a contract with (***Contractor's Name)** *to extend the apron, the runway and to resurface the airside surfaces. A consultant firm has been hired for the preparation of plans and specifications and for the implementation of the project.*

The following equipment will be used for the construction and will be required to operate on and near the airport: Dozer, Grader, Vibratory Compactor, Loader, Tandem Trucks, Pickup Trucks, Water Truck and Backhoe etc.

The work to be undertaken is outlined below.

1.2 Project Scope

The scope of the project does include the extension of the apron from an area of 5,900 sq. meters to 22,000 sq. meters approximately.

The runway will be extended towards the north from 1.52km to 1.98km.

The runway will be enlarged from 30.5m to 45.7m.

The runway edge lighting system will be relocated and a PAPI will be installed at runway end 01.

The manoeuvring areas will be resurfaced.

Finally, a new Airport Terminal Building will be constructed. It is not included in the present Method of Work Plan (MOWP). The project should not be realised before 2010. Another MOWP will be prepared in due time.

1.3 Project General Scheduling

The extension of the apron will start in September 2008 and will be completed by July, 2009. The extension and enlargement of the runway as well as the relocation of the lighting system should start in 2009 and be completed in 2010.

1.4 Apron Extension

The apron will be extended significantly; its total surface will pass from 5,960 square meters to 22,000 square meters. It will be extended towards the north, the south and the west. A, 45 meters by 45 meters concrete pad will be constructed on this apron. The whole apron will be resurfaced.

The work will be conducted around the normal flight schedule for the individual carriers and Medevac flights and will not require any airport closures. Outside *(name of the airlines)* regular schedule flights a 2-hour prior notice (PN) will be required to land and take-off at and from the *(name)* Aerodrome. A NOTAM with the mention "PN, Prior Notice" will be issued (ref section ***3.15*** for NOTAMs). The staging of the project is as follows.

1.5 Construction Stages:

Stage I

Preliminary work, i.e. material crushing and blasting. The blasting/crushing/stockpiling sites are located on the south-west side of the runway for quarry identified as CA1 and at the north-east end of the runway for quarry identified as TT.

General Staging Notes (Drawings ??????????)

1 Construction is confined to the areas shown on Drawing **??????.**

2 Construction access is restricted to the east shoulder of the runway.

3 Air traffic schedule is included in this document.

4 All persons and equipment are to be kept a minimum of 45m[1] from the centreline of the open runway during landings and takeoffs. Two (2) pull-back locations have been identified, i.e. the taxiway and the crushing site.

5 Marker boards, temporary edge light/threshold light modifications/relocations, and marker pylons shall be the responsibility of the Contractor.

6 At the end of each day, all construction equipment is to be parked in the designated construction yard located at the crushing site. The height of the equipment shall not exceed the zoning requirements i.e. 1:7 measured from a distance of 45 meters from the centre of the runway.

[1] 45 meters is the width of the runway strip for a code 3 non precision runway.

7 Medevac flights are to provide two (2) hours notice before landing.

8 The Aerodrome operator will advise the *(CAA)* Aerodrome Standards Department of the current stage of construction and any operational impacts or advisories.

9 All setbacks for construction zones are in accordance with appropriate standards.

10 All construction activity shall be confined to restricted areas and qualified escorts **Restricted *Radio Operator Certificate*** will provide radio escort and monitoring services.

NOTAM's shall be issued. The proposed texts can be found at 3.15. "Prior Notice" will apply. A close coordination will be required between the airport operator and the users, mainly *(airlines names)*. The *(ATS)* will authorise the landing and take-off of regular flights and Medevac as well as other flights provided the 2-hour prior notice is given.

1.6 Preliminary Works

The crushed gravel to be used for this project will be produced during the first phase of the project in September/October 2008.During that period of time the runway will not be affected by the operations of the Contractor. However, blasting will occur during that period. See Section 3.15 for NOTAMs.

1. Construction Procedures

The plans for the extension of the Apron and of the Runway have been prepared by *(name of responsible organisation)*. They are numbered **XXXX**, copies are attached.

Stage I through IV, in 2008, 2009 and 2010 are as follows:

Stage	*Location*	**Description of works**	*Execution Delays*[2]
Stage I (Drawing XXXX)	Apron and quarry CA1, ref. plan Appendix aaa.	• Blasting, gravel crushing transportation of gravel from quarry CA1 to apron (extension of the apron, north, south and west sides and construction of a concrete slab).	**XXXX**Working Days for blasting. On-going for crushing[3], to take place in October / November 2008 and July 2009.
Stage II (Drawing XXXX)	Outer edge of graded areas, extension of the runway towards the north (457m). Quarry TT- and ST ref. plan (Appendix dddd).	• Extension of the runway towards the north, 1,500 feet.	**XXXX** Working Days.
Stage III (*Drawing XXXX*)	Runway 01-19	• Installation of a new runway lighting system, removal of the old system and enlargement of the runway from 30.5 to 45.7 m.	**XXXX** Working Days.

[2] Execution delays are expressed in calendar working days. Day 1 means the beginning of the work. Exact date is to be determined.
[3] Work should start in September, 2008.

Stage	*Location*	**Description of works**	*Execution Delays*[2]
Stage IV	Runway, Taxiway and Apron	• Resurfacing of Runway, Taxiway and Apron.	**XXXX**Working Days.

2.1 General remark on staging of the project:

The objective is to maintain a 1.06km runway available and the possibility to re-open the runway to its full length (1.52km) for the jet ambulance with a 2-hour prior notice. During some phases of the project the 1.06kmrunway will be available only at certain times of the day. These time restrictions should be enforced for a period of approximately 4 - 5 weeks during summer 2009.

Stage I:

During that stage the apron will be extended to the south and to the north. Its surface will be extended from 5,900 sq. m. to approximately 22,000 sq. m. The work will be done in the following phases:

I. Extension to the south
II. Extension to the north
III. Construction of a slab, 45 meters by 45 meters.

Each phase shall be completed before the next phase can be undertaken. The new extension will have to be usable by aircraft before the next phase is undertaken. This will allow more available space for aircraft parking.

Stage II:

457m extension of runway 01-19 towards the north. During that phase the Contractor will work without any air traffic constraints. The runway 19 threshold will be displaced by 457m. The runway (LDA) distance available will be 1.06km. This 1.06km runway will be open 24 hours a day during that phase of the project. The runway can be reopened to its full length at anytime providing a 2-hour prior notice, mainly for the jet ambulance.

Stage III:

Removal of the old lighting system and installation of a new lighting system (runway edge lights). This also includes the installation of a PAPI system on runway 01, the relocation of wind sock, RILs and PAPI on runway 19.

The new lighting system (runway edge lights) will be operational once the extension of the runway towards the north (ref. phase II above). The new runway edge lighting system shall be operational before the old one is removed. From the time the old system is deactivated and until the time it is physically removed, each light will be marked with a 30 cm high auto reflective cone made of orange and white stripes alternatively and stabilised to the ground. Any trench or hold due to the removal of the old lighting system shall be filled up and compacted before any aircraft landing or take-off can take place. During that phase of the project the Contractor shall clear the runway for any landing and take-off and the equipment shall be parked at 30 meters from the runway edge.

Stage IV:

This stage of the project will be realised in many phases:

Phase I of Stage IV: Resurfacing of the runway extension, 457m to the north. During that phase, a 1.06km runway will be available 24 hours a day unless the installation of the new lighting system / removal of the old one is taking place. The 1.06km runway will be available but could be restricted to certain hours if the runway lighting system is being installed or removed.

Phase II of Stage IV: Resurfacing of a 457m distance. During that phase, a 1.06kmrunway will be available but restricted to certain hours to be discussed and agreed upon with *(names of the airlines)*. This was discussed at a meeting held at *(company name)* offices on September 3rd, 2008 with *(airlines names)*, *(name of owner of the project)* and the *(name of the aerodrome operator)*. Parties are looking at two time slots for landing and take-off, one in the morning and one in the afternoon.

Phase III of Stage IV: Resurfacing of a 152.4m distance. That part of the project can be completed within a short period of time, a week-end for instance. The operation mode will be discussed in due time with the main operators, *(names of the airlines)*, a NOTAM will be issued accordingly.

General Note: Once Phase III of Stage IV is completed, the resurfaced area to the north of the runway will be 1.06km. This will become the 1.06km runway

available for take-off and landing. The displaced threshold lights will be moved from displaced threshold "A" to displaced threshold "B".

Phase IV of Stage IV: The runway will be extended by approximately ten (10) meters to the south to make possible the junction between the taxiway and the runway enlarged from 30.5 to 45.7 m. The first 457 m to the south of the runway will be resurfaced. During that phase the Contractor will work without any air traffic constraints in terms of landing and take-off but aircraft will taxi from the 1.06km runway to the north to the apron to the south. The runway 01 threshold will be displaced by914m. The runway (LDA) distance available will be 1.06km. This 1.06km runway will be open 24 hours a day during that phase of the project. The runway can be reopened to its full length at anytime providing a 2-hour prior notice, mainly for the jet ambulance.

Phase V of Stage IV: The second 457m to the south of the runway will be resurfaced. After the completion of that phase, the runway will be resurfaced and extended to 1.98km by 45.7m with the new lighting system in place.

General note: It is not possible at this time to identify at what phase of the project the new lighting system will be installed and completed taking into account the extension and enlargement of the runway. A close coordination between the Airport Operator and *(the Civil Aviation Authority)* shall be exercised for the issuance of NOTAM, voice advisories etc. A close coordination will also be required between the *(name of the owner of the project)*, the Contractor and the *(name of the aerodrome operator)*.

2.2 Circulation of Construction Vehicles

During construction, the Contractor's vehicles and equipment will access the airside via the existing aerodrome access road from the (specify location). (See plans **??????)**.

2.3 Identification of Construction Vehicles

All Contractor's vehicles that will be operated on the aircraft movement areas (runway, taxiway and apron) of the *(name of the aerodrome)* aerodrome will be equipped with a rotating warning light that must be turned on while a vehicle is on these areas. If equipped with headlights, these must also be turned on at all times on airside.

The rotating warning lights shall be mounted on the vehicle in a location that will permit the beam to be seen by aircraft or surface traffic from any position within 360°. The light beam shall be set at an angle of 60° above the horizontal and it shall rotate at a constant speed of 35 RPM.

The enclosing globe of the warning light shall be “aviation yellow” for all vehicles.

2.4 Escort

Every vehicle or person entering the taxiway and runway must be escorted.

The escort is under the responsibility of the (Aerodrome Operator). The persons doing the escort are all holding a “Restricted Radio Operator Certificate”. The tasks are as follows:

1) During ATS[4] working hours. During these hours the “escort” will be on the airside on a continuous basis. This person (escort) will be the only one to communicate with the ATS. The “escort” will be responsible to advise the Contractor’s employees to clear the runway and to resume operations on the runway.

   The Contractor shall designate a representative to contact and to be contacted by the person doing the escort.

   The ATS published working hours are as follows:
   - The ATS published hours will be the same as the Contractor’s working hours.

2) Outside ATS working hours and in this case the Contractor working hours as well, the runway will be closed.

The Contractor and his employees must instantly observe orders given by the “escort”.

During the period that gravel will be hauled from one of the two quarries, one “escort” will be posted at the junction of the apron and the taxiway and the other “escort at the access point to the runway from one of the two quarries. The “escorts” will be in radio contact with the ATS and also in contact with each other by Walkie/Talkie. After having been advised by the ATS that an aircraft is about to land or take-off, they will stop all traffic heading for the taxiway or the runway until notified by the ATS that normal operations can resume. The same procedure will apply during the extension of runway 01-19 at the north end (19).

[4] Working hours will be the same as the Contractor’s working hours.

2.5 Runway Clearance (Emergency Procedure)

Should all other procedures in place fail, the following procedure will apply.

In all circumstances, the blinking on and off of runway lights is a warning signal for all vehicles to leave the runway immediately.

2.6 Inspection check before reopening runway

If for any reason the runway has to be closed or if trucks circulate on the runway, the *(name of the airport operator)* staff (airport maintainer) will inspect the manoeuvring areas (runway and taxiway) and will confirm to the ATS that these areas are clear and clean and can be re-open to air traffic. This procedure shall be completed at least ten (10) minutes before the aircraft Estimated Time of Arrival (ETA).

2.7 Airport Pass (security)

No aerodrome pass system is in place at the *(name)* Airport.

2.8 Markers

Markers to be used shall be the Contractor's responsibility.

2.9 Clearing Distance for Vehicles and Equipment

When works are executed near areas opened to aircraft operation, the Contractor must move his equipment and workers at least 45 meters from the runway centreline during all landings and take-offs. The observer/communicator will contact the "Escort" to communicate the information about the air traffic. The "escort" will advise the Contractor. The Contractor shall obey at once the orders given by the observer/communicator.

2.10 Pull-back areas

The runway will be cleared as indicated on the drawings **????????**. There are 2 pull-back areas: the blasting/crushing/stockpiling site and the taxiway.

2.11 Height of equipment (relative to runway and taxiway)

The height of the equipment park in the pull-back areas identified at 2.9 above shall not exceed 4 meters.

2.12 Surface compaction (highs and lows)

At the end of each working day and upon notification of an incoming (landing or taking-off) aircraft, the Contractor shall grade and compact the runway, taxiway and apron in such a manner that an aircraft can travel on those surfaces, as indicated by the

Engineer. During these times, the runway, taxiway and apron shall not have any significant highs or lows or granular wind-rows and the interface between the travelled portion of the runway and the area the Contractor is working on, shall have a longitudinal slope of less than ***1:30*** to ensure the safe movement of aircraft.

2.13 Declared Distances

The declared distances will be modified during stage II of the work. The width of the runway will be reduced to 22.9m during stage III of the work. The declared distances will be as follows:

TODA:	1.06km.
TORA:	1.06km.
ASDA:	1.06km.
LDA:	1.06km.

2.14 Contractor's vehicles parking area

At the end of each day, all construction equipment shall be parked in the Construction Yard located at one of the two blasting/crushing/stockpiling sites as shown on drawing **???????**. The zoning requirement, as described at **1.3???????** shall then be met.

2.15 Closing of Runway 01-19

The runway will be closed for certain period of the day during the time the runway is enlarged/resurfaced, a new runway lighting system is installed and the old system is removed. The runway will be opened during certain periods of the day to allow regular scheduled flights to land and take-off. At all other time, "Prior Permission Required" will apply (see NOTAM section **3.15????????**).

2.16 Aircraft Parking Space Shortage

The present surface of the aircraft parking area will be available at all times. More space will become available as the work progresses.

2.17 Displaced threshold

The threshold of runway 19 will be relocated, approximately 45.7m to the south of the present runway 1.52km. At another stage of the project the displaced threshold will be relocated at a distance of approximately 914m from threshold 01.

2.18 Passenger Control

The airlines will be responsible to direct passenger to and from the aircraft and to and from the air terminal building. The Contractor will make sure that his equipment does not interfere with passenger processing.

2.19 Dust Control

During the extension of the apron, **??????????**

2.20 Open Flame

No works with opened flame, no fire and no smoking are permitted on the apron.

2.21 Blasting

Blasting will be done approximately every second days during a two weeks period. See 3.15 for NOTAMs. The blasting area is located along the north-west section of the runway, north of the terminal building area. The blasts will be directed towards the north, thus not affecting the apron and the terminal building area.

2.22 Locating Existing Services

The Contractor shall take caution while working around existing services such as the runway lighting system etc.

2.23 Protection of Airfield Lighting System

As the work will take place close to the airfield lighting system, damages could be made to the system. The observer/communicator will turn the system on at the beginning and at the end of each working shift. He will also turn the system on every four (4) hours during each working shift. This will permit the identification of any break should it occur.

2.24 Aircraft Control of Aerodrome Light System (ARCAL) System

The ARCAL system will not be NOTAMed during the construction period and will remain operational.

2. Communication Plan

This communication plan includes the communications that will take place prior and during the realization of the construction project.

3.1 Communications before the construction

Traffic Analysis (type and frequency) vs. operation during construction

The schedule and the number of scheduled aircraft movements are as indicated in the following table:

Days	Period of the day	Number of movements
Monday		
Tuesday		

Wednesday		
Thursday		
Friday		
Saturday		
Sunday		

Aircraft types are mainly Dash-8, Beechcraft KingAir 100, Twin Otter and HS-748.

Report on meetings with operators and users

Formal meetings are as follows:

- November 2007: presentation of the project to the *(name of the Community)* Council.
- September 3rd, 2008, consultation meeting with the *(airlines, owner of the project and the airport operator)*
- Other presentations or consultation meetings??????????

The main users of the airport will be contacted on an individual basis in order to make them aware of the work that will be done at the *(name)* Airport during October/November 2008 and summer 2009. These users are *(name of the airlines).*

List of persons responsible for construction

For **the *(name of the airport operator)*** the person responsible for the project is:

Mr. *(name)*, Director, Transport Department *(telephone number and e-mail address)* or (*name, telephone number and e-mail address)*

- For **the *(owner of the project)*** the person responsible for the project is:

  (Name, telephone number and e-mail address).

- For **the Engineer**, the person responsible is:

To be determined.

- For the Contractor, the persons responsible is:

  To be determined.

Publications

No modification will be made to the aeronautical publications.

NOTAM's

NOTAMs: NOTAMs shall be issued as follows:

- Proposed NOTAM text, Stage II as follows:

  **"CY*XX* *(name of the airport)*
  CY*XX* RWY 01/19 CLSD. RWY AVBL 2 HRS PPR (819) 338 3343 0000/0000 DLY. O/T (819) 964-2816 TIL APRX 0000000000"**.

- Proposed NOTAM text, Stages II as follows:

  - Zoning penetrations caused by equipment or any other items, if any.

    NOTAM text will be submitted if and when required.

- NOTAM for blasting activity, proposed text to be published 24 hours prior to any blasting :

  - **CY*XX* *(name of the airport)***
    BLASTING 0.5 NM RADIUS AT AD SFC TO 1000 FT AGL. MONDAY FROM ?????? TO ??????.

3.2 Communications during construction

During the construction period, communications will be done through project meetings and daily contacts between the Engineer, the ATS, the airport maintainers and the Contractor.

Planning of project meetings

The Engineer will organise project meetings in determining the date and time. He will also be responsible for establishing and distributing the minutes of these meetings.

Issuance of communiqués

Written directives will be issued by the Engineer to the Contractor if the question requires immediate attention that cannot wait for the next project meeting.

3. Construction Safety

This section deals with the access control, escort for vehicles, FOD control, stocking material on the airside.

4.1 The access control

At the beginning of each working shift, including resuming works after any breaks, the Contractor's vehicles will be authorised to proceed on the runway by the "escort". No Contractor's vehicles shall proceed on the movement area (runway, taxiway and apron) without being escorted by a *(aerodrome operator)* employee identified as the "escort" and in communication with the ATS from whom he will get permission to proceed on the movement area.

4.2 Escort for vehicles

Vehicle escort will be done under the (name of the aerodrome operator) responsibility.

4.3 FOD control

The Contractor shall clean runways, taxiways and apron used by the contractor vehicles. Cleaning must be done on a continuous basis for area used by aircraft and on a daily basis for the other areas. The movement areas will be inspected by the *(airport operator's name)* employees (airport maintainer) after each blasting activity.

The Contractor shall keep the construction site clean and free of debris and waste.

The Contractor shall evacuate from the construction site, any debris and waste construction materials at regularly scheduled times or to eliminate them in accordance with the Engineer directives. No waste material shall be burned on the construction site.

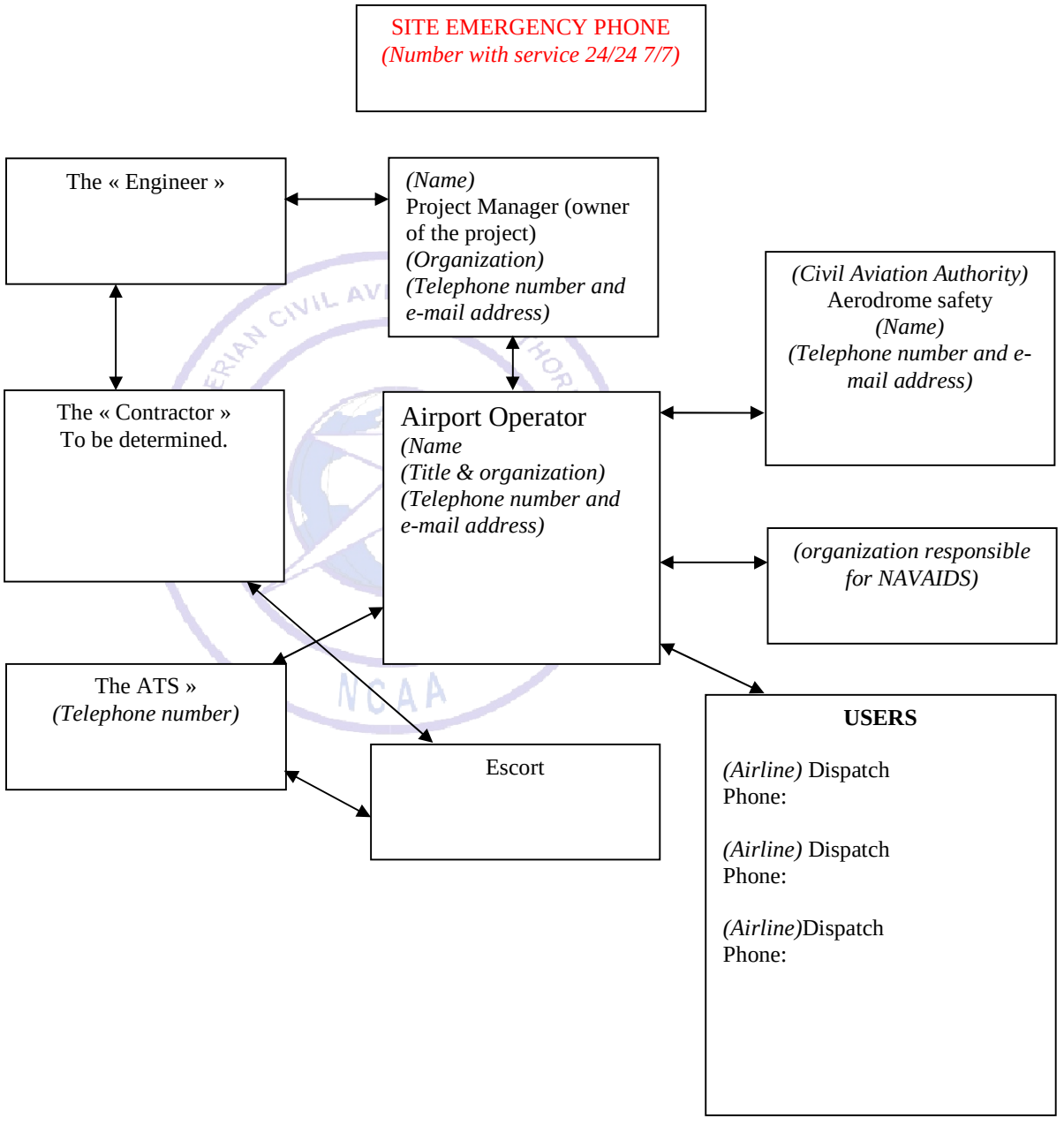
4.4 Stocking of construction material on the airside

No material should be stocked on the airside. Crushed gravel is stocked outside the construction site. It will be transported on site on time for their utilisation. The stockpiling areas are identified on drawing **???????** .

4.5 Construction Plans Approval

Construction plans for this project have been prepared and approved by the *(name of the owner of the project).*

4. COMMUNICATION CHART



5. APPROVAL OF PLAN OF CONSTRUCTION OPERATIONS

Project:	**Runway and Apron Expansion.**
Aerodrome name:	***(name of the aerodrome)***
Aerodrome Operator & Certificate Holder:	***(name of the aerodrome operator)***
Aerodrome Manager:	***(name, title, organisation)***
Certificate number:	***(self-explanatory)***
Date of issue:	***(self-explanatory)***

I undertake to meet the obligations set out in this plan of construction; and I hereby certify that the information in this plan is complete and accurate and no relevant information has been omitted.

_____ _____

Date (yy-mm-dd) **Signature of Aerodrome Operator/Certificate Holder**

This Method of Work Plan Manual is approved

_____ _____

Date (yy-mm-dd) **Signature for Civil Aviation Authority**

Appendix 2 — Works safety officer functions

The functions of the works safety officer should be to:

- Ensure the safety of aircraft operations in accordance with these directions and the MOWP;
- Ensure that, where applicable, the aerodrome works are notified by issue of a NOTAM and that the text of the NOTAM is as set out in the applicable MOWP;
- Where applicable, daily advise the aerodrome air traffic service of whatever information is necessary for the safety of aircraft operations;
- Discuss daily with the project manager any matters necessary for the safety of aircraft operations;
- Ensure that unserviceable portions of the movement area, temporary obstructions, and the limits of the works area are correctly marked and lit in accordance with the applicable MOWP;
- Ensure that vehicles, plant and equipment carrying out aerodrome works are properly marked and lit or are under works safety officer supervision or within properly marked and lit work areas;
- Ensure that all other requirements in the MOWP relating to vehicles, plant and equipment and materials are complied with;
- Ensure that access routes to work areas are in accordance with the applicable MOWP, are clearly identified and that access is restricted to those routes;
- Ensure that excavation is carried out in accordance with the MOWP to avoid damage to any utility or transport service, or loss of calibration associated with a precision approach and landing system or any other navigational aid;
- Report immediately, to the aerodrome air traffic service unit and the aerodrome operator, any incident, or damage to facilities, likely to affect air traffic services or the safety of aircraft;
- Remain on duty at the works area while work is in progress and the aerodrome is open to aircraft operations;

- Ensure that the aerodrome air traffic service unit is kept informed of the radio call signs of the vehicles used by the works safety officer;
- Require the immediate removal of vehicles, plant and personnel from the movement area where necessary for the safety of aircraft operations;
- Ensure that the movement area is safe for normal aircraft operations following removal of personnel, vehicles, plant, equipment, and rubbish, from the works area;
- Ensure that floodlighting or any other lighting required in carrying out aerodrome works is shielded so as not to present a glare to pilots.

Appendix 3 — Procedures for dealing with temporary hazards on or adjacent to aerodrome movement areas

A3-1 Introduction

1.1 The term temporary hazards include work in progress adjacent to aerodrome movement areas in connection with aerodrome construction and maintenance. It also includes the plant, machinery, and material arising from such work, or aircraft immobilised near runways.

1.2 The following guidelines should be adapted to the needs of a particular project and not incorporated verbatim into project specifications.

1.3 The prime responsibility for determining the degree of hazard and the extent of acceptable obstacles rests with the aerodrome operator, who should take into account the following:

(1) Available runway length and the associated obstacle limitation surfaces.

(2) Types of aircraft using the aerodrome and distribution of aircraft movements.

(3) Whether or not alternative runways are available.

(4) The possibility of cross-wind operations, bearing in mind seasonal variations.

(5) The weather conditions likely to prevail at the time, such as visibility and precipitation. The latter is significant as it adversely affects the braking coefficient of the runway, and thus an aircraft's controllability during ground run.

(6) The possibility of a compromise between a reduction in runway length and some degree of obstacle infringement in the established take-off climb and approach surface.

1.4 Significant obstacles in the take-off flight path area and any reduction in the runway effective operational lengths must be promulgated by NOTAM.

1.5 All temporary hazards should be marked and lit as specified in NCAA Aerodrome Standards Manual.

A3-2 Work zones

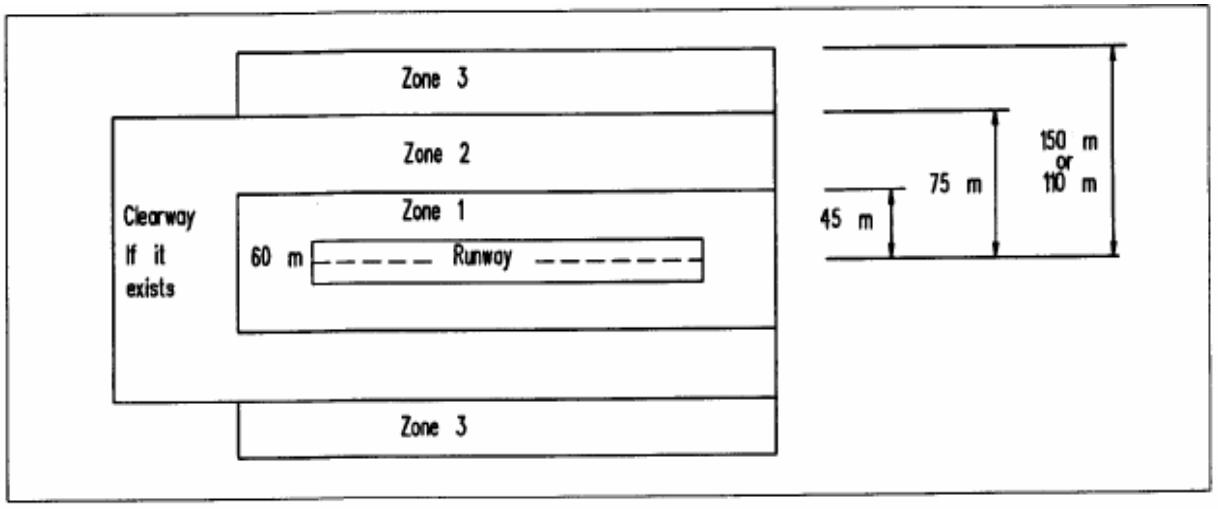


Figure 1: Zones surrounding a runway

2.1 General. The following zones are established around runways, when use of the runway is permitted to continue whilst works are carried out. Outside the zones no restrictions need be applied other than maintaining the normally required obstacle free surfaces.

2.2 Zone 1. This zone is rectangular. It symmetrically surrounds the runway. Its sides are 45 m from the runway centreline and its ends 60 m beyond the runway ends.

2.3 Zone 2. The ends coincide with the ends of Zone 1, except that where there is a clearway the end is extended to include it. The sides are 75 m from the runway centreline.

2.4.1 Zone 3. This zone is only required at aerodromes having a runway strip wider than 150 m. It extends to the edge of the runway strip, that is 110 m or 150 m from the runway centreline where appropriate.

A3-3 Control of personnel, equipment and vehicles

Work on runways or runway strips

3.1 The following procedures should be observed when the runway is in use.

[The distances stipulated are intended to emphasise common sense awareness of safety for aircraft. For example, the distance from a taxiway (see paragraph 3.6 below) may vary for a Boeing 747 having a wingspan of 60 m or a commuter aircraft with a wingspan of 25 m]

3.1.1 All drivers and works personnel should be briefed on what is expected of them and what the procedures are.

3.1.2 Vehicles carrying gravel should not be permitted on runways or taxiways without prior permission, and anything dropped should be immediately swept up.

3.1.3 Vehicles should be suitably marked or lit. Refer to NCAA Aerodrome Standards Manual.

3.1.4 ATS should advise pilots on approach, or before take-off, that at a particular location personnel will be working within the runway strip area. This is in addition to normal NOTAM action.

3.2 Zone 1. Personnel and light-weight frangible equipment used in the calibration of landing aids may be left in position clear of any aircraft movements.

3.3 Vehicles, equipment, and personnel, engaged in the work, should be moved off the runway and—

(1) For turbojet movements, to the outer edge, or clear of, Zone 2.

(2) For other aircraft movements, to the outer edge, or clear of, Zone 1.

3.4 Zone 2. All equipment and personnel should be at the outer edge, or clear of Zone 2 except that when the crosswind is less than 10 kt, work may continue without interruption during the movement of aircraft other than turbojets.

3.5 Zone 3. The only consideration in this zone is to identify whether the presence of work equipment and vehicles could interfere with the integrity of the electronic approach aids. If such an area is identified, equipment and vehicles should be cleared from the area when the electronic approach aids are being used by an approaching aircraft.

Work on taxiway or taxiway strips

3.6 When the taxiway is in use, vehicles, equipment, and personnel should be moved to give a wingtip clearance of at least 10 m.

Work on approach lighting area

3.7 The procedures for work in Zones 1 and 2 detailed in the previous paragraphs are equally applicable to any work in those areas.

3.8 For work outside the zones, vehicles and equipment should not intrude above the plane of the approach lights. If any equipment does it should be withdrawn when the runway is in use, unless the runway threshold has been displaced to allow for its height.

A3-4 Trenching work

4.1 Zone 1. Work should be limited to one side of the runway at a time, and excavation of any trench should be limited as follows:

Day operations

4.1.1 A trench may be open with a maximum width of 300 mm but the open area of the trench should not exceed 9m^2, for example 300 mm x 30 m or 200 mm x 45 m.

4.1.2 When the trench lies almost parallel with a runway, or is within 10 degrees either side of runway alignment, a second trench at right angles to, and extending from the first trench to Zone 2, may be open to a maximum width of 200 mm.

4.1.3 During aircraft movements any open trenches within 10 m of the runway edge should be covered with load bearing steel plates. They should be adequately held on the ground and marked by securely fixed cones at a maximum spacing of 6 m. The plate covering should exceed the dimensions of the excavation by a minimum of 150 mm on all sides. If this cannot be done the runway should be closed.

Night Operations

4.1.4 Any trench should be backfilled and consolidated before ceasing work for the day. A maximum length of 3 m may be left unfilled but covered overnight as provided in paragraph 4.1.3 above and marked with red obstruction lights.

4.1.5 Any materials not associated directly with the work in progress should be removed from the zone during the period of aircraft operations.

4.1.6 Spoil removed from a trench should be located on the side away from the runway and the maximum height should not exceed 200 mm. For trenches at right angles to the runway centre line the spoil should be placed on the side remote from the nearest landing threshold. If it is necessary to place the spoil on both sides of the trench the maximum height should not exceed 200 mm.

At Runway Ends

4.1.7 Any trench across the end of the runway should not exceed 300 mm in width. During daylight hours only, a maximum length of 3 m may be left unfilled during an aircraft movement but should be covered with load bearing steel plates adequately held on the ground and marked by securely fixed cones at a maximum spacing of 6 m. The plate covering should exceed the dimensions of the excavation by a minimum of 150 mm on all sides. If this cannot be done then the runway should be closed.

4.1.8 Spoil removed from a threshold trench should be moved to a point at least 10 m clear of the runway or a displaced landing threshold should be declared by NOTAM and marked.

4.1.9 Zone 2. For a Code Number 4 runway which is dry with not more than 15 kt crosswind component, or for other runways with 10 kt crosswind components, the excavation of trenches in this zone should be limited to:

(1) A trench parallel to the runway may be open with a maximum width of 300 mm and a length not exceeding 100 m; or

(2) Two trenches at right angles to the runway may be open with a maximum width of 300 mm and a total length of 100 m provided that the trenches are at the same end and same side of the runway. Spoil removed from a trench should be located on the side away from the runway, its maximum height should not exceed approximately 500 mm. For trenches at right angles to the runway centreline, the spoil should be located on the side remote from the closer landing threshold and the maximum height should not exceed approximately 300 mm. If it is necessary to place the spoil on both sides of the trench then the maximum height should not exceed approximately 300 mm.

A3-5 Work on rapid exit or normal taxiways

5.1 Work on or close to any taxiways, should conform to the requirements relating to the zone in which that part of the taxiway lies.

5.2 Where practicable, until work is complete, the taxiway should be closed to aircraft movements and pilots advised by radio and NOTAM.

5.3 If it is not practicable to close the taxiway while work is being carried out, pilots should be advised by NOTAM and radio to reduce taxiing to walking speeds within 50 m of the works.

5.4 The work should be carried out as follows:

Day Operations

5.4.1 A trench, with a maximum width of 300 mm, may be open on one side only to the edge of the taxiway, and the open area of the trench should not exceed 9 m^2, for example 300 mm x 30 m or 200 mm x 45 m.

5.4.2 If trenching is required on both sides of the taxiway, the trench on one side should be covered with load bearing steel plates which are adequately held on the ground and marked by securely fixed cones at a maximum spacing of 6 m. Where the trench is at right angles to the taxiway and its width is 300 mm or less, the trenches on both sides of the taxiway can remain open. The plate covering should exceed the dimensions of the excavation by a minimum of 150 mm on all sides.

Night Operations

5.4.3 Any trench should be backfilled and consolidated before ceasing work for the day except that a maximum length of 3 m can be left unfilled and covered overnight as provided in paragraph 5.4.2 above, and marked with red obstruction lights.

5.4.4 Any materials not associated directly with the work in progress should be removed from the taxiway strip area during the period of aircraft operations.

5.4.5 Spoil removed from a trench in Zone 1 should be located on the side away from the runway and the maximum height should not exceed 200 mm. For trenches at right angles to the taxiway centre line, the spoil should be placed on the side furthest away from the nearest landing threshold. If it is necessary

to place the spoil on both sides of the trench, the maximum height should not exceed 200 mm.

A3-6 Work on visual approach slope systems

VASIS or PAPI may be deactivated during some aircraft operations, however:

(a) For all international arrivals, the normally available VASIS or PAPI should be provided; and

(b) For domestic operations by turbojet aircraft, one side of a VASIS or PAPI or T-VASIS should be provided.

A3-7 Installation of light bases

7.1 VASIS and PAPI

7.1.1 The trenching work limitations in Zones 1 and 2 are equally applicable to these works.

Zone 1

Day operations

7.1.2 Only one base excavation should be open at any one time, having a maximum area of 9 m^2.

7.1.3 If the work is within 10 m of the runway edge then the concrete should be cast on the day that the excavation is made, and covered with steel plates until it can withstand an aircraft running over it. A cover-plate should then be placed and bolted in position. A further excavation may then be made.

7.1.4 Spoil within 10 m of the runway edge should be removed. Spoil beyond this distance should be placed on the side away from the runway to a maximum height not exceeding 200 mm.

Night operations

7.1.5 Any excavation should be backfilled and consolidated before ceasing work for the day except that a maximum excavation area of 3 m^2 may be left unfilled but covered overnight as in 7.1.3 above and marked with red obstruction lights.

7.1.6 Any materials not associated directly with the work in progress should be removed from the strip area during period of aircraft movements.

7.1.7 Spoil removed from an excavation in Zone 1 should be located on the side away from the runway and the height should not exceed 200 mm. If it is necessary to place spoil on both sides, or at the ends of the excavation, the maximum height should not exceed 200 mm.

Zone 2

7.1.8 Only one base excavation should be open at any one time, having a maximum area of 9 m^2.

7.1.9 Spoil removed from the excavation should be placed on the side away from the runway, to a height not exceeding 500 mm. If it is necessary to place spoil on both sides, or at the ends of the excavation, the maximum height should not exceed 300 mm.

A3-8 Work on runway lights

8.1 Excavations for not more than two bases should be made at any one time. During aircraft movements, any holes within 10 m of the runway edge should be covered by load-bearing steel plates which are adequately held on the ground and marked by securely fixed cone markers spaced at intervals of 6 m. The plate covering should exceed the dimensions of the excavations by 150 mm on all sides.

8.2 Concrete should be cast on the day that the excavation is made, and covered with steel plates until it can withstand an aircraft running over it. A cover plate should then be placed and bolted in position. A further excavation may then be made.

A3-9 Crashed or immobilised aircraft

9.1 **Zone 1**. The runway should be closed when any part of a crashed or immobilised aircraft is in Zone 1.

9.2 **Zone 2**. The runway may be in use during daylight hours in visual flight rule weather conditions provided the runway is dry and the crosswind does not exceed 10 kt.

9.3 The runway should be closed to all movements at night and in instrument flight rule weather conditions.

9.4 If the clearway is infringed by an obstruction, then the new runway declared distance will need to be calculated using the appropriate obstacle free gradient over the immobilised aircraft.

9.5 **Zone 3**. Instrument approaches should be limited to non-precision approach minima.

Reduction of Effective Operating Lengths

9.6 If the runway strip area infringement is such that a shortened runway can be used, then a new runway declared distance will need to be calculated.

9.7 The runway declared distance which can be declared will depend on the location of the immobilised aircraft within the runway strip area and the residual portion of the runway that can be considered available.

9.8 Consideration should be given to the type and size of aircraft which would use the remaining runway, for example, a crashed aircraft 100 m from the end of a 3000 m runway could leave an adequate operational length for many aircraft.

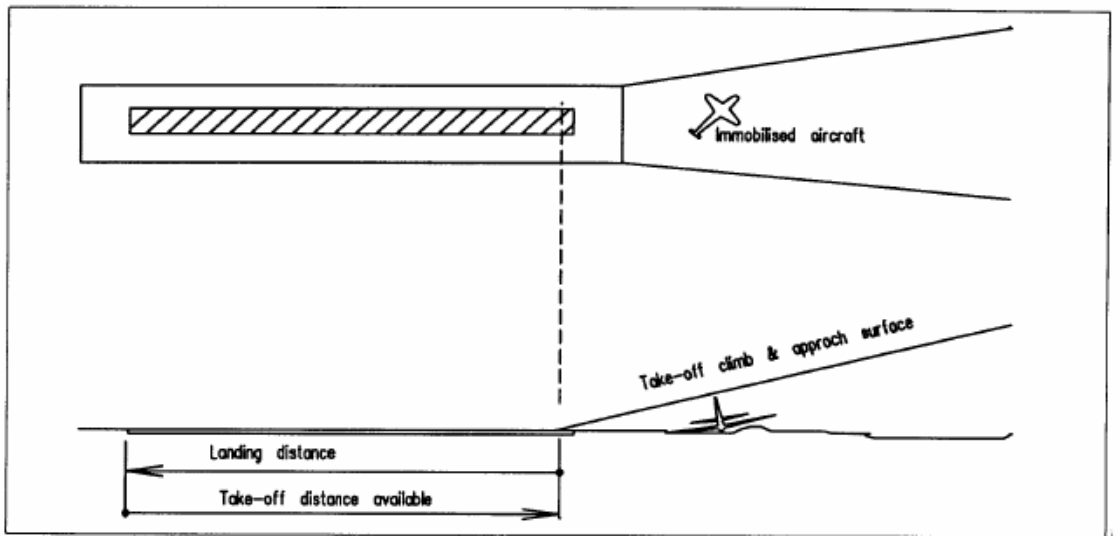


Figure 2: Immobilised aircraft off the end of the runway

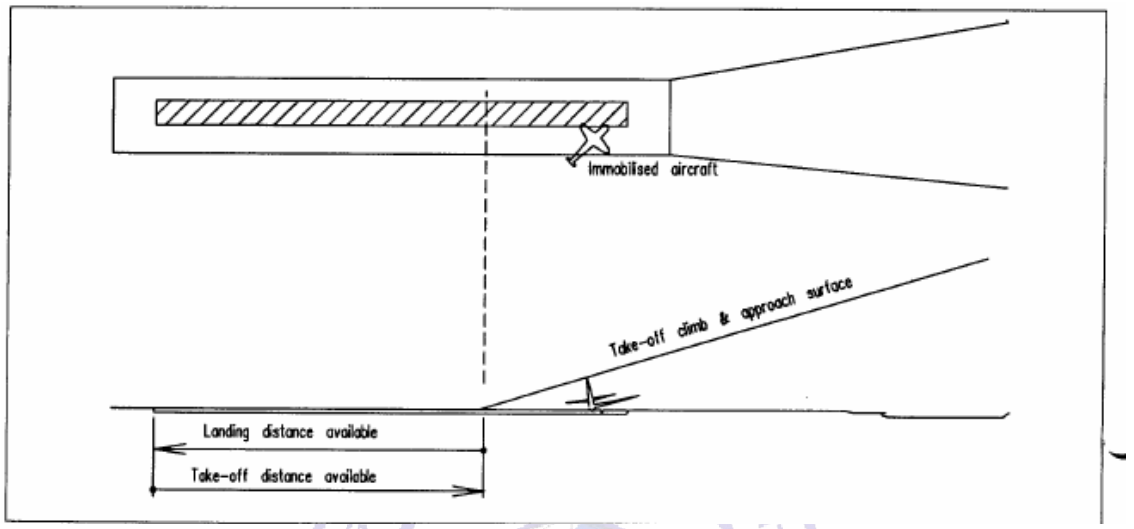


Figure 3: Immobilised aircraft in the strip

A3-10 Grass mowing in runway strip areas

10.1 **General**. Mowing should be done in the upwind half of the runway strip. When the swaths nearest the runway are being cut, the mowing circuit should be towards the aircraft landing or taking off so that the driver can see the moving aircraft.

10.2 **Zone 1.** Mowing should not take place in zone 1 when the runway is in use unless the mower operator is under the direct supervision of a safety officer or aerodrome air traffic control.

10.3 **Zone 2.** Mowing may be carried out in daylight hours during the operation of aircraft, provided that the crosswind component does not exceed 10 kt and the runway is dry.

10.4 For movements by larger aircraft or when the crosswind is greater than 10 kt or the runway is wet, the mower should move to the outer edge, or clear, of the zone.

10.5 Mowing in the area beyond the approach end of the runway should not be permitted during aircraft landings.

10.6 Mowing in the area beyond the take-off end of the runway should not be permitted during aircraft take-offs.

Dr. H.O.Demuren

Director General